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LECITHIN ORGANOGEL-BASED SYSTEM FOR TOPICAL APPLICATION OF KETOROLAC TROMETHAMINE

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LECITHIN ORGANOGEL - BASED SYSTEM FOR TOPICAL APPLICATION OF KETOROLAC TROMETHAMINE

BY

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ABSTRACT

Among various nonsteroidal anti-inflammatory drugs (NSAIDs), ketorolac tromethamine has been widely used for post operative and emergency treatment of pain. However, it accompanies adverse side effects including gastrointestinal irritation when administered orally. Topical administration of ketorolac offers the advantage of enhanced drug delivery to the affected sites with a reduced incidence of gastrointestinal side effects. However, as skin is an exceptionally effective barrier to most chemicals, very few drugs can permeate it in amounts sufficient to deliver a therapeutic dose. Therefore, systems that make the skin locally more permeable and thereby enable transdermal delivery are of great interest. Lecithin organogels are an example of such systems in which solutions of lecithin in organic solvents can be transformed into transparent gels by addition of a critical amount of water. The main objective of this study was to investigate lecithin organogels as carriers for topical application of ketorolac tromethamine. In this research, phase studies were carried out to obtain the concentration of components for the existence range of organogel and the effect of these additives on release rate of ketorolac was also evaluated through the artificial membranes and guinea pig skin. As the lecithin concentration was increased from 40 to 50 and then 60% w/w in formulations, a significant decrease in ketorolac release was obtained. A significant increase in drug release was also observed in formulations containing 6.5% w/w of ketorolac compared to those containing 1% w/w of the drug. Increasing the water content of the organogels also resulted in an increase in ketorolac release. The optimum formulation of the organogel composed of 40% lecithin, 60% IPM containing 0.6% w/w of water and 6.5% w/w of ketorolac tromethamine showed the highest drug release rate. Moreover, the viscosity of the different formulations and their rheological behavior were also determined. All formulations showed a slight rheopexy behavior rheogram. It was found that increase in lecithin concentration resulted in an increase in the viscosity of the organogel. Overall, the results have suggested that ketorolac tromethamine could be incorporated with high concentrations into lecithin organogels which makes them interesting for use as a drug delivery vehicle for water soluble drugs.

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1.1 Microemulsions

1.1.2 Definition of Microemulsions

The microemulsion concept was introduced as early as the 1940s by Hoar and Schulman who generated a clear single-phase solution by titrating a milky emulsion with hexanol. However, the microemulsion definition proposed by Danielsson and Lindman in 1981 who stated a microemulsion as "a system of water, oil and amphiphile which is a single phase optically isotropic and thermodynamically stable liquid solution."

1.1.3 Emulsion versus Microemulsion

Recognizing the differences between an emulsion and a microemulsion is important. The major differences between the two are shown in Table 1 (Tenjarla, 1999). The transparency of microemulsions arises from their small droplet diameter, typically less than 140 nm. Such small droplets produce only weak scattering of visible light when compared with that from the droplets (1-10 μm) of emulsions. The interfacial tension in a microemulsion is very low compared to that in an emulsion. This low interfacial tension leads to the spontaneous formation of the microemulsion, the small droplet size of the dispersed phase, and the thermodynamic stability of the microemulsion system. From the pharmaceutical manufacturing viewpoint, a microemulsion is very attractive compared with an emulsion. For an emulsion, several factors have to be considered when scaling up an optimum formulation to a manufacturing batch. These include scale-up equipment, compositional changes,

TABLE 1. COMPARISON OF EMULSIONS AND MICROEMULSIONS (Tenjarla, 1999)

Property	Emulsion	Microemulsion
Droplet size of dispersed phase	Typically 0.2 μm- 10 μm	< 0.2 μm
Appearance	Turbid to milky	Transparent to translucent
Formulation	Input of external energy required	Spontaneous; no energy required
Stability	Thermodynamically unstable	Thermodynamically stable

duration of mixing, emulsification time, temperature, order of adding the excipients, heating and cooling rates. Because of spontaneous formation of microemulsions with only mild agitation, many of these factors are avoided in case of their preparation (Tenjarla, 1999; Attwood, 1994).

1.1.4 Structure of Microemulsions

A microemulsion can be one of the three types: (1) oil-in-water (o/w), in which water is the continuos phase; (2) water-in-oil (w/o), in which oil is the continuos phase; and (3) bicontinous, in which approximately equal volumes of water and oil exist (Figure 1, Tenjarla, 1999). The surfactant and the phase volume ratio dictate the type of microemulsion formed. Generally, o/w microemulsions are formed in the presence of a small amount of oil, and w/o microemulsions are formed in the presence of a small amount of water. It is generally accepted that surfactants with low hydrophilic lipophilic balance (HLB) [3-6] are favored for the formation of w/o microemulsions whereas surfactants with high HLBs [8-18] are preferred for the formation of o/w microemulsion systems (Lawrence et al. 2000). HLB indicates the surface activity of a species based on its molecular constitution. The simplest presentation of the structure of microemulsions is the droplet model in which microemulsion droplets are surrounded by an interfacial monolayer consisting of both surfactant and cosurfactant molecules. The orientation of the amphiphiles at the interface will, of course, differ in o/w and w/o microemulsions. As shown in Figure 1, the hydrophobic portions of these molecules will reside in the dispersed oil droplets of

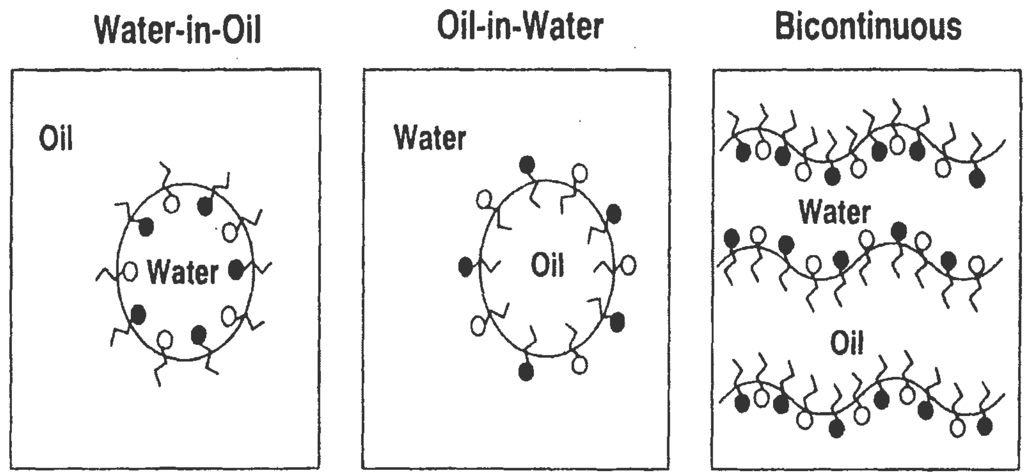


FIGURE 1. STRUCTURE OF MICROEMULSIONS
(Tenjarla, 1999)

o/w systems, with the hydrophilic groups protruding in the continuos phase, while the opposite situation will be true of w/o microemulsions.

1.1.5 Stability of Microemulsions

Since microemulsions have a very large interface between oil and water because of the small droplet size, they can be only thermodynamically stable if the interfacial tension is so low that the positive interfacial energy can be compensated by the negative free energy of mixing. The role of surfactant in the system is thus to reduce the interfacial tension between oil and water. It is generally not possible to obtain this low interfacial tension with a single surfactant; the required low interfacial tension is achieved by adding a second surfactant, called a cosurfactant. Typical cosurfactants are short or long-chain alcohols, glycol, or polyglycerol derivatives (Attwood, 1994).

When a surfactant is added to a mixture of two immiscible phases, its molecules migrate to the interface, which results in lowering of the interfacial tension. When the surfactant occupies the entire interface between the immiscible liquids, adding more surfactant results in micelle formation, and there is no further decrease in the interfacial tension. Under these conditions, adding a second surfactant will further reduce the interfacial tension, resulting in a thermodynamically stable microemulsion. The surfactant preferably should exhibit low solubility in the aqueous and nonaqueous phases of the microemulsion and should be adsorbed at the water-oil interface. The cosurfactant is also amphiphilic with an affinity for both the oil and aqueous phases and partitions into the surfactant interfacial monolayer present at the oil-water interface. In most cases, single-chain surfactants alone are unable to reduce the oil-water interfacial tension sufficiently to enable a microemulsion to form. A number of double chain surfactants and a few of nonionic surfactant such as bis (2-ethylhexyl) sodium fosuccinate (AOT) and lecithin are able to form microemulsions without the aid of cosurfactants (Lawrence et al., 2000; Bhatnagar et al., 1994).

1.2 Preparation of Microemulsions

1.2.1 Pseudo-ternary Phase Diagram

Generally, a pseudo-ternary phase diagram is constructed to determine the composition of polar, nonpolar, and surfactant phases that will yield a microemulsion. For simplicity, the microemulsion is assumed a three-component system: water, oil, and a surfactant mixture. Any combination of these three components can be plotted as a percent on pseudo-ternary phase diagram (Tenjarla, 1999). Following is the rules relating to triangular pseudo-ternary phase diagrams:

1. Each corner of the triangle represents 100% of one of the components.
2. The points on the three lines joining the corner points represent two component systems of the three possible combinations.
3. Any line drawn through the apex points to a point on the opposite side will have a constant ratio of two of the components.
4. Any point on a line parallel to a side of the triangle has a constant proportion of one of the three components.
5. Any point inside the triangle represents all possible combinations of each component.

1.2.2 Determination of the Existence of a Microemulsion Region

The existence of a microemulsion region can be determined as follows:

1. Prepare a mixture of oil and surfactant blend at a predetermined ratio.
2. Slowly titrate the oil-surfactant mixture with the aqueous phase with continuos mixing. After each addition of the aqueous phase, observe the resulting system for clarity, viscosity, and stability.
3. Upon adding the aqueous phase, the system will clear (beginning of the microemulsion region), on continued titration with the aqueous phase, the system will become cloudy (end of the microemulsion region). The percent of the oil, surfactant, and the aqueous phase at the beginning and end of the microemulsion region are noted.
4. Repeat the whole procedure with a different oil-surfactant mixture ratio. Again, the percentages of the three components are determined at the beginning and end of the microemulsion region.
5. The various points at which the microemulsion regions form and end are connected on a pseudo-ternary phase diagram. The area enclosed by lines connecting the points represents the microemulsion region of the system (Attwood, 1994).

1.3 Choice of Microemulsion Components

Different types of aqueous and nonaqueous solvents and surfactants can be used to prepare a microemulsion formulation. A few examples are listed below:

- Nonaqueous phase: Vegetable oils, synthetic oils, triglycerides, esters of fatty acids and so forth.
- Aqueous phase: Water, sodium chloride solution, buffers and so forth, or a combination of these.
- Surfactant: Ionic and nonionic surfactants, lecithin, and polyglycerol fatty acid esters.
- Cosurfactant: Alcohols, derivatives of glycols polyglycerols or propylene glycols.

1.4 Pharmaceutical Microemulsions

The selection of components for microemulsions suitable for pharmaceutical use involves a consideration of their toxicity and, if the systems are to be used topically, their irritancy and sensitizing properties. Importantly, in some cases nonionic surfactants are able to form microemulsions without the need for cosurfactant. This is helpful as it reduces the complexity of the phase behavior, and eliminates the requirement for inclusion of medium chain alcohols, since these cosurfactants have a poor toxicity profile and their evaporation can destabilize the system (Lawrence et al., 2000). Furthermore, the insensitivity of nonionic microemulsions to pH and ionic strength changes represents an added benefit. Although many nonionic surfactants have suitable properties for topical administration, their potential use in microemulsions use for oral or parenteral administration is very limited (Attwood, 1994). However, one of the problems associated with the use of microemulsions for topical drug delivery is the difficulty of applying these vehicles to the skin because of their fluidity.

1.4.1 Lecithin as a Surfactant

Lecithin, a nontoxic, naturally occurring biological surfactant, is a major component of membrane lipid. When administered in optimum amounts, it does not have a toxicity and sensitivity problems associated with most other surfactants. Hence, it is the ideal surfactant choice for preparing pharmaceutically acceptable microemulsions (Attwood, 1994). The characteristic solution properties of lecithin are:

- Strong hydrophobicity resulting from the two long hydrocarbon chains
- Strong hydrophilicity because of the zwitterionic polar head groups that are strongly hydrated and have dipole moments
- Good balance between hydrophilic and lipophilic properties, with slight partiality to a lipophilic site

1.5 Lecithin Organogels

The first description of the lecithin organogels was given by Scartazzini and Luici in 1988. They found that an addition of trace amounts of water into nonequeous solutions of lecithin caused an abrupt rise in the viscosity, producing a transition of the initial nonviscous solution into a jelly-like state.

1.5.1 Lecithin Organogel Components

Lecithin is a trivial name for 1, 2-diacyl-sn-3-phophocholine. Its structural formula is shown in Figure 2 (Shchipunov, 2001). It belongs to a biologically essential class of substances termed phosphoglycerides or phospholipids. They form the lipid matrix of biological membranes and play a key role in the cellular metabolism. As a

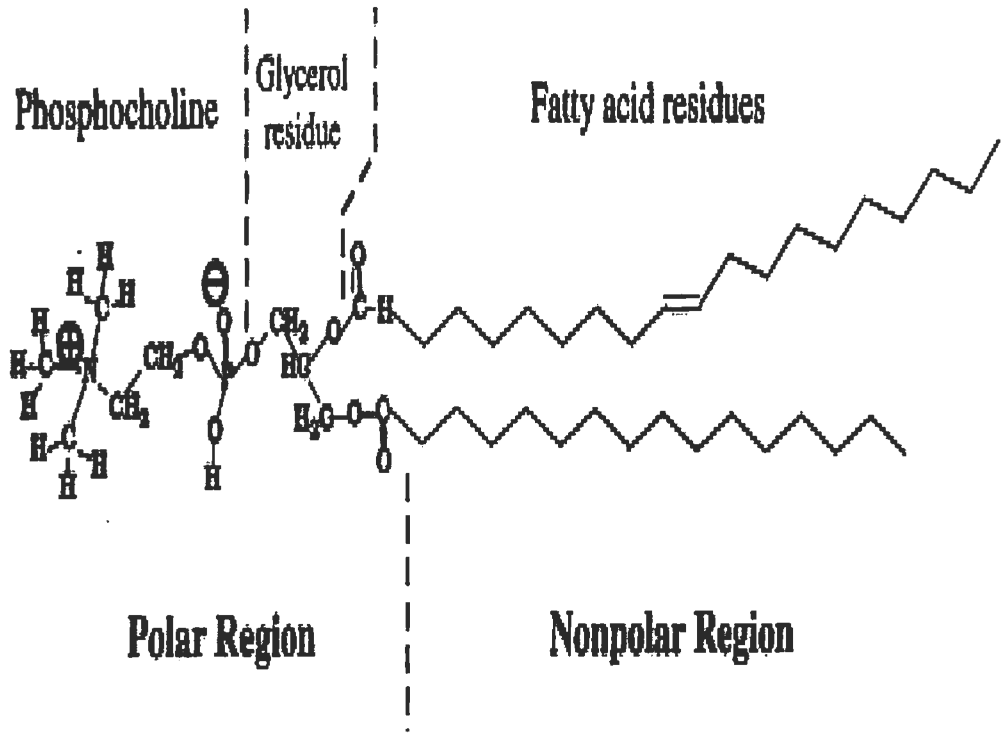


FIGURE 2. STRUCTURAL FORMULA OF LECITHIN. ITS MOLECULES INCLUDE RESIDUES OF CHOLINE, PHOSPHORIC ACID, GLYCEROL AND TWO FATTY ACIDS (Shchipunov, 2001)

biocompatible surfactant, it is widely used in every day life, including human and animal food, medicine, cosmetics and manifold industrial application.

The second component is an organic solvent, in which lecithin is capable of forming the organogel. Organic solvents could be linear, branched and cyclic alkanes, ethers and esters, fatty acids and amines.

The third component crucial for the organogel formation is water. This polar solvent is added in trace or small amounts that depend on the organic media. Water can be substituted for polar organic substances as glycerol, ethylene glycol and formamide (Shchipunov, 1995).

1.6 Structure of Organogels

Gels are an intermediate state of the matter, containing both solid and liquid components. The solid component comprises a three dimensional network of interconnected molecules which immobilizes the liquid continuous phase. Hydrogels have an aqueous continuous phase, and organogels have an organic solvent as the liquid continuos medium. Gels may also be classified based on the nature of the bonds involved in the three-dimensional solid network. Chemical gels arise when strong covalent bonds hold the network together, and physical gels when hydrogen bonds and electrostatic and van der waals interactions maintain the network.

Interest in the physical organogel field has increased with the discovery and synthesis of a number of substances able to gel organic solvents. Examples of such organogelators include, D-homosteroidal nitroxide (SNO), bis (2-ethylhexyl) sodium fosuccinate (AOT), lecithin, 2,3-bis-n-decyloxyanthracene (DDOA), and some azobenzene cholesterol derivatives. These organogels exhibit interesting properties such as the ability to solublize guest molecules, uses for purification and separation purposes and as transdermal delivery vehicles (Murdan et al., 1999).

1.6.1 Molecular Model of Organogels

The initially spherical reverse micelles that are formed by lecithin molecules in a nonpolar organic solution transform into cylindrical ones, once water has been added. This was established with the help of light scattering and small angle neutron scattering techniques by Luisi and Schurtenberger in 1990. This one-dimensional growth of micelles is caused by the formation of hydrogen bonds between water molecules and phosphate groups of lecithin molecules so that two adjusting lecithin molecules are bridged together by one water molecule. IR and NMR spectroscopies showed that water molecules could interact simultaneously with phosphate groups of neighboring lipid molecules via hydrogen bonding, acting as a bridge between them (Shchipunov et al., 1995). In this case, solvent molecules and lecithin phosphate groups can arrange in such a way that a hydrogen-bonding network will be formed. A possible arrangement is schematically shown in Figure 3 (Shchipunov et al., 1995). The increase of water amount results in the formation of long tubular and flexible micelles. These so-called polymer-like, wormlike or spaghetti-like micelles can be entangled and therefore build up a transient three-dimensional network that is responsible for the viscoelastic properties of the lecithin organogels. Figure 4 represents the structure of lecithin reverse micelles as a function of added water (Hinze et al., 1996). At the critical concentration of water, the network shrinks and the

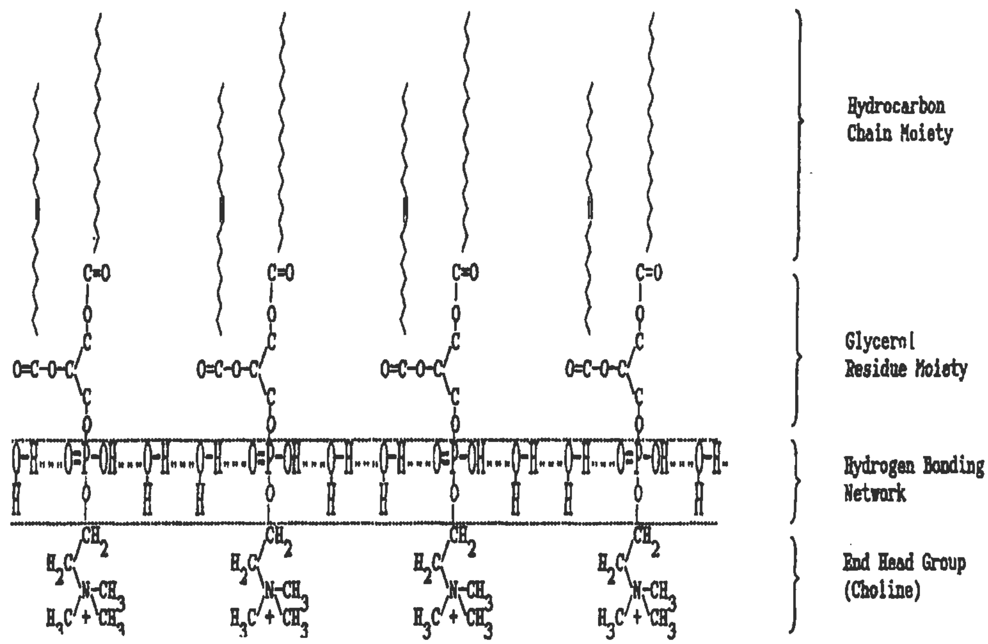


FIGURE 3. A TWO DIMENSIONA SCHEMATIC REPRESENTATION OF THE HYDROGEN BONDING NETWORK FORMED IN THE LECITHIN TUBULAR MICELLES (Shchipunov et al., 1995)

phase separation occurs. At still higher concentrations of water, a transformation to a solid, nontransparent precipitate can be observed. This diluted solution is composed of rod-like micelles which their length is not enough to overlap and form a three-dimensional network.

It was shown by IR spectroscopic studies that following addition of water to the lecithin solution about three first water molecules are attached to a phosphate group through hydrogen bonds (Shchiponuve, 2001). At this molar ratio, water molecules begin coming to the carbonyl groups. They interact with each other, also forming hydrogen bonds. With increasing further the solvent amount, water molecules are found adjacent to a choline group. At this point the solvent molecules do not interact strongly with lecithin ester groups (Schurtenberger et al., 1990).

A series of polar solvents have been studied to determine how their nature influences the formation of jelly-like hydrogen binding network in lecithin solutions. It has been established (Shchipunov et al., 1995) that glycerol, formamide and ethylene glycol, in addition to water, have the ability to induce organogel formation in the following order: glycerol> water> formamide> ethylene glycol. These polar solvents tend to be located in the most polar moiety of lecithin near the phosphate group. It has been inferred from the results that the organogel formation is sensitive to the structure of polar solvents, and in turn it should be sensitive to their physico-chemical properties.

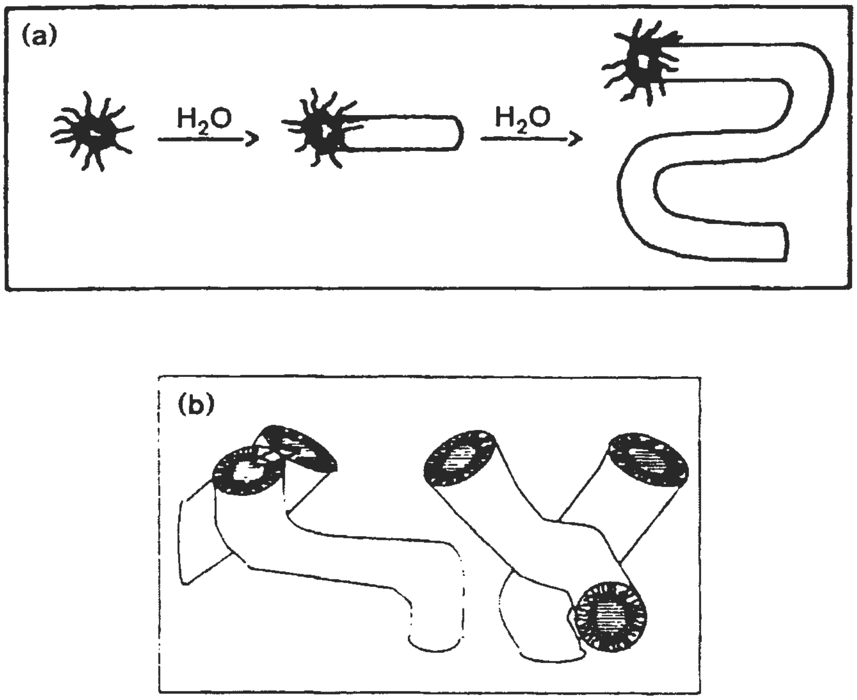


FIGURE 4. STRUCTURE OF LECITHIN REVERSE MICELLES AS A FUNCTION OF ADDED WATER. (a) ADDITION OF WATER INDUCES THE ONE-DIMENSIONAL GROWTH OF THE REVERSE MICELLES INTO LONG AND FLEXIBLE CYLINDRICAL MICELLES. (b) THE OVERLAP OF THESE CYLINDRICAL MICELLES TRANSFORMS THE ORIGINAL ORGANIC MEDIUM INTO A VISCOELASTIC GEL PHASE (Hinze et al., 1996)

1.6.2 Rheological Properties of Organogels

The transition from a low-viscous nonaqueous lecithin solution demonstrating Newtonian behavior to a jelly-like one with Maxwell rheology is caused by the addition of small amounts of polar additives. The transition can be clearly seen by a sharp increase in viscosity if a certain concentration of polar additive has been added (Shchipunov et al., 1999). Further addition of the polar additive results in a maximum of viscosity at a certain concentration. Thereafter a separation of the homogenous organogel into a two-phase system consisting of a low viscous fluid and a compact organogel occurs at a critical concentration. In other words, the viscosity depends on the molecular weight or the micellar length (Kantaria et al., 1999; Bhatnagar et al., 1994).

1.7 Application of Lecithin Organogels

Organogels have received a great attention in recent years for various applications, including topical application of drugs. Several mechanisms have been proposed to explain the advantages of organogels for the transdermal delivery of drugs. First, a large amount of drug can be incorporated in the formulation due to the high solubilizing capacity. Second, the permeation rate of the drug from the organogel may be increased, since the affinity of a drug to the internal phase in organogel can be easily modified to favor partitioning into stratum corneum, using different internal phase, changing its portion in organogel or adjusting its property. Third, the surfactant and organic solvent in the organogel may reduce the diffusional barrier of the stratum corneum by acting as permeation enhancers (Rhee et al., 2001).

The existence of microdomains of different polarity within the same single-phase solution enables both water-soluble and oil-soluble drugs to be solublised. The likely preferred sites of incorporation of a lipophilic, water-insoluble drug into an o/w microemulsion organogel are the disperse oil phase and/or hydrophobic tail region of the surfactant molecule, while a water-soluble drug would be most likely to be incorporated into the dispersed aqueous phase of a water-in-oil droplet (Trotta et al., 1997).

Use of w/o microemulsion organogel for oral or parenteral drug delivery is complicated by the fact that they are destabilized to a much greater extent when diluted by an aqueous phase. This is due to the increase in the volume fraction of the aqueous phase which increases the ratio of water to surfactant leading to droplet growth and eventually percolation (Attwood, 1994).

1.7.1 Topical Application of Drugs

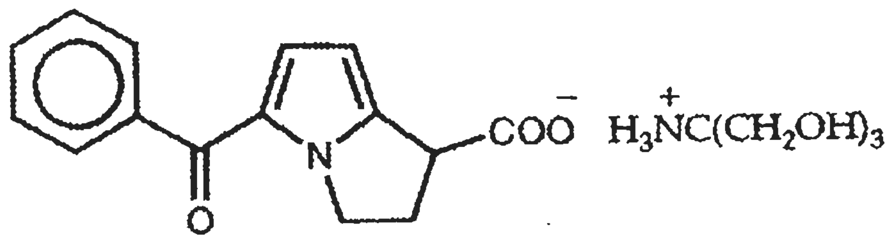
Skin has become the subject of much study in the pharmaceutical field because of its role as a route of topical application (Dreher et al., 1996). Recent developments in transdermal drug delivery systems have been extensively studied as drug delivery methods showing promising topical efficacy. However, the stratum corneum in skin provides an effective impermeable barrier to the pecutaneous penetration of topically applied substances. In order to extend the range of drugs which can be administered via the skin and to enhance the effects of locally acting drugs, it is necessary to include penetration enhancers in formulations (Yokomizo, 1996). Generally speaking, since penetration enhancers cause skin problems such as erythema and are mitogenic stimulators there is a need for enhancers which do not stimulate and which are safe for skin. Phospholipids such as lecithin are a kind of penetration enhancers that directly influence the lipid bilayer of the cell membrane in the stratum corneum. They slightly disorganize the structure of the skin, and thus, permit the permeation of drugs. It is possible that this disorganization is due to interaction between these lipids and the phospholipids of the skin.

1.7.2 Drug Release from Organogels

The release rate of drugs in general from organogel systems depends on the drug partition coefficient, drug solubility in the oil and aqueous phases, dispersed droplet size, phase volume ratio, viscosity and specific drug-excipient interaction. Small droplet size speeds up the drug release and has superior shelf stability (Cordero et al., 1997; Rhee et al., 2001). Delivery of a drug from an organogel is also directly proportional to the concentration of the drug. The intensity of drug partitioning into stratum corneum depends mainly on the lipophilicity of the drug used. Usually, the drug from the external phase is released on the surface of the membrane. Following this, drug from the internal phase partitions into the external phase to maintain the equilibrium. Therefore, there are different partitioning processes occurring: between the internal and external phases of the organogel, and between either the internal or the external phase of the organogel and the skin. Drug transport may be controlled by any of these processes, and the thermodynamic driving force for release will reflect the relative activities of the drug in the different phases (Delgado-Charro et al., 1997).

1.8 Ketorolac Tromethamine

Ketorolac Tromethamine (KT), a potent nonsteroidal anti-inflammatory drug is practically used for the postoperative and emergency treatment of pain. Figure 5 represents the chemical structure of KT (Quadir et al., 2000). However, it has side effects including GI irritation when administered orally. One promising method is to administer the drug via the skin. Novel prepared lecithin organogels incorporated with ketorolac are promising candidate for new drug delivery systems. The objective of this work was to develop a topical formulation of KT. In this study, the in vitro release of KT from various lecithin organogels was evaluated. Furthermore, the effect of lecithin concentration, water content in the vehicle and the viscosity change on the release profile of KT through synthetic membranes and guinea pig skin was examined.



Ketorolac tromethamine

FIGURE 5. CHEMICAL STRUCTURE OF KETOROLAC TROMETHAMINE (Quadir et al., 2000)

2. MATERRIALS AND METHODS

2.1 Materials and Equipments

Materials

Soybean Lecithin, Epikuron 200

Lucas Mayer, Germany

Isopropyl Myristate, Lot # R36354G14

Ruger Chemical Co. Inc., Irvington, NJ 07111

Ketorolac Tromethamine, Lot # 6626

Lemmon Company, Sellesville, PA 18960

Acetonitrile, Cat # 998-4

Fisher Scientific, Fair Lawn, NJ 07410

O- Phosphoric Acid 85%, Lot # 920830

Fisher Scientific, Fair Lawn, NJ 07410

Methanol, Cat # 452- 4

Fisher Scientific, Fair Lawn, NJ 07410

Sodium Chloride, Lot # 974188

Fisher Scientific, Fair Lawn, NJ 07410

Sodium Phosphate Dibasic, Lot # 912230

Fisher Scientific, Fair Lawn, NJ 07410

Potassium Phosphate Monobasic, Lot # 912104

Fisher Scientific, Fair Lawn, NJ 07410

Cellulose Acetate Membrane, MWCO 3,500, Lot # 13371

Spectrum Laboratories Inc., CA

Silicon Elastomer Sheeting, Thickness 0.005″, Lot # SM030454

Advanced Biotechnologies Inc., Silverdale, WA 98383

IAF/HA-HO Guinea Pig Skin

Charles River Laboratories, MA, 01887

Hamilton Syringe

Waters, Milford, MA 01757

Magnetic Stir Bars, 12mm × 4mm

Fisher Scientific, Fair Lawn, NJ 07410

Equipments

Mettler Analytical Balance, AE240 Dual range Balance

Electronic Laboratory Equipment, Kansas City, MI

Magnetic Stirrer

Fisher Scientific, Fair Lawn, NJ 07410

Mirak Digital Stirrer

pH Meter, Model IQ-240

Scientific Instruments Inc., San Diego, CA 92127

Vertical Franz Diffusion Cells

0.9 cm ID, 5.1 ml Volume

Diode Array Spectrophotometer, Model 8451A

Hewlett Packard, Wilmington, DE

HPLC Pump, Model 515

Waters, Milford, MA

UV Detector, Model 480

Waters, Milford, MA

Data Module, Model 746

Waters, Milford, MA

717 Plus- Autosampler

Waters, Milford, MA

Automated Gradient Controller

Waters, Milford, MA

Ultrasonic Generator, Model FS110

Fisher Scientific, Fair Lawn, NJ 07410

Thelco Oven

Precision Scientific Co., Chicago, IL

Cylindrical Viscometer, Model DV-I, Spindle #3 LV

Brookfield Engineering Laboratories, MA 02346

Cone/Plate Viscometer, Model DV-III, Cone Spindle CP-52

Brookfield Engineering Laboratories, MA 02346

2.2 METHODS

2.2.1 Preparation of Organogels

Lecithin solutions were prepared by first dissolving lecithin in the organic solvent [Isopropyl Myristate (IPM)], with aid of a magnetic stirrer and then while still stirring, the necessary amount of water was added to obtain a clear gel (Williman et al., 1992). Some of the obtained solutions were clear, others were cloudy, but the latter also became clear after addition of a minimal amount of water. The formation of the gels, after the addition of the water by a micropipette syringe, took place within 30 seconds. The drug-containing gels were prepared by dissolving KT into the water, and then adding the aqueous solution of KT into the mixture of lecithin/ IPM.

2.2.2 New Method of Preparation

In this method, the drug-containing gels were prepared by first dissolving KT into the solution of lecithin in organic solvent and then adding water to induce gelation. To facilitate the dissolution and obtain a homogenous mixture of dissolved components, the mixtures were heated for a very short time with constant stirring until solubilisation of the drug was completed. The dissolution was performed by means of a magnetic stirrer. Agitation was then stopped and the samples allowed to cool and set to a gel at room temperature. Formulations gave clear, homogenous, nonbirefringent gels.

2.2.3 Construction of Phase Diagram and Formulation of Ketorolac Organogels

Samples containing different ratio of lecithin/ IPM [(10:90), (20:80), (30:70), (40:60), (50:50), and (60:40)% w/w] were prepared. Phase studies were carried out by adding solutions of ketorolac or pure water to the mixtures of lecithin/ IPM or lecithin/ IPM/ KT while stirring. After each addition of 5 μl of aqueous phase containing various percentages of KT concentration [2.5, 5, 10, 50% w/v] (in case of old preparation) or pure water (in case of new preparation) to the lecithin solutions, the resulting systems for clarity and viscosity were observed. Then, the percentages of the three components were determined at the beginning and end of the organogel region. Initially, upon adding the aqueous phase, the mixture was cloudy. On continued addition, the system cleared, which indicates the beginning of the organogel region. Upon the continued addition of the aqueous phase, the system eventually will become turbid again, indicating the end of the organogel region. The various points at which the organogel region forms and ends will be connected on a pseudo-ternary phase diagram. The area enclosed by lines connecting the points will represent the organogel region of the system. Based on these results, appropriate concentration ranges of components were used in the preparation of organogels containing ketorolac. The detailed composition of different preparations is given in Tables 2, 3, 4, 5, 6 and 7.

TABLE 2. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.05	0.45	0.005	0.505	10	90	1
1	0.05	0.45	0.01	0.51	10	90	2
1	0.05	0.45	0.015	0.515	10	90	3
2	0.075	0.425	0.005	0.505	15	85	1
2	0.075	0.425	0.01	0.51	15	85	2
2	0.075	0.425	0.015	0.515	15	85	3
3	0.1	0.4	0.005	0.505	20	80	1
3	0.1	0.4	0.01	0.51	20	80	2
3	0.1	0.4	0.015	0.515	20	80	3
3	0.1	0.4	0.02	0.52	20	80	4
4	0.125	0.375	0.005	0.505	25	75	1
4	0.125	0.375	0.01	0.51	25	75	2
4	0.125	0.375	0.015	0.515	25	75	3
4	0.125	0.375	0.02	0.52	25	75	4
4	0.125	0.375	0.025	0.525	25	75	5
5	0.15	0.35	0.005	0.505	30	70	1
5	0.15	0.35	0.01	0.51	30	70	2
5	0.15	0.35	0.015	0.515	30	70	3
5	0.15	0.35	0.02	0.52	30	70	4
5	0.15	0.35	0.025	0.525	30	70	5
6	0.172	0.325	0.005	0.505	35	65	1
6	0.172	0.325	0.01	0.51	35	65	2
6	0.172	0.325	0.015	0.515	35	65	3
6	0.172	0.325	0.02	0.52	35	65	4
6	0.172	0.325	0.025	0.525	35	65	5
6	0.172	0.325	0.03	0.53	35	65	6
7	0.2	0.3	0.005	0.505	40	60	1
7	0.2	0.3	0.01	0.51	40	60	2
7	0.2	0.3	0.015	0.515	40	60	3
7	0.2	0.3	0.02	0.52	40	60	4
7	0.2	0.3	0.025	0.525	40	60	5
7	0.2	0.3	0.03	0.53	40	60	6
8	0.225	0.275	0.005	0.505	45	55	1
8	0.225	0.275	0.01	0.51	45	55	2
8	0.225	0.275	0.015	0.515	45	55	3
8	0.225	0.275	0.02	0.52	45	55	4
8	0.225	0.275	0.025	0.525	45	55	5
8	0.225	0.275	0.03	0.53	45	55	6
8	0.225	0.275	0.035	0.535	45	55	6.5

TABLE 2. CONT'D.

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
9	0.25	0.25	0.005	0.505	50	50	1
9	0.25	0.25	0.01	0.51	50	50	2
9	0.25	0.25	0.015	0.515	50	50	3
9	0.25	0.25	0.02	0.52	50	50	4
9	0.25	0.25	0.025	0.525	50	50	5
9	0.25	0.25	0.03	0.53	50	50	6
9	0.25	0.25	0.035	0.535	50	50	6.5
10	0.275	0.225	0.005	0.505	55	45	1
10	0.275	0.225	0.01	0.51	55	45	2
10	0.275	0.225	0.015	0.515	55	45	3
10	0.275	0.225	0.02	0.52	55	45	4
10	0.275	0.225	0.025	0.525	55	45	5
10	0.275	0.225	0.03	0.53	55	45	6
10	0.275	0.225	0.035	0.535	55	45	6.5
10	0.275	0.225	0.04	0.54	55	45	7
11	0.3	0.2	0.005	0.505	60	40	1
11	0.3	0.2	0.01	0.51	60	40	2
11	0.3	0.2	0.015	0.515	60	40	3
11	0.3	0.2	0.02	0.52	60	40	4
11	0.3	0.2	0.025	0.525	60	40	5
11	0.3	0.2	0.03	0.53	60	40	6
11	0.3	0.2	0.035	0.535	60	40	6.5
11	0.3	0.2	0.04	0.54	60	40	7

TABLE 3. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER (CONTAINING 2.5% W/V KT) USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.05	0.45	0.005	0.505	10	90	1
1	0.05	0.45	0.01	0.51	10	90	2
2	0.075	0.425	0.005	0.505	15	85	1
2	0.075	0.425	0.01	0.51	15	85	2
3	0.1	0.4	0.005	0.505	20	80	1
3	0.1	0.4	0.01	0.51	20	80	2
3	0.1	0.4	0.015	0.515	20	80	3
4	0.125	0.375	0.005	0.505	25	75	1
4	0.125	0.375	0.01	0.51	25	75	2
4	0.125	0.375	0.015	0.515	25	75	3
4	0.125	0.375	0.02	0.52	25	75	4
5	0.15	0.35	0.005	0.505	30	70	1
5	0.15	0.35	0.01	0.51	30	70	2
5	0.15	0.35	0.015	0.515	30	70	3
5	0.15	0.35	0.02	0.52	30	70	4
6	0.172	0.325	0.005	0.505	35	65	1
6	0.172	0.325	0.01	0.51	35	65	2
6	0.172	0.325	0.015	0.515	35	65	3
6	0.172	0.325	0.02	0.52	35	65	4
6	0.172	0.325	0.025	0.525	35	65	5
7	0.2	0.3	0.005	0.505	40	60	1
7	0.2	0.3	0.01	0.51	40	60	2
7	0.2	0.3	0.015	0.515	40	60	3
7	0.2	0.3	0.02	0.52	40	60	4
7	0.2	0.3	0.025	0.525	40	60	5
7	0.2	0.3	0.03	0.53	40	60	6
7	0.2	0.3	0.035	0.535	40	60	6.5
8	0.225	0.275	0.005	0.505	45	55	1
8	0.225	0.275	0.01	0.51	45	55	2
8	0.225	0.275	0.015	0.515	45	55	3
8	0.225	0.275	0.02	0.52	45	55	4
8	0.225	0.275	0.025	0.525	45	55	5
8	0.225	0.275	0.03	0.53	45	55	6
8	0.225	0.275	0.035	0.535	45	55	6.5

TABLE 3. CONT'D.

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
9	0.25	0.25	0.005	0.505	50	50	1
9	0.25	0.25	0.01	0.51	50	50	2
9	0.25	0.25	0.015	0.515	50	50	3
9	0.25	0.25	0.02	0.52	50	50	4
9	0.25	0.25	0.025	0.525	50	50	5
9	0.25	0.25	0.03	0.53	50	50	6
9	0.25	0.25	0.035	0.535	50	50	6.5
9	0.25	0.25	0.04	0.54	50	50	7
10	0.275	0.225	0.005	0.505	55	45	1
10	0.275	0.225	0.01	0.51	55	45	2
10	0.275	0.225	0.015	0.515	55	45	3
10	0.275	0.225	0.02	0.52	55	45	4
10	0.275	0.225	0.025	0.525	55	45	5
10	0.275	0.225	0.03	0.53	55	45	6
10	0.275	0.225	0.035	0.535	55	45	6.5
10	0.275	0.225	0.04	0.54	55	45	7
10	0.275	0.225	0.045	0.545	55	45	8
11	0.3	0.2	0.005	0.505	60	40	1
11	0.3	0.2	0.01	0.51	60	40	2
11	0.3	0.2	0.015	0.515	60	40	3
11	0.3	0.2	0.02	0.52	60	40	4
11	0.3	0.2	0.025	0.525	60	40	5
11	0.3	0.2	0.03	0.53	60	40	6
11	0.3	0.2	0.035	0.535	60	40	6.5
11	0.3	0.2	0.04	0.54	60	40	7
11	0.3	0.2	0.045	0.545	60	40	8
11	0.3	0.2	0.05	0.55	60	40	9

TABLE 4. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER (CONTAINING 5% W/V KT) USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.05	0.45	0.005	0.505	10	90	1
1	0.05	0.45	0.01	0.51	10	90	2
2	0.075	0.425	0.005	0.505	15	85	1
2	0.075	0.425	0.01	0.51	15	85	2
2	0.075	0.425	0.015	0.515	15	85	3
3	0.1	0.4	0.005	0.505	20	80	1
3	0.1	0.4	0.01	0.51	20	80	2
3	0.1	0.4	0.015	0.515	20	80	3
4	0.125	0.375	0.005	0.505	25	75	1
4	0.125	0.375	0.01	0.51	25	75	2
4	0.125	0.375	0.015	0.515	25	75	3
5	0.15	0.35	0.005	0.505	30	70	1
5	0.15	0.35	0.01	0.51	30	70	2
5	0.15	0.35	0.015	0.515	30	70	3
5	0.15	0.35	0.02	0.52	30	70	4
6	0.172	0.325	0.005	0.505	35	65	1
6	0.172	0.325	0.01	0.51	35	65	2
6	0.172	0.325	0.015	0.515	35	65	3
6	0.172	0.325	0.02	0.52	35	65	4
7	0.2	0.3	0.005	0.505	40	60	1
7	0.2	0.3	0.01	0.51	40	60	2
7	0.2	0.3	0.015	0.515	40	60	3
7	0.2	0.3	0.02	0.52	40	60	4
7	0.2	0.3	0.025	0.525	40	60	5
8	0.225	0.275	0.005	0.505	45	55	1
8	0.225	0.275	0.01	0.51	45	55	2
8	0.225	0.275	0.015	0.515	45	55	3
8	0.225	0.275	0.02	0.52	45	55	4
8	0.225	0.275	0.025	0.525	45	55	5
9	0.25	0.25	0.005	0.505	50	50	1
9	0.25	0.25	0.01	0.51	50	50	2
9	0.25	0.25	0.015	0.515	50	50	3
9	0.25	0.25	0.02	0.52	50	50	4
9	0.25	0.25	0.025	0.525	50	50	5
9	0.25	0.25	0.03	0.53	50	50	6
9	0.25	0.25	0.035	0.535	50	50	6.5
9	0.25	0.25	0.04	0.54	50	50	7

TABLE 4. CONT'D.

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
10	0.275	0.225	0.005	0.505	55	45	1
10	0.275	0.225	0.01	0.51	55	45	2
10	0.275	0.225	0.015	0.515	55	45	3
10	0.275	0.225	0.02	0.52	55	45	4
10	0.275	0.225	0.025	0.525	55	45	5
10	0.275	0.225	0.03	0.53	55	45	6
10	0.275	0.225	0.035	0.535	55	45	6.5
10	0.275	0.225	0.04	0.54	55	45	7
10	0.275	0.225	0.045	0.545	55	45	8
11	0.3	0.2	0.005	0.505	60	40	1
11	0.3	0.2	0.01	0.51	60	40	2
11	0.3	0.2	0.015	0.515	60	40	3
11	0.3	0.2	0.02	0.52	60	40	4
11	0.3	0.2	0.025	0.525	60	40	5
11	0.3	0.2	0.03	0.53	60	40	6
11	0.3	0.2	0.035	0.535	60	40	6.5
11	0.3	0.2	0.04	0.54	60	40	7
11	0.3	0.2	0.045	0.545	60	40	8

TABLE 5. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER (CONTAINING 10% W/V KT) USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.05	0.45	0.005	0.505	10	90	1
1	0.05	0.45	0.01	0.51	10	90	2
2	0.075	0.425	0.005	0.505	15	85	1
2	0.075	0.425	0.01	0.51	15	85	2
2	0.075	0.425	0.015	0.515	15	85	3
3	0.1	0.4	0.005	0.505	20	80	1
3	0.1	0.4	0.01	0.51	20	80	2
3	0.1	0.4	0.015	0.515	20	80	3
4	0.125	0.375	0.005	0.505	25	75	1
4	0.125	0.375	0.01	0.51	25	75	2
4	0.125	0.375	0.015	0.515	25	75	3
4	0.125	0.375	0.02	0.52	25	75	4
5	0.15	0.35	0.005	0.505	30	70	1
5	0.15	0.35	0.01	0.51	30	70	2
5	0.15	0.35	0.015	0.515	30	70	3
5	0.15	0.35	0.02	0.52	30	70	4
6	0.172	0.325	0.005	0.505	35	65	1
6	0.172	0.325	0.01	0.51	35	65	2
6	0.172	0.325	0.015	0.515	35	65	3
6	0.172	0.325	0.02	0.52	35	65	4
6	0.172	0.325	0.025	0.525	35	65	5
7	0.2	0.3	0.005	0.505	40	60	1
7	0.2	0.3	0.01	0.51	40	60	2
7	0.2	0.3	0.015	0.515	40	60	3
7	0.2	0.3	0.02	0.52	40	60	4
7	0.2	0.3	0.025	0.525	40	60	5
7	0.2	0.3	0.03	0.53	40	60	6
7	0.2	0.3	0.035	0.535	40	60	6.5
8	0.225	0.275	0.005	0.505	45	55	1
8	0.225	0.275	0.01	0.51	45	55	2
8	0.225	0.275	0.015	0.515	45	55	3
8	0.225	0.275	0.02	0.52	45	55	4
8	0.225	0.275	0.025	0.525	45	55	5
8	0.225	0.275	0.03	0.53	45	55	6
8	0.225	0.275	0.035	0.535	45	55	6.5
9	0.25	0.25	0.005	0.505	50	50	1
9	0.25	0.25	0.01	0.51	50	50	2
9	0.25	0.25	0.015	0.515	50	50	3
9	0.25	0.25	0.02	0.52	50	50	4
9	0.25	0.25	0.025	0.525	50	50	5
9	0.25	0.25	0.03	0.53	50	50	6

TABLE 5. CONT'D.

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
9	0.25	0.25	0.035	0.535	50	50	6.5
9	0.25	0.25	0.04	0.54	50	50	7
10	0.275	0.225	0.005	0.505	55	45	1
10	0.275	0.225	0.01	0.51	55	45	2
10	0.275	0.225	0.015	0.515	55	45	3
10	0.275	0.225	0.02	0.52	55	45	4
10	0.275	0.225	0.025	0.525	55	45	5
10	0.275	0.225	0.03	0.53	55	45	6
10	0.275	0.225	0.035	0.535	55	45	6.5
10	0.275	0.225	0.04	0.54	55	45	7
11	0.3	0.2	0.005	0.505	60	40	1
11	0.3	0.2	0.01	0.51	60	40	2
11	0.3	0.2	0.015	0.515	60	40	3
11	0.3	0.2	0.02	0.52	60	40	4
11	0.3	0.2	0.025	0.525	60	40	5
11	0.3	0.2	0.03	0.53	60	40	6
11	0.3	0.2	0.035	0.535	60	40	6.5
11	0.3	0.2	0.04	0.54	60	40	7
11	0.3	0.2	0.045	0.545	60	40	8

TABLE 6. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER (CONTAINING 50% W/V KT) USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.05	0.45	0.005	0.505	10	90	1
1	0.05	0.45	0.01	0.51	10	90	2
1	0.05	0.45	0.015	0.515	10	90	3
2	0.075	0.425	0.005	0.505	15	85	1
2	0.075	0.425	0.01	0.51	15	85	2
2	0.075	0.425	0.015	0.515	15	85	3
3	0.1	0.4	0.005	0.505	20	80	1
3	0.1	0.4	0.01	0.51	20	80	2
3	0.1	0.4	0.015	0.515	20	80	3
4	0.125	0.375	0.005	0.505	25	75	1
4	0.125	0.375	0.01	0.51	25	75	2
4	0.125	0.375	0.015	0.515	25	75	3
5	0.15	0.35	0.005	0.505	30	70	1
5	0.15	0.35	0.01	0.51	30	70	2
5	0.15	0.35	0.015	0.515	30	70	3
5	0.15	0.35	0.02	0.52	30	70	4
6	0.172	0.325	0.005	0.505	35	65	1
6	0.172	0.325	0.01	0.51	35	65	2
6	0.172	0.325	0.015	0.515	35	65	3
6	0.172	0.325	0.02	0.52	35	65	4
7	0.2	0.3	0.005	0.505	40	60	1
7	0.2	0.3	0.01	0.51	40	60	2
7	0.2	0.3	0.015	0.515	40	60	3
7	0.2	0.3	0.02	0.52	40	60	4
8	0.225	0.275	0.005	0.505	45	55	1
8	0.225	0.275	0.01	0.51	45	55	2
8	0.225	0.275	0.015	0.515	45	55	3
8	0.225	0.275	0.02	0.52	45	55	4
9	0.25	0.25	0.005	0.505	50	50	1
9	0.25	0.25	0.01	0.51	50	50	2
9	0.25	0.25	0.015	0.515	50	50	3
9	0.25	0.25	0.02	0.52	50	50	4
10	0.275	0.225	0.005	0.505	55	45	1
10	0.275	0.225	0.01	0.51	55	45	2
10	0.275	0.225	0.015	0.515	55	45	3
10	0.275	0.225	0.02	0.52	55	45	4
11	0.3	0.2	0.005	0.505	60	40	1
11	0.3	0.2	0.01	0.51	60	40	2
11	0.3	0.2	0.015	0.515	60	40	3
11	0.3	0.2	0.02	0.52	60	40	4

TABLE 7. FORMULATIONS COMPOSED OF LECITHIN, IPM AND WATER CONTAINING 6.5% W/W KT USED FOR PHASE DIAGRAM

Sample Group	Lecithin (g)	IPM (g)	Water (ml)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)
1	0.4	0.6	0.005	1.075	40	60	0.46
1	0.4	0.6	0.01	1.08	40	60	0.93
1	0.4	0.6	0.015	1.085	40	60	1.4
1	0.4	0.6	0.02	1.09	40	60	1.8
2	0.5	0.5	0.005	1.075	50	50	0.46
2	0.5	0.5	0.01	1.08	50	50	0.93
2	0.5	0.5	0.015	1.085	50	50	1.4
2	0.5	0.5	0.02	1.09	50	50	1.8
3	0.6	0.4	0.005	1.075	60	40	0.46
3	0.6	0.4	0.01	1.08	60	40	0.93
3	0.6	0.4	0.015	1.085	60	40	1.4
3	0.6	0.4	0.02	1.09	60	40	1.8
3	0.6	0.4	0.025	1.095	60	40	2.3

2.2.4 Release/Permeation Studies

The release/permeation of ketorolac from the lecithin gel through various selected membranes was determined using vertical Franz-diffusion cells having a diameter of 9 mm and a volume of 5.1 ml. Permeation studies were performed using guinea pig skin, cellulose acetate and silicone elastomer as synthetic membranes. In these cells, the skin or artificial membrane was placed between the donor and receptor compartments of the cells with the dermal side in direct contact with the receptor medium. The effective area of membrane available for diffusion was 0.64 cm^2. In all experiments, a 0.3-gram amount of each formulation containing the drug was placed onto the membrane, and then covered with parafilm. The receptor compartment was filled with 5.1 ml of degassed phosphate buffer solution (pH 7.4). The cells were thermostated at 32 °C in an incubator, and the receptor solution was stirred with a magnetic stirrer at 200 rpm throughout the experiment. The receptor phase was withdrawn at various times (0.5, 1, 2, 4, ..., 12 h) for synthetic membranes and (0.5, 1, 2, 4, ..., 24 h) for guinea pig skin, and replaced with equal volumes of fresh phosphate buffer equilibrated to 32 °C. The concentration of the drug in each receptor solution was determined either using a spectrophotometer (in case of artificial membranes) or HPLC method (in case of guinea pig skin).

2.2.5 Release Data Analysis

The cumulative amount of ketorolac permeated through guinea pig skin or synthetic membranes was plotted as a function of time. The slope and intercept of the linear portion of the plot was derived by regression. The release rate ($\mu g/cm^2/h$) was calculated as the slope and the intercept on the X-axis was taken as the lag time (h). All release studies were the average of six individual cells.

2.2.6 Spectrophotometric and HPLC Analysis of Ketorolac

The amount of ketorolac released into the receptor medium was determined with either a spectrophotometric or HPLC method. For those samples analyzed by spectrophotometer, the UV detector was set at the specific absorbance wavelength (322 nm) for KT and concentrations were determined from a calibration curve obtained with known amounts of drug under identical analytical conditions.

An HPLC method was also utilized when guinea pig skin was used as a membrane for permeation studies. In this case, a C-18 column (3.9 mm i.d. × 300 mm) was eluted at 37 °C with a mobile phase consisting of acetonitrile-phosphoric acid solution (1.3 mM, pH 3.02) with a ratio of 34: 66 (v/v) at a flow rate of 1.5 ml/min and injection volume of 20 μl (Quadir et al., 2000). The retention time of ketorolac was 10 minutes and the detection wavelength was set at 322 nm. The concentration of KT was determined by comparing the absorbance of the unknown from a calibration curve. All operations were carried out at room temperature.

2.2.7 Spectrophotometric and HPLC Data Analysis

Two series of different concentrations, 8, 16, 24, 32, 40 μg/ml and 1, 5, 10, 15, 20, 25, 50 μg/ml of KT in phosphate buffer (pH 7.4) were prepared to construct the calibration curves. Solutions were analyzed using the standard spectrophotometric and HPLC methods respectively. The peak area of the drug versus known concentrations was plotted. Linear regression analysis of the peak areas gave a correlation coefficient of 0.9999 by spectrophotometry and 0.9997 by HPLC method. Data is tabulated in Tables 8, 9 and Figures 6, 7 respectively.

2.2.8 Preparation of Synthetic Membrane and Guinea Pig Skin

Cellulose acetate and silicone elastomer membranes soaked in distilled water for 24 h were used as artificial membranes. For guinea pig skin the whole skin was used as experimental skin.

2.2.9 Viscosity Measurements

The viscosity of the lecithin/ IPM/ water system depends on the amount of lecithin and added water into the organogel. An attempt was therefore made to observe the effect of added water and lecithin on the viscosity of the system. Viscosity of each sample was measured, using both cylindrical and cone & plate viscometers at a controlled temperature (25 °C).

2.2.10 Statistical Analysis

All the release experiments were repeated six times and their mean values with standard deviation are presented. A one-way ANOVA was used to test the statistical difference in the release profile between organogels of different compositions. The multiple comparisons within the formulations were also determined. Differences were assumed to be significant at $p < 0.05$.

TABLE 8. DATA FOR KT ABSORBANCE IN BUFFER SOLUTION AT DIFFERENT CONCENTRATION USING SPECTROPHOTOMETRIC METHOD

Sample	Conc.(ug/ml)	Mean Abs. (n = 3)	Std.Dev.
1	8	0.396	0.039
2	16	0.841	0.044
3	24	1.262	0.049
4	32	1.722	0.061
5	40	2.156	0.063

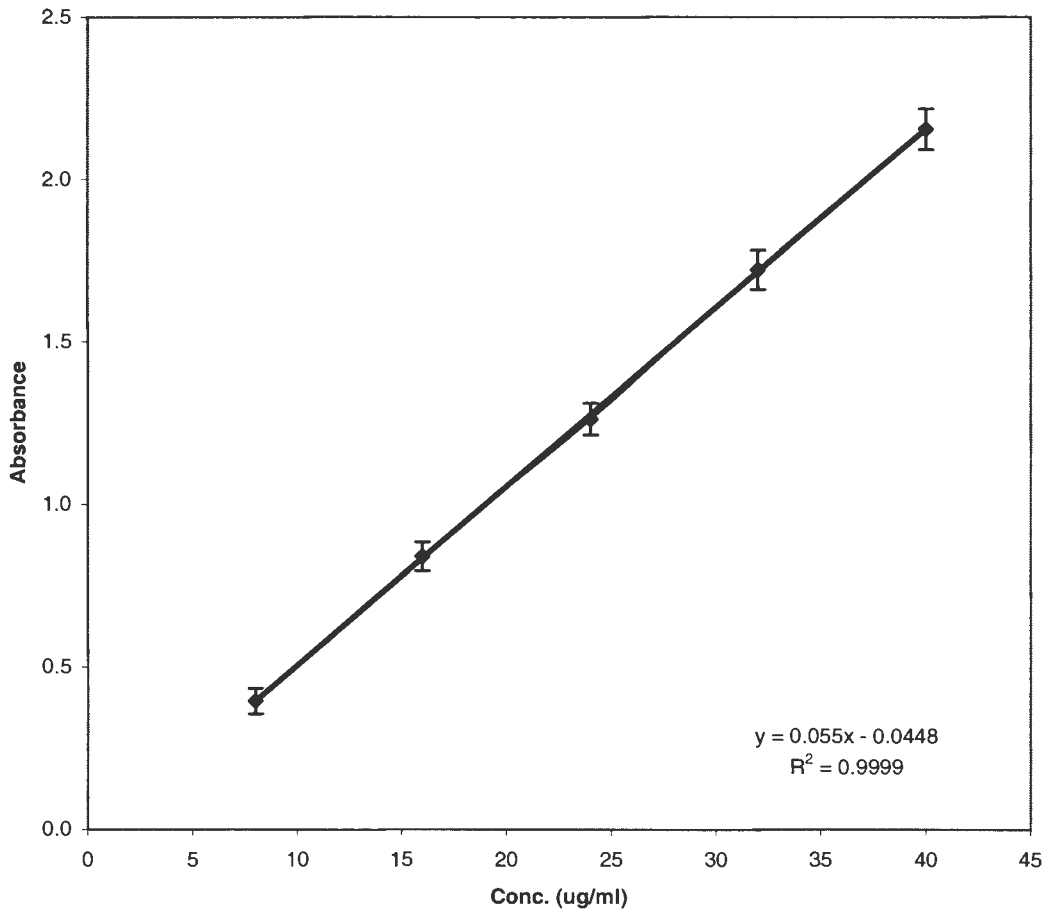


FIGURE 6. CALIBRATION CURVE FOR KETOROLAC TROMETHAMINE USING THE SPECTROPHOTOMETRIC METHOD (MEAN ± SD, N = 3)

TABLE 9. DATA FOR KETOROLAC ABSORBANCE IN BUFFER SOLUTION AT DIFFERENT CONCENTRATION USING HPLC METHOD

Sample	Concentration (ug/ml)	Area Under Peak
1	1	45416
2	5	245081
3	10	513500
4	15	718649
5	20	976095
6	25	1200978
7	50	2416148

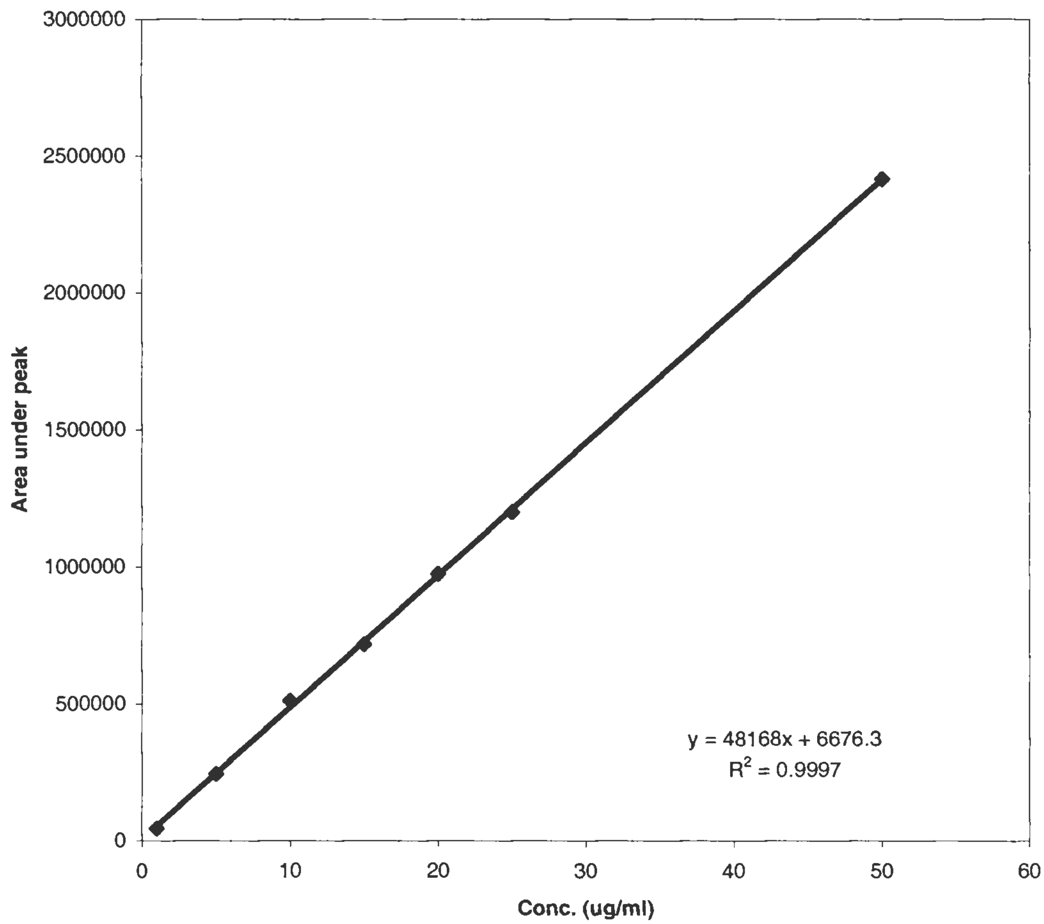


FIGURE 7. CALIBRATION CURVE FOR KETOROLAC TROMETHAMINE USING HPLC METHOD

3. RESULTS AND DISCUSSION

3.1 Organogel Preparation

Poorly purified lecithin did not possess gel-forming properties. When synthetic lecithin containing residues of saturated fatty acids were examined, the organogel formation was not observed. The gelation took place only when a soybean lecithin (Epikuron 200) containing at least 95% phosphatidylcholine was used.

3.2 Phase Diagram Studies

The construction of a phase diagram made it easy to determine the concentration range of lecithin, IPM, KT and water for the existing range of organogels. Figure 8 shows the phase diagram, constructed to determine the optimum formulation of organogel. As shown in this figure, organogels exist in a narrow water concentration region. Decrease of viscosity, cloudiness and two-phase system appearance occurred at water excess. This figure shows the existence of the organogel occurred along the lecithin/IPM axis, where its extent increased as the weight percent of lecithin increased. Compared to the phase diagram constructed in the absence of KT, a relatively large gel region was observed when KT solution was incorporated into the organogel.

No significant differences in phase behavior were noted when altering the concentration of KT solution from 2.5 to 5 and then 10% w/v (Figures 9, 10, and 11). However, a small decrease in the extent of the gel region was observed when 50% w/v of the drug solution was incorporated into the system (Figure 12).

The phase diagram resulting from the new method of preparation showed a smaller existence area of organogel compared to those from the old method (Figure 13). However, by using the new method of preparation it is possible to incorporate a higher amount of drug into the organogel. In this case, for each of the organogel samples, up to 6.5% w/w of KT could be dissolved compared to 1% w/w in case of the old method. The detailed composition of eighteen different organogels is shown in Table 10.

It seems that the presence of lecithin in the organic solution brings about an increase in solubility with respect to that observed in either water or isopropyl myristate. This finding is confirmed by Williman et al., 1991 who reported a considerably high solubility of several drugs in lecithin gel than in water or isopropyl palmitate.

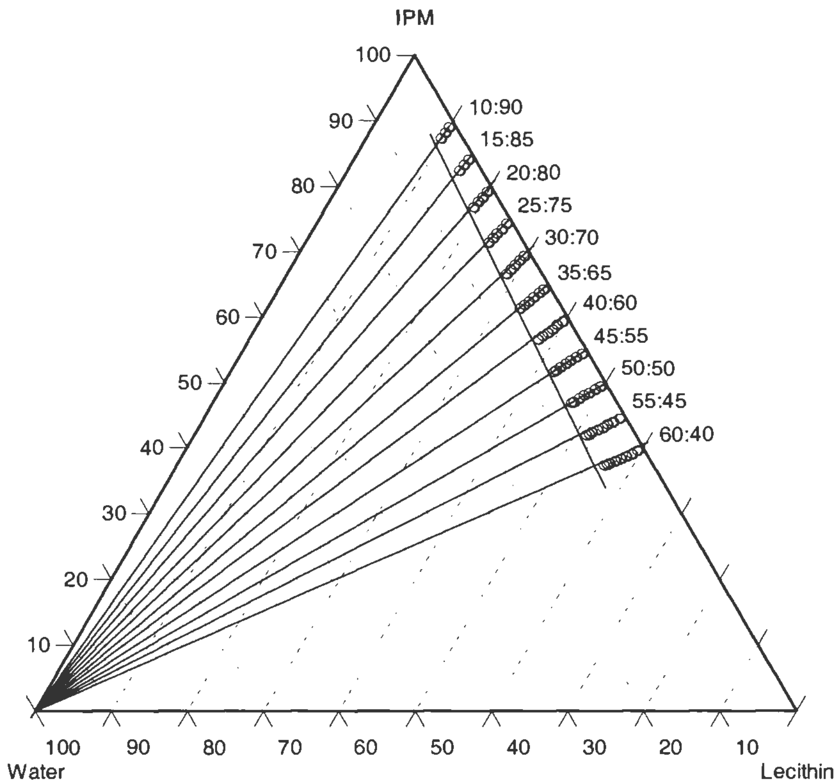


FIGURE 8. PHASE DIAGRAM OF A SYSTEM CONTAINING LECITHIN, IPM AND WATER

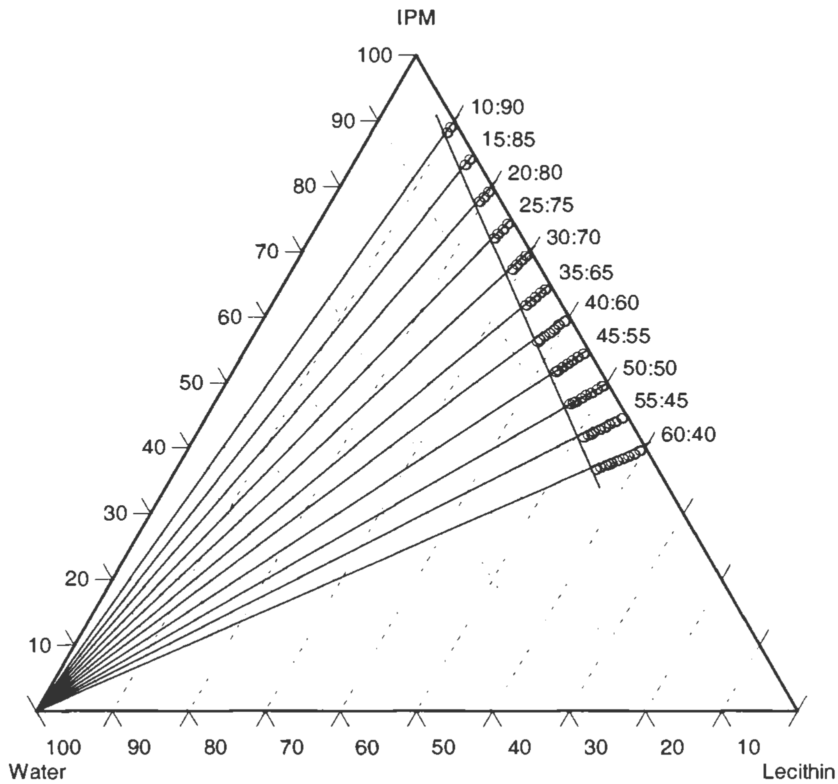


FIGURE 9. PHASE DIAGRAM OF A SYSTEM OF LECITHIN, IPM AND WATER (CONTAINING 2.5% KT W/V)

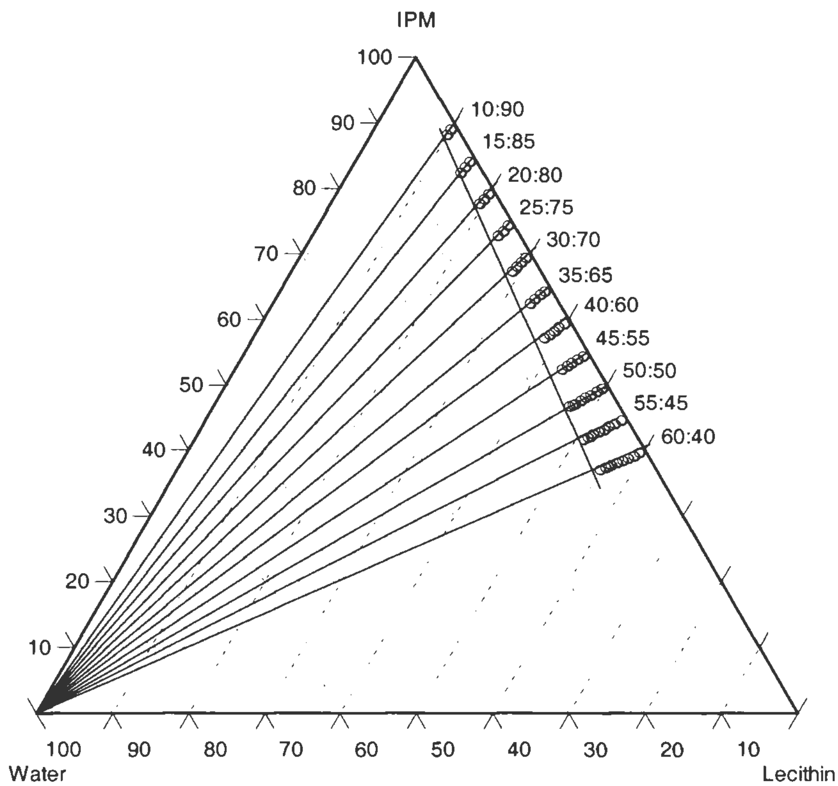


FIGURE 10. PHASE DIAGRAM OF A SYSTEM OF LECITHIN, IPM AND WATER (CONTAINING 5% KT W/V)

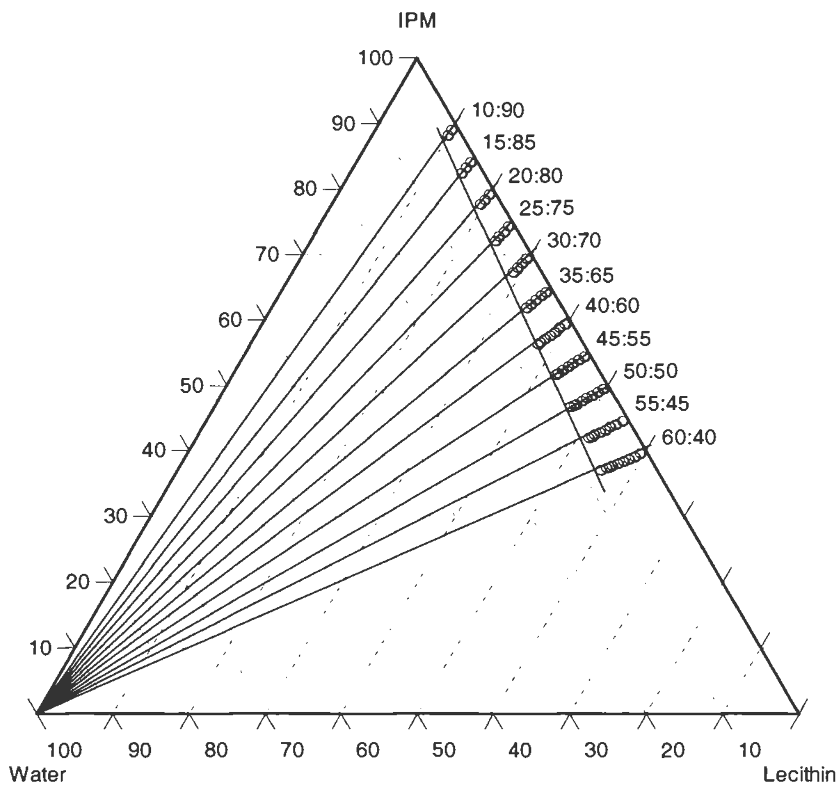


FIGURE 11. PHASE DIAGRAM OF A SYSTEM OF LECITHIN, IPM AND WATER (CONTAINING 10% KT W/V)

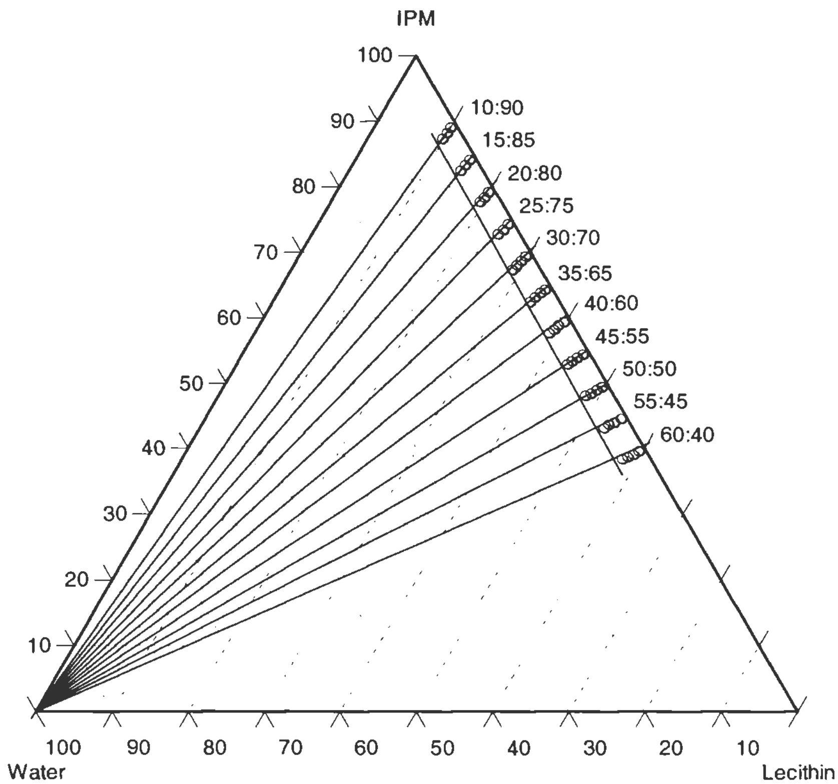


FIGURE 12. PHASE DIAGRAM OF A SYSTEM OF LECITHIN, IPM AND WATER (CONTAINING 50% KT W/V)

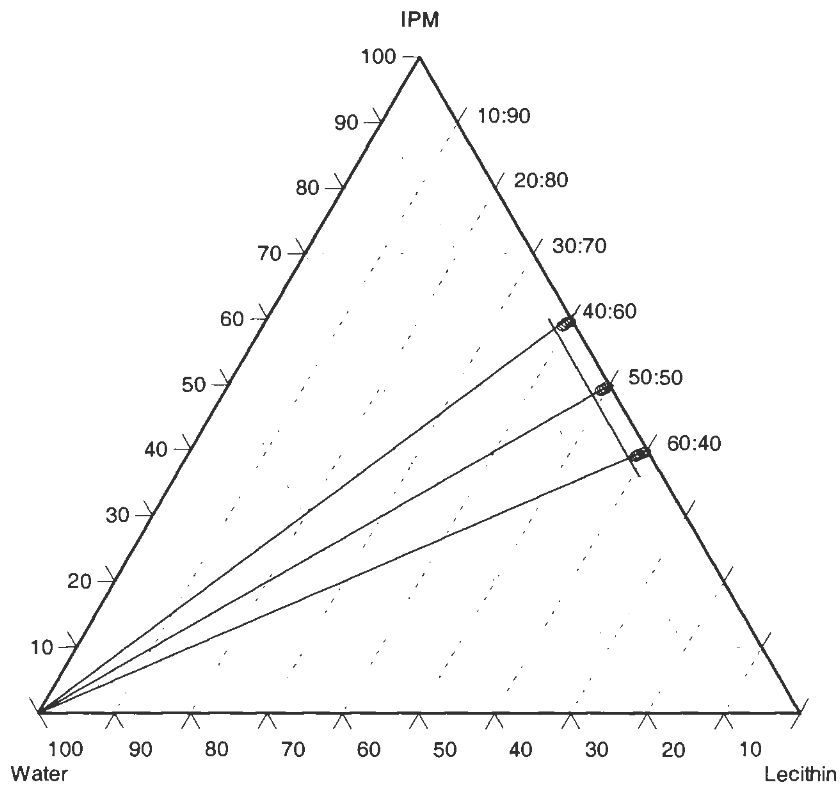


FIGURE 13. PHASE DIAGRAM OF A SYSTEM CONTAINING LECITHIN, IPM AND WATER WITH 6.5% W/W OF KT IN A GEL FORMULATION (NEW METHOD)

TABLE 10. KETOROLAC ORGANOGEL OF DIFFERENT COMPOSITIONS (NEW METHOD)

Formu-lation	Lecithin (g)	IPM (g)	Water (ml)	KT (g)	Total Weight (g)	Lecithin (%w/w)	IPM (%w/w)	Water (%w/w)	KT (%w/w)
1	1.2	1.8	0.003	0.21	3.213	**40**	**60**	0.1	6.5
2	1.2	1.8	0.0075	0.21	3.2175	**40**	**60**	0.25	6.5
3	1.2	1.8	0.015	0.21	3.225	**40**	**60**	0.5	6.5
4	1.2	1.8	0.018	0.21	3.228	**40**	**60**	0.6	6.5
5	1.2	1.8	0.021	0.21	3.231	**40**	**60**	0.7	6.5
6	1.2	1.8	0.024	0.21	3.234	**40**	**60**	0.8	6.5
7	1.5	1.5	0.003	0.21	3.213	**50**	**50**	0.1	6.5
8	1.5	1.5	0.0075	0.21	3.2175	**50**	**50**	0.25	6.5
9	1.5	1.5	0.015	0.21	3.225	**50**	**50**	0.5	6.5
10	1.5	1.5	0.018	0.21	3.228	**50**	**50**	0.6	6.5
11	1.5	1.5	0.021	0.21	3.231	**50**	**50**	0.7	6.5
12	1.5	1.5	0.024	0.21	3.234	**50**	**50**	0.8	6.5
13	1.8	1.2	0.003	0.21	3.213	**60**	**40**	0.1	6.5
14	1.8	1.2	0.0075	0.21	3.2175	**60**	**40**	0.25	6.5
15	1.8	1.2	0.015	0.21	3.225	**60**	**40**	0.5	6.5
16	1.8	1.2	0.018	0.21	3.228	**60**	**40**	0.6	6.5
17	1.8	1.2	0.021	0.21	3.231	**60**	**40**	0.7	6.5
18	1.8	1.2	0.024	0.21	3.234	**60**	**40**	0.8	6.5

3.3 Effect of Membrane on KT Release from Organogels

Release studies were performed using, both cellulose acetate and silicone elastomer in order to find out if the release rates were influenced, by different artificial membranes. A significant ($p < 0.05$) decrease in KT release was obtained when using silicone as a synthetic membrane. The release rate with the cellulose acetate membrane was ~3 times (22.746 μg/cm²/h) higher than with the silicone membrane (7.6779 μg/cm²/h). This may be due to the differences in molecular weight cut-offs (MWCO) between cellulose acetate (3,500 Dalton) and silicone elastomer membrane. As the drug molecular weight approaches the MWCO, the diffusion through the membrane slows dramatically.

The plot of cumulative release of KT through both membranes per unit area versus time is given in Figures 14, and 15. The effect of membrane on the release rate of KT from lecithin:IPM (40:60) containing 0.1% w/w of water and 1% w/w of KT is shown in Figure 16 (The experiment was done up to 10 hours when silicone elastomer was used as a membrane).

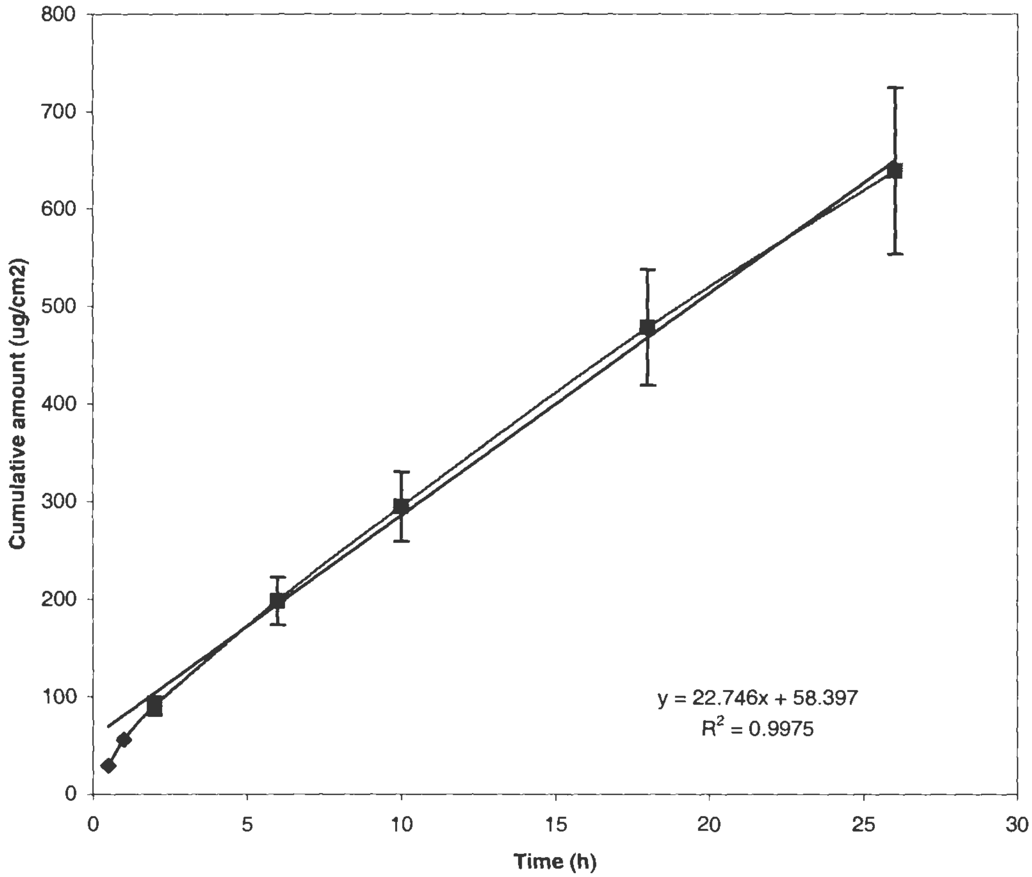


FIGURE 14. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT (MEAN ± SD, N = 6)

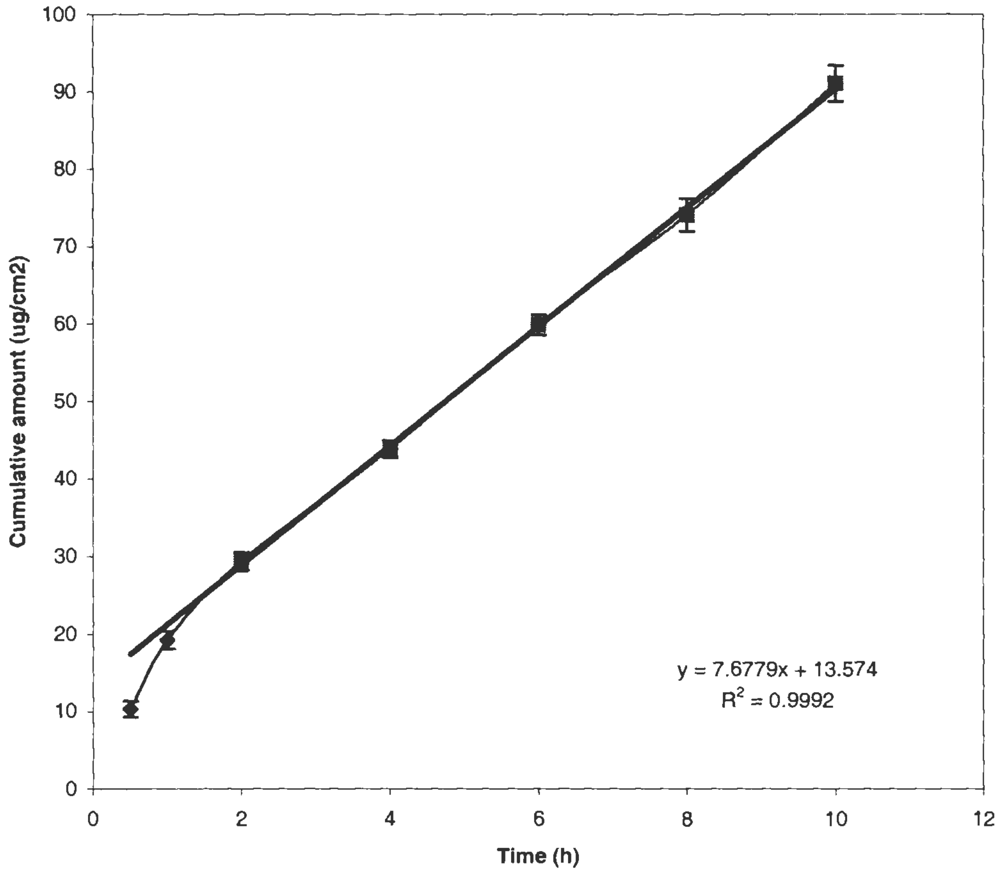


FIGURE 15. RELEASE PROFILE OF KT ACROSS SILICONE ELASTOMER FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT (MEAN ± SD, N =6)

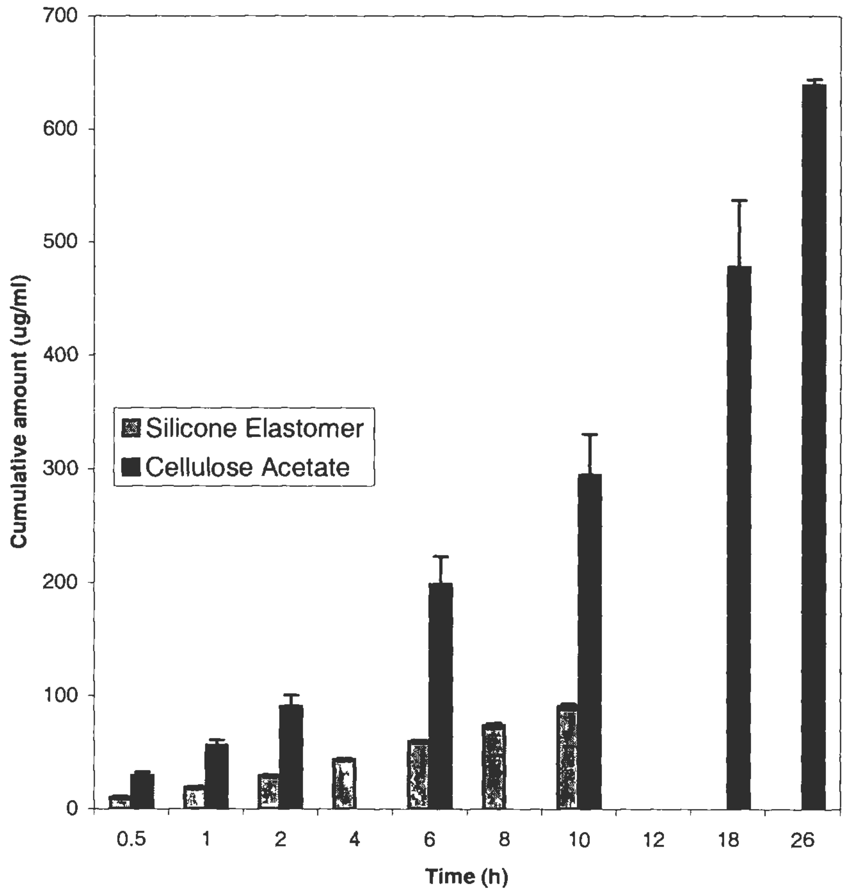


FIGURE 16. EFFECT OF MEMBRANE ON KT RELEASE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT (MEAN ± SD, N = 6)

3.4 Formulation Effects

It was found from this study that KT release from organogels was highly variable and extremely dependent upon following factors:

- KT concentration
- Lecithin concentration
- Water concentration

3.4.1 Effect of KT Concentration on Its Release Rate across Cellulose Acetate Membrane from Organogels with Different Compositions

The effect of the concentration on drug release rate from lecithin:IPM (40:60) containing 0.1% water and both 1% and 6.5% w/w of KT was evaluated. A significant ($p < 0.05$) increase in drug release was obtained in formulations containing 6.5% w/w of KT compared to those containing 1% w/w of the drug. The release rate of the formulation containing 6.5% KT was ~10 times (223.12 $\mu g/cm^2/h$) higher than the one containing 1% of the drug (22.746 $\mu g/cm^2/h$). Plot of cumulative release of KT for both concentrations versus time is given in Figures 17, and 18. The effect of KT concentration on its release from lecithin:IPM (40:60) containing 0.1% water is shown in Figure 19 (The experiment was done up to 12 hours when the formulation containing 6.5% w/w of KT was used).

The data revealed that there is a positive correlation between drug concentration and release rate of the drug due to the increase in the thermodynamic activity. In this case, thermodynamic activity of the drug increases with concentration

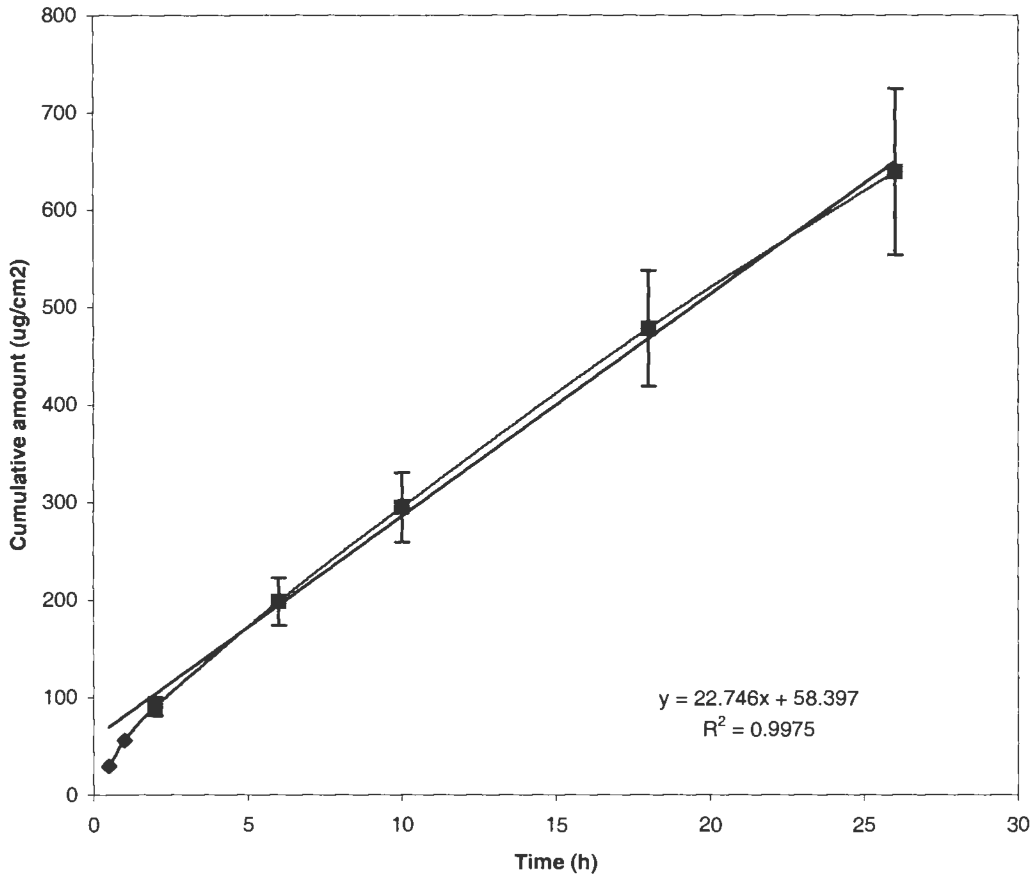


FIGURE 17. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT (MEAN ± SD, N = 6)

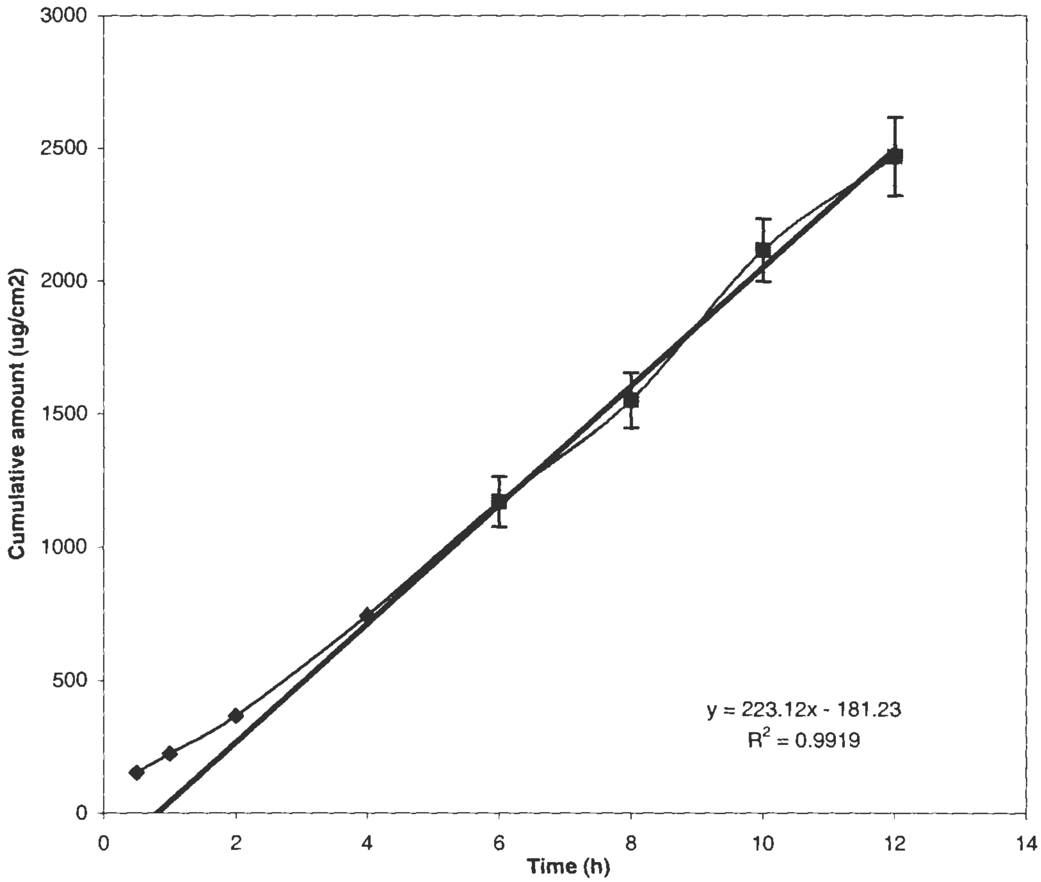


FIGURE 18. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT (MEAN ± SD, N = 6)

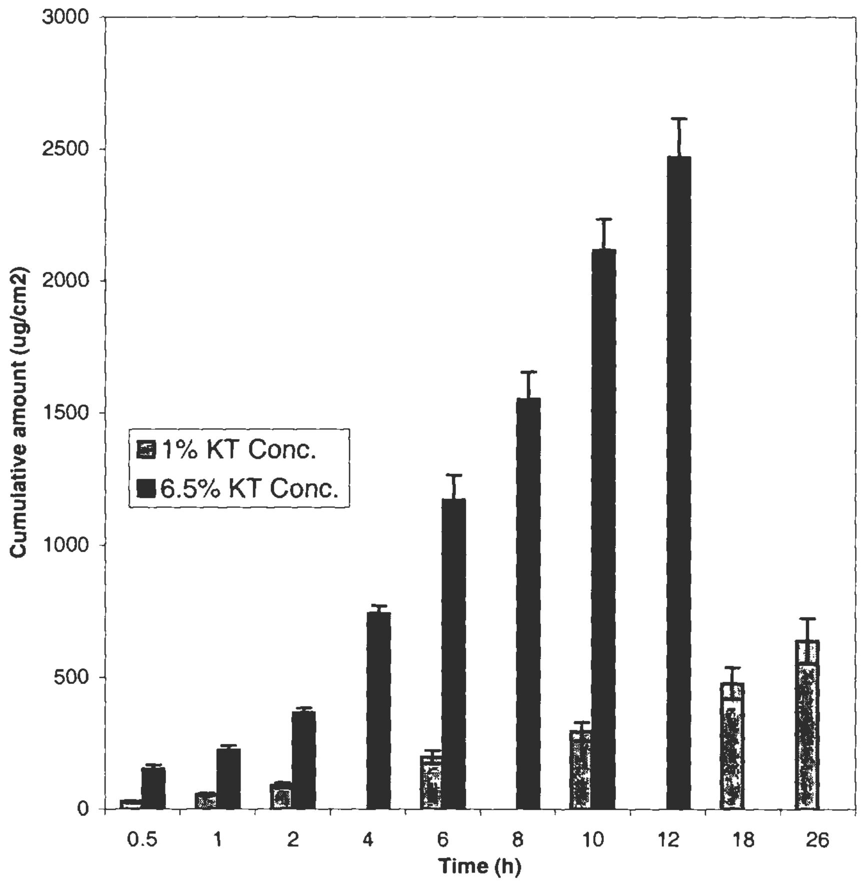


FIGURE 19. EFFECT OF KT CONCENTRATION ON ITS RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER (MEAN ± SD, N = 6)

until it reaches the limiting value which is the value of the saturated solution. This finding is in agreement with the results of Santoyo et al., 1996 who reported a direct relationship between piroxicam concentration and its release rate from propylene glycol gel. Henmi et al., 1994 also reported that the release rate of indomethacin from an oily gel formed by hydrogenated soybean phospholipids (HSL) was proportional to the drug concentration in the vehicle.

Similar results were obtained using guinea pig skin with the same formulation. There was a significant ($p< 0.05$) increase in KT release from organogels containing 6.5% w/w of KT compared to 1% w/w of the drug. The permeation profile of KT through guinea pig skin from lecithin:IPM (40:60) containing 0.1% w/w of water is shown in Figures 20, and 21. The plot of cumulative release of KT through both membranes, guinea pig skin and cellulose acetate, per unit area versus time is also given in Figure 22.

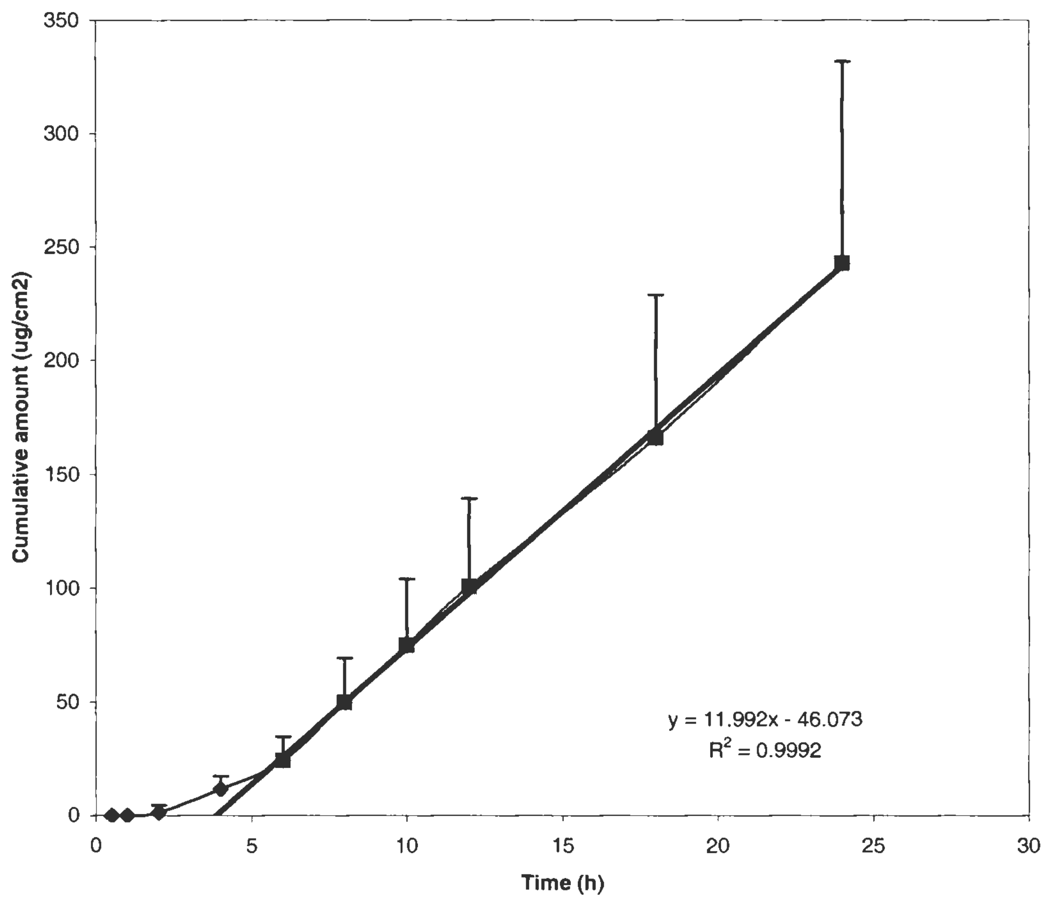


FIGURE 20. PERMEATION PROFILE OF KT THROUGH HAIRLESS GUINEA PIG SKIN FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT (MEAN ± SD, N = 6)

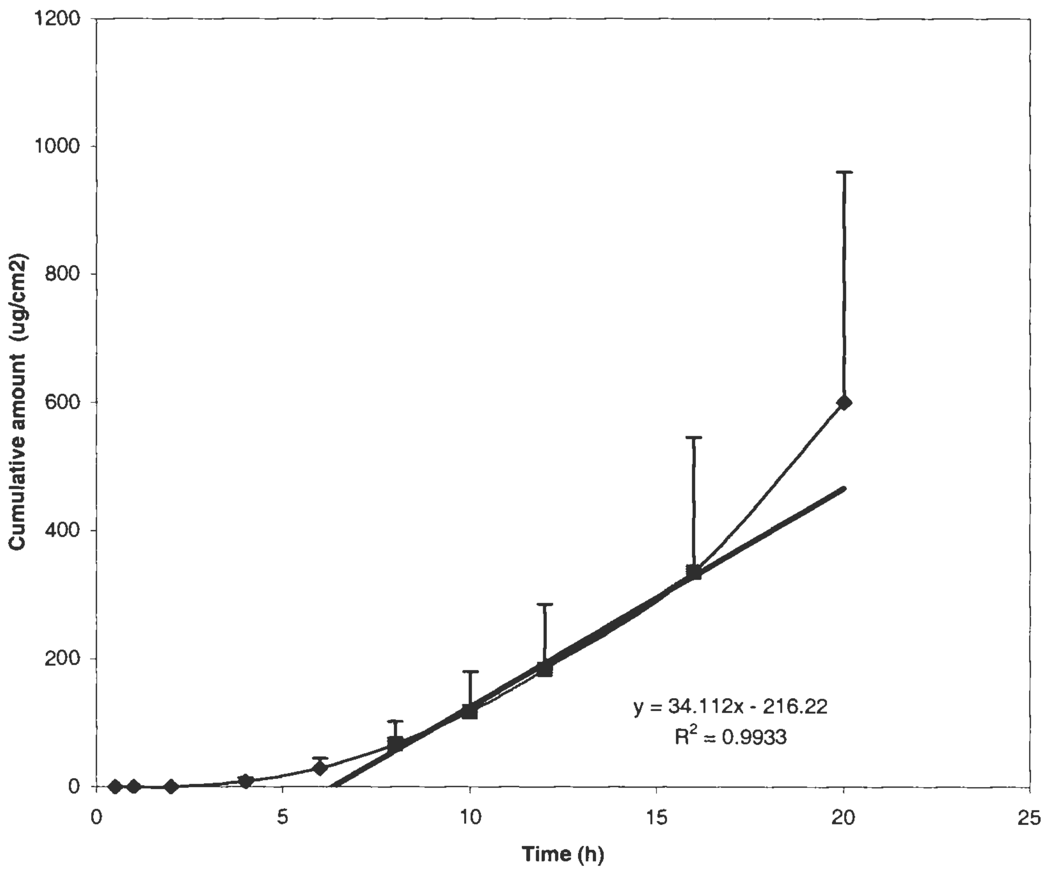


FIGURE 21. PERMEATION PROFILE OF KT THROUGH HAIRLESS GUINEA PIG SKIN FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT (MEAN ± SD, N = 6)

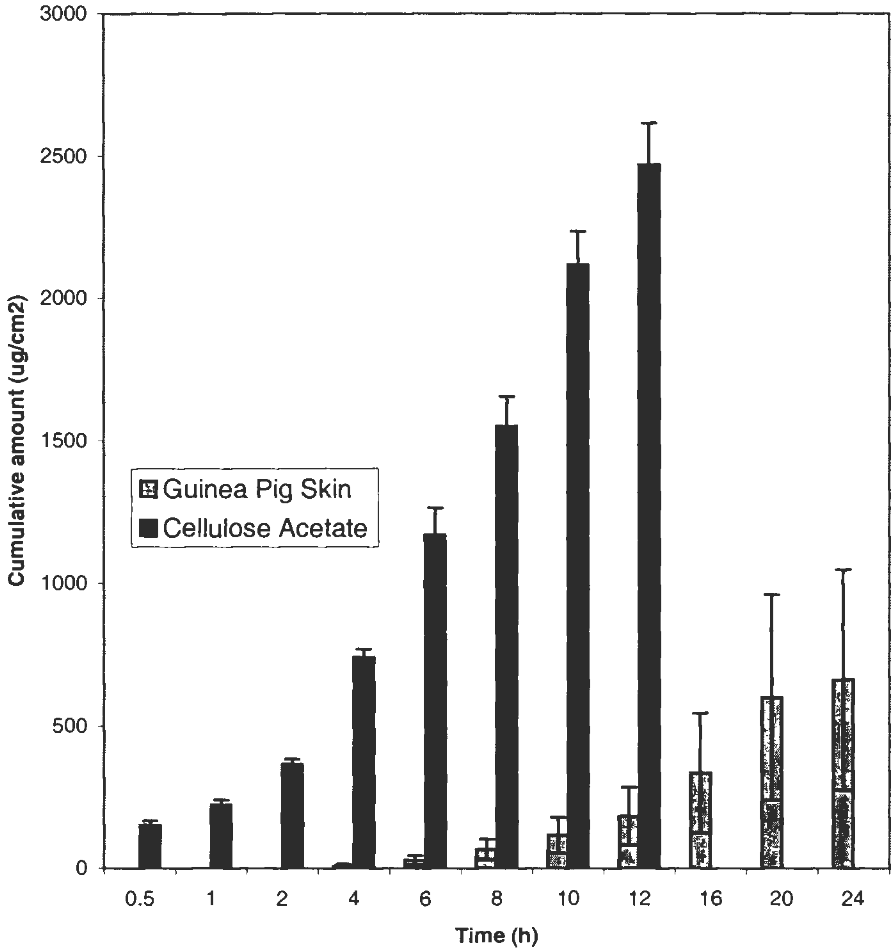


FIGURE 22. COMPARISON OF CELLULOSE ACETATE MEMBRANE WITH GUINEA PIG SKIN ON KT RELEASE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT (MEAN ± SD, N = 6)

3.4.2 Effect of Lecithin Concentration on the Release Rate of KT across Cellulose Acetate Membrane from Organogels with Different Compositions

The effect of lecithin concentration on the release rate of ketorolac from lecithin:IPM (40:60), (50:50) and (60:40) containing 0.25% w/w of water and 6.5% w/w of KT was evaluated. A significant ($p < 0.05$) decrease in KT release was obtained as the lecithin concentration was increased from 40 to 50 and then 60% w/w in formulations. The release rates of KT were (229.27 μg/cm²/h), (104.15 μg/cm²/h) and (84.987 μg/cm²/h) for formulations composed of 40, 50 and 60% w/w of lecithin respectively. The release profile of KT from organogels with different lecithin concentration is shown in Figures 23, 24, and 25.

This result may be due to a decreased thermodynamic activity of the drug in the organogel at the higher concentration of lecithin. At higher lecithin concentrations there is a more extensive entanglement of the long cylindrical micelles with each other, forming a network-like structure with a very high viscosity. The entrapment of the drug within this network lowers the amount of free drug available for release, causing a decrease in the release rate of KT across the membrane (Shchipunov et al., 1998). The effect of lecithin concentration on the release of KT from lecithin:IPM (40:60), (50:50) and (60:40) containing 0.25% w/w of water and 6.5% w/w of KT is given in Figure 26.

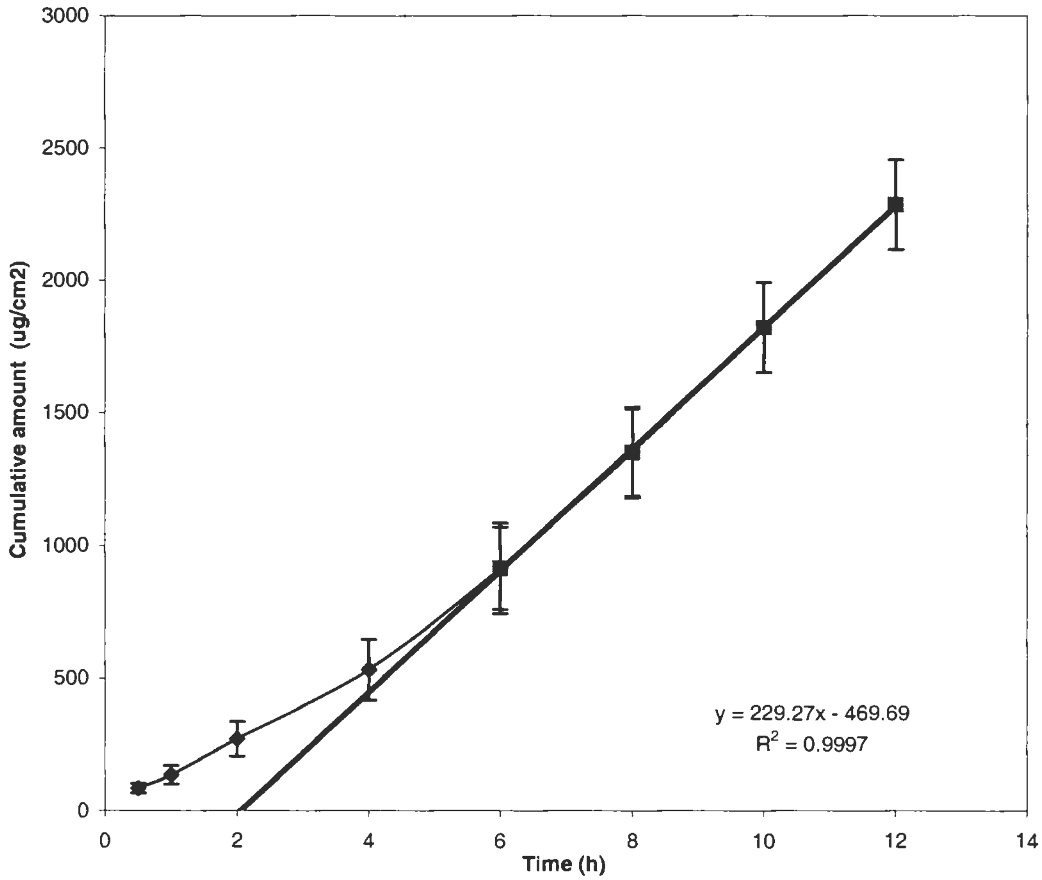


FIGURE 23. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT (MEAN ± SD, N =6)

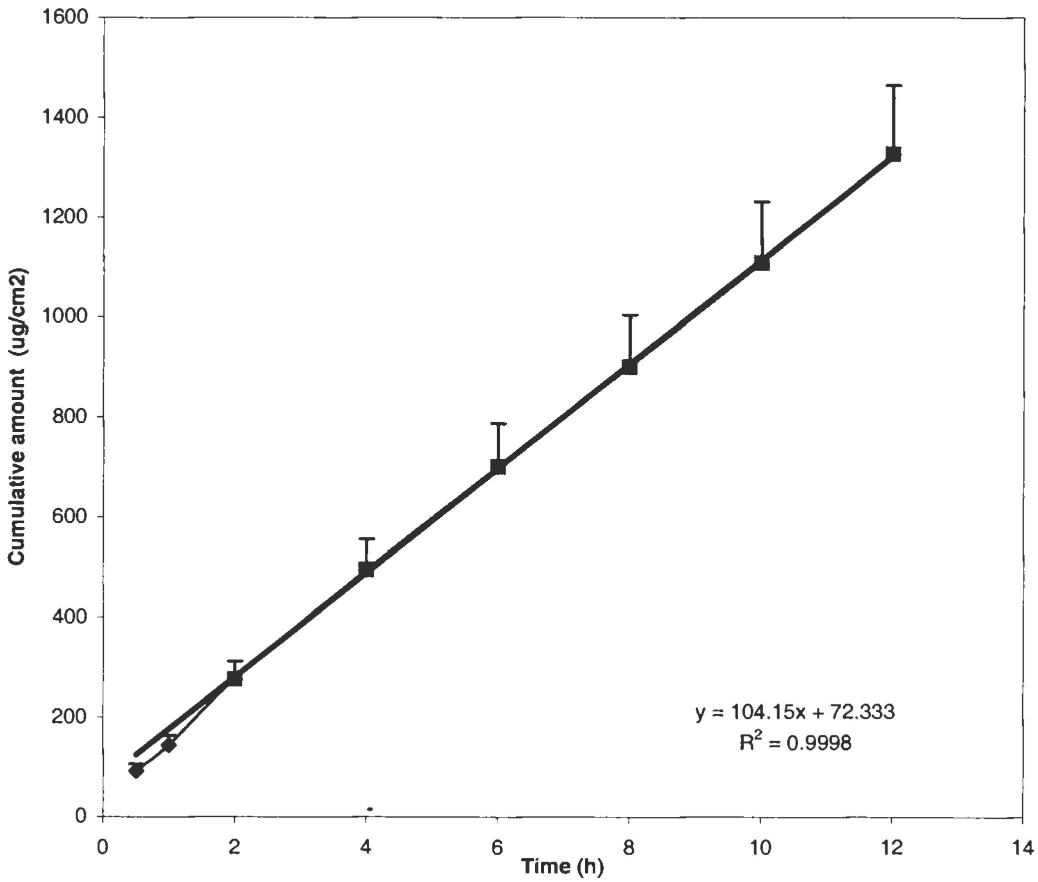


FIGURE 24. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT (MEAN ± SD, N = 6)

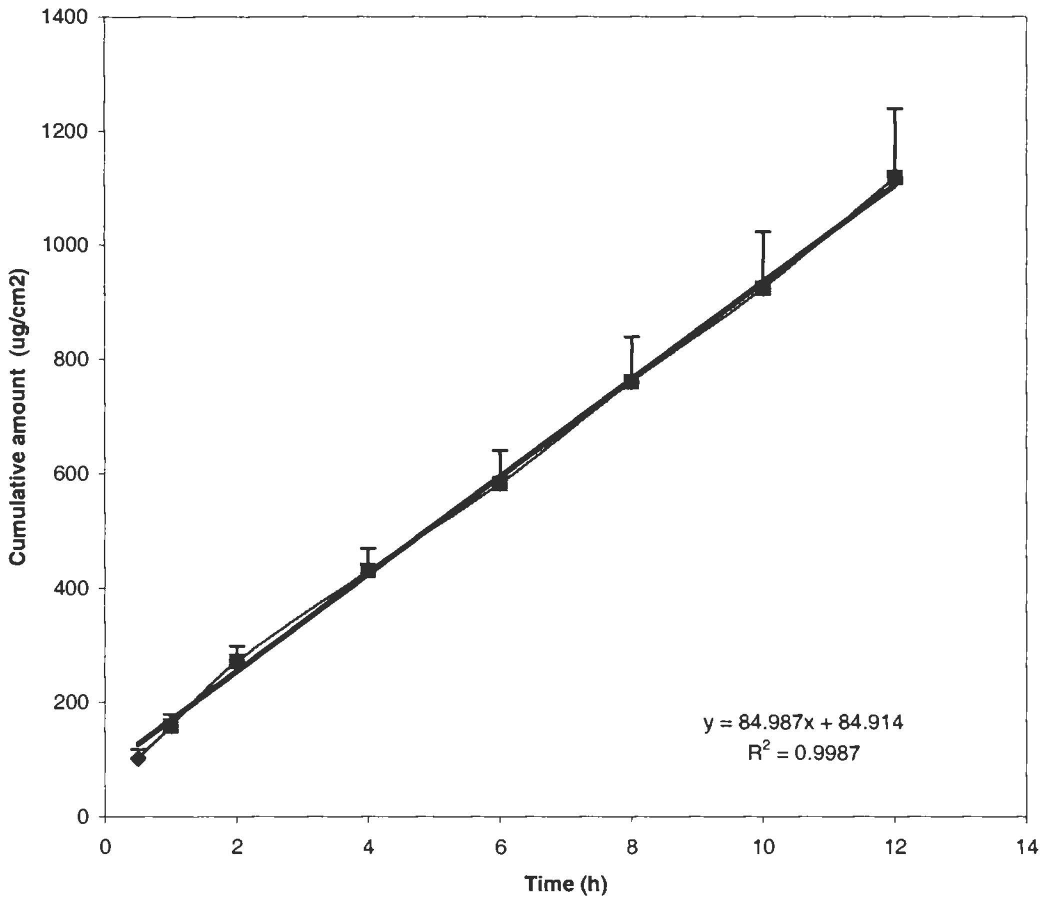


FIGURE 25. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT (MEAN ± SD, N = 6)

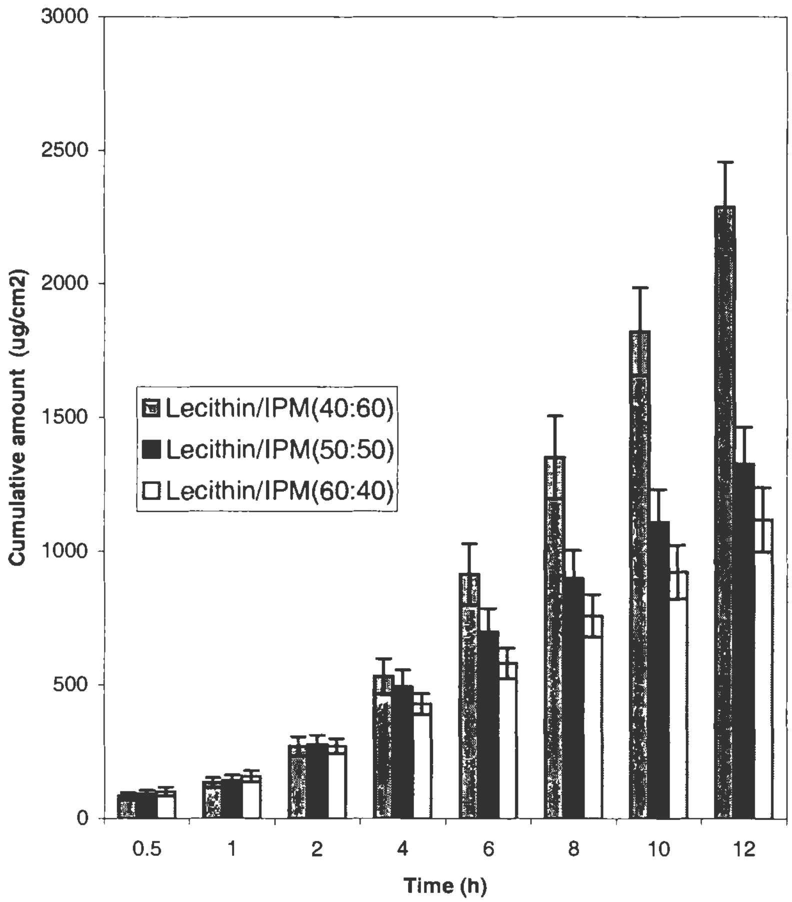


FIGURE 26. EFFECT OF LECITHIN CONCENTRATION ON KT RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60),(50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT (MEAN ± SD, N = 6)

3.4.3 Effect of Water Concentration on Release Rate of KT across Cellulose Acetate Membrane from Organogels with Different Compositions

The effect of the organogel water concentration on the release rate of KT from different formulations containing 6.5% w/w of KT was also determined. While each of the organogels evaluated had the same ratio of lecithin/ IPM, differences in water concentration caused the release rate of KT to vary.

A significant ($p < 0.05$) decrease in release rate of KT from lecithin:IPM (40:60) containing 0.5% w/w of water compared to those containing higher amounts of water was obtained. A significant ($p < 0.05$) decrease in release rate of KT from lecithin:IPM (50:50) and (60:40) containing 0.25% w/w of water compared to those containing higher amounts of water was also observed. The release rates of KT were (180.39 $\mu g/cm^2/h$), (104.15 $\mu g/cm^2/h$) and (84.987 $\mu g/cm^2/h$) for lecithin:IPM (40:60), (50:50) and (60:40) respectively. The release profile of KT from above formulations is given in Figures 27, 28, and 29 respectively.

The data revealed that increasing the water content of the organogel (lecithin:IPM 40:60) from 0.1% to 0.25% and then 0.5% w/w resulted in a decrease in KT release. Once increasing the water amount of the system, the initially spherical reverse micelles transform into cylindrical micelles and then into long tubular and flexible micelles with the ability to entangle and build up a three-dimensional network with a high viscosity. This network is responsible for the entrapment and unavailability of the drug molecules for their release from the organogel system, causing a significant decrease in release rate of KT from lecithin:IPM (40:60) containing 0.5% w/w of water. The increase of water amount from 0.5% to 0.6% w/w

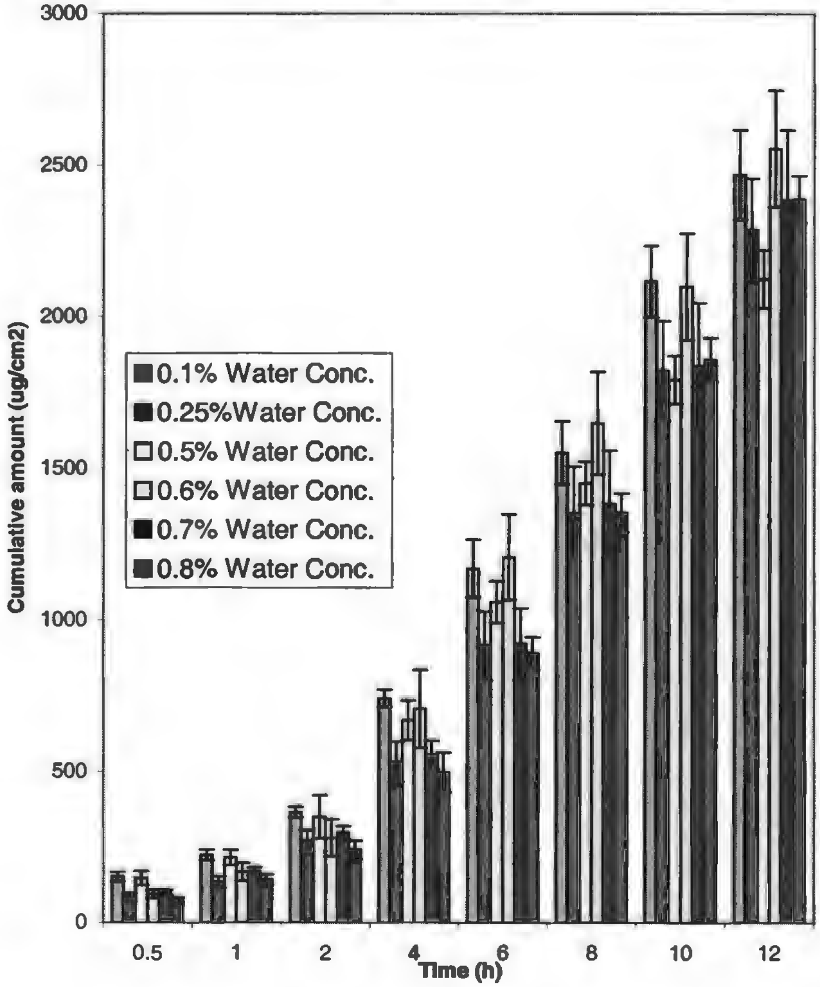


FIGURE 27. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT (MEAN ± SD, N = 6)

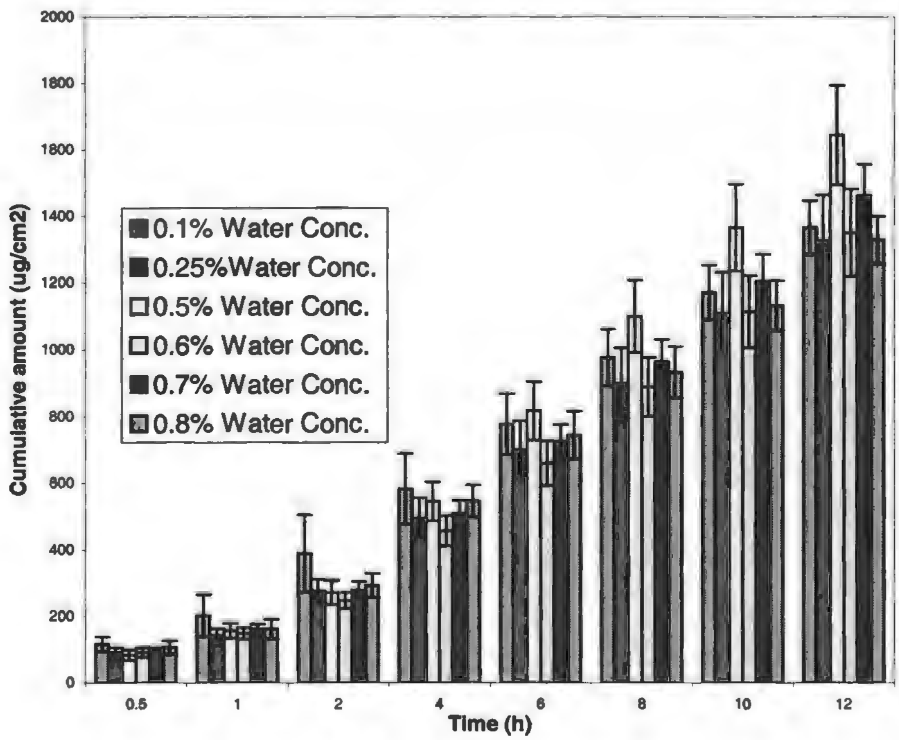


FIGURE 28. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT (MEAN ± SD, N = 6)

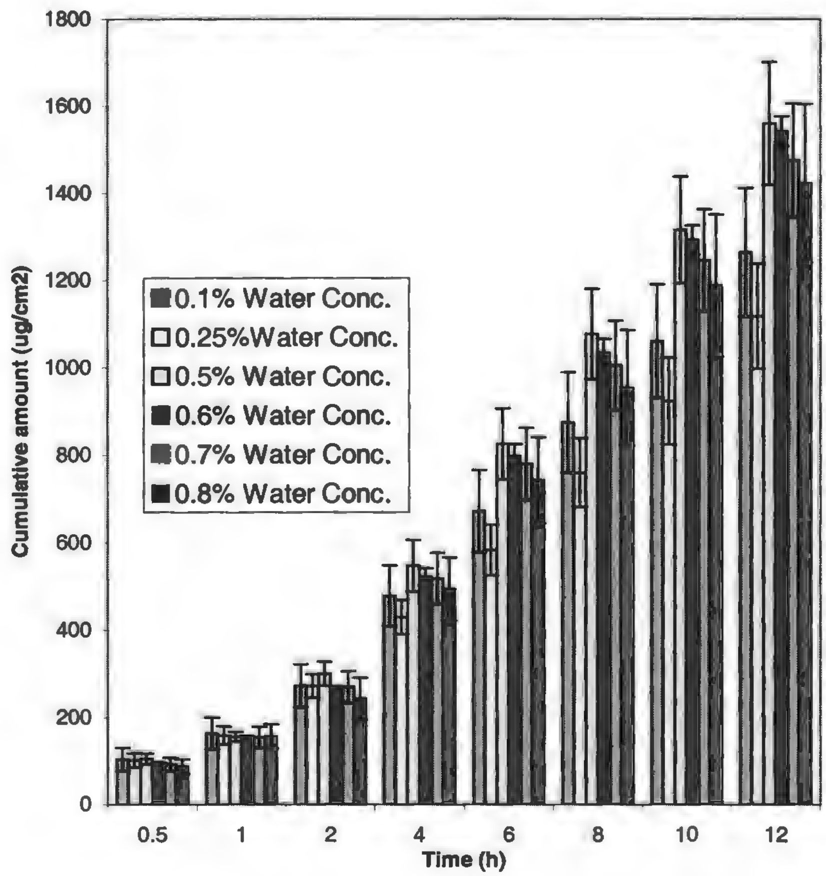


FIGURE 29. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT (MEAN ± SD, N = 6)

made the additional water and therefore, KT available within the system for partitioning into the membrane. A decrease in release rate of the drug at higher concentration of water (0.7% and 0.8% w/w) was observed, which suggests that at this concentration of water the three-dimensional network shrinks and organogel region ends. The same result was found for lecithin:IPM (50:50) and (60:40) except for the lowest release rate of KT, which happened at 0.25% w/w of water concentration. This finding is confirmed by Osborne et al., 1991 who reported a high dependency of the release of glucose as a model hydrophilic drug across human skin from microemulsions containing different concentrations of water. The effect of water concentration on the release of KT from lecithin:IPM (40:60), (50:50) and (60:40) containing 6.5% w/w of KT is shown in Figures 30, 31, and 32.

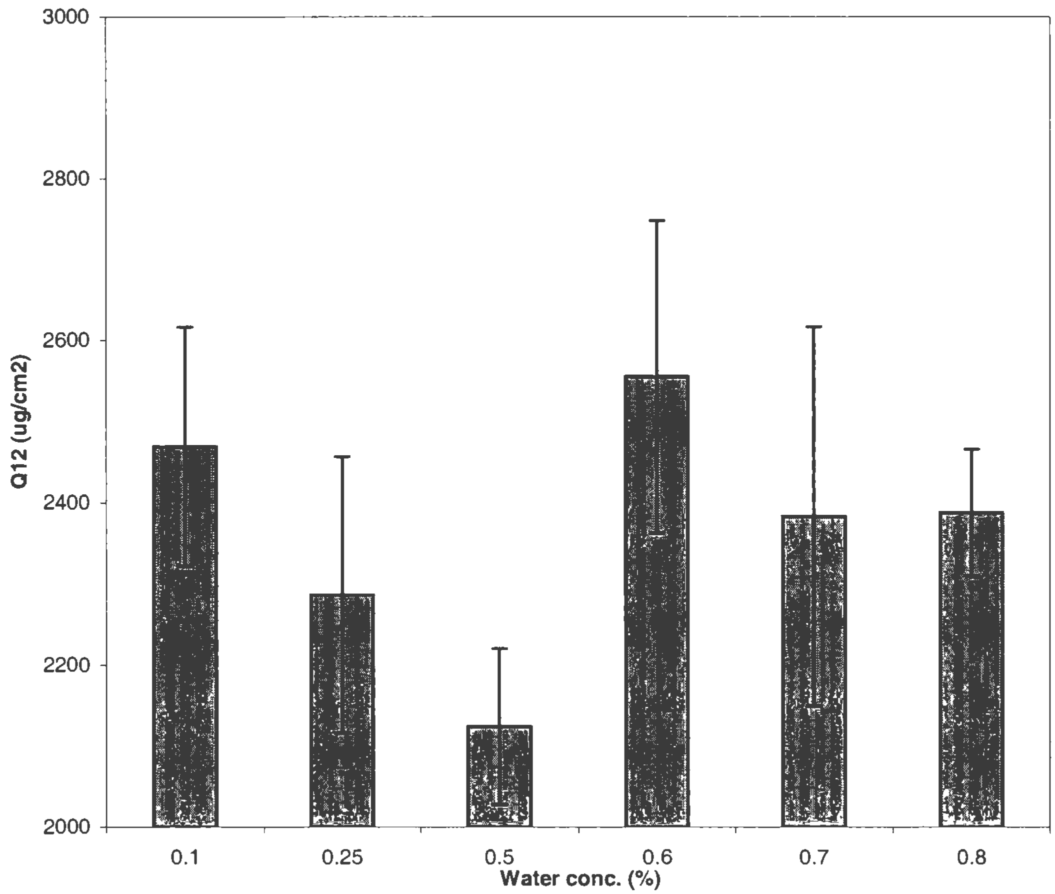


FIGURE 30. EFFECT OF WATER CONCENTRATION ON KT RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 6.5% KT (MEAN ± SD, N = 6)

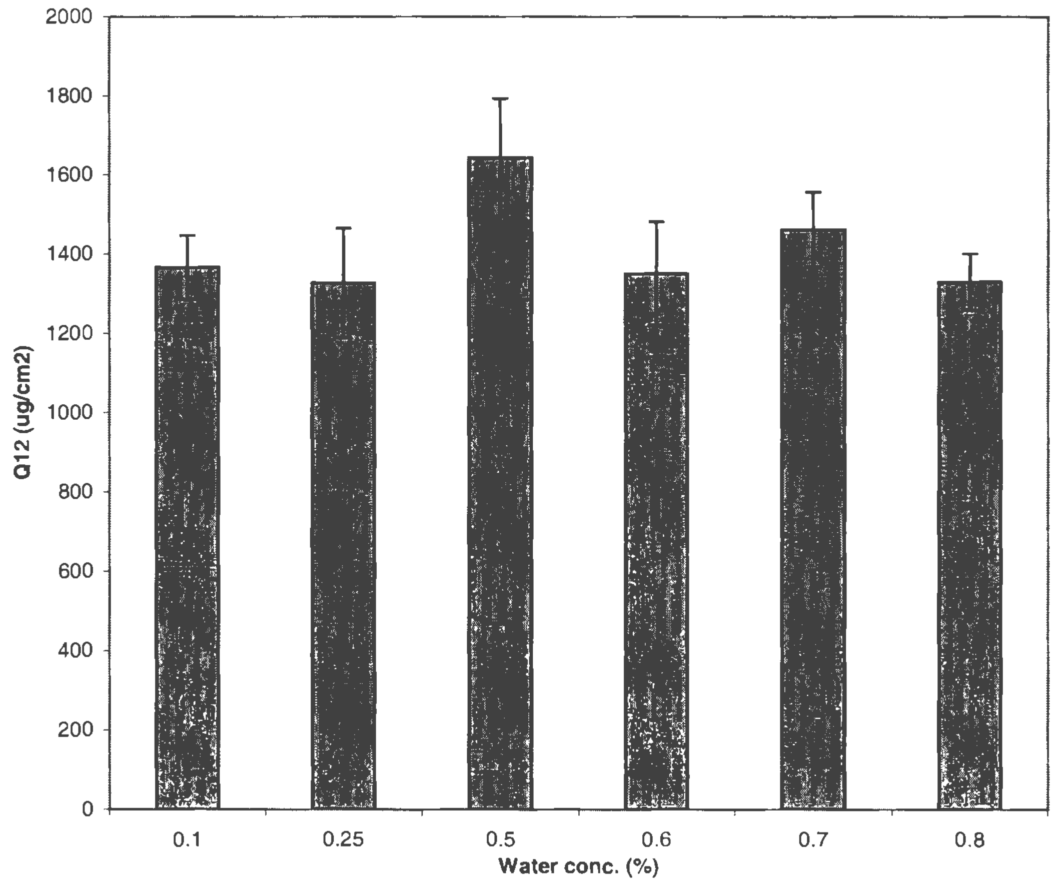


FIGURE 31. EFFECT OF WATER CONCENTRATION ON KT RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 6.5% KT (MEAN ± SD, N = 6)

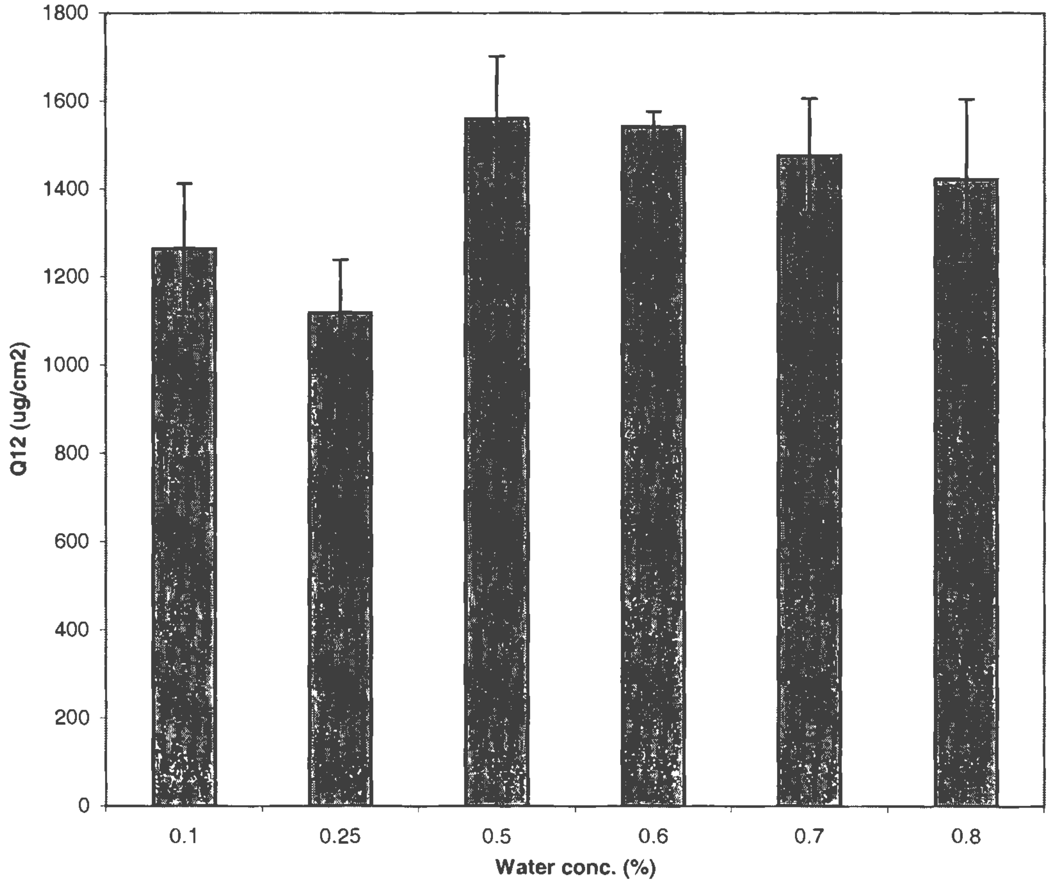


FIGURE 32. EFFECT OF WATER CONCENTRATION ON KT RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 6.5% KT (MEAN ± SD, N = 6)

3.5 Rheological Measurements

Increase in lecithin concentration produced a significant increase ($p < 0.05$) in the viscosity of the organogel. The average viscosity of the organogels were (418.80 ± 114.15), (951.76 ± 25.70) and (1832.70 ± 358.93) poise for lecithin:IPM (40:60), (50:50) and (60:40) containing 0.25% w/w of water and 6.5% w/w of KT respectively. Figure 33 shows the values of the viscosity for above formulations using cylindrical viscometer. The effect of lecithin concentration on the viscosity of the organogels containing 0.25% w/w of water and 6.5% w/w of KT using both cylindrical and cone & plate viscometer is also given in Figures 34, and 35.

Organogels viscosity measurements were determined by applying increasing and decreasing values of the shear rate, in order to reveal any possible thixotropy of the system. All formulations surprisingly gave a slight rheopexy behavior rheogram. This is essentially the opposite of thixotropic behavior, in that the viscosity of the gel increased with an increase in the shear rate. A plot of shear rate versus shear stress was made (Figure 36) as the shear rate was increased to a certain value, then immediately decreased to the starting point. As shown in Figure 36 the up and down curves do not coincide and a hysteresis loop is caused by the increase in the viscosity of the organogel with increasing time of shearing.

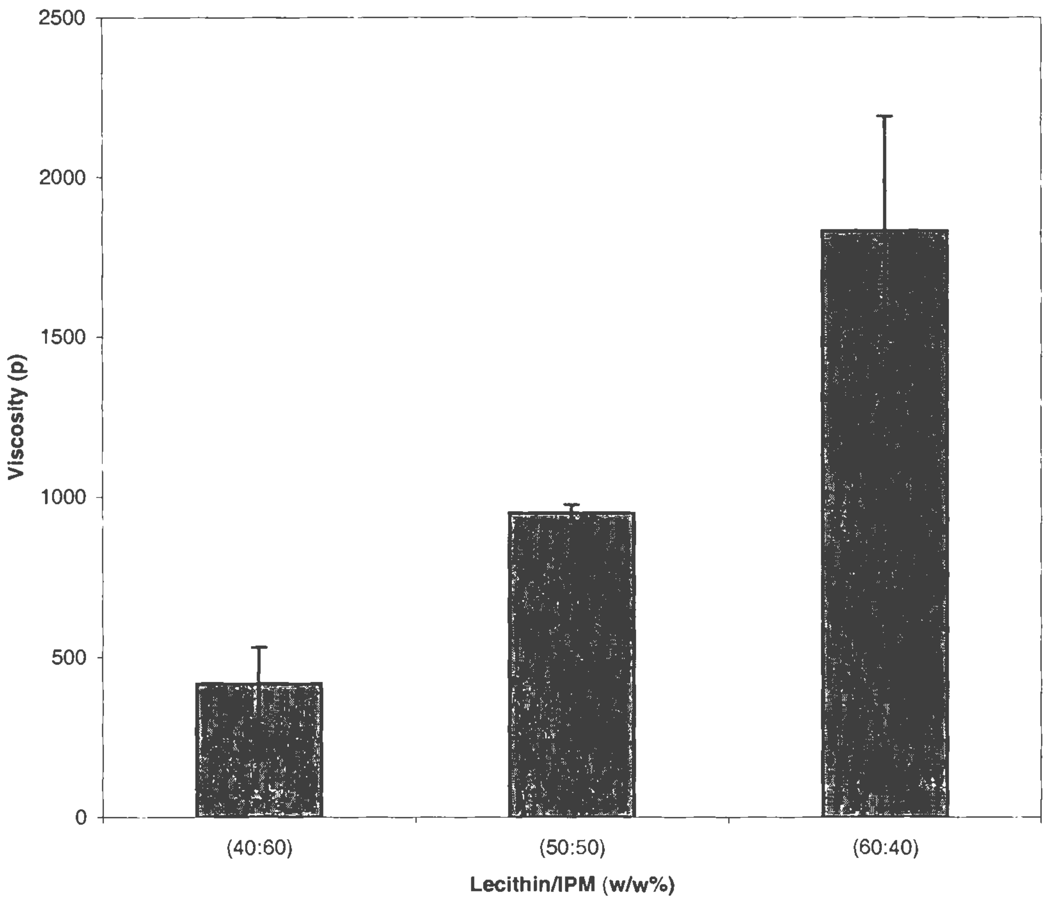


FIGURE 33. EFFECT OF LECITHIN CONCENTRATION ON VISCOSITY OF LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER (MEAN ± SD, N = 2)

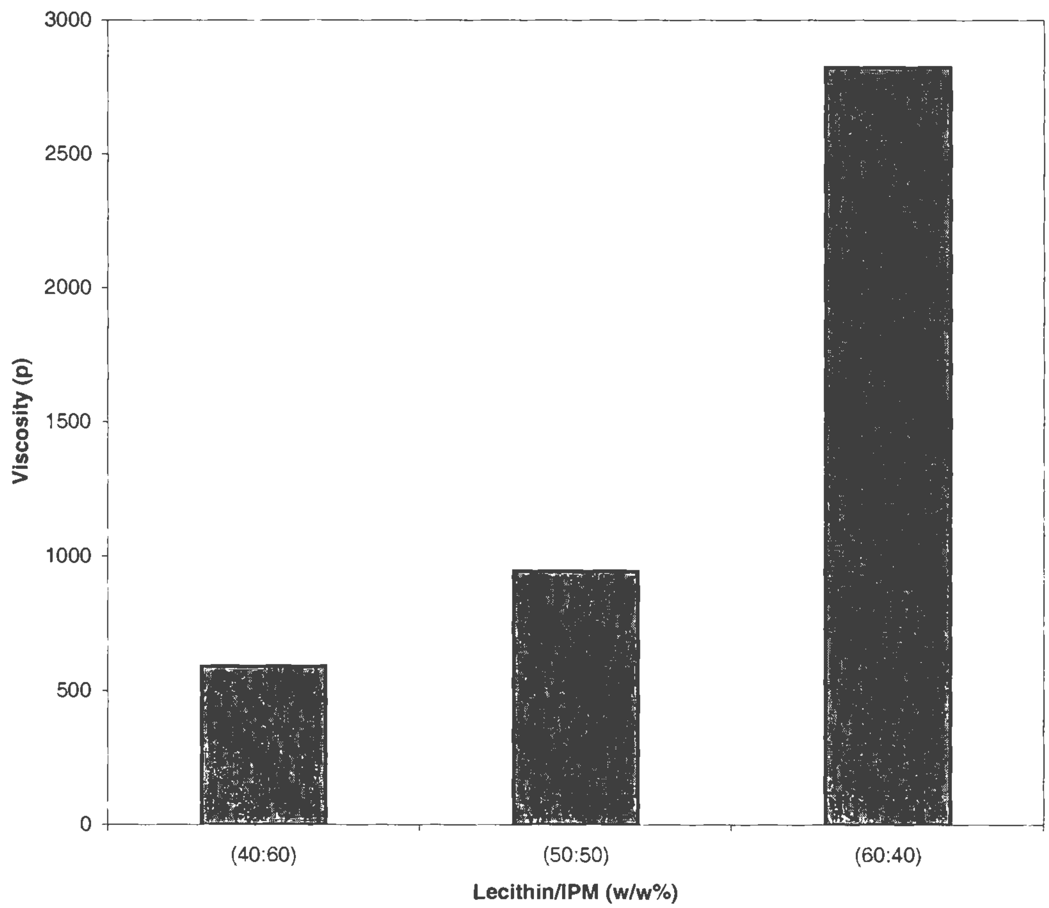


FIGURE 34. EFFECT OF LECITHIN CONCENTRATION ON THE VISCOSITY OF LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

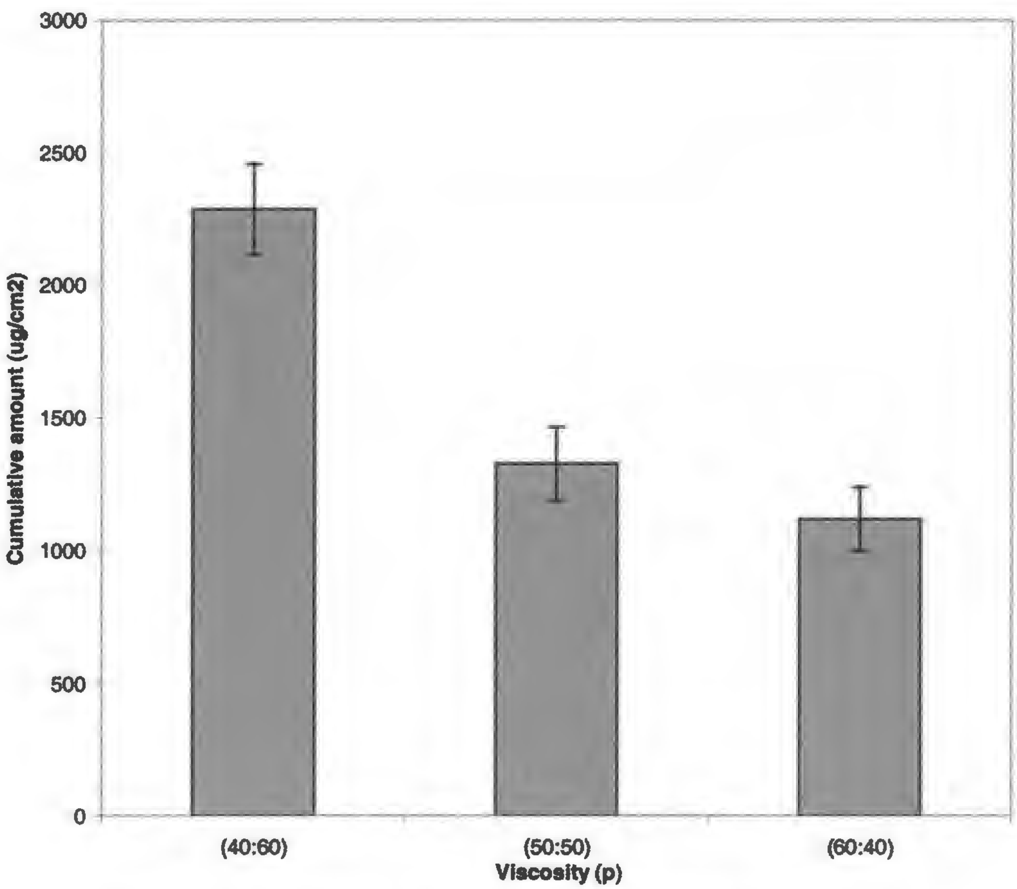


FIGURE 35. EFFECT OF VISCOSITY ON KT RELEASE ACROSS CELLULOSE ACTATE FROM ORGANOGELS WITH DIFFERENT LECITHIN CONCENTARTION BY CYLINDRICAL VISCOMETER (MEAN ± SD, N = 2)

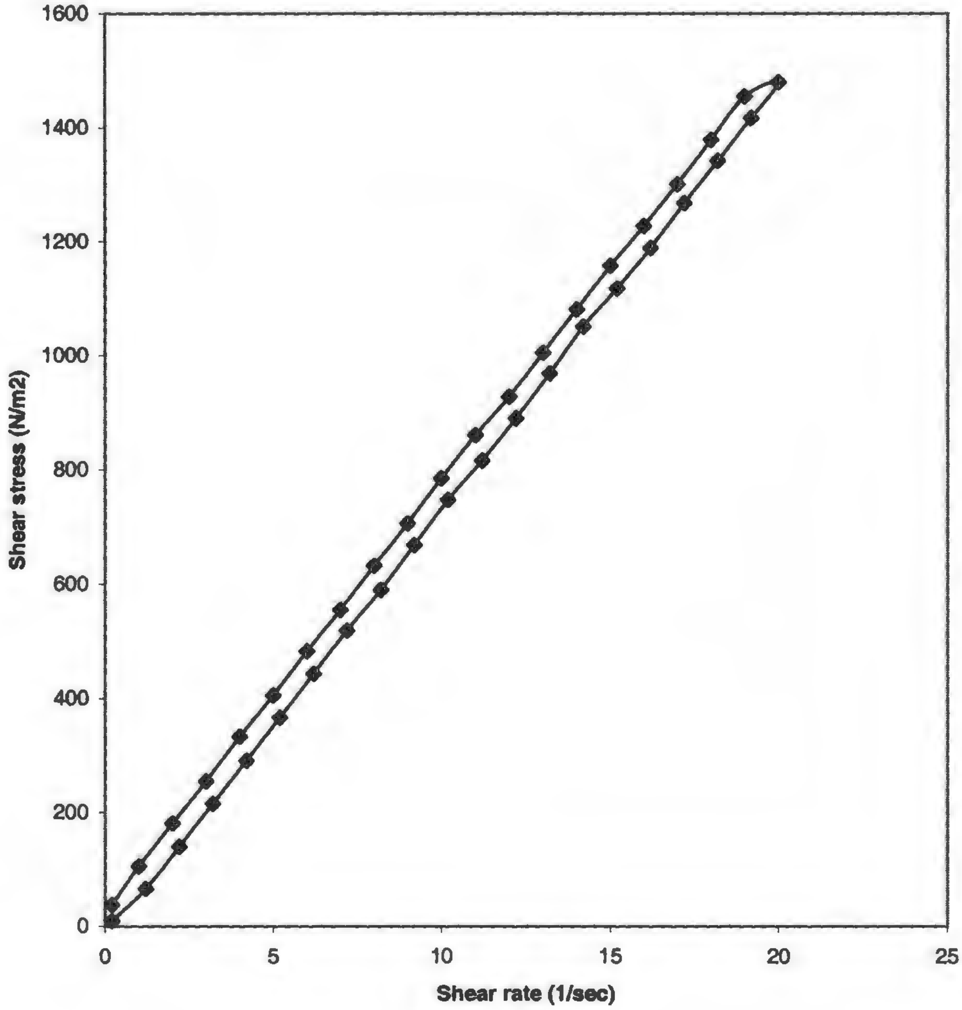


FIGURE 36. RHEOGRAM SHOWING THE RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

It was found (using both cylindrical and cone & plate viscometer) that there was a significant ($p < 0.05$) increase in viscosity of lecithin:IPM (40:60) containing 0.5% w/w of water compared to the other concentrations of water (Figures 37, and 38). This result explained the significant decrease in the release of KT from this formulation which was mentioned at section 3.4.3. Therefore, at this specific concentration of water, long tubular micelles can be entangled and from a three-dimensional network with a very high viscosity which affects the release rate of KT from the system. The effect of viscosity on cumulative release of KT from above formulation is given in Figure 39.

As KT release decreased with an increase in lecithin concentration, an inverse correlation existed between the release rate and the gel viscosity values. These data are confirmed by Santoyo et al., 1996 who reported that the drug release rate is inversely related to the viscosity of the continuous phase.

Viscosity profile of the organogel samples with eighteen different compositions obtained by cone and plate viscometer is given in Figure 40. Lecithin:IPM (60:40) containing different amounts of water showed the highest viscosity compared to the other ratios of lecithin:IPM.

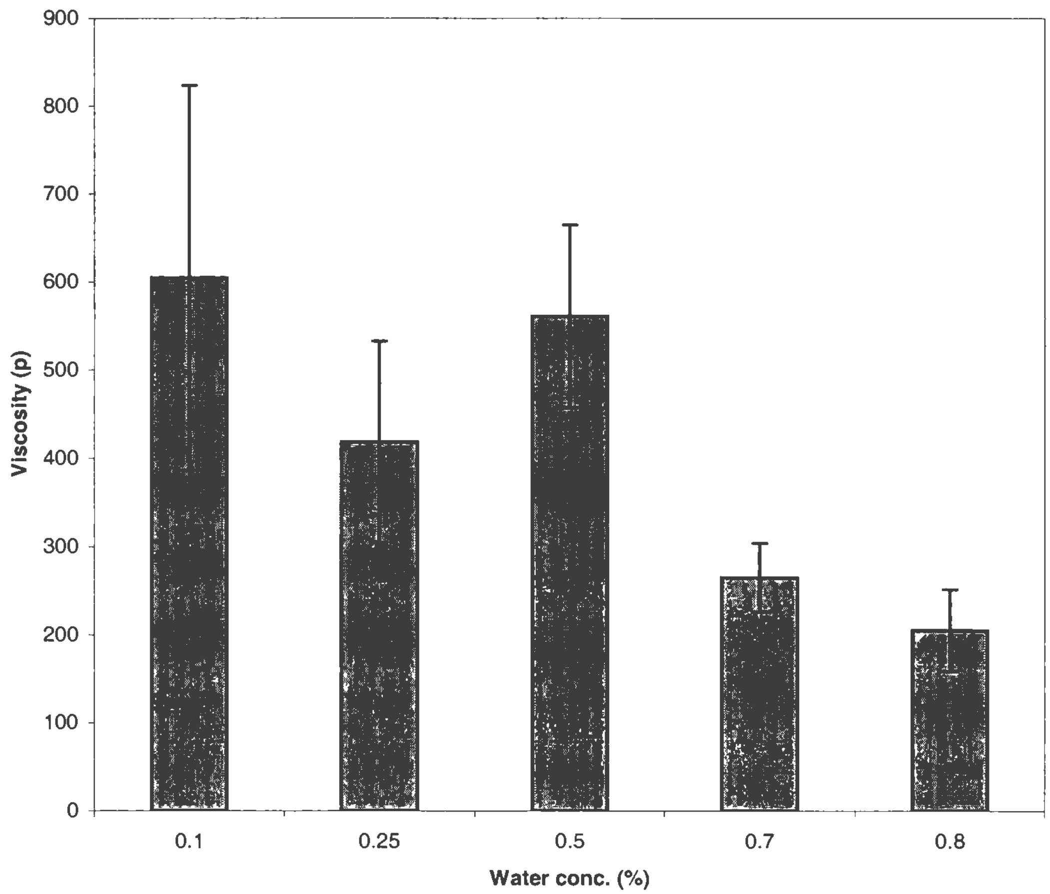


FIGURE 37. EFFECT OF WATER CONCENTRATION ON VISCOSITY OF THE LECITHIN:IPM (40:60) CONTAINING 6.5% KT BY CYLINDRICAL VISCOMETER (MEAN ± SD, N = 2)

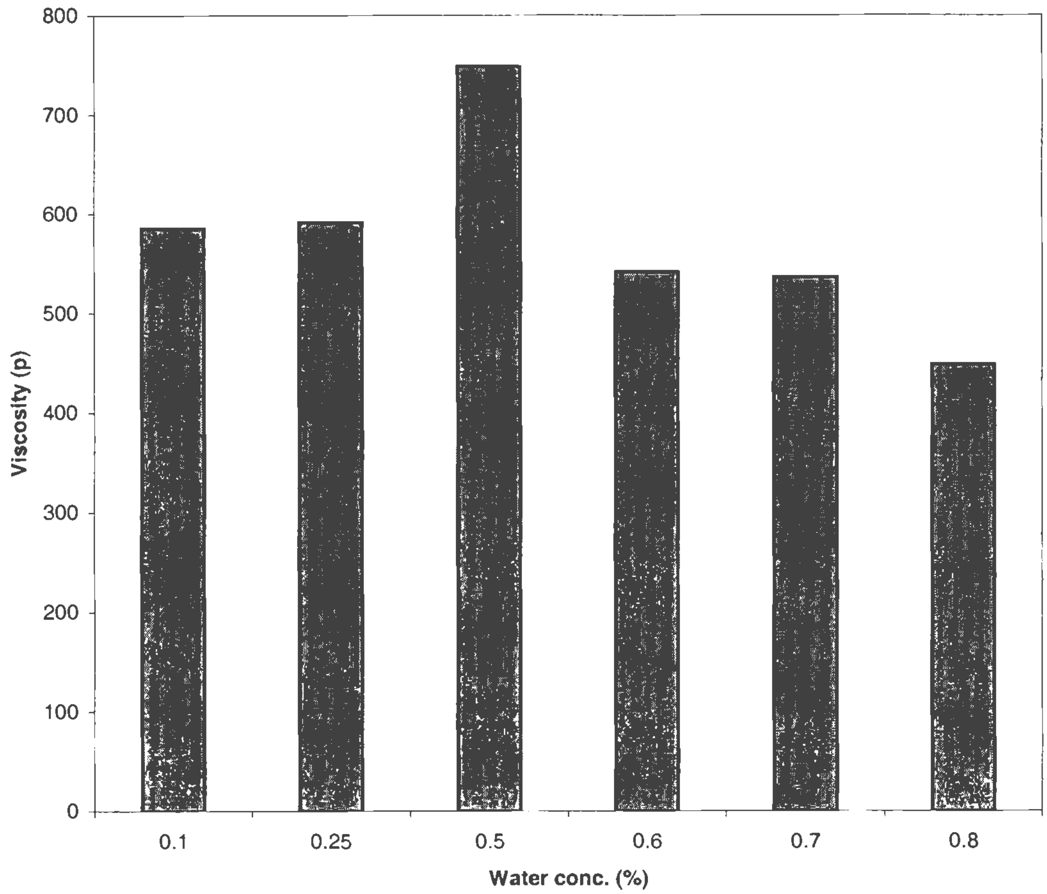


FIGURE 38. EFFECT OF WATER CONCENTRATION ON THE VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 6.5% KT BY CONE AND PLATE

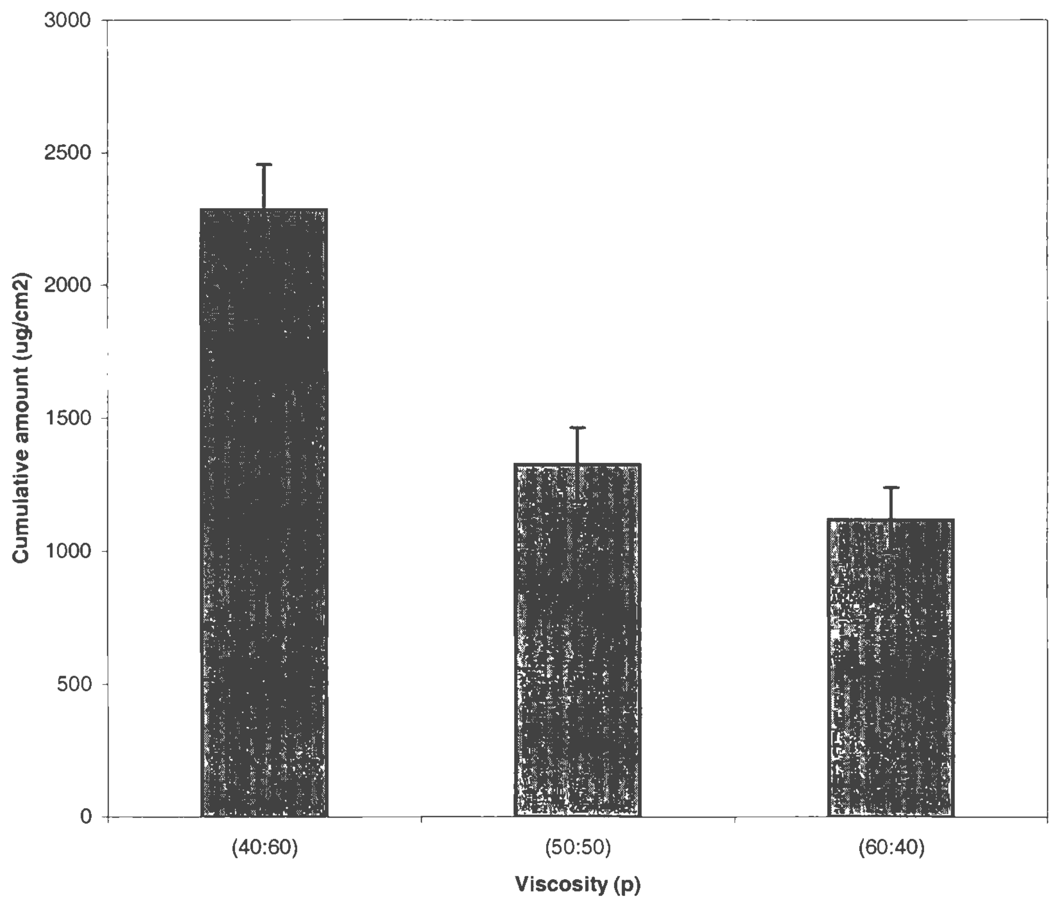


FIGURE 39. EFFECT OF VISCOSITY ON KT RELEASE ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER (MEAN ± SD, N = 2)

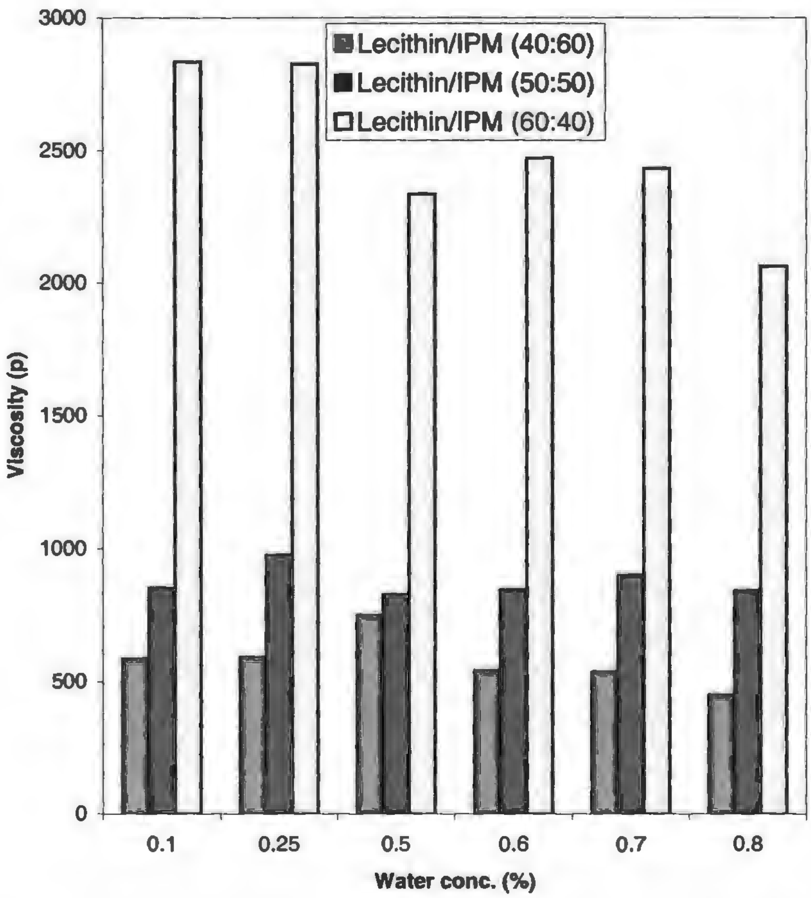


FIGURE 40. VISCOSITY OF ORGANOGEL SAMPLES WITH DIFFERENT COMPOSITIONS BY CONE AND PLATE VISCOMETER

4. CONCLUSION

As shown in Figure 41, among all the different organogel formulations tested, Formula 4, which is composed of 40% lecithin, 60% IPM containing 0.6% w/w of water and 6.5% w/w of ketorolac tromethamine showed the highest release profile. This formulation is the most desirable one based on the in vitro release studies. The mean cumulative amount of ketorolac from this optimum formula was 2555.757 ±192.55 ($\mu g/cm^2$).

Our study demonstrates that lecithin organogels are promising candidates for topical application of KT since they reduce the possibility of GI irritation, and side effects associated with oral administration of the drug. Other advantages of these organogels arising from their solubilization capacity, transparency, high thermodynamic stability and simplicity of manufacture. They have the ability to solubilize guest molecules of different chemico-physical properties (ware-insoluble, amphiphilic or water-soluble compounds). The transparency of organogels enables them to be visually assessed for microorganism growth and presence of undissolved drug. Their transparency is also of benefit in topical preparation when clear systems are more aesthetically pleasing. They are quickly absorbed by the skin without greasy shine. There is no significant change in the viscosity, color or appearance of organogels after a very long time at room temperature. Organogels are isotropic and thermoreversibe. At temperature > 40 °C, they become liquids with much lower viscosity, and high viscosity gels are again formed by cooling. The formation of organogels requires only the most basic mixing equipment. Their manufacture is not

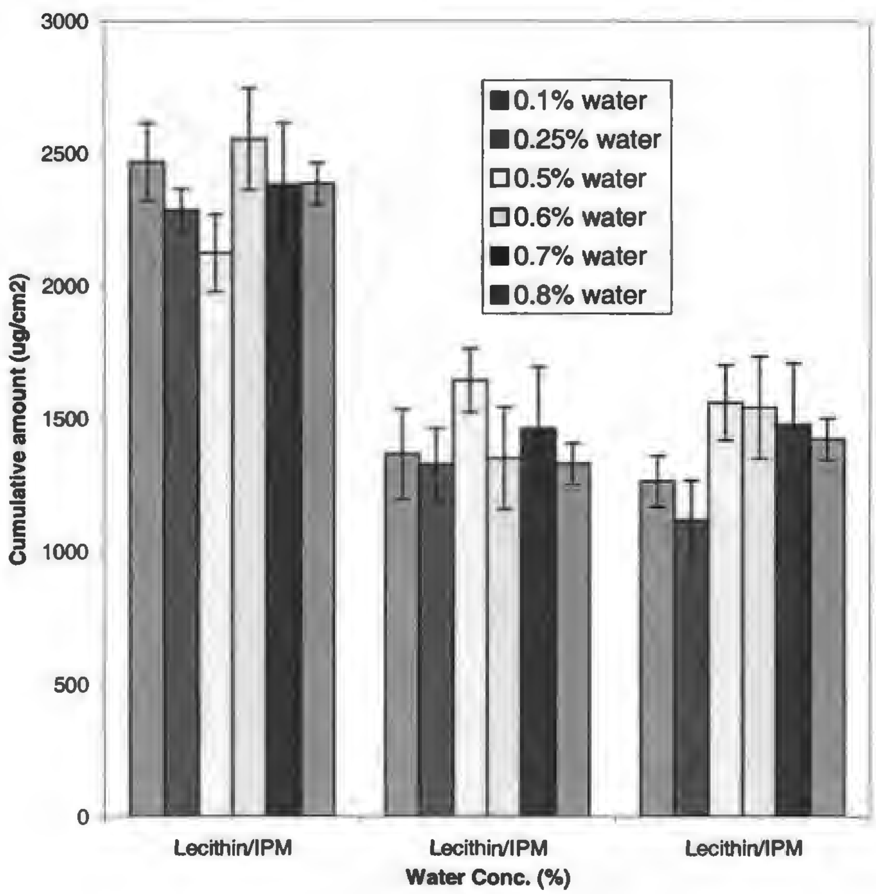


FIGURE 41. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM 6.5% KT ORGANOGELS OF DIFFERENT COMPOSITIONS (MEAN ± SD, N = 6)

so dependent on the careful control of manufacturing process. Composition of organogels is made of harmless compounds such as lecithin, fatty acid esters and water with no toxicity or irritation potential. And finally, Lecithin organogels have a high affinity for epidermal tissue, change the fluidity of tissue by hydration of stratum corneum and enhance the percutaneous absorption of drugs.

5. APPENDIX

TABLE 11. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT

Sample	Time	Abs.	ug/ml	ug/ 5.1	ug/ cm²	Cumulative amount	
	(h)						
1	0.5	0.198	4.418	22.534	35.439	35.438	**Average**
2	0.5	0.161	3.737	19.060	29.976	29.976	29.681
3	0.5	0.152	3.579	18.251	28.703	28.703	
4	0.5	0.135	3.267	16.663	26.206	26.206	**Std.Dev.**
5	0.5	0.160	3.727	19.008	29.894	29.894	3.149
6	0.5	0.146	3.475	17.720	27.869	27.869	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.151	3.563	18.173	28.581	64.019	**Average**
2	1	0.120	2.998	15.292	24.050	54.026	56.391
3	1	0.169	3.880	19.790	31.124	59.827	
4	1	0.129	3.162	16.127	25.363	51.569	**Std.Dev.**
5	1	0.139	3.343	17.050	26.814	56.707	4.828
6	1	0.122	3.033	15.468	24.326	52.195	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.247	5.301	27.035	42.517	106.536	**Average**
2	2	0.178	4.054	20.675	32.515	86.541	91.132
3	2	0.221	4.833	24.646	38.761	98.588	
4	2	0.159	3.711	18.926	29.764	81.334	**Std.Dev.**
5	2	0.162	3.769	19.221	30.230	86.937	9.443
6	2	0.193	4.322	22.040	34.662	86.857	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	0.807	15.496	79.028	124.287	230.823	**Average**
2	6	0.687	13.309	67.876	106.748	193.289	198.636
3	6	0.822	15.765	80.401	126.446	225.034	
4	6	0.571	11.192	57.079	89.768	171.101	**Std.Dev.**
5	6	0.572	11.218	57.213	89.979	176.916	24.524
6	6	0.694	13.440	68.542	107.796	194.653	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	0.723	13.953	71.160	111.913	342.736	**Average**
2	10	0.645	12.541	63.959	100.589	293.878	295.036
3	10	0.634	12.338	62.925	98.962	323.996	
4	10	0.554	10.895	55.563	87.384	258.486	**Std.Dev.**
5	10	0.469	9.344	47.655	74.948	251.863	35.589
6	10	0.673	13.042	66.513	104.605	299.258	

TABLE 11. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	18	1.380	25.914	132.163	207.853	550.589	**Average**
2	18	1.229	23.157	118.099	185.735	479.612	478.320
3	18	1.443	27.059	138.002	217.036	541.032	
4	18	1.128	21.316	108.710	170.968	429.453	**Std.Dev.**
5	18	0.978	18.595	94.833	149.143	401.006	59.371
6	18	1.114	21.067	107.439	168.970	468.228	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	26	1.206	22.737	115.956	182.364	732.953	**Average**
2	26	1.075	20.354	103.804	163.253	642.865	639.101
3	26	1.303	24.505	124.975	196.548	737.580	
4	26	1.127	21.305	108.656	170.883	600.336	**Std.Dev.**
5	26	0.739	14.254	72.696	114.330	515.336	85.402
6	26	0.897	17.119	87.308	137.309	605.538	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	29.681		3.149
1	56.391		4.828
2	91.132	91.132	9.443
6	198.636	198.636	24.524
10	295.036	295.036	35.589
18	478.320	478.320	59.371
26	639.102	639.102	85.402

TABLE 12. CUMULATIVE RELEASE OF KT ACROSS SILICONE ELASTOMER MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.035	1.442	7.355	11.567	11.567	**Average**
2	0.5	0.024	1.256	6.405	10.073	10.073	10.312
3	0.5	0.020	1.185	6.044	9.506	9.506	
4	0.5	0.019	1.164	5.934	9.333	9.333	**Std.Dev.**
5	0.5	0.035	1.448	7.383	11.611	11.611	1.021
6	0.5	0.022	1.219	6.218	9.780	9.780	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.019	1.157	5.900	9.279	20.846	**Average**
2	1	0.016	1.105	5.636	8.863	18.936	19.258
3	1	0.018	1.146	5.842	9.188	18.694	
4	1	0.014	1.067	5.442	8.558	17.891	**Std.Dev.**
5	1	0.016	1.102	5.619	8.836	20.447	1.141
6	1	0.017	1.116	5.692	8.952	18.732	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.024	1.251	6.381	10.036	30.882	**Average**
2	2	0.025	1.276	6.509	10.236	29.172	29.391
3	2	0.030	1.358	6.926	10.892	29.586	
4	2	0.020	1.176	5.999	9.435	27.326	**Std.Dev.**
5	2	0.020	1.177	6.002	9.439	29.887	1.169
6	2	0.029	1.342	6.844	10.763	29.495	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	0.054	1.800	9.181	14.439	45.321	**Average**
2	4	0.052	1.753	8.938	14.057	43.229	43.841
3	4	0.059	1.879	9.585	15.074	44.660	
4	4	0.058	1.871	9.542	15.007	42.332	**Std.Dev.**
5	4	0.053	1.769	9.023	14.190	44.077	1.0713
6	4	0.051	1.737	8.859	13.932	43.427	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	0.068	2.043	10.419	16.386	61.707	**Average**
2	6	0.062	1.934	9.863	15.512	58.741	59.867
3	6	0.069	2.077	10.592	16.658	61.318	
4	6	0.071	2.107	10.745	16.898	59.231	**Std.Dev.**
5	6	0.059	1.890	9.640	15.160	59.237	1.293
6	6	0.062	1.938	9.883	15.543	58.970	

TABLE 12. CONT'D

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	8	0.057	1.843	9.398	14.780	76.487	**Average**
2	8	0.051	1.737	8.857	13.930	72.671	74.035
3	8	0.062	1.945	9.920	15.601	76.919	
4	8	0.054	1.804	9.200	14.468	73.699	**Std.Dev.**
5	8	0.045	1.640	8.362	13.151	72.388	2.144
6	8	0.045	1.630	8.313	13.073	72.043	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	0.064	1.975	10.074	15.843	92.331	**Average**
2	10	0.064	1.973	10.060	15.821	88.492	91.074
3	10	0.079	2.252	11.486	18.064	94.983	
4	10	0.072	2.123	10.830	17.032	90.731	**Std.Dev.**
5	10	0.080	2.270	11.578	18.209	90.597	2.323
6	10	0.074	2.153	10.978	17.265	89.309	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	10.312		1.021
1	19.258		1.141
2	29.391	29.391	1.169
4	43.841	43.841	1.071
6	59.867	59.867	1.293
8	74.035	74.035	2.144
10	91.074	91.074	2.323

TABLE 13. EFFECT OF MEMBRANE ON KT RELEASE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT

	Silicone Elastomer		Cellulose Acetate	
Time	Average Cum.Amount	Std.Dev.	Average Cum.Amount	Std.Dev.
0.5	10.31	1.02	29.68	3.15
1	19.26	1.14	56.39	4.83
2	29.39	1.17	91.13	9.44
4	43.84	1.07		
6	59.87	1.29	198.63	24.52
8	74.03	2.14		
10	91.07	2.32	295.04	35.59
12				
18			478.32	59.37
26			639.1	5.4

TABLE 14. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT

Sample	Time	Abs.	ug/ml	ug/ 5.1	ug/ cm²	Cumulative amount	
	(h)						
1	0.5	0.198	4.418	22.534	35.439	35.438	**Average**
2	0.5	0.161	3.737	19.060	29.976	29.976	29.681
3	0.5	0.152	3.579	18.251	28.703	28.703	
4	0.5	0.135	3.267	16.663	26.206	26.206	**Std.Dev.**
5	0.5	0.160	3.727	19.008	29.894	29.894	3.149
6	0.5	0.146	3.475	17.720	27.869	27.869	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.151	3.563	18.173	28.581	64.019	**Average**
2	1	0.120	2.998	15.292	24.050	54.026	56.391
3	1	0.169	3.880	19.790	31.124	59.827	
4	1	0.129	3.162	16.127	25.363	51.569	**Std.Dev.**
5	1	0.139	3.343	17.050	26.814	56.707	4.828
6	1	0.122	3.033	15.468	24.326	52.195	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.247	5.301	27.035	42.517	106.536	**Average**
2	2	0.178	4.054	20.675	32.515	86.541	91.132
3	2	0.221	4.833	24.646	38.761	98.588	
4	2	0.159	3.711	18.926	29.764	81.334	**Std.Dev.**
5	2	0.162	3.769	19.221	30.230	86.937	9.443
6	2	0.193	4.322	22.040	34.662	86.857	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	0.807	15.496	79.028	124.287	230.823	**Average**
2	6	0.687	13.309	67.876	106.748	193.289	198.636
3	6	0.822	15.765	80.401	126.446	225.034	
4	6	0.571	11.192	57.079	89.768	171.101	**Std.Dev.**
5	6	0.572	11.218	57.213	89.979	176.916	24.524
6	6	0.694	13.440	68.542	107.796	194.653	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	0.723	13.953	71.160	111.913	342.736	**Average**
2	10	0.645	12.541	63.959	100.589	293.878	295.036
3	10	0.634	12.338	62.925	98.962	323.996	
4	10	0.554	10.895	55.563	87.384	258.486	**Std.Dev.**
5	10	0.469	9.344	47.655	74.948	251.863	35.589
6	10	0.673	13.042	66.513	104.605	299.258	

TABLE 14. CONT'D.

Sample	Time (h)	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
1	18	1.380	25.914	132.163	207.853	550.589	**Average**
2	18	1.229	23.157	118.099	185.735	479.612	478.320
3	18	1.443	27.059	138.002	217.036	541.032	
4	18	1.128	21.316	108.710	170.968	429.453	**Std.Dev.**
5	18	0.978	18.595	94.833	149.143	401.006	59.371
6	18	1.114	21.067	107.439	168.970	468.228	
Sample	**Time (h)**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	26	1.206	22.737	115.956	182.364	732.953	**Average**
2	26	1.075	20.354	103.804	163.253	642.865	639.101
3	26	1.303	24.505	124.975	196.548	737.580	
4	26	1.127	21.305	108.656	170.883	600.336	**Std.Dev.**
5	26	0.739	14.254	72.696	114.330	515.336	85.402
6	26	0.897	17.119	87.308	137.309	605.538	

Time (h)	Average cum. amount		Std.Dev.
0.5	29.681		3.149
1	56.391		4.828
2	91.132	91.132	9.443
6	198.636	198.636	24.524
10	295.036	295.036	35.589
18	478.320	478.320	59.371
26	639.102	639.102	85.402

TABLE 15. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.948	18.044		92.022	144.723	144.723	
2	0.5	1.133	21.421		109.246	171.811	171.811	**Average**
3	0.5	0.856	16.374		83.506	131.330	131.330	152.822
4	0.5	1.123	21.233		108.286	170.301	170.301	**Std.Dev.**
5	0.5	0.962	18.301		93.333	146.784	146.784	15.689
6	0.5	0.997	18.948		96.636	151.980	151.980	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	1	0.456	9.101		46.415	72.996	217.720	
2	1	0.452	9.034		46.072	72.458	244.268	**Average**
3	1	0.427	8.574		43.728	68.770	200.101	224.110
4	1	0.456	9.101		46.414	72.995	243.296	**Std.Dev.**
5	1	0.411	8.288		42.267	66.473	213.257	17.396
6	1	0.463	9.231		47.078	74.039	226.019	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	2	0.948	18.053		92.068	144.796	362.516	
2	2	0.952	18.124		92.434	145.371	389.639	**Average**
3	2	0.927	17.665		90.090	141.684	341.785	366.315
4	2	0.905	17.272		88.085	138.531	381.828	**Std.Dev.**
5	2	0.913	17.418		88.834	139.709	352.966	17.816
6	2	0.937	17.846		91.014	143.137	369.156	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	4	1.123	21.240	42.480	216.650	340.725	703.241	
2	4	1.073	20.327	40.653	207.331	326.069	715.708	**Average**
3	4	1.334	25.061	50.121	255.619	402.012	743.797	742.302
4	4	1.265	23.822	47.644	242.984	382.141	763.969	**Std.Dev.**
5	4	1.423	26.689	53.379	272.232	428.139	781.105	29.066
6	4	1.247	23.491	46.983	239.613	376.839	745.994	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	6	1.221	23.022	46.045	234.828	369.314	1072.554	
2	6	1.225	23.081	46.163	235.431	370.262	1085.970	**Average**
3	6	1.784	33.257	66.514	339.222	533.494	1277.291	1170.373
4	6	1.514	28.348	56.695	289.146	454.739	1218.708	**Std.Dev.**
5	6	1.618	30.237	60.473	308.413	485.040	1266.146	94.198
6	6	1.174	22.166	44.332	226.091	355.573	1101.568	

TABLE 15. CONT'D.

Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	8	1.313	24.768	49.536	252.635	397.319	1469.873	
2	8	1.439	27.047	54.095	275.884	433.882	1519.852	**Average**
3	8	1.095	20.798	41.596	212.140	333.632	1610.923	1551.097
4	8	1.026	19.537	39.073	199.273	313.396	1532.104	**Std.Dev.**
5	8	1.534	28.780	57.561	293.560	461.681	1727.826	103.722
6	8	1.132	21.472	42.943	219.011	344.438	1446.005	
Sample	**Time**	**Abs.**	**ug/ml**	**3*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	10	1.172	22.124	66.371	338.494	532.349	2002.223	
2	10	1.012	19.216	57.647	293.999	462.372	1982.224	**Average**
3	10	1.327	24.948	74.843	381.702	600.301	2211.224	2116.640
4	10	1.313	24.681	74.044	377.623	593.888	2125.992	**Std.Dev.**
5	10	1.231	23.197	69.592	354.918	558.179	2286.006	117.878
6	10	1.432	26.854	80.562	410.866	646.168	2092.174	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	12	1.102	20.854	41.707	212.707	334.524	2336.747	
2	12	1.039	19.705	39.409	200.988	316.094	2298.318	**Average**
3	12	1.265	23.823	47.645	242.990	382.150	2593.374	2469.334
4	12	1.032	19.581	39.162	199.725	314.108	2440.099	**Std.Dev.**
5	12	1.315	24.732	49.463	252.263	396.733	2682.739	147.397
6	12	1.233	23.225	46.449	236.890	372.557	2464.731	

Time	Average cum. amnt.		Std.Dev.
(h)			
0.5	152.822		15.689
1	224.110		17.396
2	366.315		17.816
4	742.302		29.066
6	1170.373	1170.373	94.198
8	1551.097	1551.097	103.722
10	2116.640	2116.640	117.878
12	2469.334	2469.334	147.397

TABLE 16. EFFECT OF KT CONCENTRATION ON ITS TRANSDERMAL FLUX ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER

	1% KT Conc.		6.5% KT Conc.	
Time	Average Cum.Amount	Std.Dev.	Average Cum.Amount	Std.Dev.
0.5	29.68	3.15	152.82	15.69
1	56.39	4.83	224.11	17.4
2	91.13	9.44	366.31	17.82
4			742.3	29.07
6	198.64	24.52	1170.37	94.2
8			1551.1	103.72
10	295.04	35.59	2116.64	117.88
12			2469.33	147.4
18	478.32	59.37		
26	639.1	85.402		

TABLE 17. PERMEATION OF KT THROUGH GUINEA PIG SKIN FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 1% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0	0	0	0	0	
2	0.5	0	0	0	0	0	**Average**
3	0.5	0	0	0	0	0	0
4	0.5	0	0	0	0	0	**Std.Dev.**
5	0.5	0	0	0	0	0	0
6	0.5	0	0	0	0	0	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0	0	0	0	0	
2	1	0	0	0	0	0	**Average**
3	1	0	0	0	0	0	0
4	1	0	0	0	0	0	**Std.Dev.**
5	1	0	0	0	0	0	0
6	1	0	0	0	0	0	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0	0	0	0	0	
2	2	0	0	0	0	0	**Average**
3	2	0	0	0	0	0	1.346
4	2	0	0	0	0	0	**Std.Dev.**
5	2	0	0	0	0	0	3.298
6	2	0.011	1.007	5.136	8.077	8.077	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	0.022	1.211	6.175	9.711	9.711	
2	4	0.033	1.411	7.196	11.317	11.317	**Average**
3	4	0.054	1.801	9.184	14.444	14.444	11.723
4	4	0.000	0.815	4.154	6.533	6.533	**Std.Dev.**
5	4	0.000	0.815	4.154	6.533	6.533	5.780
6	4	0.049	1.711	8.726	13.723	21.800	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	0.022	1.215	6.194	9.742	19.453	
2	6	0.041	1.557	7.940	12.488	23.805	**Average**
3	6	0.074	2.158	11.007	17.310	31.754	24.207
4	6	0.021	1.202	6.132	9.644	16.177	**Std.Dev.**
5	6	0.000	0.815	4.154	6.533	13.067	10.487
6	6	0.087	2.392	12.201	19.188	40.988	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	8	0.150	3.611	18.415	28.962	48.414	
2	8	0.133	3.307	16.866	26.525	50.330	**Average**
3	8	0.111	2.911	14.848	23.352	55.106	49.762
4	8	0.084	2.420	12.341	19.409	35.586	**Std.Dev.**
5	8	0.039	1.597	8.143	12.806	25.873	19.619
6	8	0.241	5.270	26.879	42.273	83.261	

TABLE 17. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	10	0.130	3.181	16.223	25.514	73.929	
2	10	0.162	3.761	19.183	30.169	80.500	**Average**
3	10	0.132	3.220	16.423	25.828	80.934	75.118
4	10	0.099	2.623	13.375	21.035	56.621	**Std.Dev.**
5	10	0.024	1.243	6.340	9.971	35.844	29.086
6	10	0.227	4.939	25.191	39.618	122.879	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	0.125	3.091	15.765	24.793	98.722	
2	12	0.172	3.946	20.124	31.649	112.149	**Average**
3	12	0.134	3.250	16.573	26.064	106.998	100.790
4	12	0.099	2.623	13.375	21.035	77.656	**Std.Dev.**
5	12	0.027	1.314	6.700	10.536	46.380	38.774
6	12	0.229	4.982	25.407	39.958	162.837	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	18	0.433	8.693	44.333	69.723	168.445	
2	18	0.497	9.851	50.242	79.015	191.164	**Average**
3	18	0.358	7.327	37.368	58.768	165.765	166.146
4	18	0.255	5.443	27.762	43.661	121.317	**Std.Dev.**
5	18	0.206	4.566	23.288	36.625	83.005	62.868
6	18	0.671	13.009	66.348	104.345	267.182	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	24	0.481	9.563	48.773	76.705	245.150	
2	24	0.569	11.156	56.898	89.483	280.647	**Average**
3	24	0.444	8.895	45.363	71.343	237.108	242.886
4	24	0.341	7.013	35.765	56.247	177.564	**Std.Dev.**
5	24	0.272	5.766	29.409	46.251	129.256	88.974
6	24	0.781	15.012	76.561	120.407	387.589	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	0.000		0.000
1	0.000		0.000
2	1.346		3.298
4	11.723		5.780
6	24.207	24.207	10.487
8	49.762	49.762	19.619
10	75.118	75.118	29.086
12	100.790	100.790	38.774
18	166.146	166.146	62.868
24	242.886	242.886	88.974

TABLE 18. PERMEATION OF KT THROUGH GUINEA PIG SKIN FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY HPLC

Sample	Time	AUP	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0	0	0	0	0	
2	0.5	0	0	0	0	0	**Average**
3	0.5	0	0	0	0	0	0
4	0.5	0	0	0	0	0	**Std.Dev.**
5	0.5	0	0	0	0	0	0
6	0.5	0	0	0	0	0	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0	0	0	0	0	
2	1	0	0	0	0	0	**Average**
3	1	0	0	0	0	0	0
4	1	0	0	0	0	0	**Std.Dev.**
5	1	0	0	0	0	0	0
6	1	0	0	0	0	0	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0	0	0	0	0	
2	2	0	0	0	0	0	**Average**
3	2	0	0	0	0	0	0
4	2	0	0	0	0	0	**Std.Dev.**
5	2	0	0	0	0	0	0
6	2	0	0	0	0	0	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	50330	0.906	4.622	7.269	7.269	
2	4	80761	1.538	7.844	12.336	12.336	**Average**
3	4	92046	1.772	9.039	14.215	14.215	8.562
4	4	14698	0.167	0.849	1.336	1.336	**Std.Dev.**
5	4	93672	1.806	9.211	14.486	14.486	6.032
6	4	17054	0.215	1.099	1.728	1.728	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	109619	2.137	10.900	17.142	24.411	
2	6	144452	2.860	14.588	22.942	35.278	**Average**
3	6	218999	4.408	22.481	35.355	49.571	29.204
4	6	61445	1.137	5.799	9.120	10.456	**Std.Dev.**
5	6	175260	3.500	17.850	28.072	42.558	15.929
6	6	74072	1.399	7.136	11.222	12.951	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	8	179690	3.592	18.319	28.810	53.220	
2	8	232315	4.684	23.890	37.573	72.851	**Average**
3	8	437608	8.946	45.627	71.757	121.328	66.642
4	8	135966	2.684	13.689	21.529	31.984	**Std.Dev.**
5	8	297030	6.028	30.742	48.349	90.907	35.704
6	8	106442	2.071	10.563	16.613	29.563	

TABLE 18. CONT'D.

Sample	Time	AUP	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
1	10	228223	4.599	23.457	36.891	90.111	
2	10	266200	5.388	27.478	43.215	116.066	**Average**
3	10	566058	11.613	59.227	93.146	214.474	117.707
4	10	180632	3.611	18.418	28.966	60.951	**Std.Dev.**
5	10	475256	9.728	49.613	78.026	168.933	62.957
6	10	163665	3.259	16.622	26.141	55.704	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	12	237952	4.801	24.487	38.511	128.623	
2	12	284574	5.769	29.424	46.275	162.340	**Average**
3	12	671185	13.796	70.358	110.652	325.126	183.970
4	12	166660	3.321	16.939	26.640	87.591	**Std.Dev.**
5	12	775652	15.964	81.419	128.047	296.980	102.026
6	12	291654	5.916	30.173	47.453	103.158	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	16	570962	11.715	59.746	93.963	222.585	
2	16	579779	11.898	60.680	95.431	257.771	**Average**
3	16	2E+06	35.778	182.466	286.964	612.090	335.940
4	16	368976	7.522	38.360	60.329	147.920	**Std.Dev.**
5	16	2E+06	36.858	187.975	295.627	592.607	209.734
6	16	484142	9.913	50.554	79.506	182.664	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	20	1E+06	22.762	116.085	182.566	405.152	
2	20	1E+06	23.441	119.550	188.016	445.787	**Average**
3	20	3E+06	61.692	314.631	494.820	1106.909	600.377
4	20	829010	17.072	87.068	136.932	284.852	**Std.Dev.**
5	20	3E+06	52.073	265.574	417.668	1010.276	360.335
6	20	1E+06	20.774	105.946	166.622	349.285	
Sample	**Time**	**AUP**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
1	24	205604	4.130	21.062	33.125	438.276	
2	24	196584	3.943	20.107	31.623	477.410	**Average**
3	24	927927	19.126	97.541	153.403	1260.313	662.528
4	24	526784	10.798	55.069	86.606	371.458	**Std.Dev.**
5	24	193912	3.887	19.824	31.178	1041.454	386.403
6	24	228719	4.610	23.510	36.974	386.259	

Time	Average Cum. amount		Std.Dev.
0.5	0.000		0.000
1	0.000		0.000
2	0.000		0.000
4	8.562		6.032
6	29.204		15.929
8	66.642	66.642	35.704
10	117.707	117.707	62.957
12	183.970	183.970	102.026
16	335.940	335.940	209.734
20	600.377		360.335
24	662.53		386.403

TABLE 19. COMPARISON OF CELLULOSE ACETATE MEMBRANE WITH GUINEA PIG SKIN ON KT RELEASE FROM LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT

	Guinea Pig Skin		**Cellulose Acetate**	
Time	Average Cum.Amount	Std.Dev.	Average Cum.Amount	Std.Dev.
0.5	0.000	0.000	152.822	15.689
1	0.000	0.000	224.110	17.396
2	0.000	0.000	366.315	17.816
4	8.562	6.032	742.302	29.066
6	29.204	15.929	1170.373	94.198
8	66.642	35.704	1551.097	103.722
10	117.707	62.957	2116.640	117.878
12	183.970	102.026	2469.334	147.397
16	335.940	209.734		
20	600.377	360.335		
24	662.530	386.403		

TABLE 20. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.440	8.811		44.937	70.673	70.673	
2	0.5	0.563	11.055		56.380	88.668	88.668	**Average**
3	0.5	0.509	10.075		51.384	80.811	80.811	84.797
4	0.5	0.624	12.166		62.046	97.580	97.580	**Std.Dev.**
5	0.5	0.651	12.655		64.538	101.499	101.499	13.455
6	0.5	0.432	8.671		44.223	69.549	69.549	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	1	0.262	5.580		28.459	44.758	115.431	
2	1	0.330	6.808		34.720	54.605	143.273	**Average**
3	1	0.276	5.834		29.755	46.796	127.607	135.350
4	1	0.327	6.768		34.517	54.284	151.864	**Std.Dev.**
5	1	0.343	7.045		35.927	56.503	158.002	18.346
6	1	0.273	5.781		29.485	46.371	115.921	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	2	0.802	15.404		78.558	123.549	238.980	
2	2	0.942	17.935		91.467	143.849	287.122	**Average**
3	2	0.827	15.853		80.849	127.151	254.759	271.488
4	2	1.009	19.153		97.682	153.624	305.488	**Std.Dev.**
5	2	1.016	19.295		98.403	154.758	312.760	35.148
6	2	0.736	14.200		72.422	113.898	229.818	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	4	1.593	29.777		151.863	238.835	477.814	
2	4	1.994	37.066		189.037	297.297	584.420	**Average**
3	4	1.608	30.057		153.289	241.078	495.836	533.034
4	4	2.001	37.203		189.737	298.399	603.887	**Std.Dev.**
5	4	1.823	33.962		173.205	272.400	585.160	65.614
6	4	1.472	27.587		140.692	221.267	451.085	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	6	1.198	22.599	45.197	230.505	362.515	840.329	
2	6	1.519	28.441	56.881	290.094	456.230	1040.649	**Average**
3	6	1.136	21.474	42.949	219.039	344.481	840.318	915.320
4	6	1.454	27.252	54.504	277.969	437.161	1041.047	**Std.Dev.**
5	6	1.229	23.156	46.312	236.193	371.460	956.620	113.787
6	6	1.059	20.065	40.129	204.660	321.869	772.954	

TABLE 20. CONT'D.

Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	8	1.493	28.038	56.077	285.991	449.778	1290.107	
2	8	1.631	30.545	61.090	311.558	489.987	1530.636	**Average**
3	8	1.393	26.222	52.445	267.468	420.647	1260.964	1351.132
4	8	1.585	29.701	59.401	302.947	476.445	1517.492	**Std.Dev.**
5	8	1.384	26.054	52.107	265.747	417.940	1374.560	154.835
6	8	1.186	22.447	44.893	228.955	360.077	1133.030	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	10	1.630	30.445	60.889	310.536	488.380	1778.487	
2	10	1.653	30.867	61.734	314.844	495.155	2025.791	**Average**
3	10	1.637	30.577	61.154	311.884	490.500	1751.464	1821.655
4	10	1.564	29.254	58.509	298.395	469.284	1986.777	**Std.Dev.**
5	10	1.443	27.048	54.096	275.891	433.894	1808.454	164.197
6	10	1.484	27.798	55.597	283.543	445.928	1578.958	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	12	1.564	29.256	58.512	298.409	469.308	2247.795	
2	12	1.616	30.197	60.393	308.005	484.398	2510.189	**Average**
3	12	1.680	31.354	62.707	319.807	502.960	2254.424	2286.971
4	12	1.504	28.151	56.302	287.139	451.583	2438.360	**Std.Dev.**
5	12	1.450	27.171	54.341	277.140	435.857	2244.311	170.221
6	12	1.490	27.914	55.829	284.727	447.789	2026.747	

Time	Average cum. amnt		Std.Dev.
(h)			
0.5	84.797		13.455
1	135.350		18.346
2	271.488		35.148
4	533.034		65.614
6	915.320	915.320	113.787
8	1351.132	1351.132	154.835
10	1821.655	1821.655	164.197
12	2286.971	2286.971	170.221

TABLE 21. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANEFROM LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.602	11.753	59.941	94.269	94.269	
2	0.5	0.614	11.971	61.055	96.020	96.020	Average
3	0.5	0.513	10.149	51.761	81.405	81.405	92.550
4	0.5	0.763	14.683	74.884	117.770	117.770	Std.Dev.
5	0.5	0.558	10.962	55.904	87.921	87.921	14.219
6	0.5	0.489	9.714	49.541	77.914	77.914	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.329	6.789	34.623	54.451	148.720	
2	1	0.288	6.054	30.877	48.561	144.581	Average
3	1	0.257	5.493	28.012	44.055	125.460	144.023
4	1	0.375	7.624	38.884	61.153	178.923	Std.Dev.
5	1	0.324	6.714	34.242	53.853	141.773	19.820
6	1	0.276	5.831	29.736	46.765	124.679	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.932	17.762	90.588	142.467	291.188	
2	2	0.856	16.377	83.522	131.355	275.936	Average
3	2	0.709	13.713	69.939	109.993	235.453	277.002
4	2	0.984	18.699	95.365	149.980	328.903	Std.Dev.
5	2	0.984	18.702	95.379	150.002	291.775	35.506
6	2	0.737	14.223	72.535	114.076	238.755	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.589	29.709	151.515	238.287	529.474	
2	4	1.494	27.976	142.678	224.389	500.325	Average
3	4	1.201	22.651	115.522	181.682	417.134	494.806
4	4	1.606	30.014	153.072	240.737	569.639	Std.Dev.
5	4	1.582	29.585	150.885	237.296	529.072	61.915
6	4	1.220	22.995	117.276	184.440	423.194	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.497	28.034	142.972	224.851	754.325	
2	6	1.409	26.433	134.808	212.012	712.337	Average
3	6	1.180	22.261	113.531	178.549	595.684	700.962
4	6	1.501	28.096	143.291	225.354	794.994	Std.Dev.
5	6	1.501	28.099	143.304	225.375	754.446	86.264
6	6	1.126	21.293	108.597	170.790	593.984	

TABLE 21. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.367	25.745	131.297	206.491	960.816	
2	8	1.355	25.528	130.192	204.752	917.089	**Average**
3	8	1.167	22.099	112.707	177.254	772.938	899.919
4	8	1.464	27.511	140.307	220.661	1015.655	**Std.Dev.**
5	8	1.395	26.245	133.850	210.506	964.952	105.012
6	8	1.145	21.703	110.687	174.077	768.061	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.425	26.717	136.256	214.290	1175.106	
2	10	1.397	26.215	133.694	210.261	1127.350	**Average**
3	10	1.255	23.632	120.521	189.544	962.482	1108.63
4	10	1.571	29.380	149.840	235.653	1251.308	**Std.Dev.**
5	10	1.438	26.955	137.469	216.197	1181.149	122.904
6	10	1.233	23.234	118.492	186.353	954.414	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.397	26.220	133.721	210.303	1385.409	
2	12	1.488	27.869	142.130	223.527	1350.877	**Average**
3	12	1.334	25.077	127.890	201.133	1163.615	1327.03
4	12	1.640	30.633	156.231	245.704	1497.011	**Std.Dev.**
5	12	1.511	28.283	144.242	226.849	1407.998	137.800
6	12	1.346	25.293	128.995	202.870	1157.283	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	92.550		14.219
1	144.023		19.820
2	277.002	277.002	35.506
4	494.806	494.806	61.915
6	700.962	700.962	86.264
8	899.919	899.919	105.012
10	1108.635	1108.635	122.904
12	1327.032	1327.032	137.800

TABLE 22. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.557	10.949	55.841	87.820	87.820	
2	0.5	0.426	8.554	43.624	68.608	114.332	**Average**
3	0.5	0.515	10.179	51.914	81.645	101.361	102.362
4	0.5	0.355	7.262	37.035	58.245	84.583	**Std.Dev.**
5	0.5	0.448	8.956	45.676	71.835	98.688	16.196
6	0.5	0.501	9.928	50.632	79.629	127.387	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.395	7.998	40.790	64.151	151.971	
2	1	0.328	6.786	34.609	54.429	168.761	**Average**
3	1	0.369	7.526	38.381	60.361	161.722	159.353
4	1	0.277	5.851	29.839	46.927	131.510	**Std.Dev.**
5	1	0.305	6.362	32.448	51.031	149.719	20.547
6	1	0.401	8.110	41.359	65.045	192.433	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.766	14.739	75.170	118.220	270.191	
2	2	0.695	13.442	68.554	107.815	276.576	**Average**
3	2	0.735	14.174	72.288	113.688	275.410	272.616
4	2	0.671	13.019	66.396	104.420	235.930	**Std.Dev.**
5	2	0.708	13.685	69.795	109.766	259.486	26.894
6	2	0.817	15.668	79.906	125.668	318.100	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	1.177	22.221	113.328	178.230	448.421	
2	4	1.068	20.225	103.149	162.222	438.798	**Average**
3	4	1.206	22.744	115.996	182.427	457.837	430.863
4	4	0.865	16.546	84.384	132.710	368.640	**Std.Dev.**
5	4	0.913	17.422	88.850	139.735	399.221	39.206
6	4	1.012	19.220	98.022	154.159	472.259	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	1.060	20.086	102.437	161.102	609.523	
2	6	1.092	20.678	105.457	165.852	604.649	**Average**
3	6	1.156	21.834	111.353	175.125	632.962	583.120
4	6	0.796	15.286	77.957	122.602	491.242	**Std.Dev.**
5	6	0.868	16.598	84.650	133.129	532.349	57.754
6	6	1.023	19.416	99.023	155.734	627.993	

TABLE 22. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.225	23.158	118.106	185.745	795.268	
2	8	1.285	24.260	123.724	194.581	799.230	**Average**
3	8	1.309	24.685	125.896	197.996	830.958	760.484
4	8	0.909	17.409	88.788	139.637	630.879	**Std.Dev.**
5	8	1.075	20.438	104.235	163.930	696.279	78.839
6	8	1.201	22.728	115.912	182.294	810.288	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.133	21.415	109.216	171.764	967.032	
2	10	1.170	22.087	112.645	177.157	976.387	**Average**
3	10	1.222	23.036	117.482	184.763	1015.722	923.934
4	10	0.819	15.698	80.058	125.907	756.786	**Std.Dev.**
5	10	1.011	19.200	97.920	153.999	850.278	99.253
6	10	1.101	20.835	106.257	167.110	977.398	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.302	24.489	124.893	196.420	1163.452	
2	12	1.365	25.642	130.772	205.665	1182.052	**Average**
3	12	1.485	27.811	141.837	223.066	1238.788	1118.46
4	12	1.021	19.370	98.785	155.359	912.145	**Std.Dev.**
5	12	1.249	23.528	119.993	188.712	1038.990	120.549
6	12	1.312	24.675	125.845	197.916	1175.314	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	102.362		16.196
1	159.353	159.353	20.547
2	272.616	272.616	26.894
4	430.863	430.863	39.206
6	583.120	583.120	57.754
8	760.484	760.484	78.839
10	923.934	923.934	99.253
12	1118.457	1118.457	120.549

TABLE 23. EFFECT OF LECITHIN CONCENTRATION ON KT RELEASE FROM LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT

	Lecithin/IPM(40:60)		Lecithin/IPM(50:50)		Lecithin/IPM(60:40)	
Time	Average Cum.Amnt.	Std.Dev	Average Cum.Amnt.	Std.Dev	Average Cum.Amnt.	Std.Dev.
0.5	84.8	13.46	92.55	14.22	102.36	16.2
1	135.35	18.35	144.02	19.82	159.35	20.55
2	271.49	35.15	277	35.51	272.62	26.89
4	533.03	65.61	494.81	61.92	430.86	39.21
6	915.32	113.8	700.96	86.26	583.12	57.75
8	1351.13	154.8	899.92	105	760.48	78.84
10	1821.66	164.2	1108.63	122.9	923.93	99.25
12	2286.97	170.2	1327.03	137.8	1118.46	120.55

TABLE 24. RELEASE PROFILE OF KT FROM LECITHIN:IPM (40:60) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT

	0.1% Water Conc.		0.25%Water Conc.		0.5% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	152.82	15.69	84.80	13.46	147.35	23.07
1	224.11	17.40	135.35	18.35	216.45	24.88
2	366.31	17.82	271.49	35.15	350.71	71.59
4	742.30	29.07	533.03	65.61	669.21	65.25
6	1170.37	94.20	915.32	113.79	1059.35	68.71
8	1551.10	103.72	1351.13	154.83	1450.72	71.91
10	2116.64	117.88	1821.66	164.20	1791.67	79.43
12	2469.33	147.40	2286.97	170.22	2124.48	96.22

	0.6% Water Conc.		0.7% Water Conc.		0.8% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	95.18	13.61	99.41	8.94	73.46	9.40
1	169.16	29.77	170.8	13.76	142.88	17.74
2	280.84	61.54	297.02	22.55	241.26	29.70
4	707.52	128.77	555.85	46.06	496.84	65.61
6	1206.9	140.92	920.36	117.91	889.09	54.30
8	1648.37	168.74	1382.10	176.01	1353.16	63.14
10	2099.12	176.10	1835.81	209.67	1856.69	72.37
12	2555.76	192.55	2383.48	233.56	2388.26	78.07

TABLE 25. RELEASE PROFILE OF KT FROM LECITHIN:IPM (50:50) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT

	0.1% Water Conc.		0.25%Water Conc.		0.5% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	116.94	22.11	92.55	14.22	84.26	15.51
1	202.57	62.90	144.02	19.82	157.67	22.48
2	389.43	116.22	277.00	35.51	272.20	36.59
4	583.20	105.74	494.81	61.92	546.53	57.92
6	777.58	90.90	700.96	86.26	817.24	87.52
8	976.58	85.22	899.92	105.01	1099.93	108.09
10	1172.10	81.21	1108.63	122.90	1365.74	130.31
12	1366.66	80.86	1327.03	137.80	1644.62	149.33

	0.6% Water Conc.		0.7% Water Conc.		0.8% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	92.33	14.20	98.22	7.69	107.16	19.60
1	149.56	17.17	162.98	14.17	162.62	29.11
2	247.79	24.33	278.84	25.44	293.45	36.11
4	457.98	46.01	509.53	38.90	547.21	48.06
6	660.79	66.40	725.08	51.25	744.85	70.65
8	888.64	88.53	964.41	66.70	933.25	76.53
10	1113.83	108.04	1204.05	82.16	1133.17	74.98
12	1351.01	131.06	1462.15	94.67	1329.88	71.20

TABLE 26. RELEASE PROFILE OF KT FROM LECITHIN:IPM (60:40) CONTAINING DIFFERENT WATER AMOUNTS AND 6.5% KT

	0.1% Water Conc.		0.25%Water Conc.		0.5% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	104.35	26.52	102.36	16.20	105.14	12.23
1	163.72	35.64	159.35	20.55	156.46	11.26
2	272.98	49.18	272.62	26.89	300.39	27.50
4	478.67	69.40	430.86	39.21	548.08	59.23
6	672.72	93.93	583.12	57.75	825.60	81.40
8	874.93	114.91	760.48	78.84	1077.48	102.89
10	1061.90	129.98	923.93	99.25	1316.70	122.77
12	1264.94	147.28	1118.46	120.55	1560.72	141.37

	0.6% Water Conc.		0.7% Water Conc.		0.8% Water Conc.	
Time	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev	Average Cum.Amnt	Std.Dev.
0.5	94.20	3.23	92.92	15.00	87.57	17.09
1	151.33	6.11	154.70	24.05	157.00	28.24
2	265.73	5.84	269.96	36.36	243.10	48.10
4	522.33	19.06	518.56	58.67	494.29	72.39
6	797.86	27.37	780.38	82.31	742.56	98.60
8	1033.75	32.79	1005.79	102.30	954.29	132.15
10	1293.00	33.45	1246.81	116.81	1188.49	163.50
12	1542.80	34.13	1476.27	130.26	1423.23	181.94

TABLE 27. EFFECT OF WATER CONCENTRATION ON KT RELEASE FROM LECITHIN:IPM (40:60) CONTAINING 6.5% KT

Water Conc. (%)	Q12 (ug/cm²)	Std.Dev.
0.1	2469.33	147.4
0.25	2286.97	170.22
0.5	2124.48	96.22
0.6	2555.757	192.55
0.7	2383.48	233.56
0.8	2388.26	78.07

TABLE 28. EFFECT OF WATER CONCENTRATION ON KT RELEASE FROM LECITHIN:IPM (50:50) CONTAINING 6.5% KT

Water Conc.(%)	Q12(ug/cm²)	Std.Dev.
0.1	1366.66	80.86
0.25	1327.03	137.80
0.5	1644.62	149.33
0.6	1351.01	131.06
0.7	1462.15	94.66
0.8	1329.88	71.20

TABLE 29. EFFECT OF WATER CONCENTRATION ON KT RELEASE FROM LECITHIN:IPM (60:40) CONTAINING 6.5% KT

Water Conc.(%)	Q12 (ug/cm^2)	Std.Dev.
0.1	1264.94	147.28
0.25	1118.46	120.55
0.5	1560.72	141.37
0.6	1542.80	34.13
0.7	1476.27	130.26
0.8	1423.23	181.94

TABLE 30. EFFECT OF VISCOSITY ON KT RELEASE FROM ORGANOGELS WITH DIFFERENT LECITHIN CONCENTRATION BY CYLINDRICAL VISCOMETER

Lecithin/IPM	Mean Viscosity (p)	Mean Cum.Amount (ug/cm2)	Std.Dev.
(40:60)	418.8	2286.97	170.22
(50:50)	951.76	1327.032	137.8
(60:40)	1832.7	1118.46	120.55

TABLE 31. EFFECT OF LECITHIN CONCENTRATION ON VISCOSITY C LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

Sample	Viscosity 1 (p)	Viscosity 2 (p)	Mean viscosity (p)	Std.Dev.
Lecithin/IPM				
(40:60)	338.08	499.51	418.80	114.15
(50:50)	933.58	969.93	951.76	25.70
(60:40)	1578.9	2086.5	1832.70	358.93

Sample	Mean Viscosity (p)	Std.Dev.
Lecithin/IPM		
(40:60)	418.80	114.15
(50:50)	951.76	25.70
(60:40)	1832.70	358.93

TABLE 32. EFFECT OF LECITHIN CONCENTRATION ON THE VISCOSITY OF LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

Sample	Viscosity (p)
Lecithin/IPM	
(40:60)	591.98
(50:50)	947.61
(60:40)	2825

TABLE 33. EFFECT OF THE SHEAR RATE ON VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.6	9.44	0.2	47184
0.6	4.2	66.1	1.2	55048
1.1	8.9	140	2.2	63627
1.6	13.7	215.5	3.2	67336
2.1	18.5	291	4.2	69278
2.6	23.3	366.5	5.2	70474
3.1	28.2	443.5	6.2	71537
3.6	33	519	7.2	72087
4.1	37.5	589.8	8.2	71927
4.6	42.5	668.4	9.2	72657
5.1	47.5	747.1	10.2	73243
5.6	51.9	816.3	11.2	72882
6.1	56.6	890.2	12.2	72968
6.6	61.6	968.8	13.2	73397
7.1	66.8	1051	14.2	73988
7.6	71.1	1118	15.2	73570
8.1	75.6	1189	16.2	73397
8.6	80.6	1268	17.2	73702
9.1	85.3	1342	18.2	73714
9.6	90.1	1417	19.2	73807
10.0	94.1	1480	20.0	74000
9.5	92.5	1455	19.0	76571
9.0	87.7	1379	18.0	76630
8.5	82.7	1301	17.0	76512
8.0	78.1	1228	16.0	76772
7.5	73.6	1158	15.0	77172
7.0	68.7	1081	14.0	77180
6.5	63.9	1005	13.0	77309
6.0	59.0	928	12.0	77329
5.5	54.7	860.3	11.0	78211
5.0	49.9	784.8	10.0	78483
4.5	44.9	706.2	9.0	78465
4.0	40.2	632.3	8.0	79033
3.5	35.3	555.2	7.0	79314
3.0	30.7	482.8	6.0	80475
2.5	25.8	405.8	5.0	81156
2.0	21.2	333.4	4.0	83358
1.5	16.2	254.8	3.0	84931
1.0	11.5	180.9	2.0	90436
0.5	6.7	105.4	1.0	105378
0.1	2.4	37.7	0.2	188736

TABLE 34. EFFECT OF WATER CONCENTRATION ON VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 6.5% KT BY CYLINDRICAL VISCOMETER

Water Conc.(%)	Viscosity 1 (p)	Viscosity 2 (p)	Mean Viscosity (p)	Std.Dev.
0.1	450.46	759.92	605.19	218.82
0.25	338.08	499.51	418.80	114.15
0.5	488	634.69	561.35	103.73
0.7	293	238.11	265.56	38.81
0.8	172.89	238.55	205.72	46.43

Water Conc.(%)	Mean Viscosity (p)	Std.Dev.
0.1	605.19	218.82
0.25	418.80	114.15
0.5	561.35	103.73
0.7	265.56	38.81
0.8	205.72	46.43

TABLE 35. EFFECT OF WATER CONCENTRATION ON THE VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 6.5% KT BY CONE AND PLATE VISCOMETER

Water Conc. (%)	Viscosity (p)
0.1	585.91
0.25	591.98
0.5	748.96
0.6	541.68
0.7	536.66
0.8	448.86

TABLE 36. EFFECT OF VISCOSITY ON KT RELEASE FROM LECITHIN:IPM (40:60), (50:50) AND (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

Lecithin/IPM	Viscosity (p)	Mean Cum. Amount (ug/cm2)	Std.Dev.
(40:60)	591.98	2286.97	170.22
(50:50)	947.61	1327.03	137.8
(60:40)	2825	1118.46	120.55

TABLE 37. VISCOSITY OF ORGANOGEL SAMPLES WITH DIFFERENT COMPOSITIONS BY CONE AND PLATE VISCOMETER

	Lecithin/IPM (40:60)	**Lecithin/IPM (50:50)**	**Lecithin/IPM (60:40)**
Water Conc.(%)	Viscosity (p)	Viscosity (p)	Viscosity (p)
0.1	585.91	851.35	2834.80
0.25	591.98	974.61	2825.00
0.5	748.96	827.20	2335.90
0.6	541.68	844.70	2472.40
0.7	536.66	900.22	2432.00
0.8	448.86	842.30	2063.60

TABLE 38. RELEASE PROFILE OF KT ACROSS CELLULOSE ACETATE FROM 6.5% KT ORGANOGELS OF DIFFERENT COMPOSITIONS

	Lecithin/IPM (40:60)		**Lecithin/IPM (50:50)**		**Lecithin/IPM (60:40)**	
Water Conc.	Cum.Amount	Std.Dev.	Cum.Amount	Std.Dev.	Cum.Amount	Std.Dev.
0.1% water	2469.33	147.4	1366.664	80.858	1264.94	147.28
0.25% water	2286.97	170.22	1327.03	137.8	1118.46	120.55
0.5% water	2124.48	96.22	1644.62	149.33	1560.72	141.37
0.6% water	2555.757	192.55	1351.01	131.06	1542.8	34.13
0.7% water	2383.48	233.56	1462.15	94.66	1476.27	130.26
0.8% water	2388.26	78.07	1329.88	71.2	1423.23	181.94

TABLE 39. CUMULATIVE RELAESE OF KT ACROSS CELLULOS ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.722	13.950		71.143	111.886	111.886	
2	0.5	0.871	16.646		84.894	133.513	171.811	**Average**
3	0.5	0.628	12.234		62.393	98.126	131.330	147.349
4	0.5	0.725	13.993		71.364	112.233	170.301	**Std.Dev.**
5	0.5	0.564	11.075		56.484	88.833	146.784	23.070
6	0.5	0.585	11.445		58.372	91.801	151.980	
Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	1	0.463	9.238		47.116	74.100	185.986	
2	1	0.495	9.814		50.051	78.715	250.525	**Average**
3	1	0.397	8.024		40.925	64.362	195.692	216.447
4	1	0.429	8.609		43.906	69.051	239.352	**Std.Dev.**
5	1	0.385	7.808		39.818	62.622	209.406	24.883
6	1	0.406	8.196		41.801	65.740	217.719	
Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	2	1.305	24.536		125.135	196.800	382.786	
2	2	0.286	6.017		30.686	48.260	298.786	**Average**
3	2	0.197	4.391		22.392	35.216	230.908	350.714
4	2	1.212	22.851		116.540	183.282	422.633	**Std.Dev.**
5	2	1.113	21.049		107.349	168.827	378.233	71.591
6	2	1.143	21.596		110.141	173.218	390.937	
Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	4	1.134	21.427	42.855	218.560	343.729	726.515	
2	4	1.154	21.801	43.602	222.369	349.720	648.505	**Average**
3	4	1.059	20.075	40.149	204.762	322.029	552.937	669.208
4	4	1.007	19.124	38.248	195.063	306.775	729.409	**Std.Dev.**
5	4	0.948	18.058	36.116	184.190	289.675	667.908	65.251
6	4	0.980	18.642	37.283	190.144	299.038	689.976	
Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	6	1.407	26.389	52.778	269.169	423.321	1149.836	
2	6	1.343	25.238	50.476	257.429	404.859	1053.364	**Average**
3	6	1.311	24.647	49.293	251.397	395.371	948.308	1059.347
4	6	1.240	23.366	46.732	238.335	374.829	1104.238	**Std.Dev.**
5	6	1.194	22.530	45.059	229.802	361.410	1029.317	68.712
6	6	1.262	23.753	47.507	242.285	381.041	1071.017	

TABLE 39. CONT'D.

Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.2	ug/cm²	Cumulative amount	
	(h)							
1	8	1.348	25.396	50.793	259.043	407.396	1557.233	
2	8	1.309	24.687	49.373	251.805	396.013	1449.377	**Average**
3	8	1.494	28.050	56.101	286.114	449.970	1398.278	1450.724
4	8	1.347	25.370	50.741	258.778	406.979	1511.217	**Std.Dev.**
5	8	1.102	20.930	41.860	213.486	335.749	1365.066	71.905
6	8	1.159	21.953	43.906	223.920	352.158	1423.175	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	10	1.134	21.439	42.877	218.673	343.907	1901.139	
2	10	1.085	20.541	41.081	209.514	329.502	1778.878	**Average**
3	10	1.277	24.038	48.076	245.188	385.606	1783.884	1791.674
4	10	1.163	21.967	43.933	224.061	352.380	1863.596	**Std.Dev.**
5	10	1.057	20.032	40.064	204.328	321.347	1686.413	79.429
6	10	1.028	19.509	39.019	198.995	312.958	1736.133	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	12	1.110	21.002	42.005	214.224	336.910	2238.049	
2	12	1.038	19.681	39.362	200.745	315.712	2094.590	**Average**
3	12	1.235	23.274	46.548	237.393	373.347	2157.232	2124.476
4	12	1.175	22.173	44.347	226.169	355.696	2219.292	**Std.Dev.**
5	12	1.068	20.236	40.472	206.405	324.613	2011.026	96.221
6	12	0.951	18.111	36.223	184.736	290.533	2026.667	

Time	Average cum.amnt.		Std.Dev.
(h)			
0.5	147.349		23.070
1	216.447		24.883
2	350.714	350.714	71.591
4	669.208	669.208	65.251
6	1059.347	1059.347	68.712
8	1450.724	1450.724	71.905
10	1791.674	1791.674	79.429
12	2124.476	2124.476	96.221

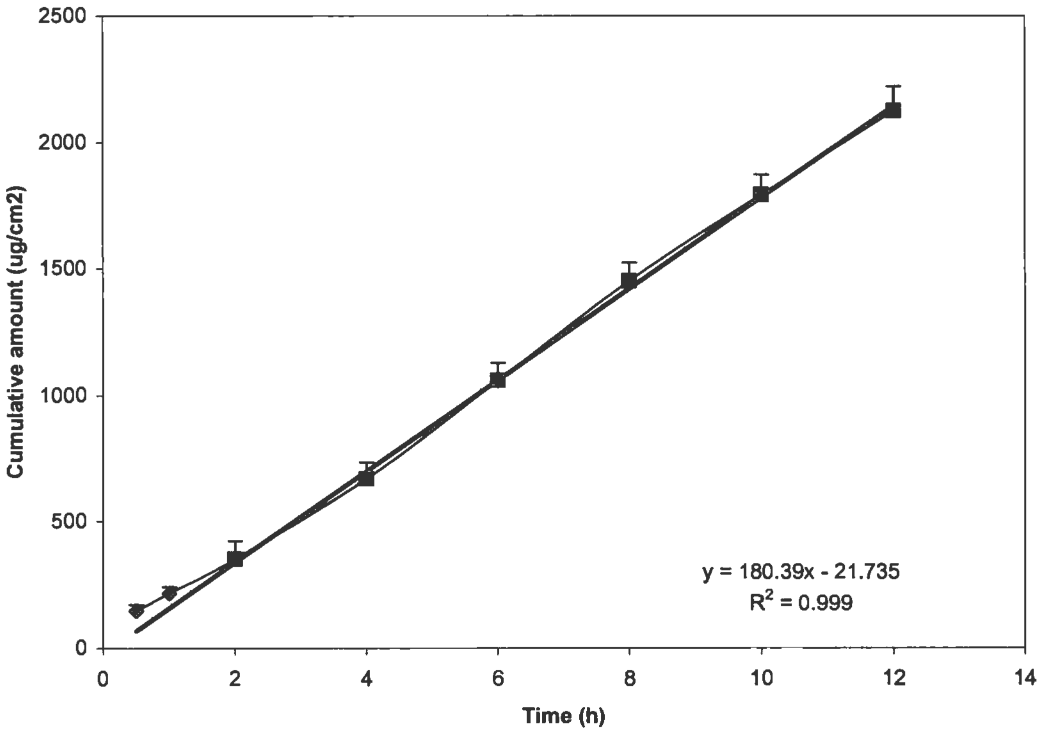


FIGURE 42. RELEASE PROFILE OF KT FROM LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT (MEAN ± SD, N = 6)

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TABLE 40. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.618	12.044		61.425	96.603	96.603	
2	0.5	0.598	11.681		59.575	93.693	93.693	**Average**
3	0.5	0.500	9.899		50.484	79.396	79.396	95.183
4	0.5	0.563	11.058		56.395	88.693	88.693	**Std.Dev.**
5	0.5	0.590	11.541		58.857	92.565	92.565	13.608
6	0.5	0.779	14.980		76.398	120.151	120.151	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	1	0.437	8.758		44.667	70.248	166.851	
2	1	0.438	8.773		44.744	70.368	164.061	**Average**
3	1	0.384	7.792		39.738	62.495	141.891	169.157
4	1	0.421	8.477		43.234	67.994	156.687	**Std.Dev.**
5	1	0.405	8.177		41.701	65.584	158.149	29.775
6	1	0.690	13.360		68.135	107.155	227.306	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	2	0.681	13.196		67.299	105.840	272.692	
2	2	0.633	12.319		62.829	98.811	262.872	**Average**
3	2	0.566	11.104		56.632	89.064	230.955	280.843
4	2	0.640	12.458		63.535	99.921	256.608	**Std.Dev.**
5	2	0.645	12.536		63.934	100.549	258.697	61.540
6	2	1.162	21.934		111.865	175.930	403.236	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	4	1.379	25.885	51.771	264.032	415.242	687.934	
2	4	1.451	27.190	54.380	277.340	436.172	699.043	**Average**
3	4	1.130	21.364	42.728	217.911	342.708	573.664	707.524
4	4	1.354	25.440	50.879	259.484	408.090	664.698	**Std.Dev.**
5	4	1.350	25.356	50.712	258.633	406.752	665.449	128.768
6	4	1.845	34.356	68.712	350.431	551.122	954.359	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	6	1.630	30.455	60.911	310.644	488.549	1176.483	
2	6	1.865	34.727	69.455	354.220	557.081	1256.125	**Average**
3	6	1.585	29.631	59.262	302.237	475.328	1048.991	1206.9
4	6	1.560	29.177	58.355	297.610	468.051	1132.749	**Std.Dev.**
5	6	1.676	31.285	62.570	319.108	501.860	1167.309	140.918
6	6	1.688	31.506	63.012	321.361	505.404	1459.763	

TABLE 40. CONT'D.

Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.2	ug/cm²	Cumulative amount	
	(h)							
1	8	1.455	27.336	54.672	278.829	438.514	1614.996	
2	8	1.592	29.827	59.654	304.236	478.472	1734.596	**Average**
3	8	1.346	25.368	50.737	258.757	406.947	1455.938	1648.37
4	8	1.401	26.365	52.731	268.926	422.939	1555.688	**Std.Dev.**
5	8	1.399	26.322	52.643	268.481	422.239	1589.548	168.737
6	8	1.596	29.903	59.807	305.013	479.694	1939.457	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	10	1.517	28.394	56.789	289.623	455.489	2070.485	
2	10	1.594	29.796	59.593	303.923	477.979	2212.575	**Average**
3	10	1.443	27.059	54.117	275.999	434.063	1890.001	2099.12
4	10	1.451	27.198	54.396	277.420	436.297	1991.985	**Std.Dev.**
5	10	1.508	28.238	56.476	288.029	452.983	2042.532	176.100
6	10	1.490	27.907	55.815	284.656	447.678	2387.135	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	12	1.494	27.986	55.972	285.457	448.938	2519.423	
2	12	1.482	27.768	55.537	283.237	445.447	2658.022	**Average**
3	12	1.554	29.070	58.140	296.516	466.330	2356.331	2555.76
4	12	1.434	26.894	53.788	274.321	431.424	2423.409	**Std.Dev.**
5	12	1.481	27.736	55.471	282.903	444.922	2487.453	192.554
6	12	1.679	31.342	62.684	319.687	502.770	2889.905	

Time	Average cum.amnt		Std.Dev.
(h)			
0.5	95.183		13.608
1	169.157		29.775
2	280.843		61.540
4	707.524		128.768
6	1206.903	1206.903	140.918
8	1648.371	1648.371	168.737
10	2099.119	2099.119	1455.938
12	2555.757	2555.757	176.100

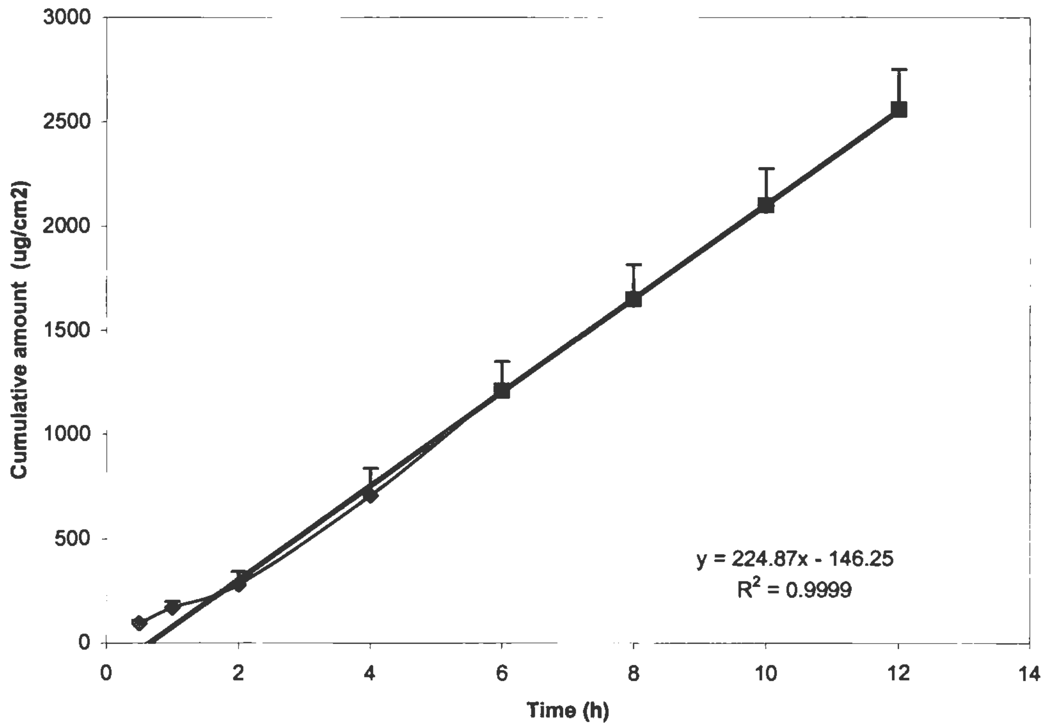


FIGURE 43. RELEASE PROFILE OF KT FROM LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT (MEAN ± SD, N =6)

TABLE 41. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.675	13.087		66.746	104.971	104.971	
2	0.5	0.692	13.401		68.344	107.485	107.485	Average
3	0.5	0.628	12.230		62.373	98.094	98.094	99.406
4	0.5	0.609	11.882		60.598	95.302	95.302	Std.Dev.
5	0.5	0.532	10.485		53.474	84.098	84.098	8.936
6	0.5	0.685	13.276		67.708	106.483	106.484	
Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	1	0.464	9.250		47.174	74.190	179.161	
2	1	0.462	9.219		47.017	73.944	181.429	Average
3	1	0.456	9.112		46.471	73.085	171.179	170.804
4	1	0.458	9.141		46.618	73.316	168.618	Std.Dev.
5	1	0.371	7.559		38.551	60.628	144.726	13.763
6	1	0.457	9.130		46.563	73.230	179.713	
Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	2	0.871	16.648		84.905	133.530	312.691	
2	2	0.885	16.897		86.175	135.527	316.956	Average
3	2	0.824	15.791		80.535	126.657	297.837	297.016
4	2	0.868	16.600		84.661	133.146	301.764	Std.Dev.
5	2	0.703	13.594		69.330	109.036	253.762	22.547
6	2	0.774	14.883		75.905	119.376	299.090	
Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	4	1.859	34.621		176.566	277.685	590.375	
2	4	1.892	35.215		179.597	282.452	599.407	Average
3	4	1.598	29.875		152.365	239.624	537.460	555.852
4	4	1.835	34.183		174.333	274.173	575.937	Std.Dev.
5	4	1.462	27.403		139.756	219.794	473.555	46.065
6	4	1.733	32.327		164.867	259.286	558.376	
Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	6	1.431	26.835	53.670	273.718	430.476	1020.851	
2	6	1.588	29.691	59.381	302.844	476.281	1075.689	Average
3	6	0.916	17.461	34.922	178.103	280.102	817.562	920.356
4	6	1.268	23.867	47.735	243.448	382.870	958.807	Std.Dev.
5	6	0.989	18.795	37.591	191.714	301.508	775.063	117.912
6	6	1.038	19.686	39.371	200.793	315.788	874.163	

TABLE 41. CONT'D.

Sample	Time	Abs.	ug/ml	2*(ug/ml)	ug/5.2	ug/cm²	Cumulative amount	
	(h)							
1	8	1.554	29.143	58.287	297.263	467.505	1488.356	
2	8	1.907	35.562	71.125	362.736	570.474	1646.163	**Average**
3	8	1.157	21.923	43.846	223.614	351.677	1169.239	1382.1
4	8	1.590	29.803	59.606	303.990	478.084	1436.891	**Std.Dev.**
5	8	1.535	28.794	57.588	293.697	461.897	1236.960	176.012
6	8	1.463	27.480	54.960	280.298	440.824	1314.987	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	10	1.366	25.657	51.314	261.702	411.579	1899.935	
2	10	1.702	31.768	63.537	324.037	509.613	2155.776	**Average**
3	10	1.242	23.404	46.809	238.725	375.442	1544.680	1835.81
4	10	1.624	30.335	60.671	309.420	486.624	1923.515	**Std.Dev.**
5	10	1.535	28.727	57.455	293.020	460.832	1697.792	209.670
6	10	1.595	29.808	59.617	304.045	478.171	1793.159	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	12	1.711	31.930	63.860	325.688	512.209	2412.143	
2	12	1.991	37.017	74.034	377.572	593.807	2749.583	**Average**
3	12	1.769	32.972	65.944	336.314	528.921	2073.601	2383.48
4	12	1.926	35.836	71.672	365.525	574.861	2498.376	**Std.Dev.**
5	12	1.737	32.405	64.809	330.526	519.818	2217.610	233.556
6	12	1.863	34.685	69.370	353.788	556.402	2349.560	

Time	Average cum.amnt		Std.Dev.
(h)			
0.5	99.406		8.936
1	170.804		13.763
2	297.016		22.547
4	555.852		46.065
6	920.356	920.356	117.912
8	1382.099	1382.099	176.012
10	1835.809	1835.809	209.670
12	2383.479	2383.479	233.556

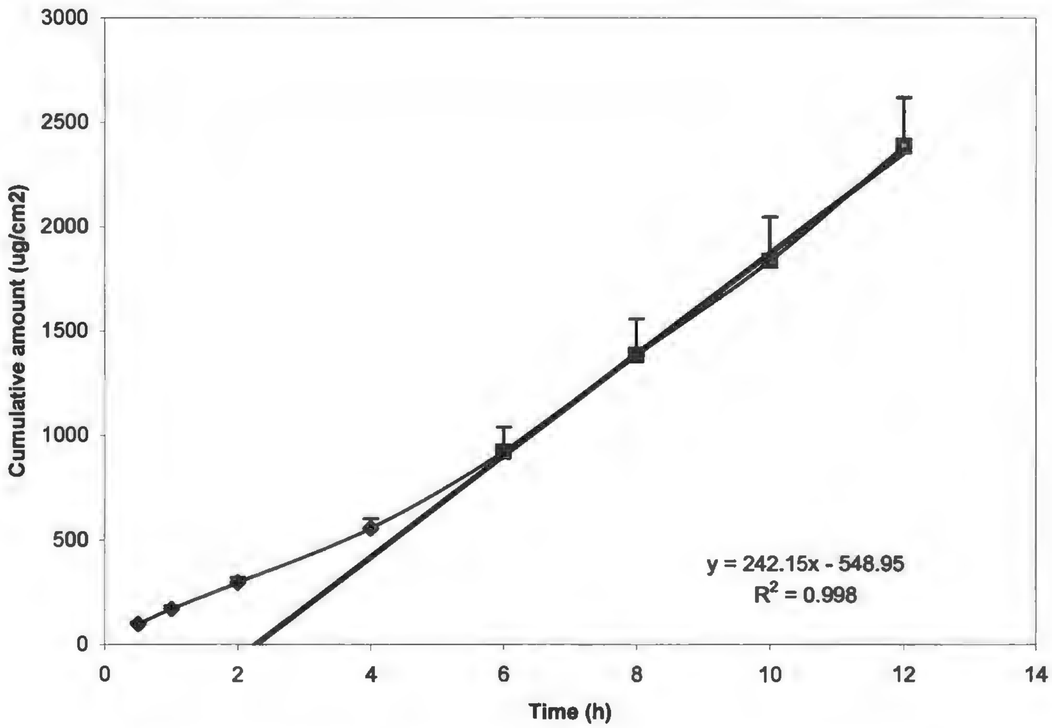


FIGURE 44. RELEASE PROFILE OF KT FROM LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AAND 6.5% KT (MEAN ± SD, N =6)

TABLE 42. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml		ug/5.1	ug/cm²	Cumulative amount	
	(h)							
1	0.5	0.431	8.656		44.145	69.427	69.427	
2	0.5	0.520	10.261		52.329	82.298	82.298	**Average**
3	0.5	0.475	9.450		48.197	75.800	75.800	73.465
4	0.5	0.391	7.926		40.422	63.572	63.572	**Std.Dev.**
5	0.5	0.393	7.966		40.626	63.893	63.893	9.396
6	0.5	0.544	10.697		54.556	85.800	85.800	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	1	0.395	8.001		40.804	64.173	133.600	
2	1	0.495	9.819		50.076	78.755	161.052	**Average**
3	1	0.453	9.044		46.123	72.538	148.338	142.882
4	1	0.359	7.344		37.455	58.906	122.478	**Std.Dev.**
5	1	0.390	7.906		40.319	63.410	127.302	17.739
6	1	0.495	9.815		50.055	78.722	164.522	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	2	0.734	14.169		72.261	113.644	247.244	
2	2	0.734	14.161		72.221	113.582	274.634	**Average**
3	2	0.599	11.707		59.706	93.900	242.237	241.262
4	2	0.520	10.273		52.391	82.395	204.874	**Std.Dev.**
5	2	0.510	10.092		51.467	80.942	208.245	29.699
6	2	0.681	13.193		67.283	105.816	270.337	
Sample	**Time**	**Abs.**	**ug/ml**		**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	4	1.965	36.540		186.352	293.076	540.319	
2	4	1.950	36.269		184.973	290.907	565.541	**Average**
3	4	1.701	31.740		161.876	254.582	496.819	496.838
4	4	1.440	27.003		137.717	216.587	421.460	**Std.Dev.**
5	4	1.359	25.532		130.215	204.789	413.034	65.614
6	4	1.831	34.101		173.916	273.517	543.854	
Sample	**Time**	**Abs.**	**ug/ml**	**2*(ug/ml)**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)							
1	6	1.325	24.913	49.827	254.117	399.650	939.969	
2	6	1.284	24.165	48.329	246.478	387.636	953.177	**Average**
3	6	1.053	19.956	39.912	203.551	320.125	816.944	889.092
4	6	1.492	27.950	55.900	285.092	448.363	869.824	**Std.Dev.**
5	6	1.433	26.877	53.755	274.150	431.155	844.189	54.304
6	6	1.212	22.853	45.705	233.098	366.592	910.446	

TABLE 42. CONT'D

Sample	Time (h)	Abs.	ug/ml	2*(ug/ml)	ug/5.2	ug/cm²	Cumulative amount	
1	8	1.487	27.930	55.861	284.890	448.045	1388.015	
2	8	1.446	27.176	54.353	277.199	435.950	1389.128	**Average**
3	8	1.370	25.789	51.578	263.049	413.696	1230.640	1353.160
4	8	1.776	33.173	66.347	338.369	532.153	1401.976	**Std.Dev.**
5	8	1.714	32.050	64.099	326.906	514.125	1358.314	63.142
6	8	1.461	27.456	54.912	280.053	440.439	1350.885	

Sample	Time (h)	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
1	10	1.678	31.319	62.639	319.457	502.409	1890.423	
2	10	1.668	31.142	62.283	317.645	499.559	1888.687	**Average**
3	10	1.626	30.377	60.755	309.850	487.301	1717.940	1856.69
4	10	1.702	31.763	63.525	323.978	509.519	1911.496	**Std.Dev.**
5	10	1.792	33.403	66.805	340.708	535.830	1894.144	72.373
6	10	1.624	30.333	60.666	309.398	486.589	1837.475	

Sample	Time (h)	Abs.	ug/ml	2*(ug/ml)	ug/5.1	ug/cm²	Cumulative amount	
1	12	1.798	33.514	67.027	341.840	537.611	2428.035	
2	12	1.730	32.263	64.527	329.085	517.552	2406.239	**Average**
3	12	1.777	33.115	66.231	337.776	531.219	2249.160	2388.26
4	12	1.803	33.600	67.200	342.720	538.995	2450.491	**Std.Dev.**
5	12	1.856	34.568	69.135	352.590	554.517	2448.662	78.074
6	12	1.702	31.763	63.525	323.979	509.521	2346.995	

Time (h)	Average cum.amnt		Std.Dev.
0.5	73.465		9.396
1	142.882		17.739
2	241.262		29.699
4	496.838	496.838	65.614
6	889.092	889.092	54.304
8	1353.160	1353.160	63.142
10	1856.694	1856.694	72.373
12	2388.263	2388.263	78.074

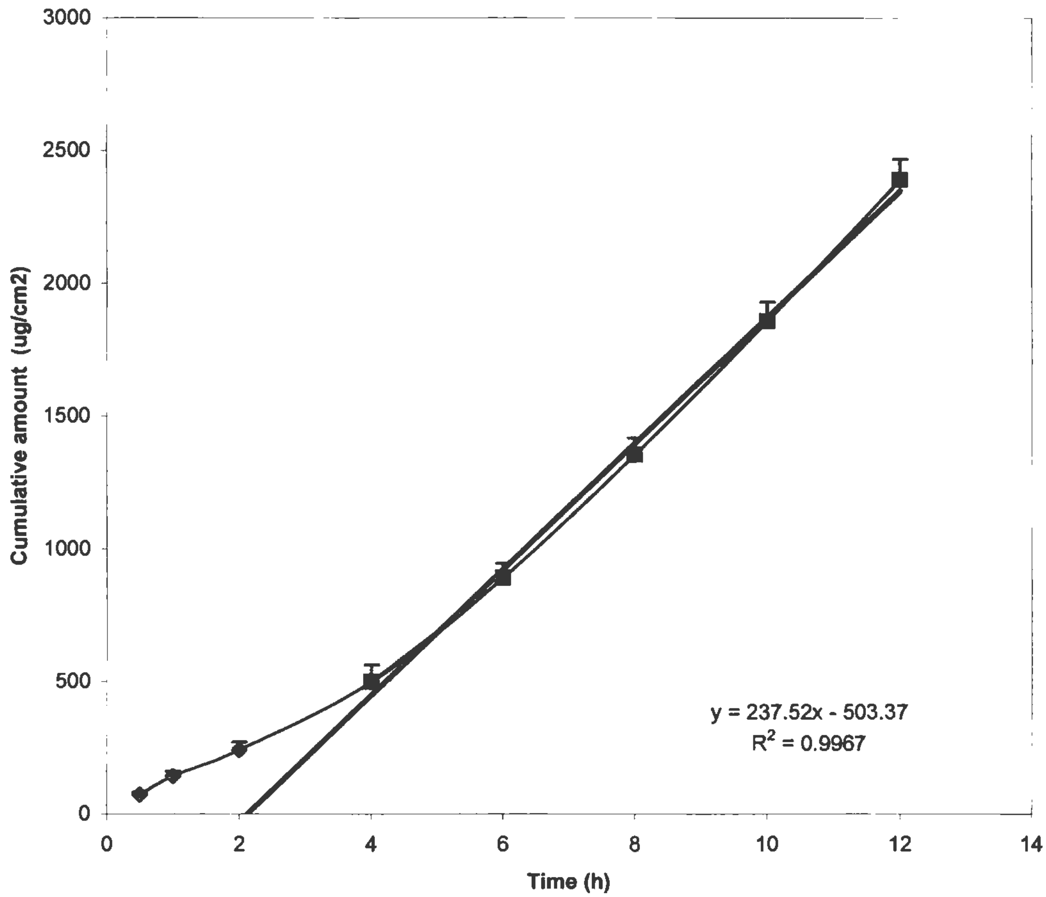


FIGURE 45. RELEASE PROFILE OF KT FROM LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 43. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT (NO. 1)

Sample	Time	Abs	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.541	10.650	54.313	85.417	85.417	
2	0.5	0.552	10.844	55.306	86.979	86.979	**Average**
3	0.5	0.556	10.919	55.688	87.580	87.580	96.026
4	0.5	0.671	13.013	66.366	104.374	104.374	**Std.Dev.**
5	0.5	0.668	12.962	66.104	103.962	103.962	10.374
6	0.5	0.695	13.446	68.573	107.845	107.845	
Sample	Time	Abs	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.268	5.693	29.034	45.661	131.079	
2	1	0.237	5.116	26.094	41.037	128.017	**Average**
3	1	0.260	5.544	28.275	44.468	132.048	140.275
4	1	0.287	6.033	30.768	48.390	152.763	**Std.Dev.**
5	1	0.235	5.093	25.973	40.848	144.810	11.308
6	1	0.264	5.622	28.670	45.090	152.935	
Sample	Time	Abs	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.891	17.014	86.773	136.468	267.547	
2	2	0.864	16.519	84.245	132.492	260.508	**Average**
3	2	0.865	16.545	84.382	132.707	264.755	273.861
4	2	0.959	18.254	93.094	146.408	299.172	**Std.Dev.**
5	2	0.839	16.066	81.935	128.859	273.670	13.821
6	2	0.809	15.532	79.215	124.581	277.516	
Sample	Time	Abs	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.452	27.217	138.809	218.305	485.852	
2	4	1.330	24.993	127.467	200.466	460.975	**Average**
3	4	1.359	25.519	130.146	204.681	469.436	479.189
4	4	1.507	28.206	143.852	226.235	525.407	**Std.Dev.**
5	4	1.284	24.166	123.245	193.827	467.497	24.161
6	4	1.247	23.495	119.827	188.451	465.967	
Sample	Time	Abs	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.574	29.428	150.085	236.038	721.890	
2	6	1.401	26.278	134.020	210.772	671.747	**Average**
3	6	1.417	26.570	135.507	213.112	682.548	692.606
4	6	1.606	30.012	153.060	240.718	766.124	**Std.Dev.**
5	6	1.225	23.083	117.721	185.140	652.636	43.393
6	6	1.290	24.277	123.815	194.724	660.691	

TABLE 43. CONT'D.

Sample	Time	Abs	ug/ml	ug/5.3	ug/cm²	Cumulative amount	
	(h)						
1	8	1.599	29.956	152.776	240.270	962.159	
2	8	1.327	25.012	127.563	200.618	872.366	**Average**
3	8	1.321	24.913	127.057	199.822	882.370	904.655
4	8	1.550	29.067	148.239	233.136	999.260	**Std.Dev.**
5	8	1.292	24.377	124.323	195.523	848.159	61.110
6	8	1.343	25.300	129.032	202.928	863.619	
Sample	**Time**	**Abs**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.625	30.364	154.856	243.542	1205.702	
2	10	1.284	24.164	123.236	193.814	1066.179	**Average**
3	10	1.323	24.863	126.799	199.417	1081.786	1117.1
4	10	1.542	28.851	147.139	231.405	1230.665	**Std.Dev.**
5	10	1.328	24.959	127.289	200.186	1048.345	79.422
6	10	1.370	25.722	131.184	206.313	1069.932	
Sample	**Time**	**Abs**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.391	26.107	133.147	209.400	1415.102	
2	12	1.371	25.745	131.299	206.494	1272.673	**Average**
3	12	1.229	23.163	118.133	185.787	1267.573	1320.67
4	12	1.334	25.075	127.882	201.120	1431.785	**Std.Dev.**
5	12	1.410	26.456	134.927	212.200	1260.546	79.961
6	12	1.370	25.731	131.230	206.386	1276.318	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	96.026		10.374
1	140.275		11.308
2	273.861	273.861	13.821
4	479.189	479.189	24.161
6	692.606	692.606	43.393
8	904.655	904.655	61.110
10	1117.102	1117.102	79.422
12	1320.666	1320.666	79.961

TABLE 44. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT (NO. 2)

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.904	17.247	87.962	138.338	138.338	
2	0.5	0.909	17.345	88.461	139.123	139.123	Average
3	0.5	0.865	16.546	84.382	132.708	132.708	137.762
4	0.5	0.870	16.637	84.850	133.444	133.444	Std.Dev.
5	0.5	0.923	17.595	89.733	141.124	141.124	3.855
6	0.5	0.928	17.684	90.188	141.839	141.839	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.878	16.779	85.574	134.583	272.920	
2	1	0.779	14.986	76.430	120.202	259.325	Average
3	1	0.810	15.539	79.251	124.638	257.346	264.873
4	1	0.816	15.647	79.800	125.502	258.946	Std.Dev.
5	1	0.857	16.387	83.575	131.438	272.562	7.171
6	1	0.821	15.746	80.306	126.298	268.137	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	1.637	30.576	155.937	245.241	518.161	
2	2	1.561	29.198	148.910	234.190	493.515	Average
3	2	1.647	30.754	156.847	246.673	504.019	504.998
4	2	1.537	28.755	146.653	230.641	489.586	Std.Dev.
5	2	1.528	28.603	145.878	229.421	501.983	13.167
6	2	1.701	31.741	161.878	254.585	522.721	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.234	23.243	118.542	186.430	704.592	
2	4	1.132	21.396	109.120	171.612	665.127	Average
3	4	1.238	23.322	118.940	187.057	691.077	687.219
4	4	1.331	25.012	127.560	200.614	690.200	Std.Dev.
5	4	1.099	20.790	106.031	166.755	668.738	16.870
6	4	1.195	22.549	115.000	180.861	703.582	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.203	22.679	115.661	181.899	886.491	
2	6	1.122	21.215	108.197	170.161	835.288	Average
3	6	1.184	22.337	113.918	179.159	870.236	862.562
4	6	1.261	23.749	121.119	190.483	880.683	Std.Dev.
5	6	1.045	19.814	101.053	158.926	827.664	24.805
6	6	1.131	21.373	109.001	171.426	875.008	

TABLE 44. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.322	24.925	127.119	199.920	1086.410	
2	8	1.146	21.720	110.774	174.214	1009.502	**Average**
3	8	1.257	23.734	121.042	190.363	1060.599	1048.420
4	8	1.296	24.443	124.660	196.052	1076.735	**Std.Dev.**
5	8	1.125	21.342	108.844	171.179	998.843	35.961
6	8	1.209	22.868	116.629	183.422	1058.429	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.357	25.489	129.992	204.437	1290.848	
2	10	1.107	20.937	106.780	167.933	1177.435	**Average**
3	10	1.188	22.407	114.273	179.718	1240.316	1227.088
4	10	1.196	22.563	115.073	180.975	1257.710	**Std.Dev.**
5	10	1.106	20.920	106.690	167.791	1166.634	47.548
6	10	1.129	21.339	108.828	171.154	1229.584	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.521	28.463	145.161	228.294	1519.142	
2	12	1.174	22.163	113.032	177.765	1355.200	**Average**
3	12	1.218	22.954	117.064	184.107	1424.423	1412.663
4	12	1.185	22.362	114.045	179.359	1437.068	**Std.Dev.**
5	12	1.128	21.328	108.774	171.068	1337.703	64.957
6	12	1.141	21.551	109.911	172.856	1402.440	

Time	Average Cum. amount		Std.Dev.
(h)			
0.5	137.762		3.855
1	264.873		7.171
2	504.998		13.167
4	687.219		16.870
6	862.562	862.562	24.805
8	1048.420	1048.420	35.961
10	1227.088	1227.088	47.548
12	1412.663	1412.663	94.957

TABLE 45. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT

Time (h)	Average cumulative amount		Std.Dev.
0.5	116.943		22.107
1	202.574		62.895
2	389.429	389.429	116.223
4	583.204	583.204	105.74
6	777.584	777.584	90.897
8	976.538	976.538	85.217
10	1172.095	1172.095	81.207
12	1366.664	1366.664	80.858

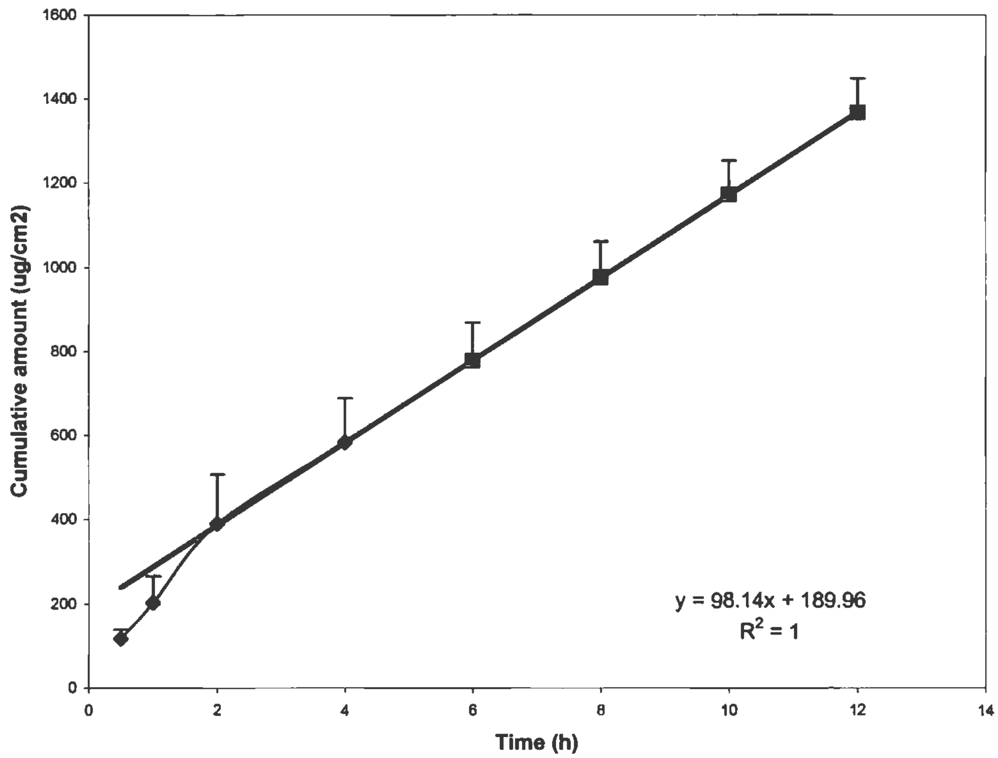


FIGURE 46. RELEASE PROFILE OF KT FROM LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT (MEAN ± SD, N = 12)

TABLE 46. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.688	13.322	67.942	106.853	106.853	
2	0.5	0.477	9.492	48.408	76.131	76.131	**Average**
3	0.5	0.375	7.636	38.942	61.245	61.245	84.256
4	0.5	0.543	10.695	54.545	85.782	85.782	**Std.Dev.**
5	0.5	0.598	11.681	59.573	93.691	93.691	15.514
6	0.5	0.516	10.203	52.034	81.834	81.834	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.437	8.755	44.650	70.221	177.074	
2	1	0.431	8.646	44.096	69.349	145.480	**Average**
3	1	0.348	7.149	36.458	57.337	118.582	157.665
4	1	0.522	10.305	52.555	82.653	168.436	**Std.Dev.**
5	1	0.522	10.314	52.599	82.722	176.413	22.475
6	1	0.491	9.746	49.706	78.172	160.005	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.637	12.396	63.219	99.425	276.499	
2	2	0.695	13.444	68.563	107.830	253.310	**Average**
3	2	0.570	11.177	57.004	89.650	208.231	272.196
4	2	0.827	15.853	80.849	127.151	295.587	**Std.Dev.**
5	2	0.862	16.494	84.120	132.296	308.709	36.591
6	2	0.852	16.312	83.191	130.835	290.840	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.647	30.751	156.831	246.647	523.146	
2	4	1.964	36.521	186.255	292.923	546.233	**Average**
3	4	1.567	29.307	149.463	235.061	443.292	546.533
4	4	1.946	36.201	184.627	290.363	585.950	**Std.Dev.**
5	4	1.952	36.311	185.187	291.243	599.952	57.923
6	4	1.942	36.129	184.259	289.784	580.624	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.705	31.818	162.274	255.207	778.353	
2	6	1.767	32.939	167.988	264.195	810.428	**Average**
3	6	1.472	27.571	140.613	221.141	664.433	817.243
4	6	1.980	36.808	187.719	295.225	881.175	**Std.Dev.**
5	6	1.983	36.861	187.992	295.654	895.605	87.519
6	6	1.963	36.510	186.201	292.838	873.462	

TABLE 46. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.903	35.483	180.965	284.603	1062.956	
2	8	1.874	34.960	178.296	280.406	1090.833	**Average**
3	8	1.610	30.155	153.789	241.864	906.297	1099.93
4	8	1.985	36.986	188.629	296.656	1177.831	**Std.Dev.**
5	8	1.994	37.135	189.387	297.849	1193.454	108.094
6	8	1.972	36.748	187.417	294.750	1168.212	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.768	32.959	168.091	264.357	1327.313	
2	10	1.747	32.579	166.155	261.312	1352.145	**Average**
3	10	1.493	27.956	142.577	224.230	1130.527	1365.74
4	10	1.891	35.193	179.485	282.275	1460.106	**Std.Dev.**
5	10	1.897	35.299	180.025	283.126	1476.580	130.315
6	10	1.872	34.857	177.772	279.582	1447.794	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.844	34.339	175.131	275.429	1602.742	
2	12	1.730	32.261	164.529	258.754	1610.899	**Average**
3	12	1.671	31.189	159.066	250.163	1380.690	1644.62
4	12	1.993	37.050	188.953	297.166	1757.273	**Std.Dev.**
5	12	1.996	37.099	189.203	297.559	1774.138	149.325
6	12	1.972	36.675	187.045	294.165	1741.959	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	84.256		15.514
1	157.665		22.475
2	272.196		36.591
4	546.533	546.533	57.923
6	817.243	817.243	87.519
8	1099.931	1099.931	108.094
10	1365.744	1365.744	130.315
12	1644.617	1644.617	149.325

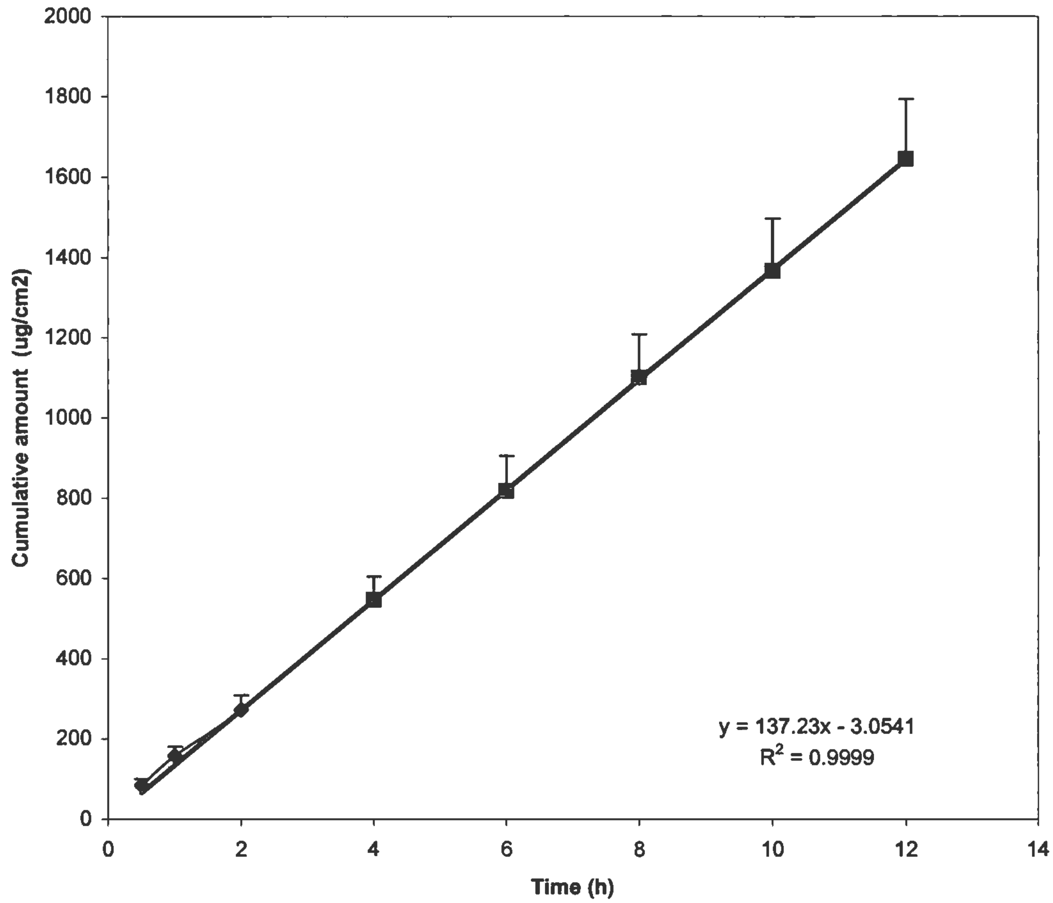


FIGURE 47. RELEASE PROFILE OF LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 47. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.6% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.593	11.588	59.101	92.947	92.947	
2	0.5	0.568	11.141	56.820	89.360	96.020	**Average**
3	0.5	0.558	10.960	55.894	87.905	81.405	92.330
4	0.5	0.508	10.054	51.273	80.638	117.770	**Std.Dev.**
5	0.5	0.558	10.962	55.904	87.921	87.921	14.197
6	0.5	0.485	9.640	49.167	77.324	77.914	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.324	6.700	34.169	53.737	146.684	
2	1	0.387	7.842	39.995	62.900	158.921	**Average**
3	1	0.372	7.576	38.640	60.768	142.174	149.557
4	1	0.373	7.590	38.708	60.875	178.645	**Std.Dev.**
5	1	0.324	6.714	34.242	53.853	141.773	17.169
6	1	0.307	6.387	32.575	51.231	129.145	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.559	10.987	56.032	88.121	234.805	
2	2	0.703	13.598	69.350	109.067	267.988	**Average**
3	2	0.696	13.466	68.677	108.008	250.181	247.792
4	2	0.675	13.095	66.786	105.035	283.680	**Std.Dev.**
5	2	0.562	11.035	56.279	88.510	230.283	24.329
6	2	0.577	11.304	57.652	90.669	219.814	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	1.269	23.883	121.806	191.563	426.368	
2	4	1.541	28.830	147.034	231.240	499.228	**Average**
3	4	1.559	29.161	148.723	233.897	484.078	457.980
4	4	1.523	28.513	145.415	228.694	512.373	**Std.Dev.**
5	4	1.273	23.962	122.205	192.192	422.475	46.010
6	4	1.214	22.883	116.706	183.543	403.356	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	1.278	24.043	122.621	192.845	619.214	
2	6	1.489	27.896	142.269	223.746	722.973	**Average**
3	6	1.460	27.366	139.568	219.498	703.576	660.785
4	6	1.457	27.312	139.291	219.063	731.436	**Std.Dev.**
5	6	1.252	23.584	120.277	189.160	611.635	66.398
6	6	1.138	21.509	109.697	172.521	575.877	

TABLE 47. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.441	27.088	138.147	217.263	836.477	
2	8	1.693	31.671	161.524	254.029	977.002	**Average**
3	8	1.567	29.386	149.870	235.701	939.277	888.639
4	8	1.663	31.118	158.703	249.591	981.028	**Std.Dev.**
5	8	1.424	26.769	136.522	214.708	826.344	88.525
6	8	1.294	24.415	124.516	195.826	771.703	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.370	25.725	131.198	206.335	1042.812	
2	10	1.686	31.471	160.503	252.424	1229.426	**Average**
3	10	1.512	28.302	144.338	227.001	1166.278	1113.829
4	10	1.642	30.671	156.423	246.007	1227.035	**Std.Dev.**
5	10	1.438	26.955	137.469	216.197	1042.541	108.038
6	10	1.348	25.332	129.191	203.179	974.882	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.437	26.937	137.378	216.054	1258.866	
2	12	1.821	33.923	173.009	272.090	1501.516	**Average**
3	12	1.521	28.471	145.204	228.363	1394.640	1351.013
4	12	1.775	33.090	168.760	265.408	1492.443	**Std.Dev.**
5	12	1.511	28.283	144.242	226.849	1269.390	131.062
6	12	1.425	26.723	136.289	214.341	1189.223	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	92.330		14.197
1	149.557		17.169
2	247.792		24.329
4	457.980		46.010
6	660.785	660.785	66.398
8	888.639	888.639	88.525
10	1113.829	1113.829	108.038
12	1351.013	1351.013	131.062

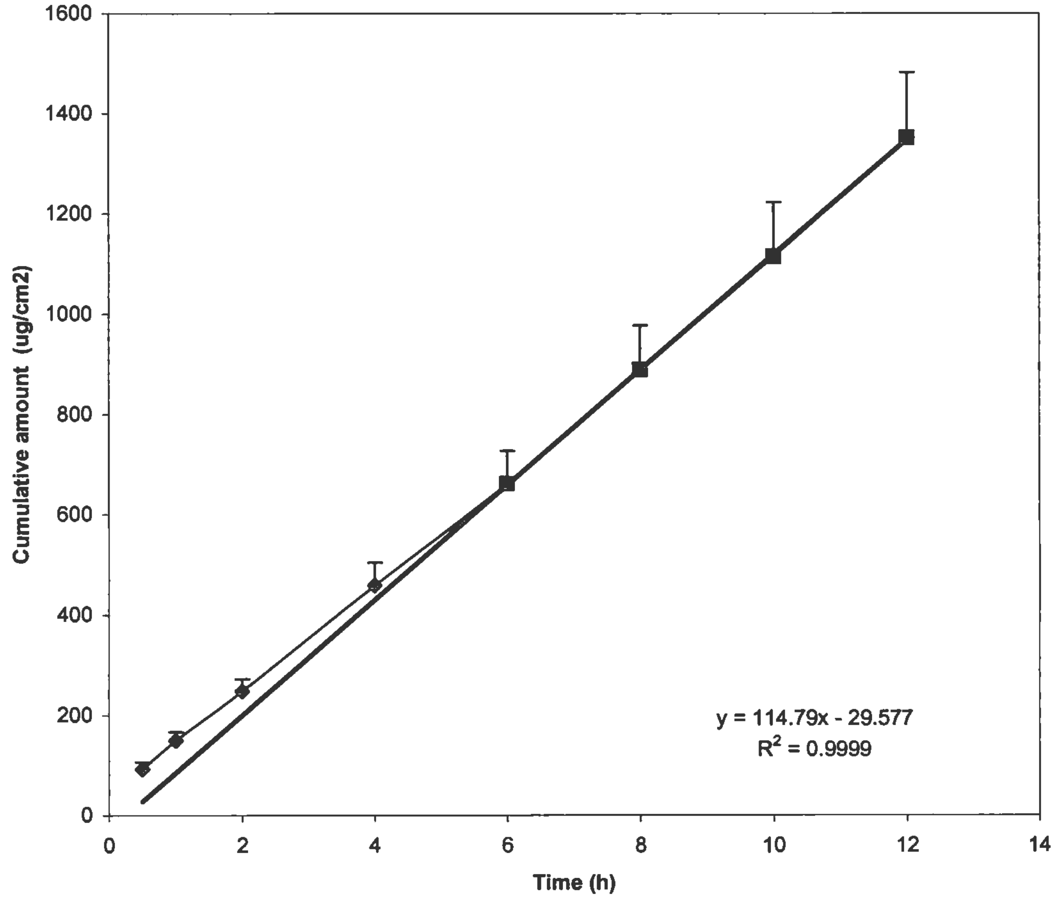


FIGURE 48. RELEASE PROFILE OF LECITHIN:IPM (50:50) CONTAINING 0.6% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 48. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.558	10.952	55.853	87.840	87.840	
2	0.5	0.638	12.410	63.290	99.536	99.536	**Average**
3	0.5	0.596	11.656	59.447	93.493	93.493	98.217
4	0.5	0.663	12.875	65.664	103.270	103.270	**Std.Dev.**
5	0.5	0.707	13.671	69.722	109.652	109.652	7.686
6	0.5	0.610	11.908	60.729	95.509	95.509	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.339	6.972	35.557	55.920	143.760	
2	1	0.413	8.332	42.491	66.825	166.362	**Average**
3	1	0.360	7.352	37.495	58.968	152.461	162.982
4	1	0.417	8.394	42.808	67.324	170.594	**Std.Dev.**
5	1	0.466	9.290	47.378	74.511	184.163	14.171
6	1	0.401	8.110	41.359	65.045	160.554	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.621	12.109	61.755	97.122	240.882	
2	2	0.799	15.343	78.249	123.061	289.423	**Average**
3	2	0.696	13.460	68.647	107.961	260.422	278.835
4	2	0.777	14.939	76.188	119.821	290.416	**Std.Dev.**
5	2	0.843	16.139	82.311	129.450	313.613	25.438
6	2	0.762	14.675	74.841	117.702	278.257	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.411	26.466	134.976	212.276	453.158	
2	4	1.619	30.257	154.310	242.683	532.107	**Average**
3	4	1.453	27.235	138.900	218.448	478.869	509.533
4	4	1.543	28.878	147.277	231.622	522.038	**Std.Dev.**
5	4	1.660	31.004	158.119	248.673	562.286	38.905
6	4	1.536	28.736	146.552	230.482	508.738	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.315	24.719	126.069	198.269	651.427	
2	6	1.505	28.187	143.751	226.078	758.184	**Average**
3	6	1.347	25.309	129.077	203.000	681.869	725.083
4	6	1.459	27.350	139.487	219.371	741.408	**Std.Dev.**
5	6	1.530	28.640	146.065	229.716	792.002	51.251
6	6	1.442	27.038	137.895	216.867	725.605	

TABLE 48. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.430	26.882	137.097	215.613	867.039	
2	8	1.678	31.392	160.101	251.791	1009.975	**Average**
3	8	1.488	27.939	142.488	224.090	905.959	964.408
4	8	1.635	30.617	156.144	245.568	986.976	**Std.Dev.**
5	8	1.696	31.724	161.791	254.449	1046.451	66.702
6	8	1.627	30.477	155.430	244.445	970.050	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.416	26.552	135.417	212.970	1080.010	
2	10	1.700	31.729	161.817	254.488	1264.463	**Average**
3	10	1.493	27.960	142.594	224.258	1130.216	1204.049
4	10	1.674	31.246	159.354	250.615	1237.591	**Std.Dev.**
5	10	1.646	30.744	156.793	246.587	1293.038	82.163
6	10	1.662	31.035	158.279	248.925	1218.975	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.561	29.196	148.901	234.177	1314.187	
2	12	1.814	33.801	172.383	271.106	1535.569	**Average**
3	12	1.666	31.103	158.623	249.466	1379.682	1462.154
4	12	1.807	33.667	171.703	270.037	1507.629	**Std.Dev.**
5	12	1.737	32.389	165.183	259.782	1552.821	94.668
6	12	1.766	32.923	167.905	264.064	1483.039	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	98.217		7.686
1	162.982		14.171
2	278.835		25.438
4	509.533	509.533	38.905
6	725.083	725.083	51.251
8	964.408	964.408	66.702
10	1204.049		82.163
12	1462.154		94.668

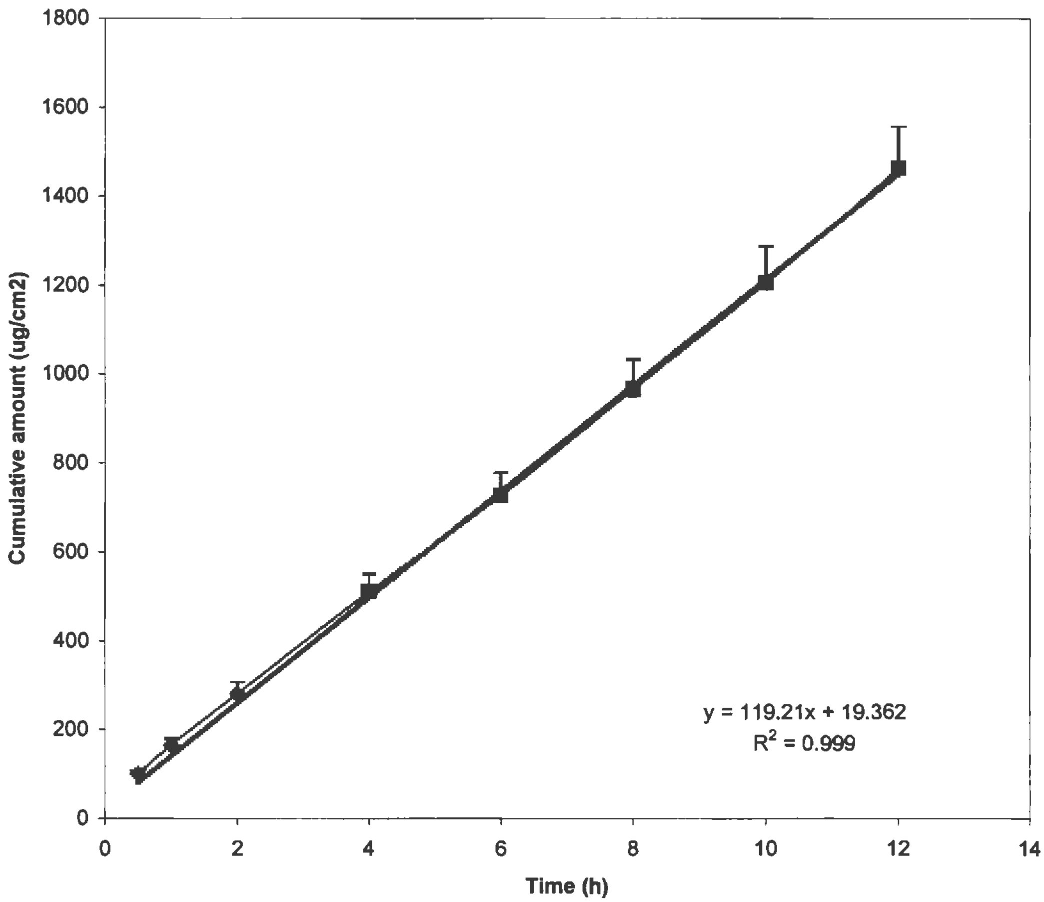


FIGURE 49. RELEASE PROFILE OF KT FROM LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 49. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.888	16.966	86.527	136.080	136.080	
2	0.5	0.789	15.161	77.322	121.604	121.604	**Average**
3	0.5	0.645	12.539	63.951	100.575	100.575	107.163
4	0.5	0.699	13.519	68.948	108.435	108.435	**Std.dev.**
5	0.5	0.509	10.071	51.362	80.778	80.778	19.605
6	0.5	0.610	11.908	60.729	95.509	95.509	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.438	8.775	44.752	70.381	206.462	
2	1	0.365	7.456	38.025	59.801	181.405	**Average**
3	1	0.280	5.909	30.135	47.393	147.968	162.620
4	1	0.297	6.208	31.660	49.791	158.226	**Std.dev.**
5	1	0.232	5.028	25.641	40.325	121.103	29.110
6	1	0.401	8.110	41.359	65.045	160.554	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.887	16.948	86.433	135.933	342.395	
2	2	0.876	16.740	85.373	134.266	315.671	**Average**
3	2	0.859	16.425	83.765	131.737	279.706	293.452
4	2	0.971	18.474	94.216	148.173	306.399	**Std.dev.**
5	2	0.759	14.610	74.509	117.180	238.283	36.111
6	2	0.762	14.675	74.841	117.702	278.257	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	1.712	31.948	162.936	256.249	598.643	
2	4	1.706	31.827	162.317	255.276	570.947	**Average**
3	4	1.697	31.672	161.526	254.032	533.738	547.207
4	4	1.899	35.346	180.265	283.502	589.901	**Std.dev.**
5	4	1.571	29.386	149.870	235.700	473.983	48.057
6	4	1.586	29.645	151.188	237.773	516.030	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	1.483	27.781	141.681	222.821	821.464	
2	6	1.465	27.452	140.003	220.183	791.130	**Average**
3	6	1.393	26.133	133.281	209.610	743.348	744.848
4	6	1.312	24.678	125.857	197.935	787.836	**Std.dev.**
5	6	1.056	20.014	102.070	160.525	634.507	70.652
6	6	1.154	21.790	111.128	174.771	690.801	

TABLE 49. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.217	23.022	117.410	184.651	1006.115	
2	8	1.293	24.403	124.454	195.728	986.858	**Average**
3	8	1.191	22.534	114.925	180.743	924.090	933.247
4	8	1.342	25.295	129.007	202.889	990.724	**Std.dev.**
5	8	1.161	22.000	112.202	176.460	810.967	76.528
6	8	1.254	23.679	120.764	189.926	880.727	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.367	25.675	130.944	205.935	1212.051	
2	10	1.280	24.083	122.825	193.166	1180.025	**Average**
3	10	1.281	24.101	122.913	193.305	1117.395	1133.17
4	10	1.318	24.774	126.347	198.706	1189.431	**Std.dev.**
5	10	1.354	25.435	129.718	204.007	1014.974	74.977
6	10	1.357	25.487	129.983	204.424	1085.151	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.249	23.515	119.927	188.609	1400.659	
2	12	1.282	24.120	123.014	193.464	1373.488	**Average**
3	12	1.289	24.249	123.669	194.495	1311.890	1329.882
4	12	1.319	24.803	126.494	198.937	1388.367	**Std.dev.**
5	12	1.332	25.029	127.649	200.754	1215.728	71.197
6	12	1.354	25.435	129.718	204.007	1289.158	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	107.163		19.605
1	162.620		29.110
2	293.452		36.111
4	547.207	547.207	48.057
6	744.848	744.848	70.652
8	933.247	933.247	76.528
10	1133.171	1133.171	74.977
12	1329.882	1329.882	71.197

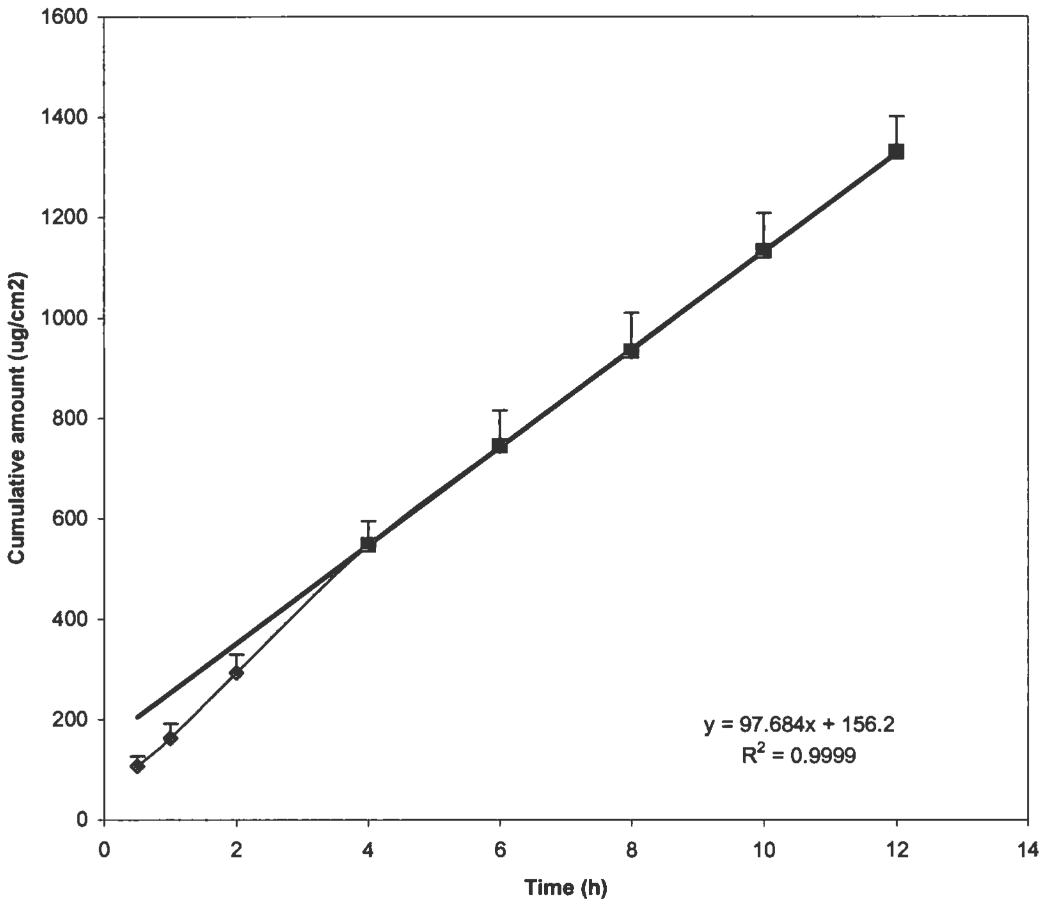


FIGURE 50. RELEASE PROFILE OF KT FROM LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 50. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5%KT (NO. 1)

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	1.204	22.702	115.780	182.087	182.087	
2	0.5	0.739	14.254	72.698	114.332	114.332	**Average**
3	0.5	0.650	12.637	64.450	101.361	101.361	118.073
4	0.5	0.535	10.545	53.782	84.583	84.583	**Std.Dev.**
5	0.5	0.632	12.304	62.751	98.688	98.688	34.569
6	0.5	0.829	15.882	80.999	127.387	127.387	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.501	9.920	50.593	79.567	261.654	
2	1	0.375	7.629	38.907	61.189	175.521	**Average**
3	1	0.391	7.929	40.438	63.597	164.958	183.389
4	1	0.290	6.094	31.081	48.881	133.464	**Std.Dev.**
5	1	0.389	7.882	40.196	63.216	161.905	44.405
6	1	0.473	9.406	47.971	75.444	202.831	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.861	16.467	83.980	132.076	393.730	
2	2	0.775	14.914	76.064	119.626	295.146	**Average**
3	2	0.807	15.489	78.994	124.234	289.192	305.153
4	2	0.620	12.083	61.622	96.913	230.377	**Std.Dev.**
5	2	0.757	14.569	74.302	116.855	278.760	56.526
6	2	0.921	17.565	89.579	140.881	343.712	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.471	27.558	140.544	221.033	614.763	
2	4	1.573	29.407	149.977	235.869	531.015	**Average**
3	4	1.659	30.974	157.969	248.438	537.630	531.671
4	4	1.227	23.116	117.890	185.405	415.782	**Std.Dev.**
5	4	1.524	28.523	145.469	228.778	507.538	68.729
6	4	1.598	29.871	152.343	239.589	583.301	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.368	25.679	130.962	205.963	820.726	
2	6	1.684	31.434	160.312	252.122	783.137	**Average**
3	6	1.532	28.668	146.209	229.942	767.572	747.894
4	6	1.133	21.417	109.224	171.777	587.559	**Std.Dev.**
5	6	1.391	26.105	133.138	209.386	716.924	86.763
6	6	1.520	28.444	145.065	228.144	811.445	

TABLE 50. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.3	ug/cm²	Cumulative amount	
	(h)						
1	8	1.360	25.622	130.672	205.508	1026.234	
2	8	1.705	31.883	162.601	255.722	1038.859	**Average**
3	8	1.548	29.028	148.043	232.827	1000.398	968.611
4	8	1.235	23.334	119.004	187.158	774.716	**Std.Dev.**
5	8	1.438	27.037	137.886	216.854	933.777	102.806
6	8	1.503	28.207	143.853	226.238	1037.683	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.182	22.301	113.733	178.867	1205.101	
2	10	1.537	28.768	146.717	230.741	1269.600	**Average**
3	10	1.465	27.444	139.963	220.120	1220.519	1167.930
4	10	1.146	21.659	110.461	173.722	948.439	**Std.Dev.**
5	10	1.338	25.136	128.195	201.613	1135.390	116.096
6	10	1.264	23.794	121.350	190.847	1228.530	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.226	23.113	117.879	185.387	1390.489	
2	12	1.661	31.010	158.152	248.725	1518.325	**Average**
3	12	1.582	29.585	150.881	237.291	1457.809	1384.242
4	12	1.256	23.656	120.645	189.738	1138.176	**Std.Dev.**
5	12	1.453	27.231	138.879	218.415	1353.806	133.284
6	12	1.452	27.219	138.816	218.315	1446.845	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	118.087		34.569
1	183.389		44.405
2	305.153		56.526
4	531.671	531.671	68.729
6	747.894	747.894	86.763
8	968.611	968.611	102.806
10	1167.930	1167.930	116.096
12	1384.242	1384.242	133.284

TABLE 51. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT (NO. 2)

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.535	10.545	53.782	84.583	84.583	
2	0.5	0.532	10.486	53.478	84.105	84.105	**Average**
3	0.5	0.550	10.819	55.178	86.778	86.778	90.628
4	0.5	0.621	12.114	61.780	97.161	97.161	**Std.Dev.**
5	0.5	0.631	12.295	62.707	98.619	98.619	6.388
6	0.5	0.590	11.535	58.830	92.522	92.522	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.290	6.094	31.081	48.881	133.464	
2	1	0.285	5.992	30.561	48.063	132.169	**Average**
3	1	0.302	6.297	32.117	50.510	137.288	144.053
4	1	0.386	7.826	39.914	62.772	159.933	**Std.Dev.**
5	1	0.362	7.399	37.735	59.346	157.964	12.208
6	1	0.305	6.356	32.416	50.981	143.502	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.615	11.992	61.162	96.189	229.653	
2	2	0.635	12.369	63.081	99.208	231.377	**Average**
3	2	0.652	12.675	64.641	101.662	238.949	240.816
4	2	0.621	12.114	61.781	97.163	257.096	**Std.Dev.**
5	2	0.599	11.699	59.664	93.833	251.797	11.188
6	2	0.590	11.535	58.829	92.520	236.023	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	1.227	23.116	117.890	185.405	415.058	
2	4	1.246	23.467	119.680	188.221	419.598	**Average**
3	4	1.264	23.796	121.360	190.863	429.812	425.675
4	4	1.205	22.720	115.871	182.230	439.326	**Std.Dev.**
5	4	1.196	22.566	115.086	180.996	432.793	9.708
6	4	1.199	22.621	115.368	181.439	417.462	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	1.133	21.417	109.224	171.777	586.835	
2	6	1.142	21.585	110.081	173.124	592.722	**Average**
3	6	1.154	21.801	111.183	174.857	604.669	597.551
4	6	1.124	21.245	108.347	170.397	609.724	**Std.Dev.**
5	6	1.114	21.063	107.424	168.945	601.738	9.138
6	6	1.136	21.464	109.464	172.154	589.616	

TABLE 51. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.3	ug/cm²	Cumulative amount	
	(h)						
1	8	1.235	23.350	119.086	187.286	774.121	
2	8	1.246	23.536	120.034	188.777	781.499	**Average**
3	8	1.251	23.641	120.570	189.621	794.290	781.247
4	8	1.146	21.716	110.753	174.182	783.905	**Std.Dev.**
5	8	1.137	21.560	109.954	172.925	774.662	7.435
6	8	1.250	23.612	120.422	189.388	779.004	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.2**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.149	21.697	110.657	174.030	948.151	
2	10	1.169	22.069	112.550	177.006	958.505	**Average**
3	10	1.176	22.191	113.173	177.988	972.278	955.874
4	10	1.139	21.523	109.766	172.629	956.535	**Std.Dev.**
5	10	1.125	21.265	108.452	170.562	945.225	9.500
6	10	1.159	21.887	111.621	175.547	954.550	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.2**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.256	23.656	120.645	189.738	1137.889	
2	12	1.269	23.887	121.822	191.590	1150.095	**Average**
3	12	1.275	23.989	122.343	192.408	1164.686	1145.640
4	12	1.247	23.495	119.823	188.446	1144.980	**Std.Dev.**
5	12	1.226	23.100	117.808	185.277	1130.501	11.596
6	12	1.266	23.831	121.537	191.141	1145.691	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	90.628		6.388
1	144.053		12.208
2	240.815	240.815	11.188
4	425.675	425.675	9.708
6	597.551	597.551	9.138
8	781.247	781.247	7.435
10	955.874	955.874	9.500
12	1145.640	1145.640	11.596

TABLE 52. CUMULATIVE RELAESE OF KT FROM LECITIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT

Time (h)	Average cumulative amount		Std.Dev.
0.5	104.351		27.698
1	163.721		37.229
2	272.984		51.363
4	478.673	478.673	72.486
6	672.722	672.722	98.103
8	874.929	874.929	120.014
10	1061.902	1061.902	135.762
12	1264.941	1264.941	153.826

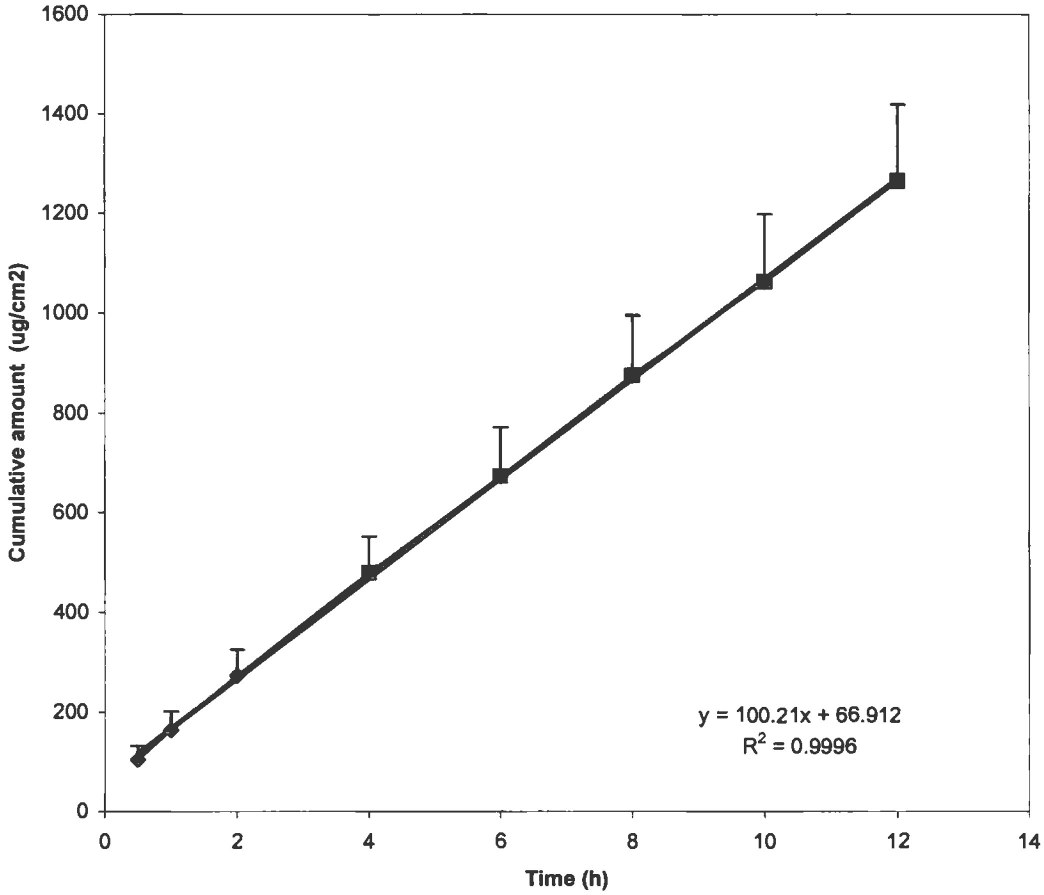


FIGURE 51. RELEASE PROFILE OF KT FROM LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT (MEAN ± SD, N = 12)

TABLE 53. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm^2	Cumulative amount	
	(h)						
1	0.5	0.649	12.606	64.292	101.112	101.112	
2	0.5	0.838	16.043	81.817	128.673	128.673	Average
3	0.5	0.688	13.323	67.947	106.859	106.859	105.139
4	0.5	0.634	12.340	62.934	98.975	98.975	Std.Dev.
5	0.5	0.648	12.592	64.221	101.001	101.001	12.227
6	0.5	0.601	11.746	59.905	94.212	94.212	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm^2	Cumulative amount	
	(h)						
1	1	0.297	6.219	31.715	49.878	150.990	
2	1	0.282	5.948	30.334	47.706	176.380	Average
3	1	0.224	4.882	24.897	39.155	146.014	156.461
4	1	0.353	7.236	36.902	58.036	157.011	Std.Dev.
5	1	0.365	7.453	38.012	59.781	160.782	11.256
6	1	0.321	6.655	33.941	53.379	147.591	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm^2	Cumulative amount	
	(h)						
1	2	0.938	17.861	91.090	143.257	294.247	
2	2	0.875	16.731	85.327	134.194	310.574	Average
3	2	0.660	12.815	65.357	102.787	248.802	300.388
4	2	1.005	19.096	97.388	153.162	310.173	Std.Dev.
5	2	1.105	20.914	106.660	167.745	328.527	27.505
6	2	1.069	20.249	103.270	162.413	310.004	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm^2	Cumulative amount	
	(h)						
1	4	1.722	32.123	163.826	257.649	551.896	
2	4	1.668	31.143	158.827	249.787	560.361	Average
3	4	1.220	22.996	117.281	184.448	433.250	548.075
4	4	1.703	31.784	162.098	254.932	565.105	Std.Dev.
5	4	1.856	34.564	176.275	277.227	605.753	59.235
6	4	1.752	32.676	166.646	262.083	572.087	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm^2	Cumulative amount	
	(h)						
1	6	1.903	35.409	180.586	284.008	835.904	
2	6	1.938	36.060	183.905	289.227	849.588	Average
3	6	1.539	28.805	146.905	231.037	664.287	825.604
4	6	1.905	35.448	180.787	284.323	849.427	Std.Dev.
5	6	1.928	35.878	182.978	287.769	893.522	81.400
6	6	1.936	36.007	183.637	288.806	860.893	

TABLE 53. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.836	34.262	174.736	274.807	1110.711	
2	8	1.761	32.899	167.783	263.871	1113.459	**Average**
3	8	1.361	25.624	130.681	205.521	869.808	1077.48
4	8	1.714	32.051	163.462	257.077	1106.504	**Std.Dev.**
5	8	1.704	31.863	162.500	255.563	1149.085	102.886
6	8	1.696	31.721	161.778	254.429	1115.322	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.699	31.702	161.682	254.277	1364.988	
2	10	1.653	30.862	157.396	247.537	1360.996	**Average**
3	10	1.316	24.735	126.147	198.391	1068.200	1316.700
4	10	1.673	31.236	159.305	250.539	1357.044	**Std.Dev.**
5	10	1.655	30.901	157.597	247.853	1396.938	122.769
6	10	1.578	29.513	150.515	236.714	1352.036	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.677	31.306	159.661	251.098	1616.086	
2	12	1.690	31.545	160.879	253.014	1614.010	**Average**
3	12	1.371	25.733	131.238	206.397	1274.597	1560.72
4	12	1.745	32.537	165.940	260.974	1618.017	**Std.Dev.**
5	12	1.687	31.495	160.623	252.612	1649.550	141.371
6	12	1.601	29.928	152.633	240.045	1592.081	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	105.139		12.227
1	156.461		11.254
2	300.388		27.505
4	548.075		59.235
6	825.604	825.604	81.400
8	1077.482	1077.482	102.886
10	1316.700	1316.700	122.769
12	1560.724	1560.724	141.371

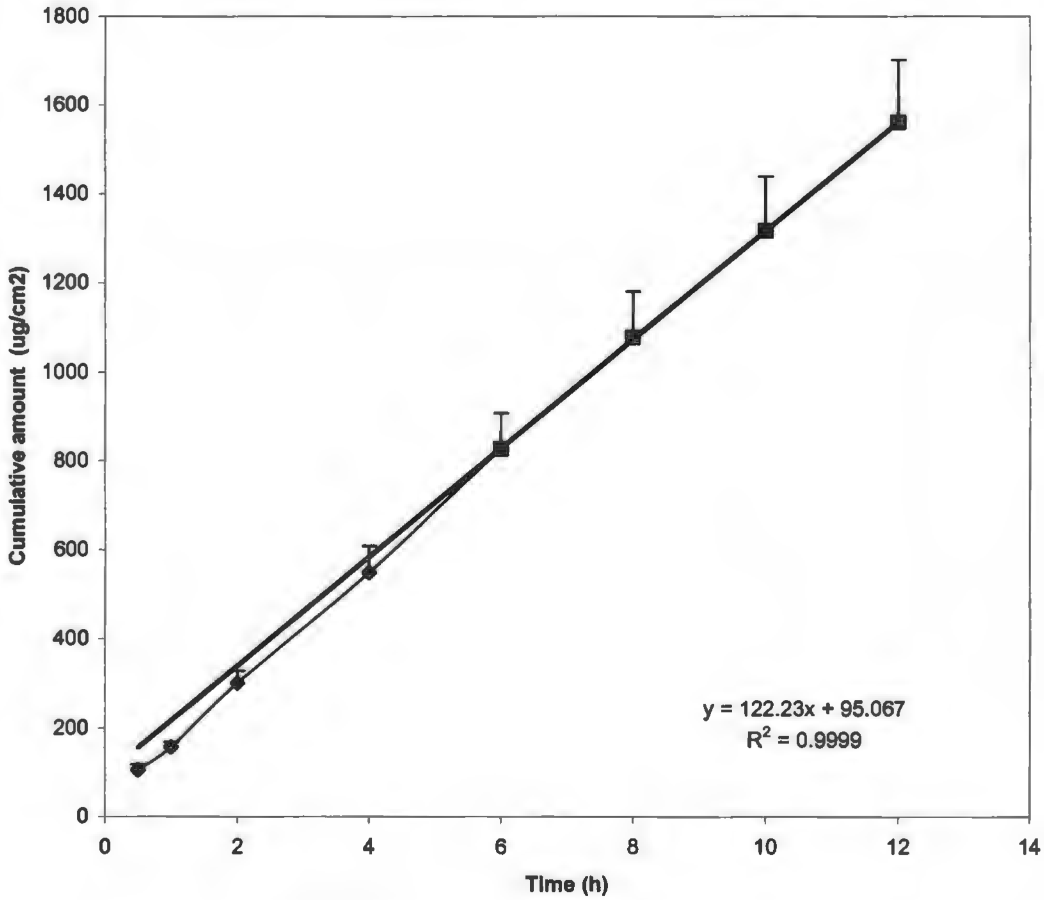


FIGURE 52. RELEASE PROFILE OF KT FROM LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 54. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.600	11.724	59.794	94.038	94.038	
2	0.5	0.626	12.190	62.170	97.774	97.774	**Average**
3	0.5	0.608	11.872	60.548	95.224	95.224	94.199
4	0.5	0.560	10.997	56.087	88.208	88.208	**Std.Dev.**
5	0.5	0.612	11.937	60.876	95.740	95.740	3.229
6	0.5	0.601	11.746	59.905	94.212	94.212	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	1	0.343	7.044	35.924	56.498	150.536	
2	1	0.352	7.206	36.751	57.798	155.572	**Average**
3	1	0.325	6.724	34.294	53.935	149.159	151.329
4	1	0.338	6.956	35.476	55.793	144.000	**Std.Dev.**
5	1	0.404	8.151	41.570	65.377	161.117	6.113
6	1	0.321	6.655	33.941	53.379	147.591	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	2	0.769	14.792	75.439	118.642	269.178	
2	2	0.731	14.107	71.948	113.152	268.724	**Average**
3	2	0.736	14.192	72.378	113.829	262.987	265.725
4	2	0.735	14.178	72.306	113.715	257.716	**Std.Dev.**
5	2	0.727	14.040	71.602	112.609	273.726	5.836
6	2	0.740	14.267	72.759	114.429	262.019	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	4	1.834	34.157	174.203	273.969	543.147	
2	4	1.466	27.461	140.050	220.256	488.980	**Average**
3	4	1.739	32.426	165.371	260.078	523.066	522.334
4	4	1.733	32.318	164.821	259.213	516.929	**Std.Dev.**
5	4	1.766	32.921	167.898	264.054	537.780	19.063
6	4	1.752	32.676	166.646	262.083	524.103	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	6	1.870	34.812	177.539	279.216	822.363	
2	6	1.724	32.169	164.061	258.018	746.998	**Average**
3	6	1.824	33.972	173.259	272.484	795.550	797.861
4	6	1.887	35.129	179.160	281.765	798.694	**Std.Dev.**
5	6	1.897	35.297	180.014	283.108	820.888	27.374
6	6	1.865	34.731	177.129	278.571	802.674	

TABLE 54. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.654	30.959	157.890	248.313	1070.675	
2	8	1.520	28.528	145.493	228.816	975.814	**Average**
3	8	1.558	29.223	149.036	234.388	1029.938	1033.75
4	8	1.553	29.131	148.570	233.656	1032.350	**Std.Dev.**
5	8	1.584	29.691	151.425	238.145	1059.033	32.792
6	8	1.542	28.930	147.544	232.042	1034.716	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.769	32.975	168.171	264.482	1335.157	
2	10	1.746	32.556	166.036	261.124	1236.938	**Average**
3	10	1.696	31.653	161.428	253.877	1283.816	1293
4	10	1.699	31.699	161.666	254.252	1286.602	**Std.Dev.**
5	10	1.712	31.948	162.936	256.249	1315.281	33.448
6	10	1.776	33.100	168.808	265.484	1300.200	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.603	29.963	152.811	240.325	1575.483	
2	12	1.720	32.091	163.666	257.398	1494.336	**Average**
3	12	1.608	30.049	153.248	241.012	1524.828	1542.8
4	12	1.567	29.304	149.449	235.037	1521.639	**Std.Dev.**
5	12	1.759	32.790	167.228	262.999	1578.281	34.132
6	12	1.752	32.671	166.624	262.050	1562.250	

Time	Average cum. amount		Std.Dev
(h)			
0.5	94.199		3.229
1	151.329	151.329	6.113
2	265.725	265.725	5.836
4	522.334	522.334	19.063
6	797.861	797.861	27.374
8	1033.754	1033.754	32.792
10	1292.999	1292.999	33.448
12	1542.803	1542.803	34.132

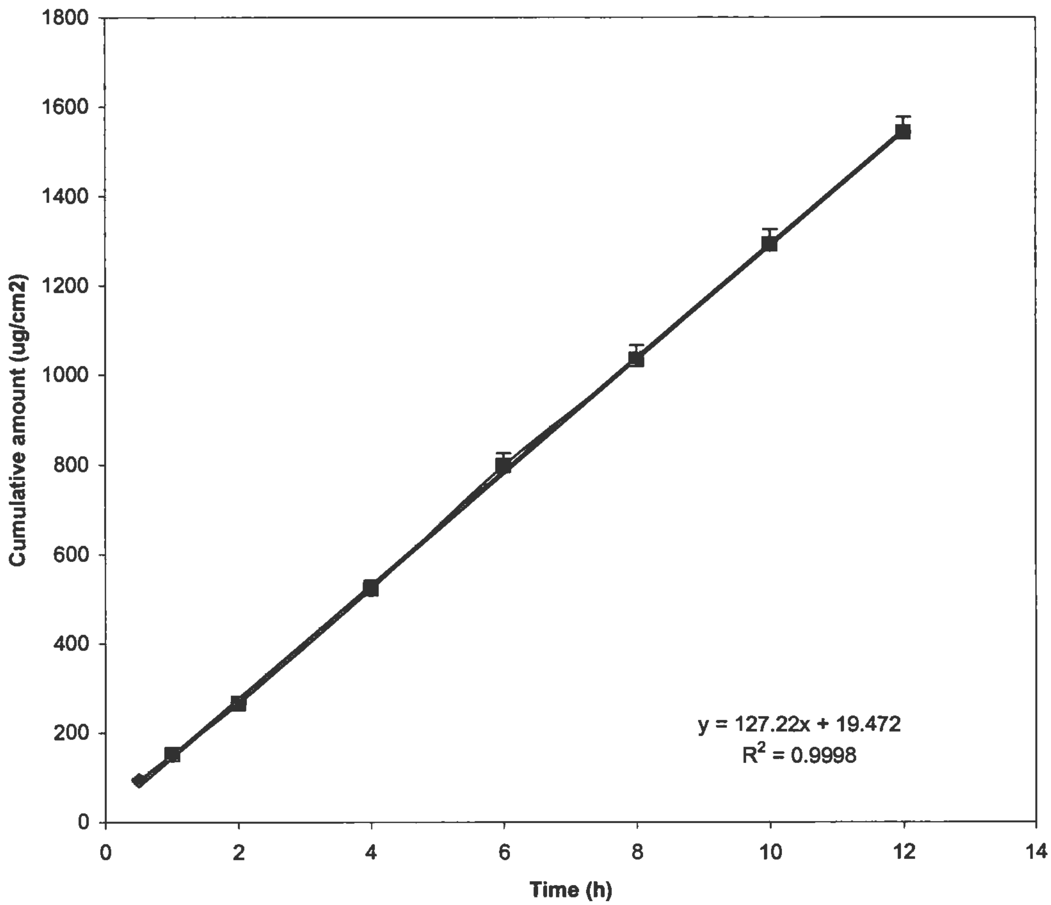


FIGURE 53. RELEASE PROFILE OF KT FROM (LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 55. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	0.5	0.774	14.890	75.941	119.432	119.432	
2	0.5	0.577	11.300	57.630	90.635	90.635	**Average**
3	0.5	0.483	9.603	48.975	77.024	77.024	92.917
4	0.5	0.507	10.031	51.159	80.457	80.457	**Std.Dev.**
5	0.5	0.612	11.937	60.876	95.740	95.740	15.005
6	0.5	0.601	11.746	59.905	94.212	94.212	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	1	0.480	9.539	48.650	76.512	195.944	
2	1	0.365	7.458	38.037	59.821	150.456	**Average**
3	1	0.297	6.223	31.736	49.912	126.935	154.701
4	1	0.336	6.919	35.288	55.497	135.954	**Std.Dev.**
5	1	0.404	8.151	41.570	65.377	161.117	24.050
6	1	0.391	7.928	40.432	63.587	157.799	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	2	0.896	17.099	87.203	137.143	333.087	
2	2	0.767	14.761	75.279	118.390	268.846	**Average**
3	2	0.620	12.096	61.691	97.022	223.957	269.955
4	2	0.723	13.955	71.173	111.933	247.887	**Std.Dev.**
5	2	0.727	14.040	71.602	112.609	273.726	36.357
6	2	0.740	14.267	72.759	114.429	272.227	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	4	1.834	34.157	174.203	273.969	607.056	
2	4	1.727	32.209	164.265	258.338	527.185	**Average**
3	4	1.374	25.805	131.604	206.974	430.930	518.561
4	4	1.566	29.295	149.405	234.969	482.856	**Std.Dev.**
5	4	1.736	32.376	165.117	259.679	533.405	58.668
6	4	1.722	32.130	163.864	257.708	529.936	
Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²	Cumulative amount	
	(h)						
1	6	1.870	34.812	177.539	279.216	886.272	
2	6	1.796	33.470	170.695	268.452	795.637	**Average**
3	6	1.444	27.062	138.016	217.058	647.988	780.384
4	6	1.632	30.487	155.486	244.533	727.389	**Std.Dev.**
5	6	1.897	35.297	180.014	283.108	816.513	82.314
6	6	1.865	34.731	177.129	278.571	808.507	

TABLE 55. CONT'D.

Sample	Time	Abs.	ug/ml	ug/5.2	ug/cm²	Cumulative amount	
	(h)						
1	8	1.665	31.159	158.913	249.922	1136.194	
2	8	1.518	28.480	145.247	228.430	1024.067	**Average**
3	8	1.286	24.277	123.812	194.719	842.708	1005.790
4	8	1.386	26.079	133.003	209.174	936.563	**Std.Dev.**
5	8	1.584	29.691	151.425	238.145	1054.658	102.297
6	8	1.542	28.930	147.544	232.042	1040.549	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	10	1.768	32.961	168.101	264.372	1400.566	
2	10	1.663	31.050	158.353	249.042	1273.108	**Average**
3	10	1.464	27.440	139.944	220.090	1062.797	1246.812
4	10	1.534	28.710	146.421	230.276	1166.839	**Std.Dev.**
5	10	1.612	30.130	153.663	241.665	1296.323	116.812
6	10	1.606	30.009	153.045	240.693	1281.242	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²**	**Cumulative amount**	
	(h)						
1	12	1.640	30.631	156.217	245.682	1646.247	
2	12	1.593	29.774	151.847	238.810	1511.918	**Average**
3	12	1.392	26.118	133.203	209.488	1272.285	1476.267
4	12	1.437	26.934	137.364	216.033	1382.871	**Std.Dev.**
5	12	1.559	29.153	148.683	233.833	1530.156	130.256
6	12	1.552	29.035	148.079	232.883	1514.125	

Time	Average cum. amount		Std.Dev.
(h)			
0.5	92.917		15.005
1	154.701		24.050
2	269.955		36.357
4	518.561		58.668
6	780.384	780.384	82.314
8	1005.790	1005.790	102.297
10	1246.812	1246.812	116.812
12	1476.267	1476.267	130.256

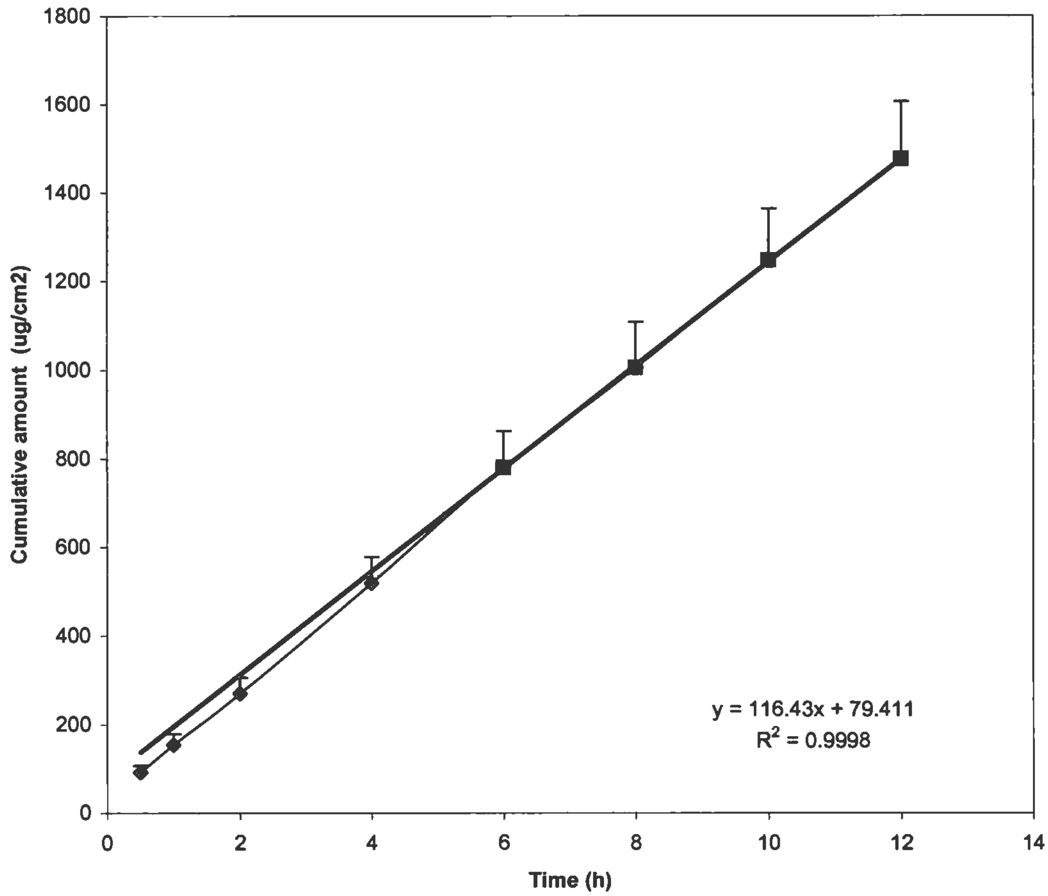


FIGURE 54. RELEASE PROFILE OF KT FROM LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 56. CUMULATIVE RELEASE OF KT ACROSS CELLULOSE ACETATE MEMBRANE FROM LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT

Sample	Time	Abs.	ug/ml	ug/5.1	ug/cm²/	Cumulative amount	
	(h)						
1	0.5	0.703	13.599	69.357	109.078	109.078	
2	0.5	0.700	13.548	69.093	108.662	108.663	**Average**
3	0.5	0.515	10.175	51.894	81.614	81.614	87.573
4	0.5	0.517	10.223	52.135	81.993	81.993	**Std.Dev.**
5	0.5	0.459	9.169	46.760	73.539	73.539	17.091
6	0.5	0.439	8.796	44.860	70.551	70.551	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
	(h)						
1	1	0.538	10.593	54.027	84.968	194.046	
2	1	0.507	10.035	51.178	80.487	189.150	**Average**
3	1	0.430	8.626	43.995	69.191	150.805	156.998
4	1	0.409	8.245	42.048	66.129	148.122	**Std.Dev.**
5	1	0.345	7.094	36.178	56.897	130.436	28.245
6	1	0.359	7.341	37.440	58.882	129.432	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
	(h)						
1	2	0.716	13.828	70.522	110.909	304.955	
2	2	0.707	13.670	69.715	109.641	298.791	**Average**
3	2	0.511	10.114	51.580	81.120	231.926	243.102
4	2	0.516	10.202	52.030	81.828	229.949	**Std.Dev.**
5	2	0.405	8.185	41.744	65.651	196.086	48.103
6	2	0.418	8.412	42.903	67.473	196.905	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
	(h)						
1	4	1.934	35.976	183.476	288.552	593.507	
2	4	1.827	34.027	173.537	272.922	571.712	**Average**
3	4	1.632	30.482	155.458	244.489	476.414	494.291
4	4	1.629	30.424	155.161	244.021	473.970	**Std.Dev.**
5	4	1.491	27.922	142.404	223.959	420.045	72.393
6	4	1.554	29.074	148.276	233.193	430.098	
Sample	**Time**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
	(h)						
1	6	1.930	35.903	183.103	287.966	881.473	
2	6	1.816	33.833	172.550	271.369	843.081	**Average**
3	6	1.621	30.289	154.472	242.937	719.351	742.564
4	6	1.606	30.013	153.065	240.725	714.695	**Std.Dev.**
5	6	1.461	27.375	139.613	219.569	639.614	98.596
6	6	1.512	28.310	144.383	227.071	657.169	

TABLE 56. CONT'D.

Sample	Time (h)	Abs.	ug/ml	ug/5.2	ug/cm²/	Cumulative amount	
1	8	1.719	32.146	163.943	257.832	1139.305	
2	8	1.618	30.298	154.520	243.013	1086.094	**Average**
3	8	1.357	25.568	130.399	205.078	924.429	954.292
4	8	1.329	25.058	127.794	200.981	915.676	**Std.Dev.**
5	8	1.015	19.350	98.686	155.204	794.818	132.146
6	8	1.379	25.965	132.423	208.261	865.430	
Sample	**Time (h)**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
1	10	1.835	34.179	174.312	274.139	1413.444	
2	10	1.763	32.868	167.626	263.625	1349.719	**Average**
3	10	1.577	29.483	150.361	236.472	1160.902	1188.490
4	10	1.367	25.675	130.943	205.934	1121.610	**Std.Dev.**
5	10	1.187	22.404	114.261	179.699	974.516	163.500
6	10	1.637	30.586	155.988	245.321	1110.751	
Sample	**Time (h)**	**Abs.**	**ug/ml**	**ug/5.1**	**ug/cm²/**	**Cumulative amount**	
1	12	1.699	31.704	161.689	254.287	1667.732	
2	12	1.653	30.865	157.411	247.560	1597.279	**Average**
3	12	1.612	30.118	153.603	241.571	1402.472	1423.229
4	12	1.496	28.011	142.856	224.669	1346.279	**Std.Dev.**
5	12	1.289	24.244	123.646	194.458	1168.975	181.938
6	12	1.641	30.656	156.347	245.887	1356.639	

Time (h)	Average cum. amount		Std.Dev.
0.5	87.573		17.091
1	156.998		28.245
2	243.102		48.103
4	494.291	497.708	72.393
6	742.564	713.397	98.596
8	954.292	954.292	132.146
10	1188.490	1188.490	163.500
12	1423.229	1423.229	181.938

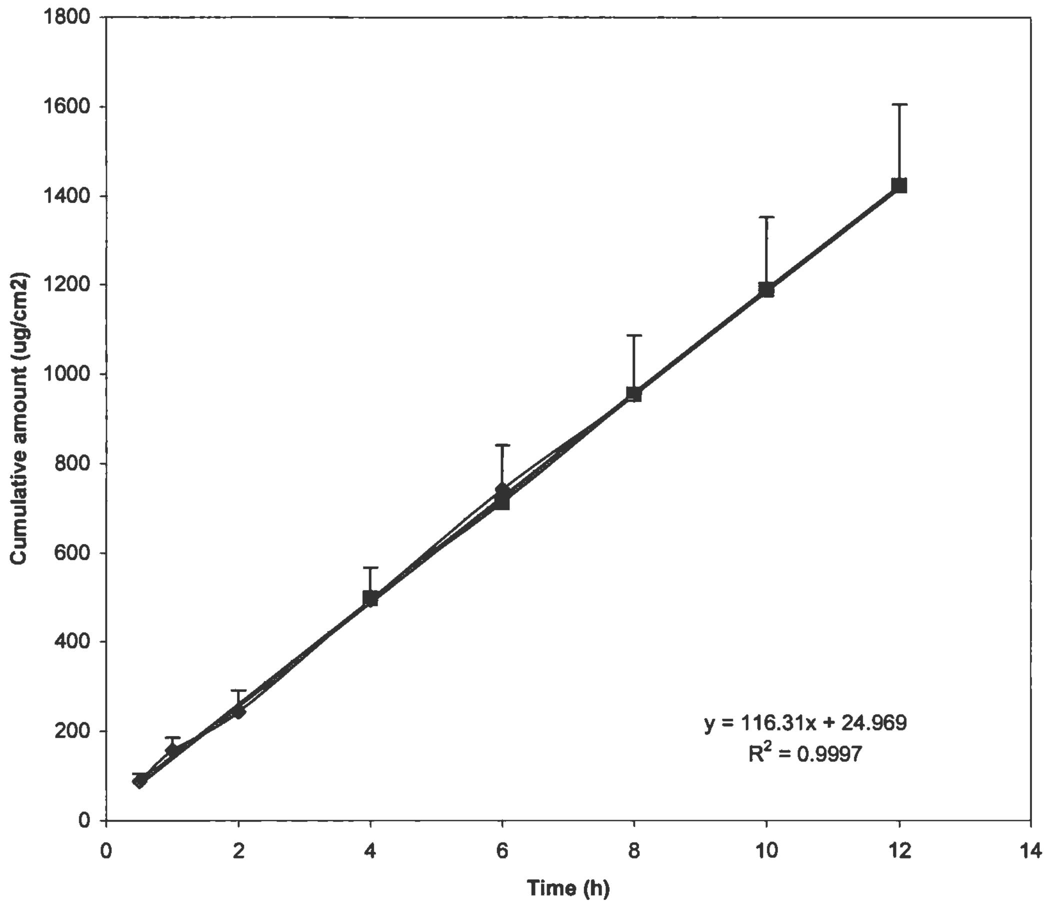


FIGURE 55. RELEASE PROFILE OF KT FROM LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT (MEAN ± SD, N = 6)

TABLE 57. VALUES OF VISCOSITY FOR KT ORGANOGELS WITH DIFFERENT COMPOSITIONS BY CYLINDRICAL VISCOMETER (NO.1)

40:60 0.1%	L = 1.6 cm					
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1.2	31.43	0.3	0.07	450.46	24000	46500
2.4	62.86	0.6	0.14	450.46	24000	46500
6	157.16	1.5	0.35	450.46	24000	46500
12	314.32	3	0.70	450.46	24000	46500
24	628.65	6	1.40	450.46	24000	46500
48	1257.29	12	2.79	450.46	24000	46500
40:60 0.25%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1	26.19	0.3	0.07	375.39	20000	38750
1.9	49.77	0.6	0.14	356.62	19000	36812.5
4.7	123.11	1.5	0.35	352.86	18800	36425
9.3	243.60	3	0.70	349.11	18600	36037.5
18.4	481.96	6	1.40	345.36	18400	35650
36.1	945.59	12	2.79	338.79	18400	35650
40:60 0.5%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1.3	34.05	0.3	0.07	488.00	26000	50375
2.6	68.10	0.6	0.14	488.00	26000	50375
6.5	170.26	1.5	0.35	488.00	26000	50375
13	340.52	3	0.70	488.00	26000	50375
26	681.03	6	1.40	488.00	26000	50375
52	1362.07	12	2.79	488.00	26000	50375
40:60 0.7%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
0.9	23.57	0.3	0.07	337.85	18000	34875
1.6	41.91	0.6	0.14	300.31	16000	31000
3.9	102.16	1.5	0.35	292.80	15600	30225
7.7	201.69	3	0.70	289.05	15600	30225
15.6	408.62	6	1.40	292.80	15600	30225
31.3	819.86	12	2.79	293.74	15500	30031.25

TABLE 57. CONT'D.

40:60 0.8%						
Reading	**Sh Str**	**RPM**	**Sh Rt**	**Viscosity**	**Reading Visco.**	**(3.1/1.6)*Reading Visco.**
(%)	**(dyne/cm2)**		**(1/sec)**	**(p)**	**(cp)**	
6	157.16	3	0.70	225.23	12000	23250
10	261.94	6	1.40	187.69	10000	19375
18.9	495.06	12	2.79	177.37	9450	18309.375
50:50 0.1%						
Reading	**Sh Str**	**RPM**	**Sh Rt**	**Viscosity**	**Reading Visco.**	**(3.1/1.6)*Reading Visco.**
(%)	**(dyne/cm2)**		**(1/sec)**	**(p)**	**(cp)**	
3	80.14	0.3	0.07	1148.49	60000	116250
5.8	154.93	0.6	0.14	1110.20	58000	112375
14.5	387.34	1.5	0.35	1110.20	58000	112375
28.5	761.32	3	0.70	1091.06	57000	110437.5
56.8	1517.29	6	1.40	1087.23	56800	110050
50:50 0.25%						
Reading	**Sh Str**	**RPM**	**Sh Rt**	**Viscosity**	**Reading Visco.**	**(3.1/1.6)*Reading Visco.**
(%)	**(dyne/cm2)**		**(1/sec)**	**(p)**	**(cp)**	
2.6	68.10	0.3	0.07	976.00	52000	100750
5	130.97	0.6	0.14	938.47	50000	96875
12.5	327.42	1.5	0.35	938.47	50000	96875
25	654.84	3	0.70	938.47	50000	96875
49.8	1304.44	6	1.40	934.71	49800	96487.5
60:40 0.1%						
Reading	**Sh Str**	**RPM**	**Sh Rt**	**Viscosity**	**Reading Visco.**	**(3.1/1.6)*Reading Visco.**
(%)	**(dyne/cm2)**		**(1/sec)**	**(p)**	**(cp)**	
6.8	178.12	0.3	0.07	2552.63	136000	263500
12.5	327.42	0.6	0.14	2346.16	125000	242187.5
29	759.62	1.5	0.35	2177.24	116000	224750
59	1545.42	3	0.70	2214.78	116000	224750
60:40 0.25%						
Reading	**Sh Str**	**RPM**	**Sh Rt**	**Viscosity**	**Reading Visco.**	**(3.1/1.6)*Reading Visco.**
(%)	**(dyne/cm2)**		**(1/sec)**	**(p)**	**(cp)**	
6.4	167.64	0.3	0.07	2402.47	128000	248000
11.4	298.61	0.6	0.14	2139.70	114000	220875
24.5	641.74	1.5	0.35	1839.39	98000	189875
44.5	1165.62	3	0.70	1670.47	98000	189875

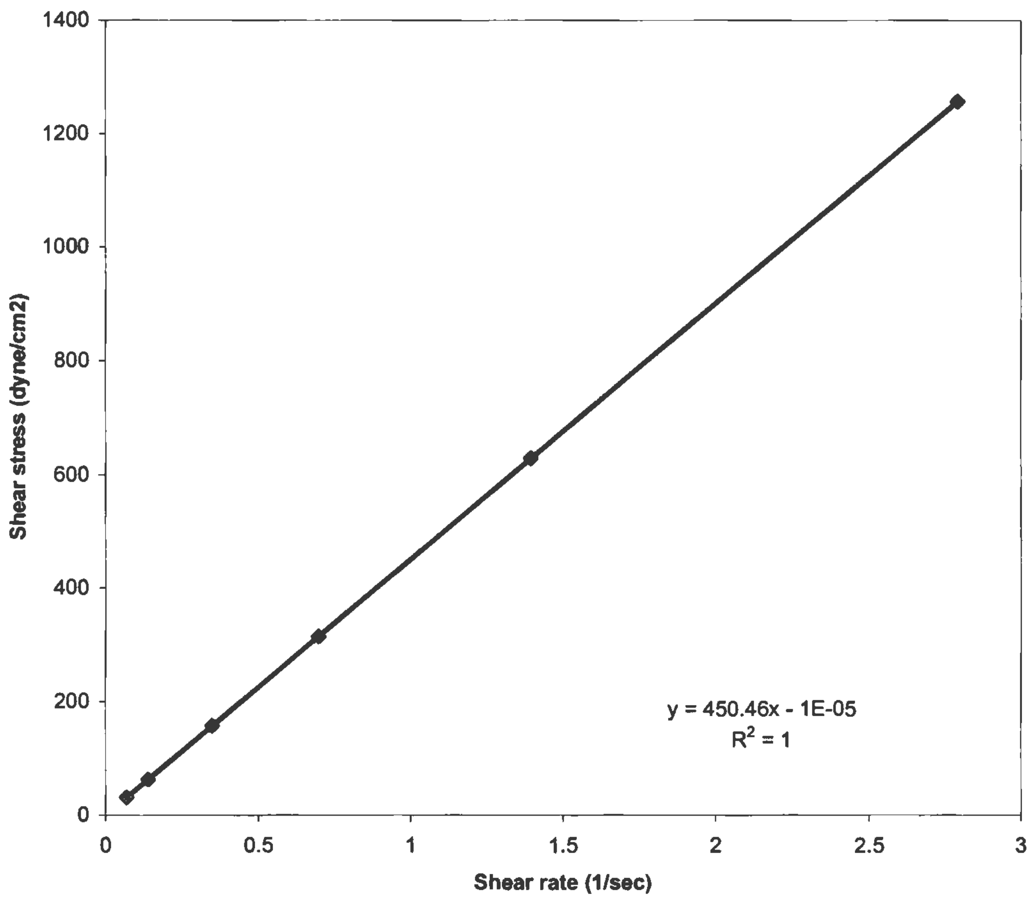


FIGURE 56. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

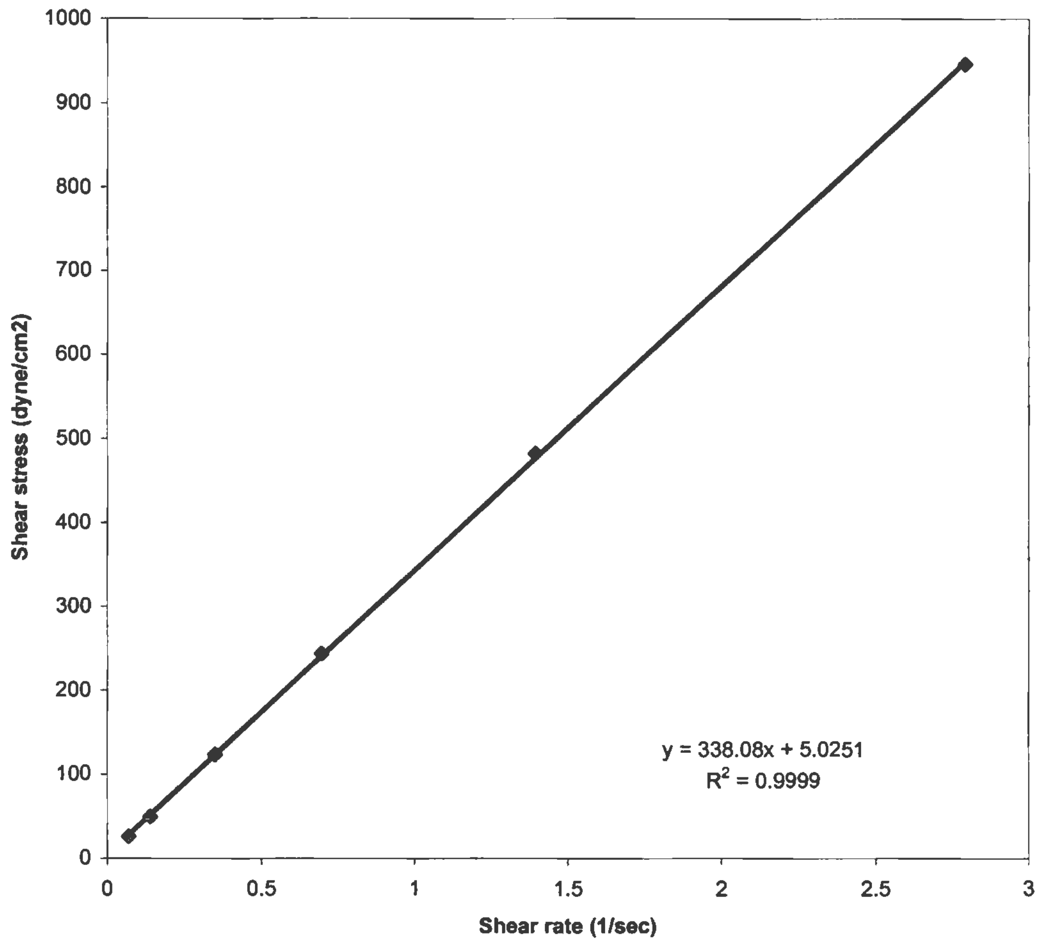


FIGURE 57. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

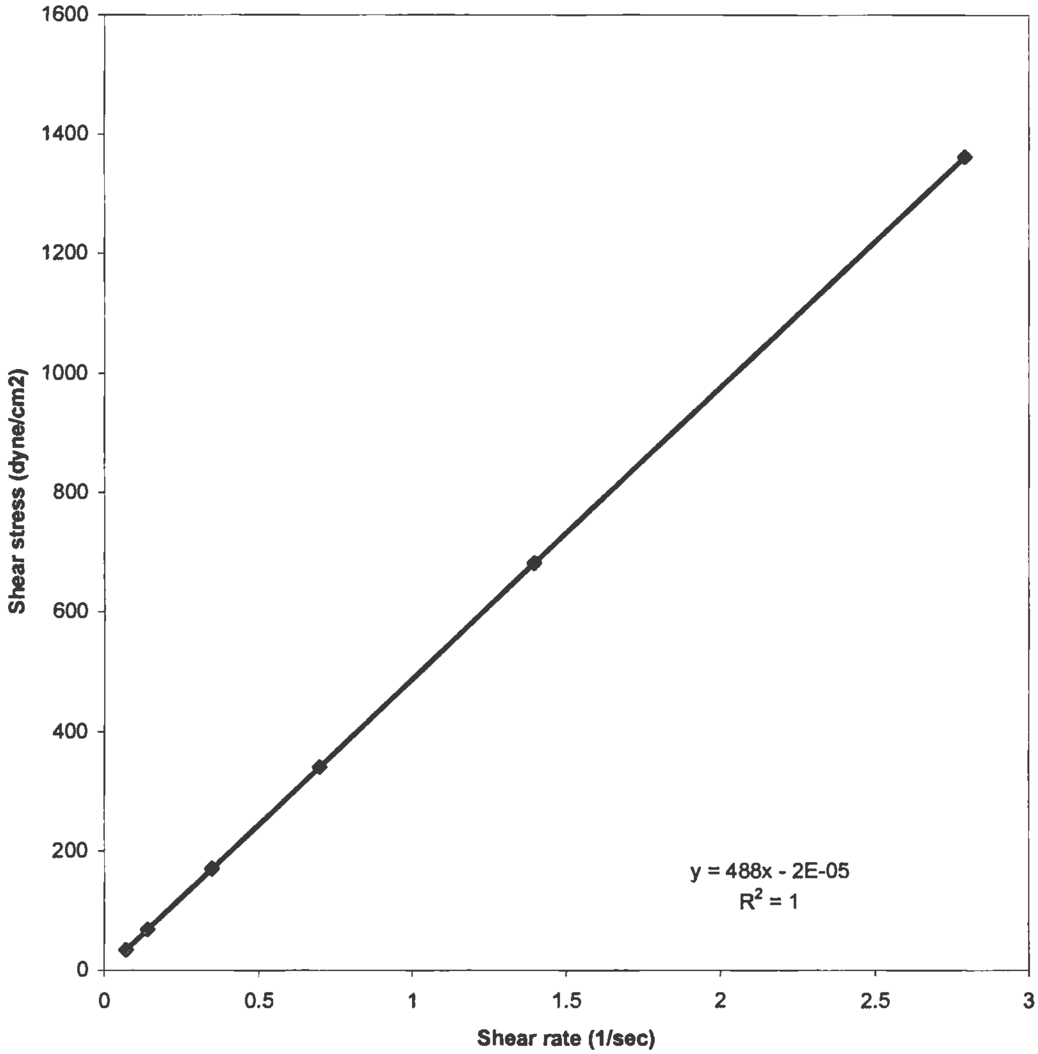


FIGURE 58. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

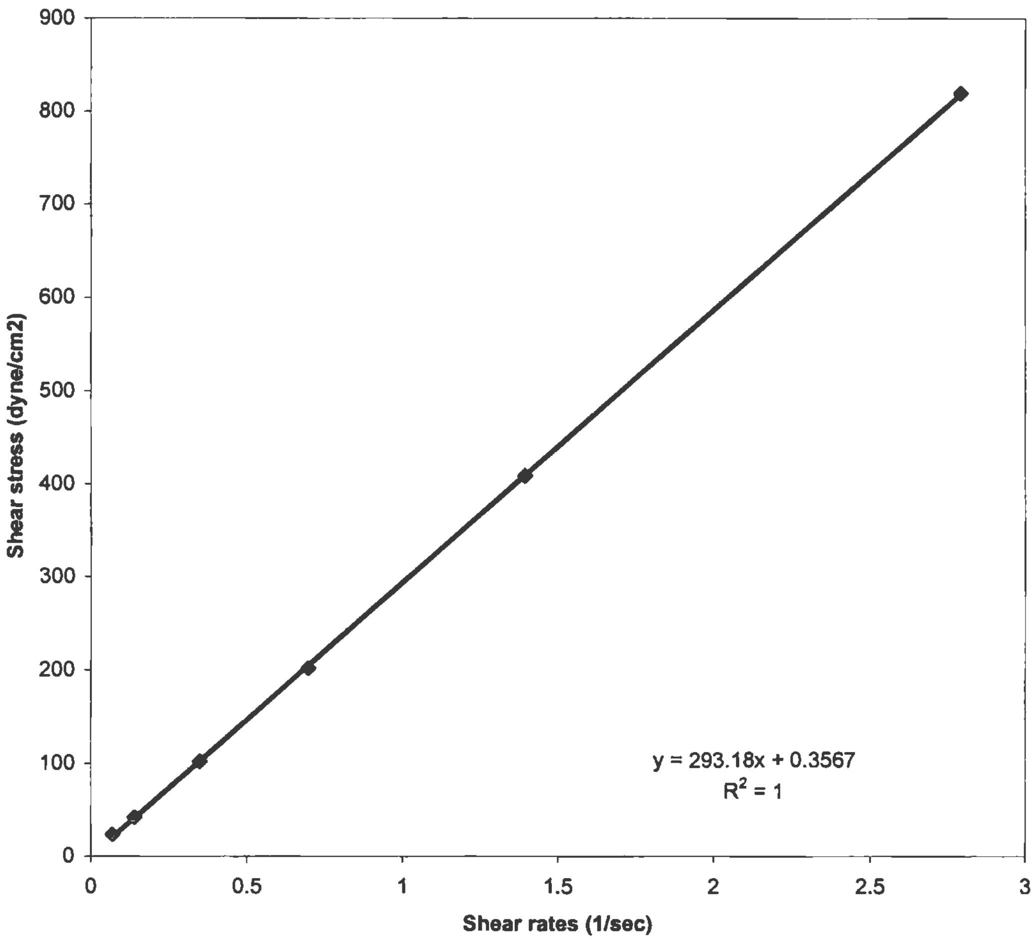


FIGURE 59. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

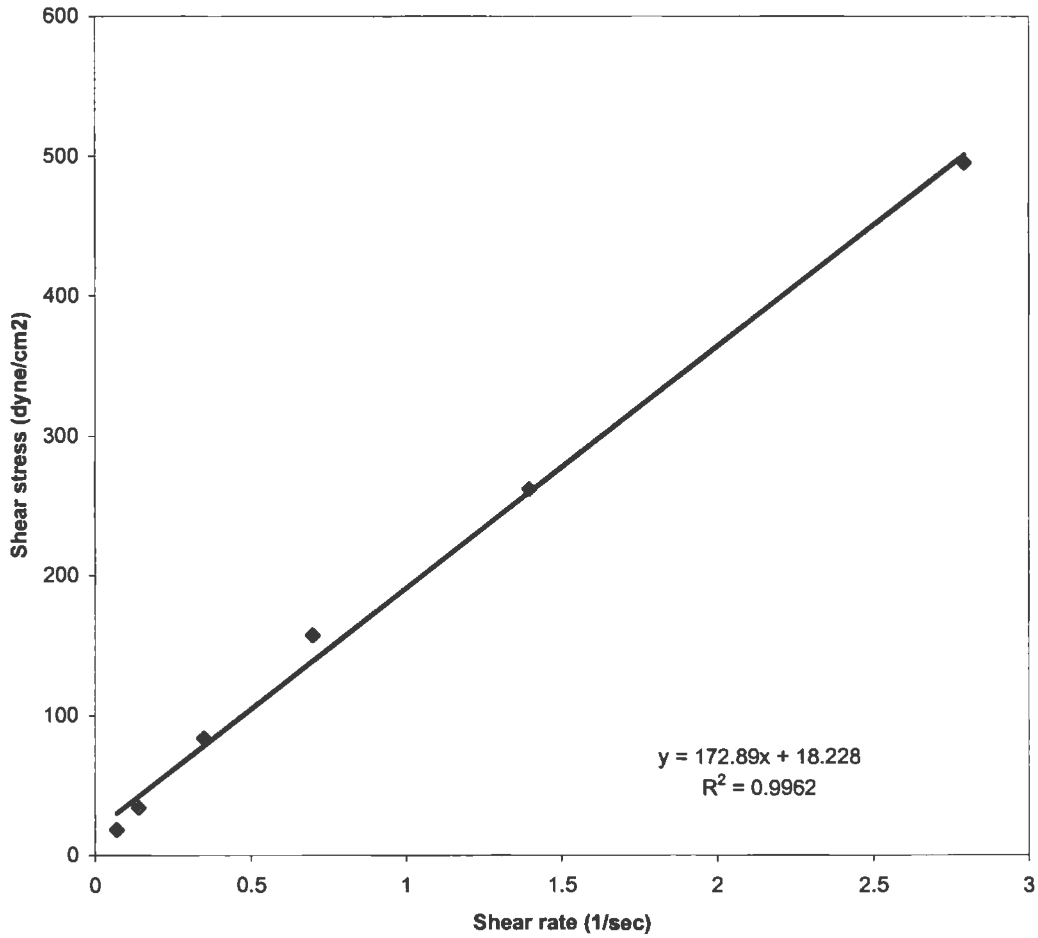


FIGURE 60. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

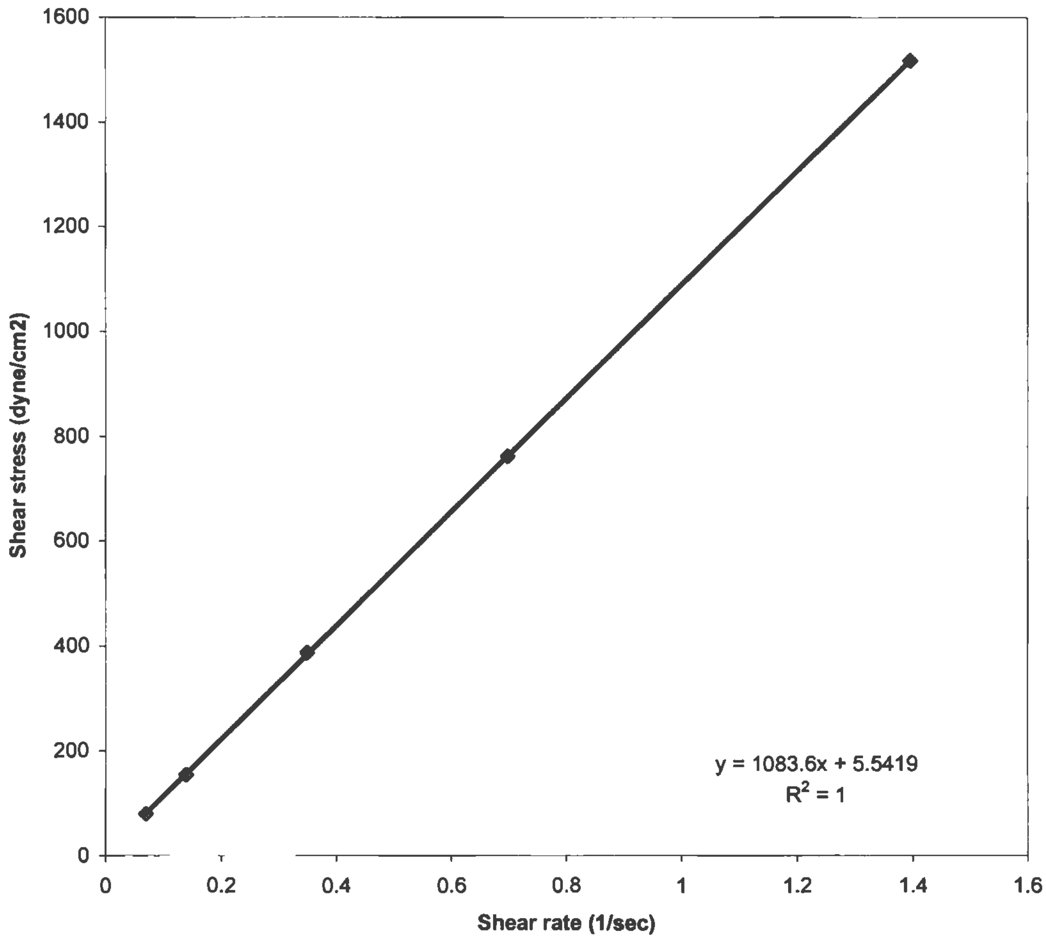


FIGURE 61. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

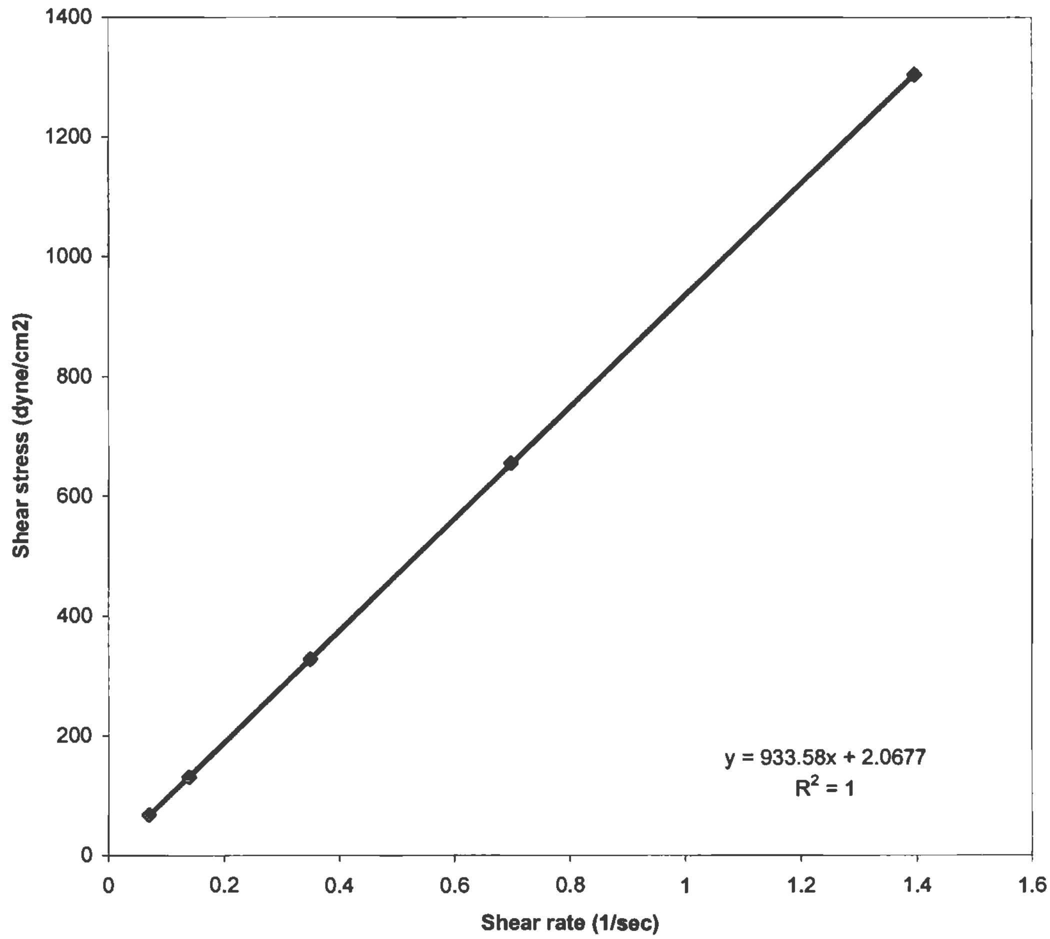


FIGURE 62. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

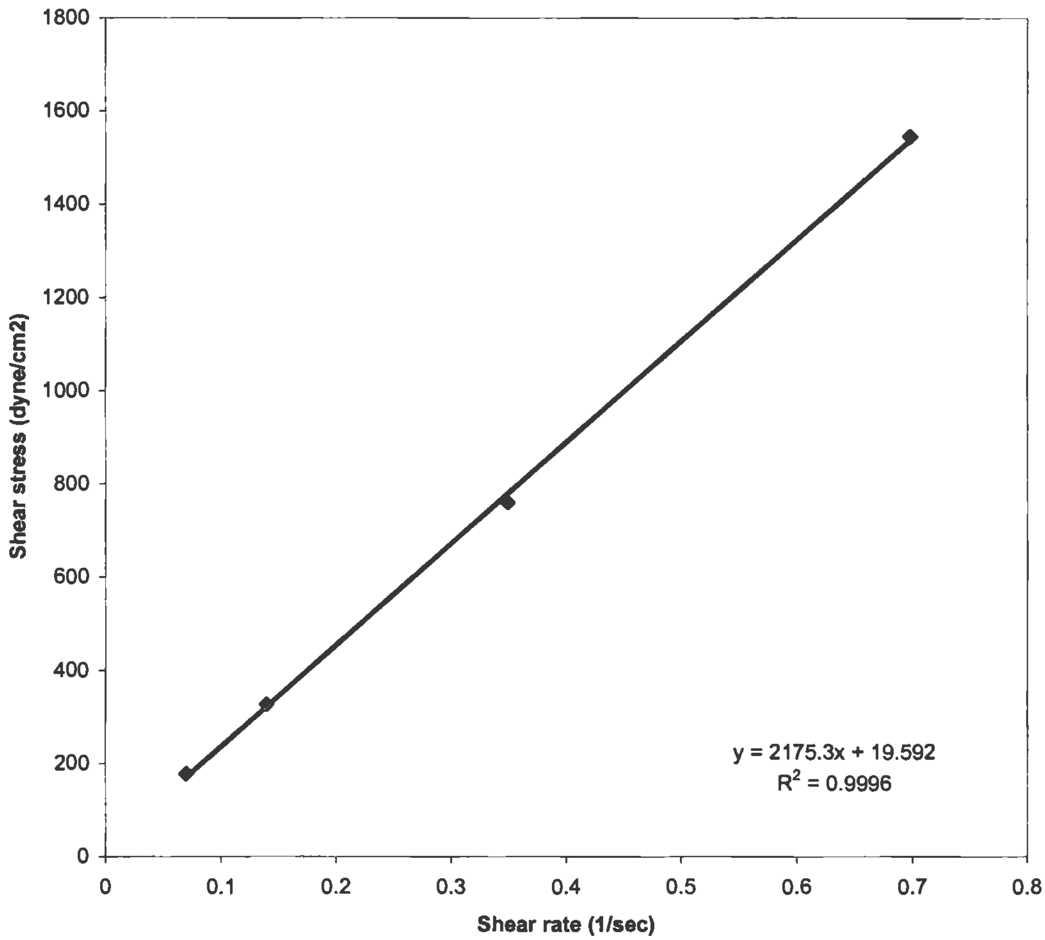


FIGURE 63. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

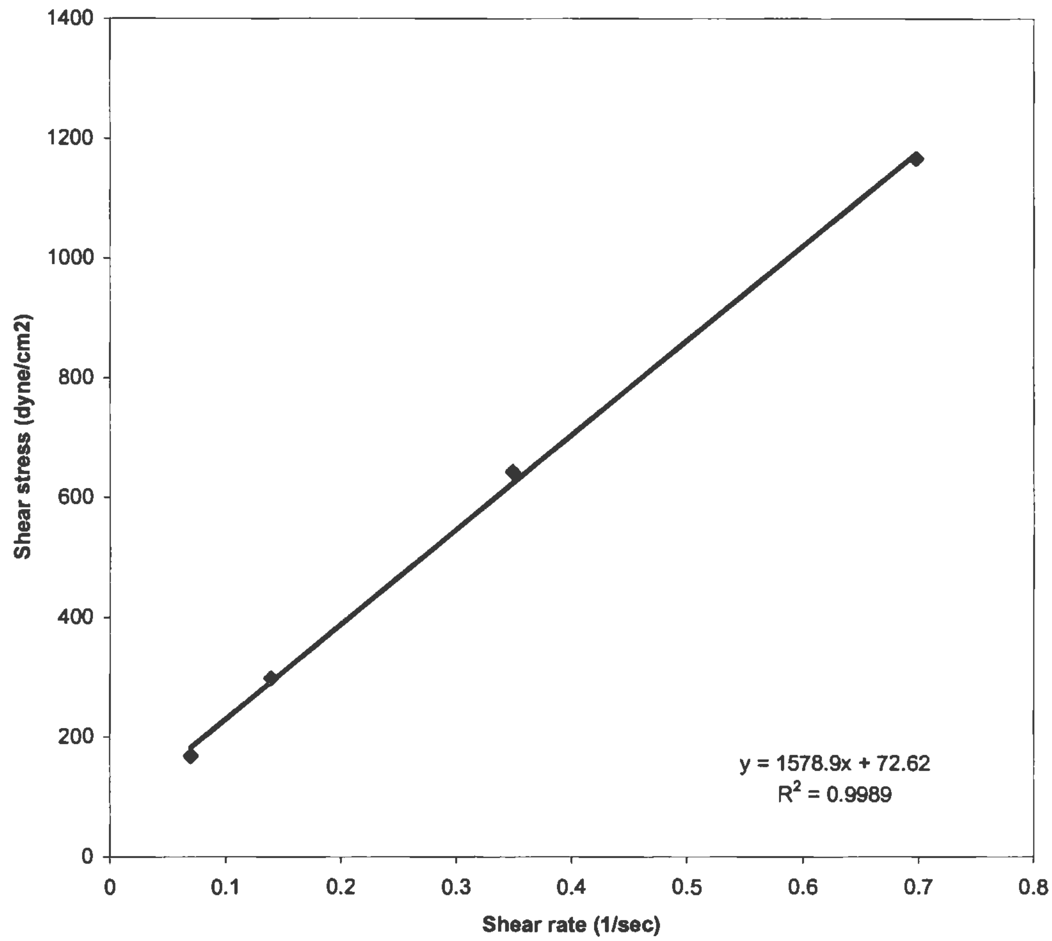


FIGURE 64. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

TABLE 58. VALUES OF VISCOSITY FOR KT ORGANOGELS WITH DIFFERENT COMPOSITIONS BY CYLINDRICAL VISCOMETER (NO.2)

40:60 0.1% L= 1.6 cm						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
2.2	57.63	0.3	0.07	825.85	44000	85250
4.3	112.63	0.6	0.14	807.08	43000	83312.5
10.6	277.65	1.5	0.35	795.82	42400	82150
21.1	552.69	3	0.70	792.07	42200	81762.5
42	1100.13	6	1.40	788.31	42000	81375
81	2121.68	12	2.79	760.16	42000	81375
40:60 0.25%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1.7	44.53	0.3	0.07	638.16	34000	65875
3.4	89.06	0.6	0.14	638.16	34000	65875
8.3	217.41	1.5	0.35	623.14	33200	64325
16.9	442.67	3	0.70	634.40	33800	65487.5
33.8	885.34	6	1.40	634.40	33800	65487.5
67.6	1770.69	12	2.79	634.40	33800	65487.5
40:60 0.5%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1.5	39.29	0.3	0.07	563.08	30000	58125
2.8	73.34	0.6	0.14	525.54	28000	54250
6.8	178.12	1.5	0.35	510.53	27200	52700
13.5	353.61	3	0.70	506.77	27000	52312.5
26.7	699.37	6	1.40	501.14	26700	51731.25
53.4	1398.74	12	2.79	501.14	26700	51731.25
40:60 0.7%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1	26.19	0.3	0.07	375.39	20000	38750
1.9	49.77	0.6	0.14	356.62	19000	36812.5
4.4	115.25	1.5	0.35	330.34	17600	34100
8	209.55	3	0.70	300.31	16000	31000
14	366.71	6	1.40	262.77	14200	27512.5
26	681.03	12	2.79	244.00	13000	25187.5

TABLE 58. CONT'D.

40:60 0.8%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
1	26.19	0.3	0.07	375.39	19000	36812.5
1.9	49.77	0.6	0.14	356.62	19000	36812.5
4.6	120.49	1.5	0.35	345.36	18400	35650
8.2	214.79	3	0.70	307.82	16400	31775
14.5	379.81	6	1.40	272.16	14500	28093.75
26	681.03	12	2.79	244.00	13000	25187.5
50:50 0.1%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
4.2	112.19	0.3	0.07	1607.88	30000	58125
7.9	211.03	0.6	0.14	1512.17	30000	58125
16	427.41	1.5	0.35	1225.05	28800	55800
29.5	788.03	3	0.70	1129.34	25200	48825
58.5	1562.71	6	1.40	1119.77	23000	44562.5
50:50 0.25%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
4.4	115.25	0.3	0.07	1651.70	20000	38750
7.2	188.59	0.6	0.14	1351.39	20000	38750
15.3	400.76	1.5	0.35	1148.68	19600	37975
27.7	725.56	3	0.70	1039.82	19400	37587.5
53.7	1406.60	6	1.40	1007.91	19400	37587.5
60:40 0.1%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
9.4	246.22	0.3	0.07	3528.63	188000	364250
18.3	479.34	0.6	0.14	3434.78	183000	354562.5
42.1	1102.75	1.5	0.35	3160.75	168000	325500
80.9	2119.06	3	0.70	3036.88	161000	311937.5
60:40 0.25%						
Reading	Sh Str	RPM	Sh Rt	Viscosity	Reading Visco.	(3.1/1.6)*Reading Visco.
(%)	(dyne/cm2)		(1/sec)	(p)	(cp)	
8.3	217.41	0.3	0.07	3115.71	166000	321625
15.2	398.14	0.6	0.14	2852.94	152000	294500
33.1	867.01	1.5	0.35	2485.06	132000	255750
58.7	1537.57	3	0.70	2203.52	117000	226687.5

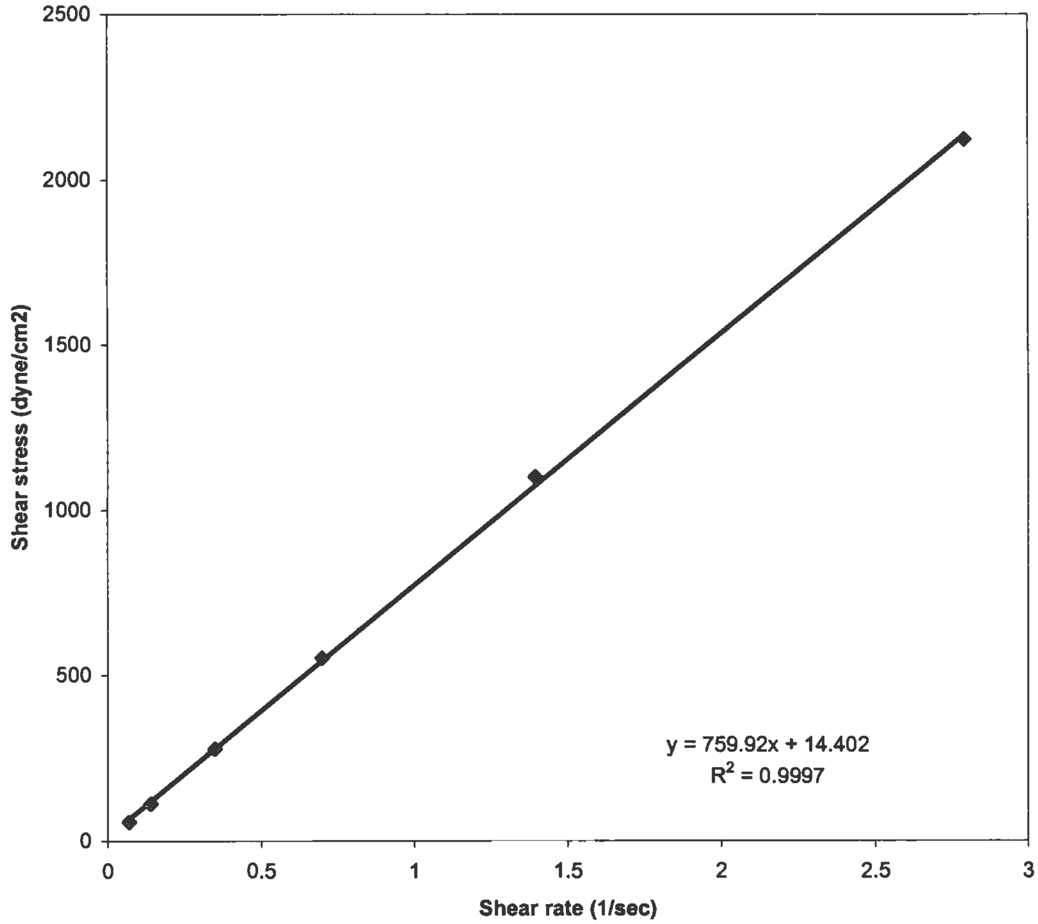


FIGURE 65. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

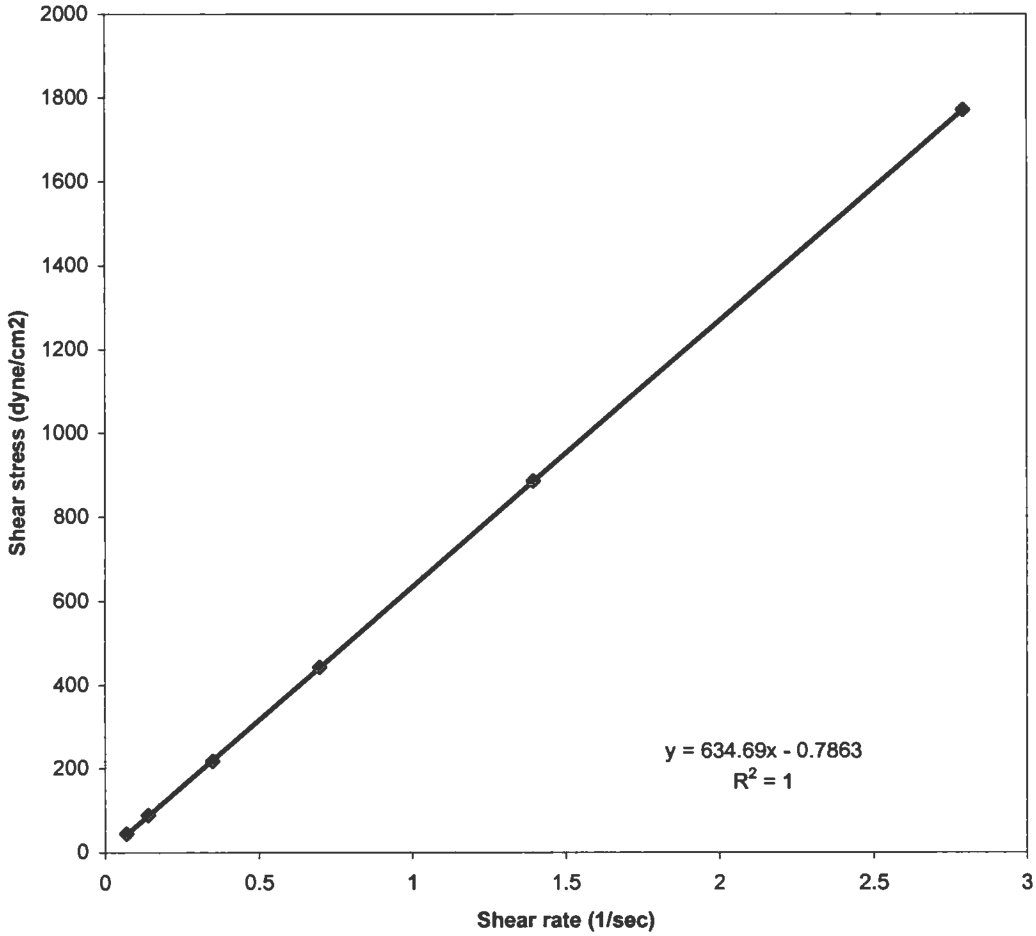


FIGURE 66. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

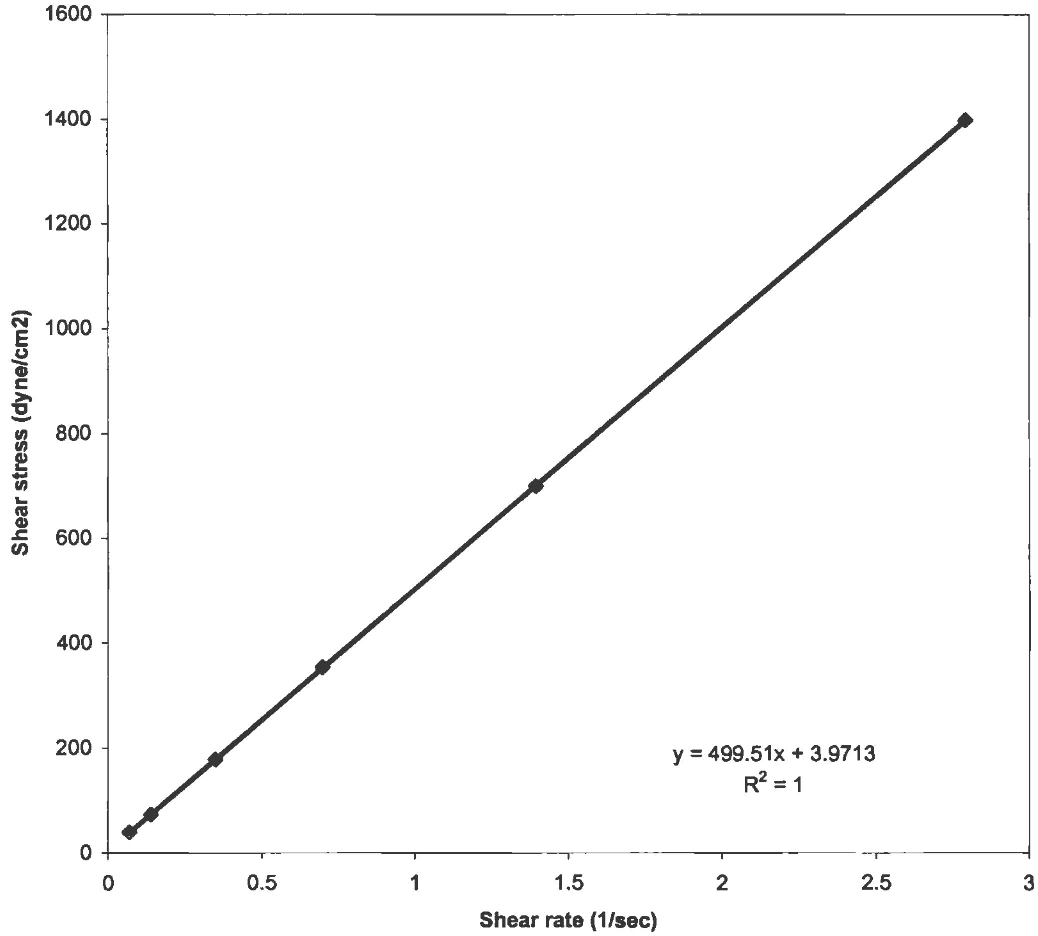


FIGURE 67. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

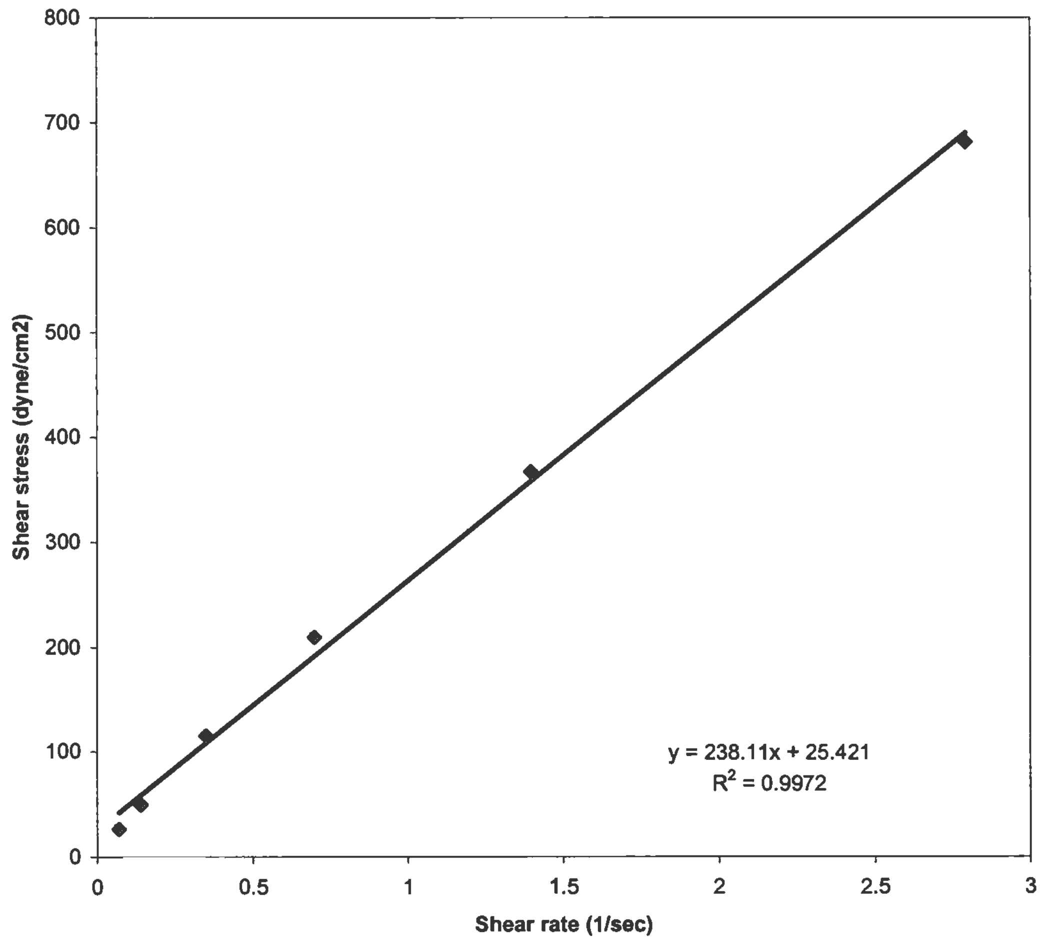


FIGURE 68. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

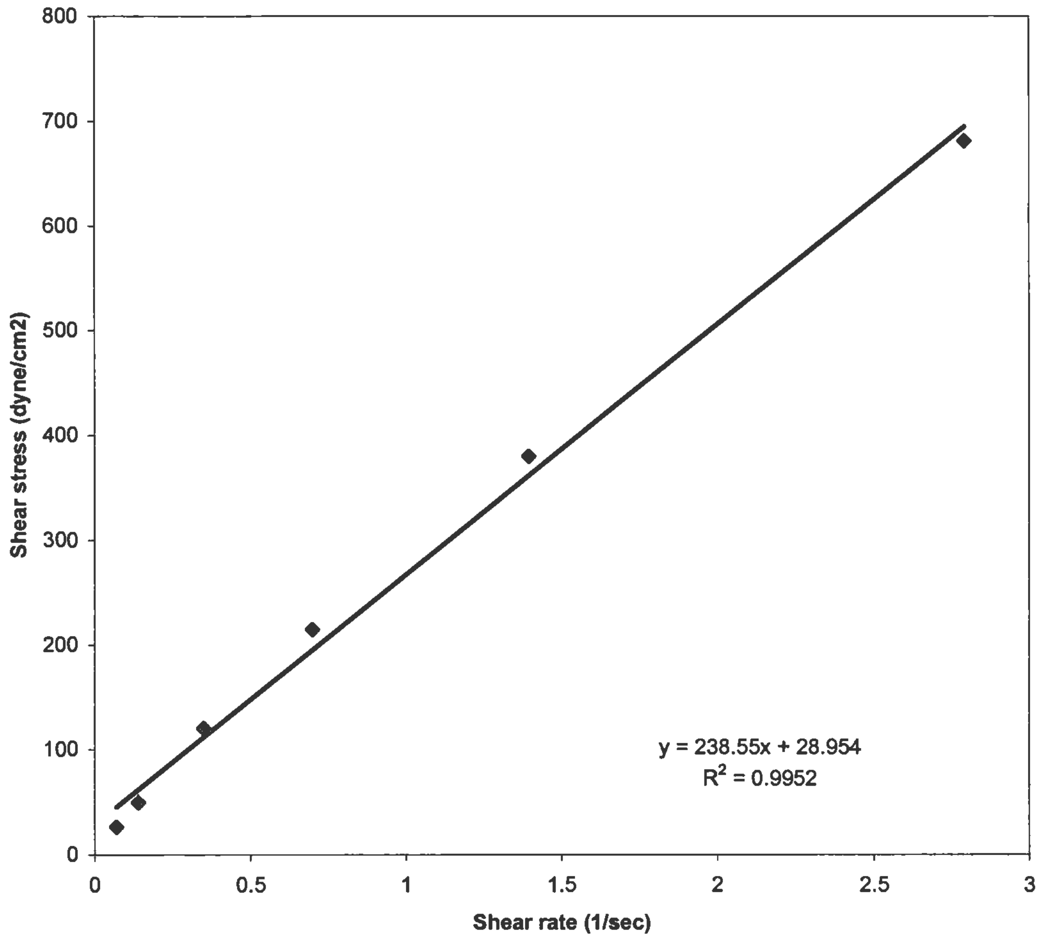


FIGURE 69. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

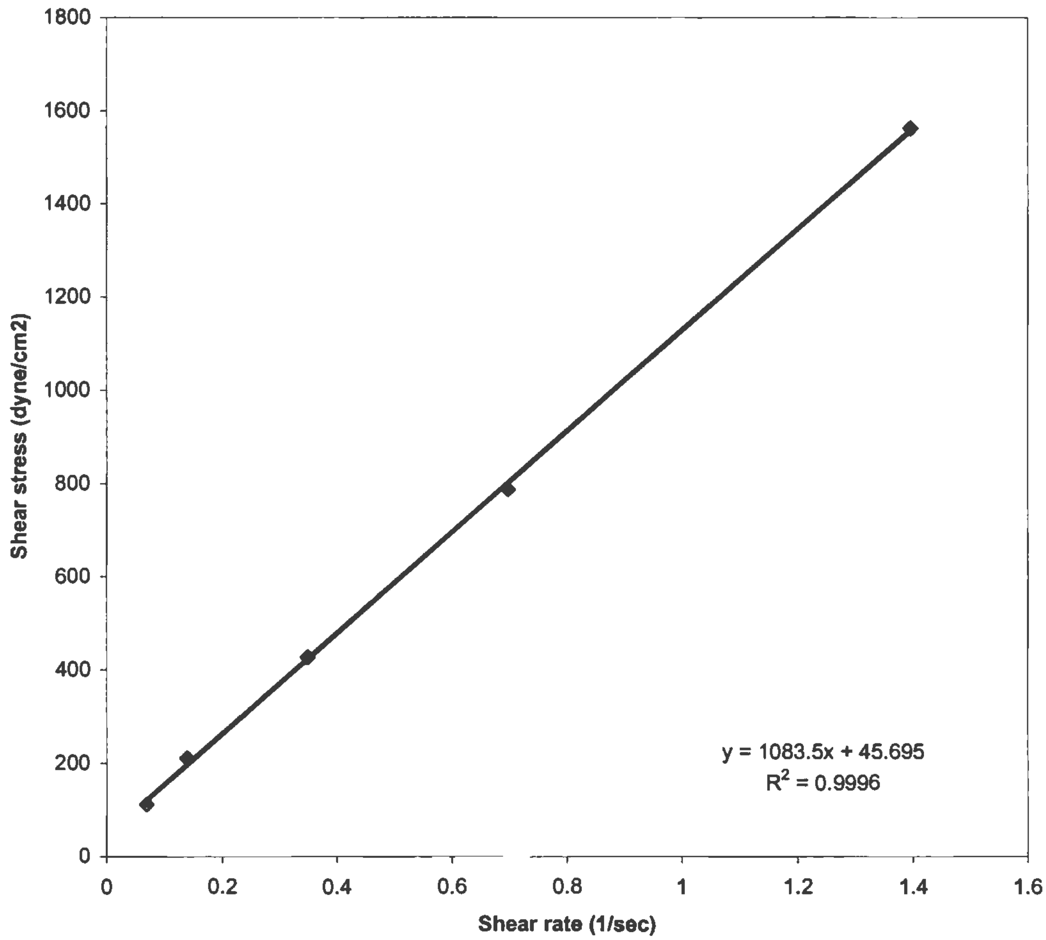


FIGURE 70. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

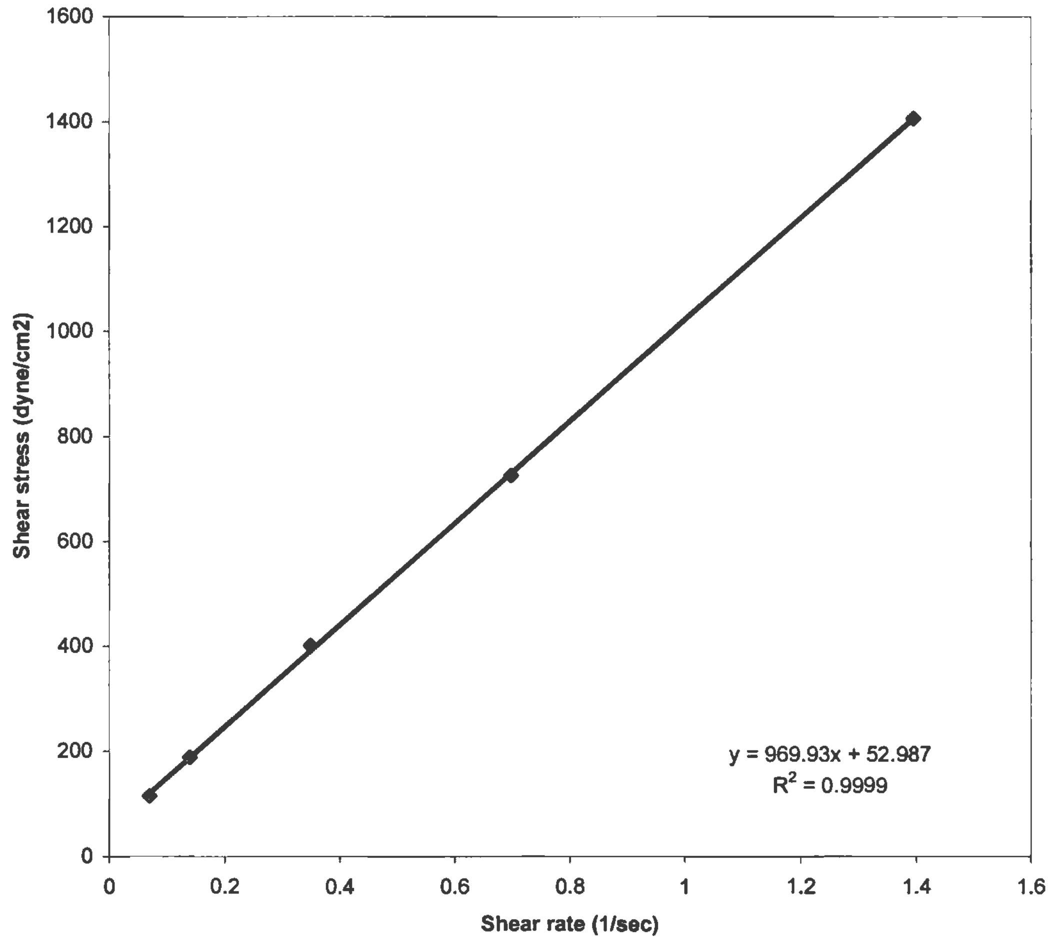


FIGURE 71. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

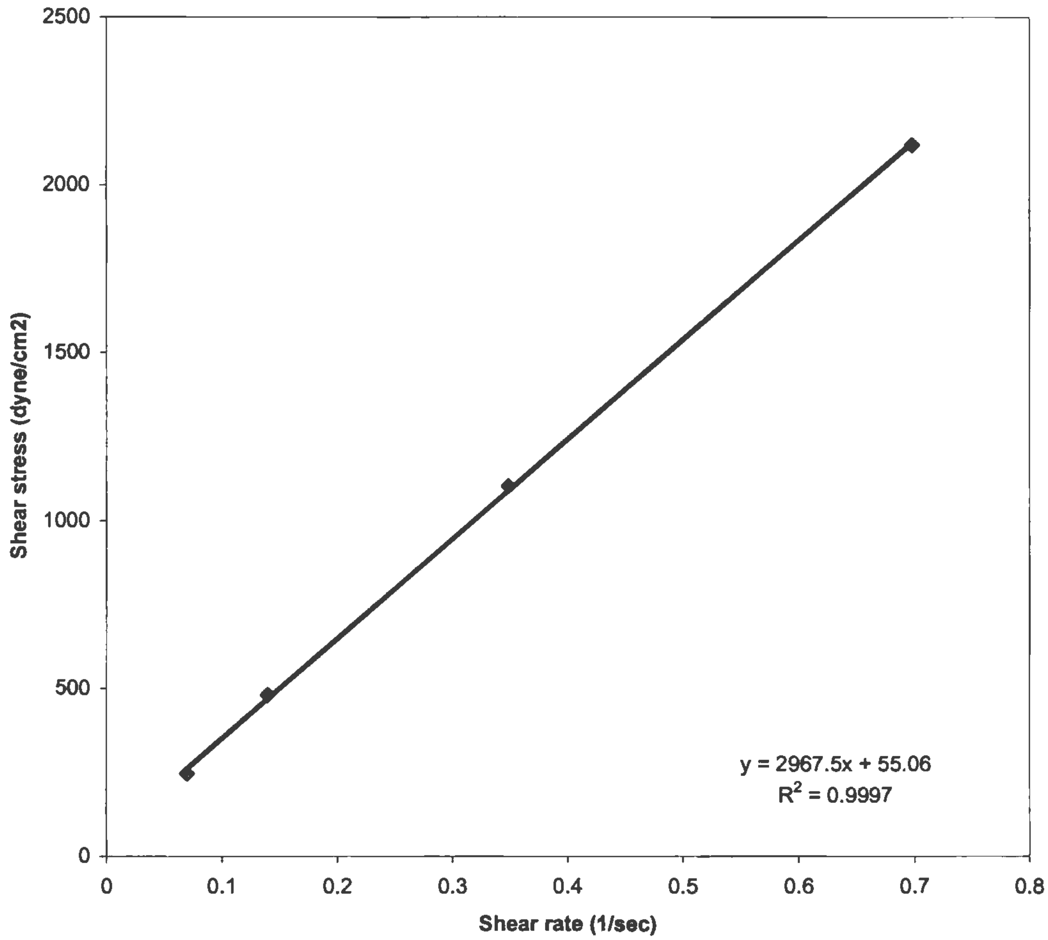


FIGURE 72. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

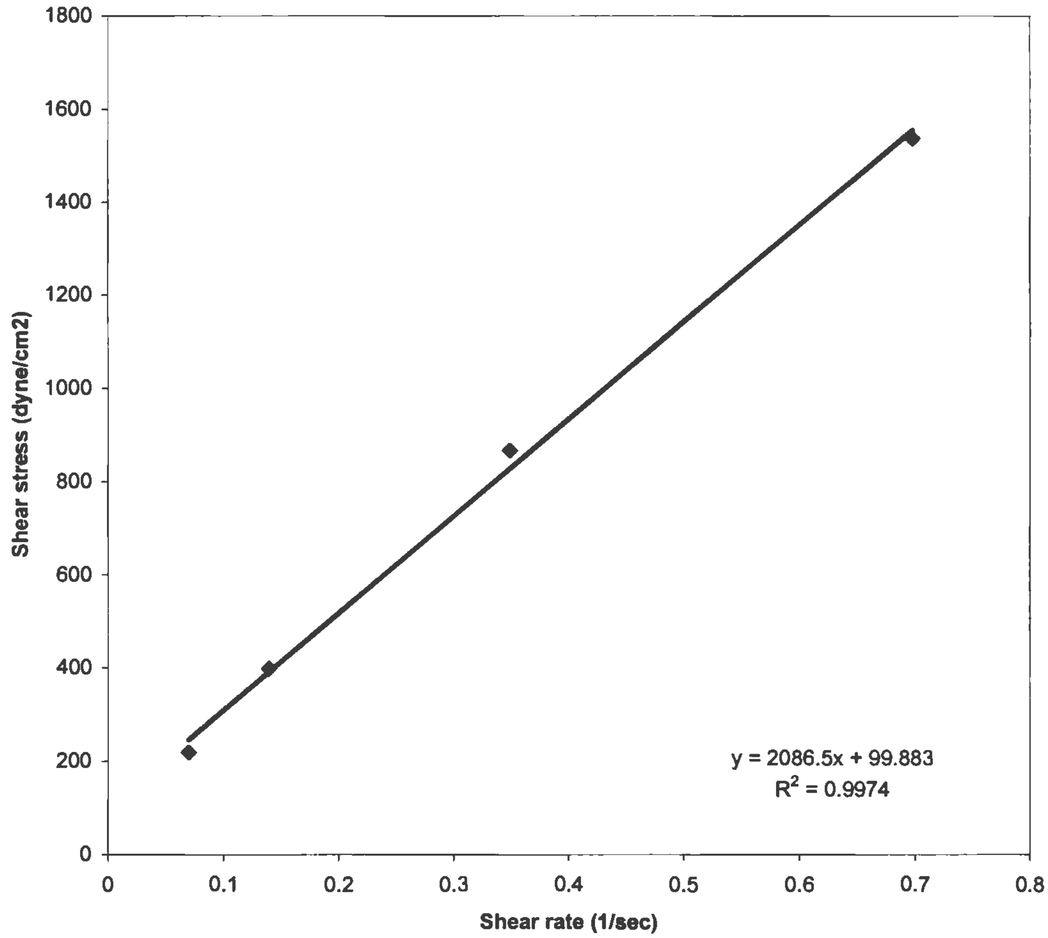


FIGURE 73. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CYLINDRICAL VISCOMETER

TABLE 59. VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.4	6.29	0.2	31456
0.6	3.6	56.6	1.2	47184
1.1	7.2	113.2	2.2	51473
1.6	10.8	169.9	3.2	53082
2.1	14.6	229.6	4.2	54674
2.6	18.1	284.7	5.2	54746
3.1	21.7	341.3	6.2	55048
3.6	25.4	399.5	7.2	55485
4.1	29	456.1	8.2	55623
4.6	32.9	517.5	9.2	56245
5.1	36.6	575.6	10.2	56436
5.6	40.6	638.6	11.2	57014
6.1	44.2	695.2	12.2	56982
6.6	47.8	751.8	13.2	56954
7.1	51.7	813.1	14.2	57263
7.6	55.8	877.6	15.2	57738
8.1	59.3	932.7	16.2	57572
8.6	62.9	989.3	17.2	57517
9.1	66.8	1051	18.2	57727
9.6	70.8	1114	19.2	57997
10	73.6	1158	20	57879

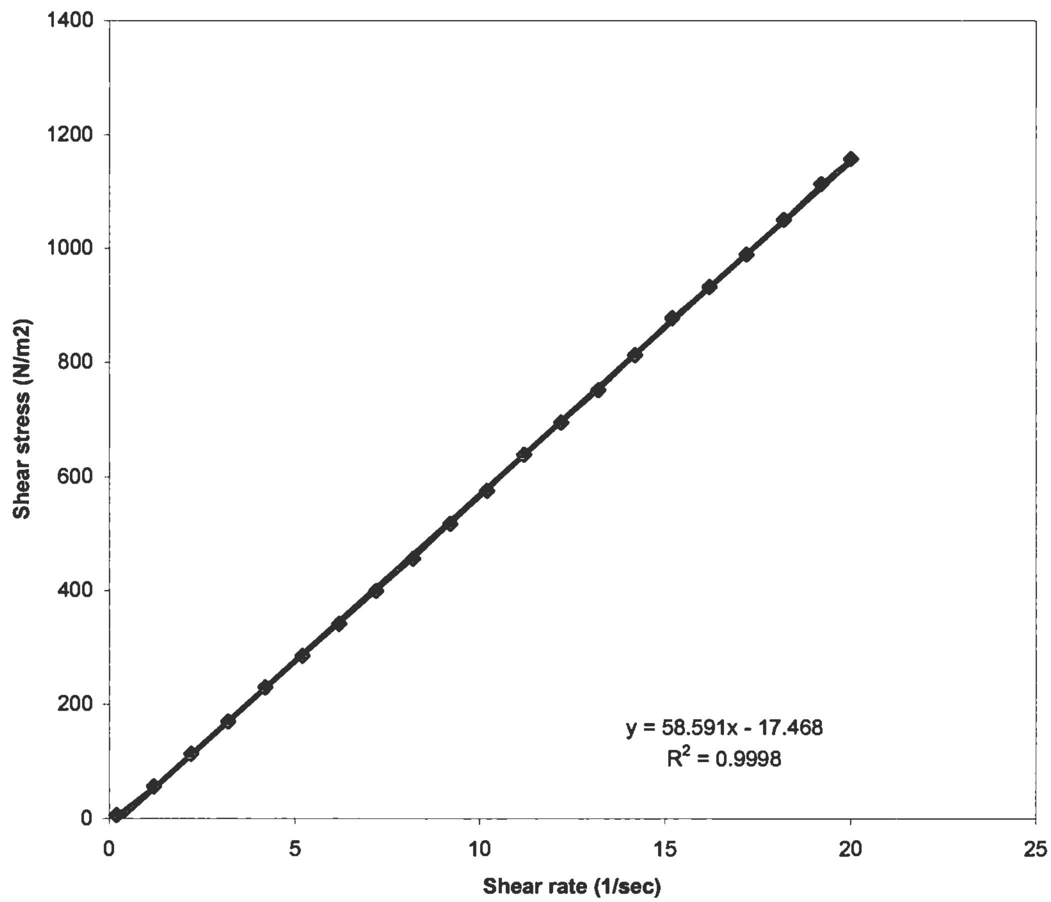


FIGURE 74. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 60. VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.6	9.44	0.2	47184
0.6	4.2	66.1	1.2	55048
1.1	8.9	140	2.2	63627
1.6	13.7	215.5	3.2	67336
2.1	18.5	291	4.2	69278
2.6	23.3	366.5	5.2	70474
3.1	28.2	443.5	6.2	71537
3.6	33	519	7.2	72087
4.1	37.5	589.8	8.2	71927
4.6	42.5	668.4	9.2	72657
5.1	47.5	747.1	10.2	73243
5.6	51.9	816.3	11.2	72882
6.1	56.6	890.2	12.2	72968
6.6	61.6	968.8	13.2	73397
7.1	66.8	1051	14.2	73988
7.6	71.1	1118	15.2	73570
8.1	75.6	1189	16.2	73397
8.6	80.6	1268	17.2	73702
9.1	85.3	1342	18.2	73714
9.6	90.1	1417	19.2	73807
10	94.1	1480	20	74000

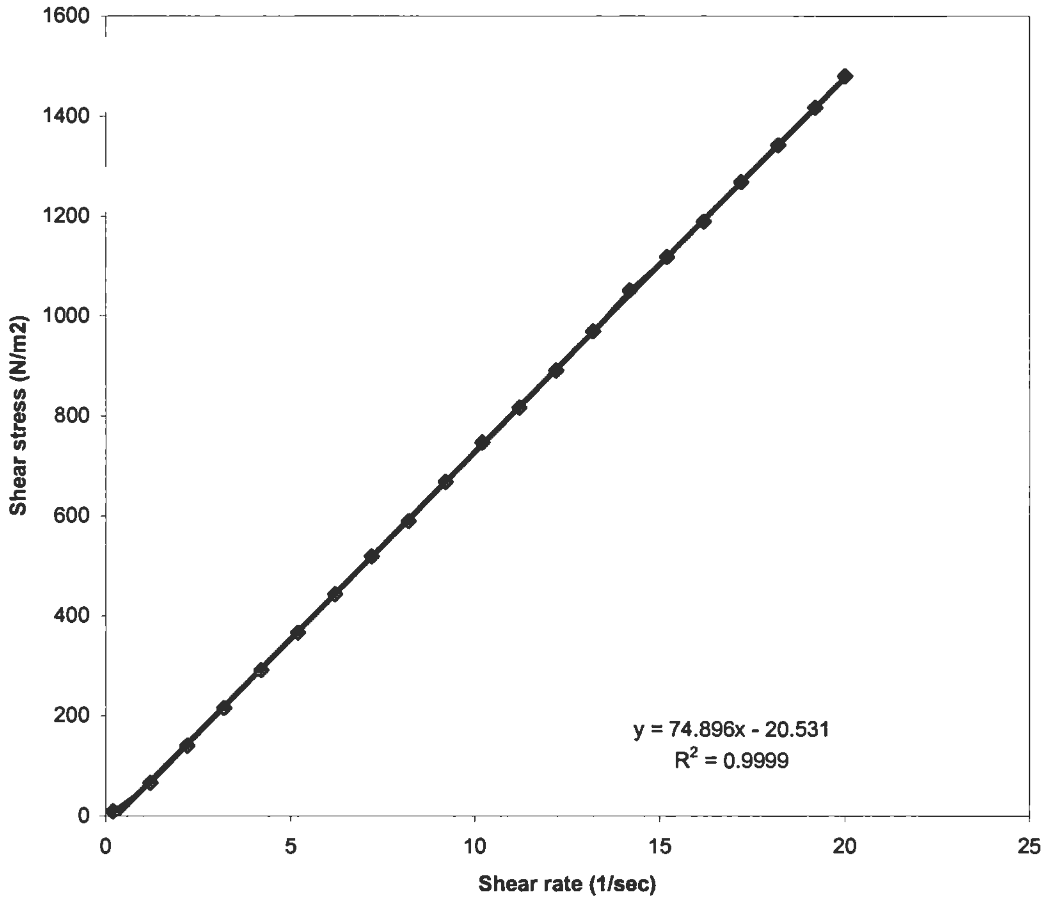


FIGURE 75. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 61. VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.5	7.86	0.2	39320
0.6	3.7	58.2	1.2	48495
1.1	6.8	107	2.2	48614
1.6	10.5	165.1	3.2	51608
2.1	14.7	231.2	4.2	55048
2.6	18.4	289.4	5.2	55653
3.1	22.1	347.6	6.2	56063
3.6	25.6	402.6	7.2	55922
4.1	29.4	462.4	8.2	56391
4.6	33.2	522.2	9.2	56758
5.1	36.8	578.8	10.2	56744
5.6	40.9	643.3	11.2	57435
6.1	44.7	703	12.2	57626
6.6	48.7	766	13.2	58027
7.1	52.6	827.3	14.2	58260
7.6	56	880.8	15.2	57945
8.1	59.9	942.1	16.2	58155
8.6	63.7	1002	17.2	58248
9.1	67.5	1062	18.2	58332
9.6	70.9	1115	19.2	58079
10	74.4	1170	20	58508

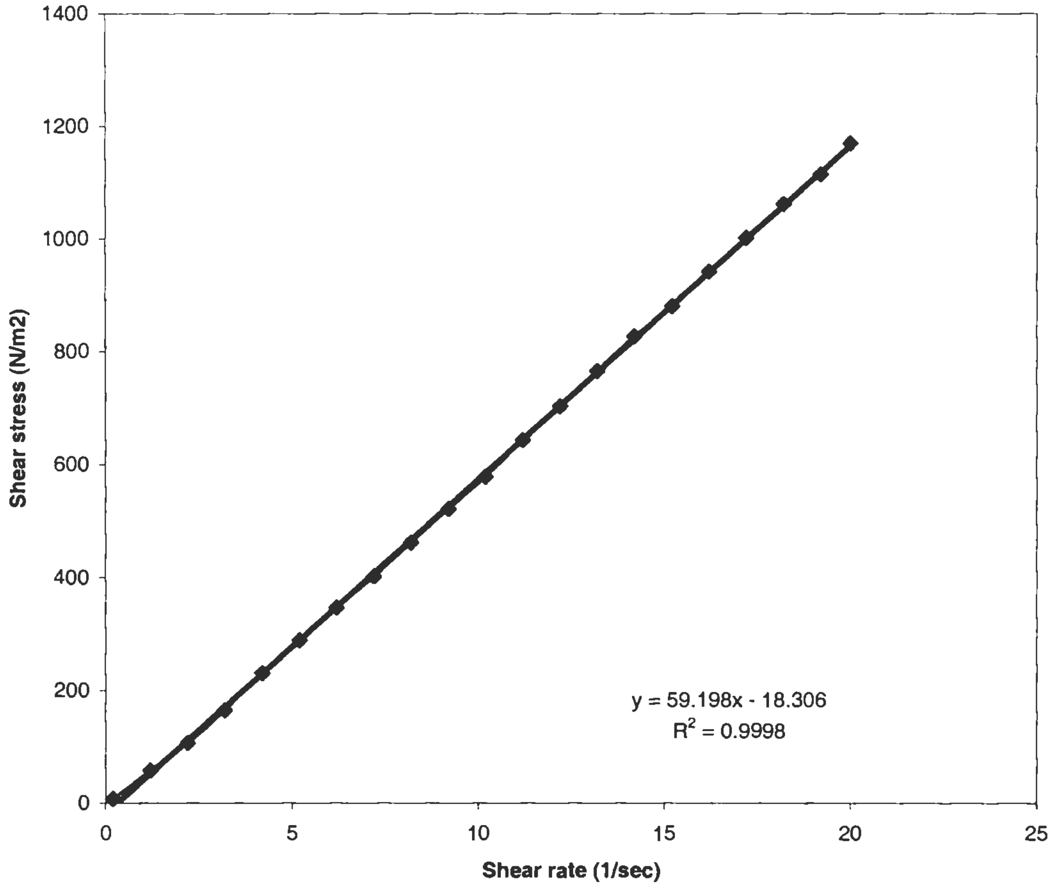


FIGURE 76. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 62. VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.5	7.86	0.2	39320
0.6	3.4	53.5	1.2	44563
1.1	6.3	99.1	2.2	45039
1.6	9.9	155.7	3.2	48658
2.1	13.8	217	4.2	51678
2.6	17.2	271.5	5.2	52023
3.1	20.6	324	6.2	52258
3.6	24	377.5	7.2	52427
4.1	27.4	430.9	8.2	52555
4.6	30.7	482.8	9.2	53484
5.1	34.3	539.5	10.2	52889
5.6	37.3	592.9	11.2	52942
6.1	41.4	651.1	12.2	53372
6.6	44.7	703	13.2	53261
7.1	48.2	758.1	14.2	53387
7.6	51.6	811.6	15.2	53392
8.1	55.1	866.6	16.2	53495
8.6	58.5	920.1	17.2	53493
9.1	61.9	973.6	18.2	53492
9.6	65.3	1027	19.2	53492
10	68.1	1071	20	53554

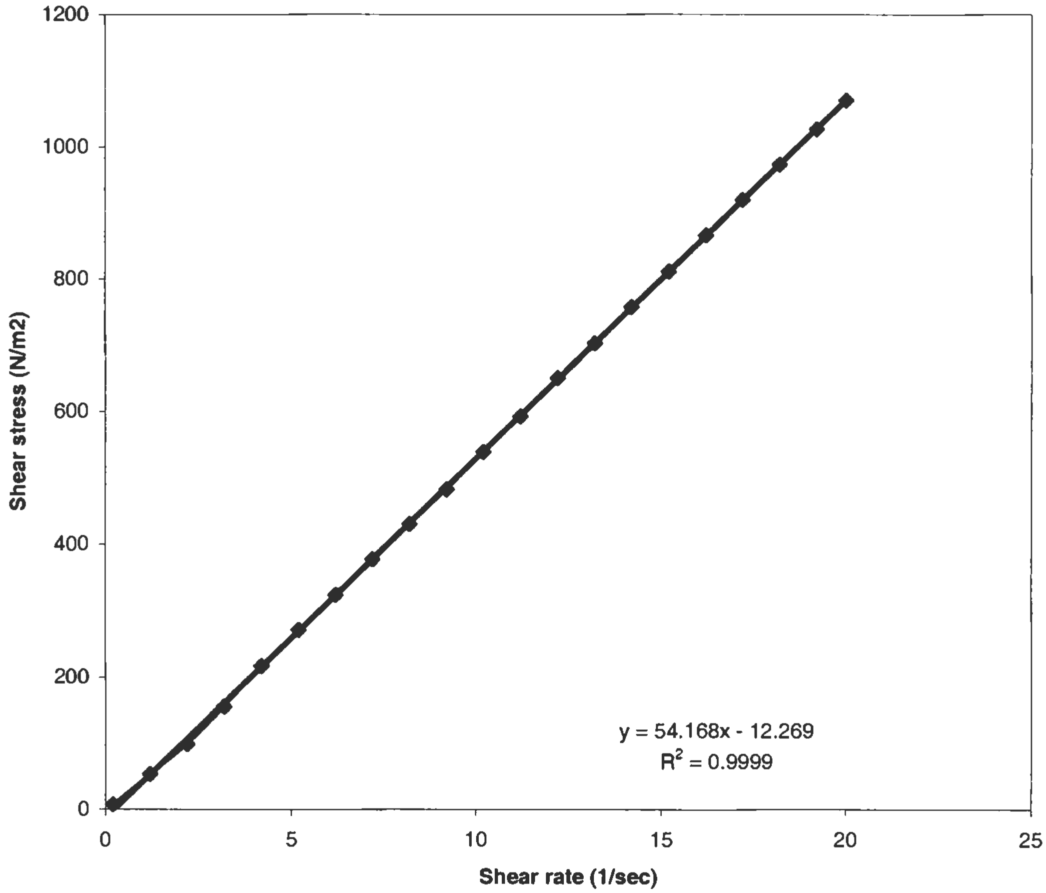


FIGURE 77. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 63. VISCOSITY OF LECIHTIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.6	9.44	0.2	47184
0.6	3.5	55	1.2	45873
1.1	7	110.1	2.2	50044
1.6	10.4	163.6	3.2	51116
2.1	14.1	221.8	4.2	52801
2.6	17.6	276.8	5.2	53233
3.1	21	330.3	6.2	53272
3.6	24.5	385.3	7.2	53519
4.1	28.1	442	8.2	53897
4.6	31.5	495.4	9.2	53851
5.1	34.9	548.9	10.2	53814
5.6	38	597.7	11.2	53363
6.1	41.4	651.1	12.2	53372
6.6	45.2	710.9	13.2	53856
7.1	48.4	761.2	14.2	53608
7.6	51.9	816.3	15.2	53703
8.1	14.9	863.5	16.2	53300
8.6	58.4	918.5	17.2	53402
9.1	62	975.1	18.2	53579
9.6	64.8	1019	19.2	53082
10	67.8	1066	20	53318

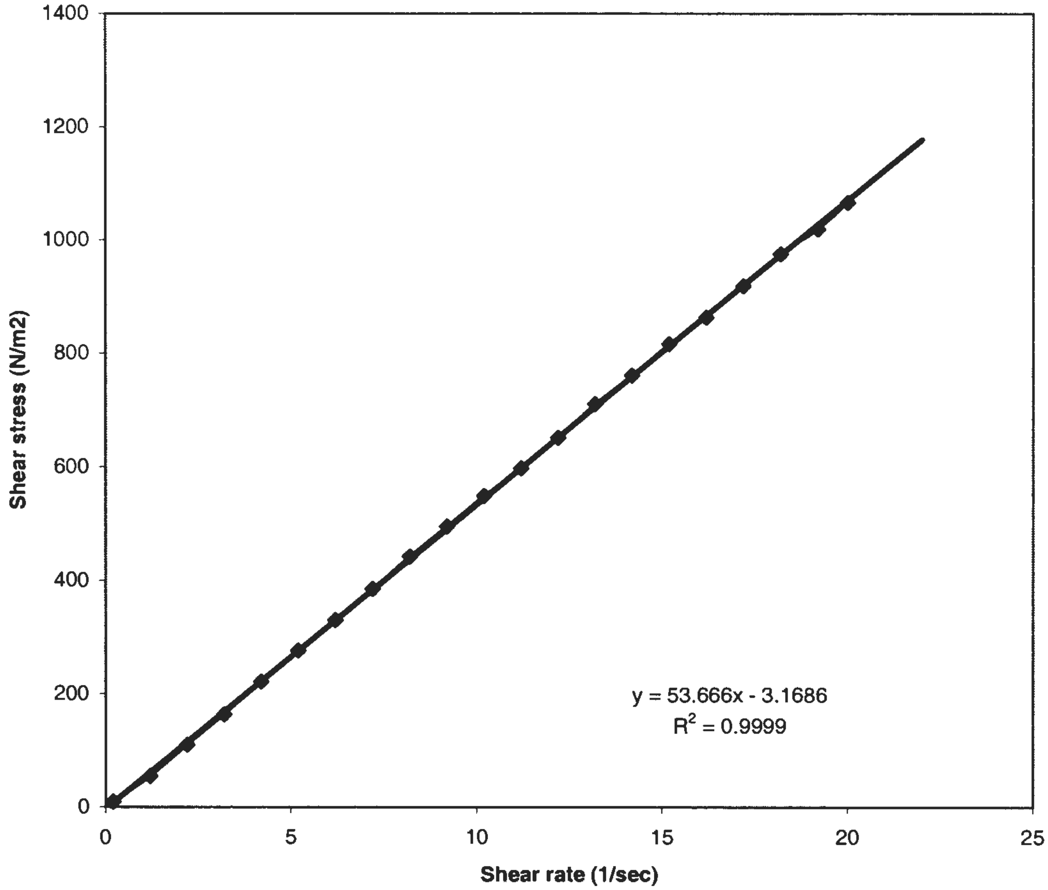


FIGURE 78. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 64. VISCOSITY OF LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.4	6.29	0.2	31456
0.6	2.9	45.6	1.2	38009
1.1	5.8	91.2	2.2	41465
1.6	8.5	133.7	3.2	41778
2.1	11.3	177.7	4.2	42316
2.6	14.1	221.8	5.2	42647
3.1	16.9	265.8	6.2	42871
3.6	19.6	308.3	7.2	42815
4.1	22.3	350.7	8.2	42772
4.6	25	393.2	9.2	42739
5.1	27.9	438.8	10.2	43021
5.6	30.5	479.7	11.2	42831
6.1	33.3	523.7	12.2	42930
6.6	36.2	569.4	13.2	43133
7.1	39.3	618.1	14.2	43529
7.6	42.6	670	15.2	44080
8.1	45.7	718.8	16.2	44368
8.6	48.4	761.2	17.2	44258
9.1	51.6	811.6	18.2	44591
9.6	54.5	857.2	19.2	44645
10	57	896.5	20	44825

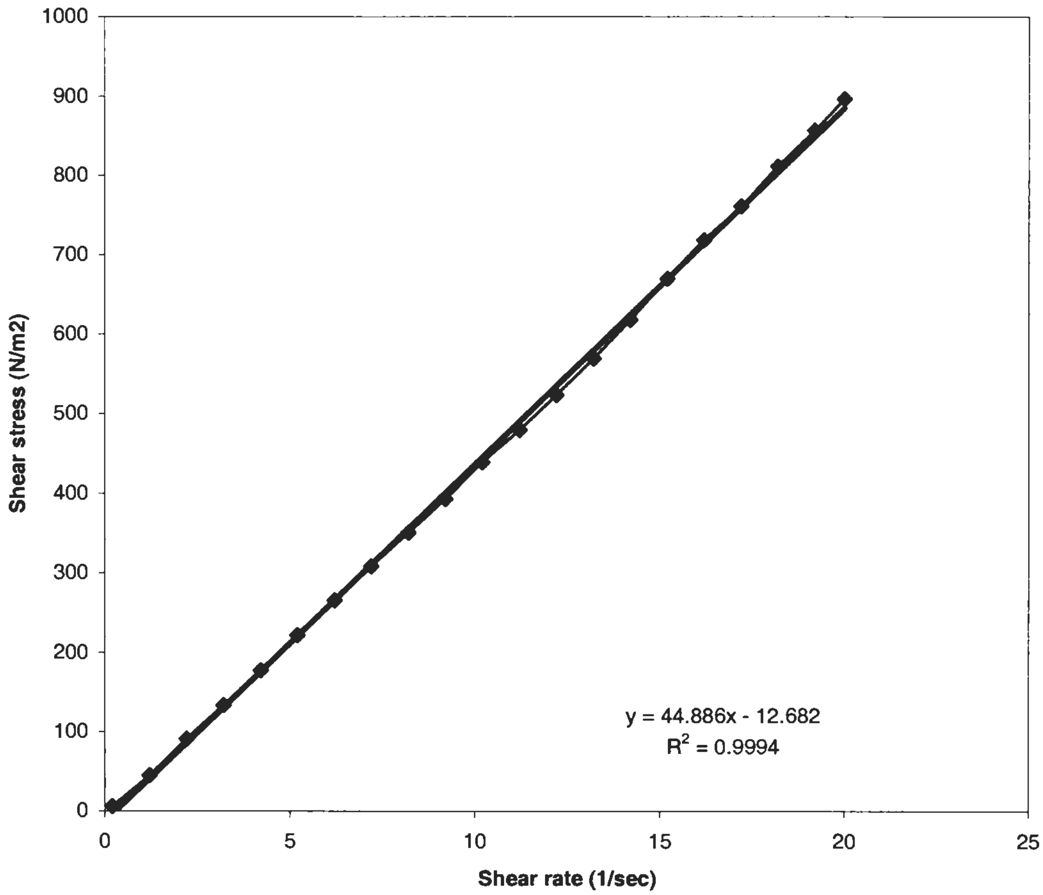


FIGURE 79. RHEOGRAM FOR LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 65. VISCOSITY OF LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.5	7.86	0.2	39320
0.6	4.4	69.2	1.2	57669
1.1	9.3	146.3	2.2	66487
1.6	14.3	224.9	3.2	70285
2.1	19.9	313	4.2	74521
2.6	25.3	397.9	5.2	76523
3.1	30.6	481.3	6.2	77625
3.6	35.9	564.6	7.2	78422
4.1	40.8	641.7	8.2	78256
4.6	46.5	731.4	9.2	79495
5.1	52.2	821	10.2	80490
5.6	57.6	905.9	11.2	80887
6.1	63.2	994	12.2	81476
6.6	69.1	1087	13.2	82334
7.1	74.9	1178	14.2	82960
7.6	80.2	1261	15.2	82986
8	85.3	1341	16	83850

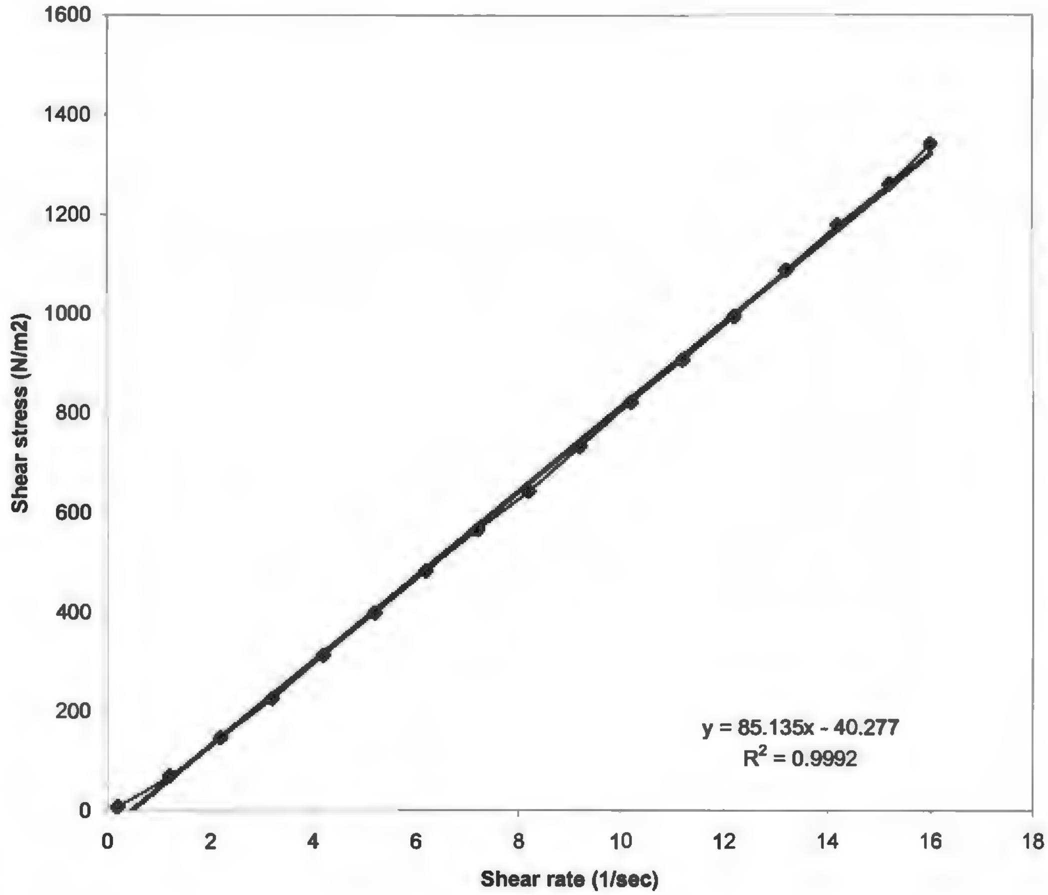


FIGURE 80. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 66. VISCOSITY FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5%KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.6	9.44	0.2	47184
0.6	4.7	73.9	1.2	61601
1.1	10.6	166.7	2.2	75780
1.6	16.8	264.2	3.2	82572
2.1	23	361.7	4.2	86130
2.6	29.1	457.7	5.2	88016
3.1	35.1	552.1	6.2	89041
3.6	41.2	648	7.2	89999
4.1	47.3	743.9	8.2	90724
4.6	53.5	841.4	9.2	91462
5.1	59.7	939	10.2	92055
5.6	65.1	1024	11.2	91419
6.1	71.1	1118	12.2	91661
6.6	77.8	1224	13.2	92700
7.1	83.2	1309	14.2	92153
7.6	90.1	1417	15.2	93230
8	94.1	1480	16	92500

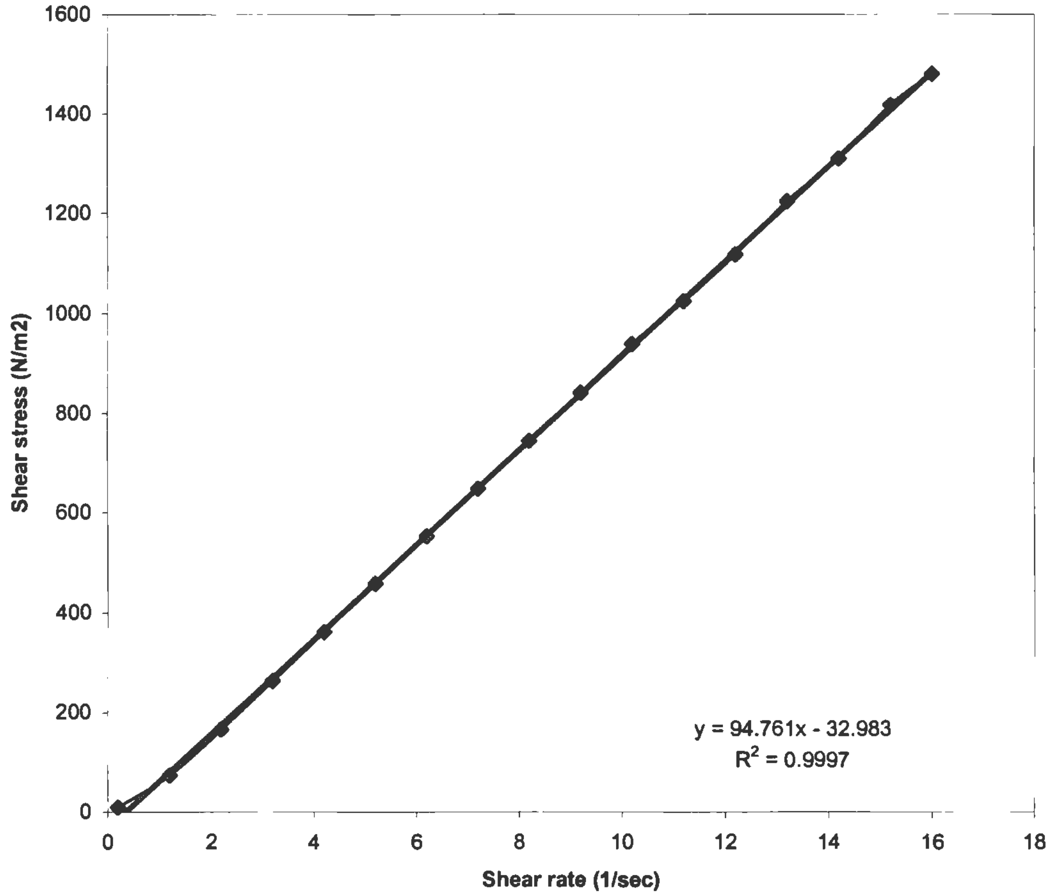


FIGURE 81. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 67. VISCOSITY OF LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.6	9.44	0.2	47184
0.6	4.4	69.2	1.2	57669
1.1	9.3	146.3	2.2	66487
1.6	14	220.2	3.2	68810
2.1	19.2	302	4.2	71899
2.6	24.4	383.8	5.2	73801
3.1	29.4	462.4	6.2	74581
3.6	34.2	537.9	7.2	74708
4.1	39.2	616.5	8.2	75188
4.6	44.4	698.3	9.2	75905
5.1	49.7	781.7	10.2	76635
5.6	55.8	877.6	11.2	78359
6.1	61.3	946.1	12.2	79027
6.6	67.5	1062	13.2	80427
7.1	73	1148	14.2	80855
7.6	78.7	1238	15.2	81434
8	83	1305	16	81589

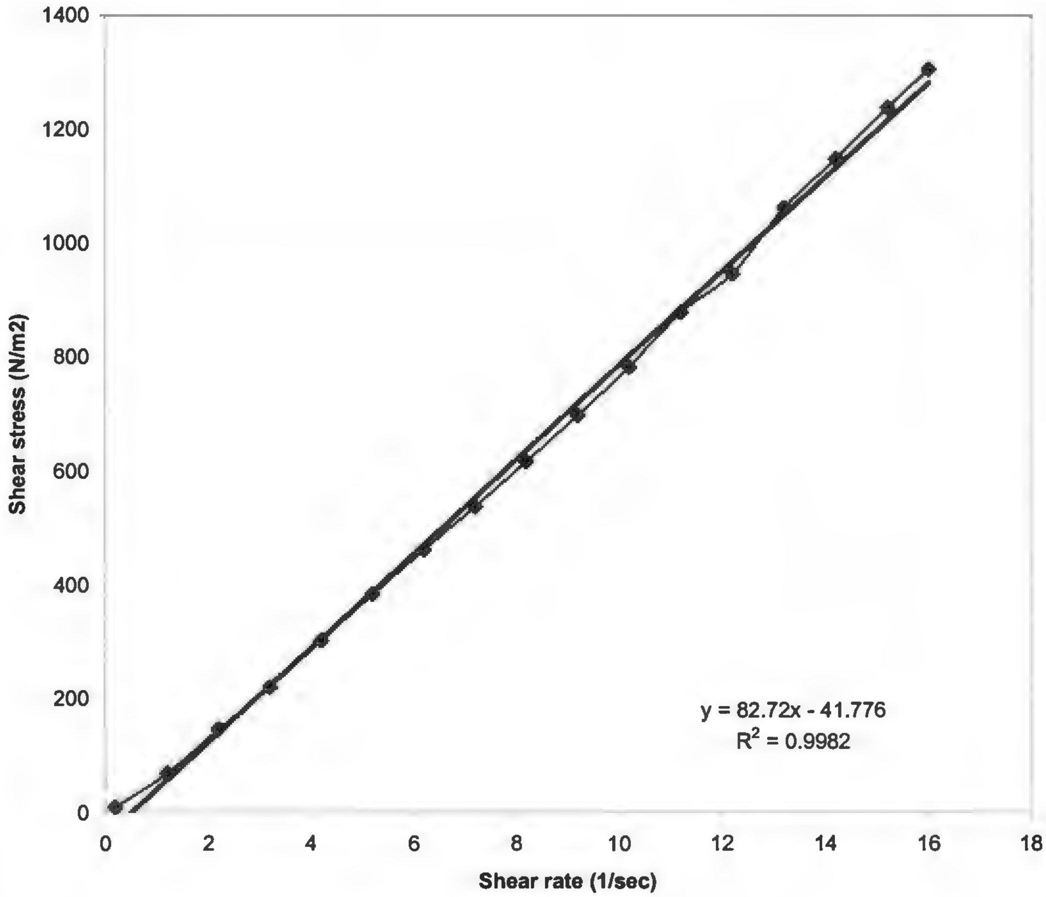


FIGURE 82. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 68. VISCOSITY OF LECITHIN:IPM (50:50)CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.4	6.29	0.2	31456
0.6	3.6	56.6	1.2	47184
1.1	9.4	147.8	2.2	67201
1.6	14.6	229.6	3.2	71759
2.1	20	314.6	4.2	74895
2.6	25	393.2	5.2	75615
3.1	30	471.8	6.2	76103
3.6	34.6	544.2	7.2	75582
4.1	40.4	635.4	8.2	77489
4.6	45.8	720.3	9.2	78298
5.1	51.6	811.6	10.2	79565
5.6	56.9	894.9	11.2	79904
6.1	63.1	992.4	12.2	81347
6.6	68.9	1084	13.2	82095
7.1	74.3	1169	14.2	82295
7.6	79.8	1255	15.2	82572
8	83.6	1315	16	82179

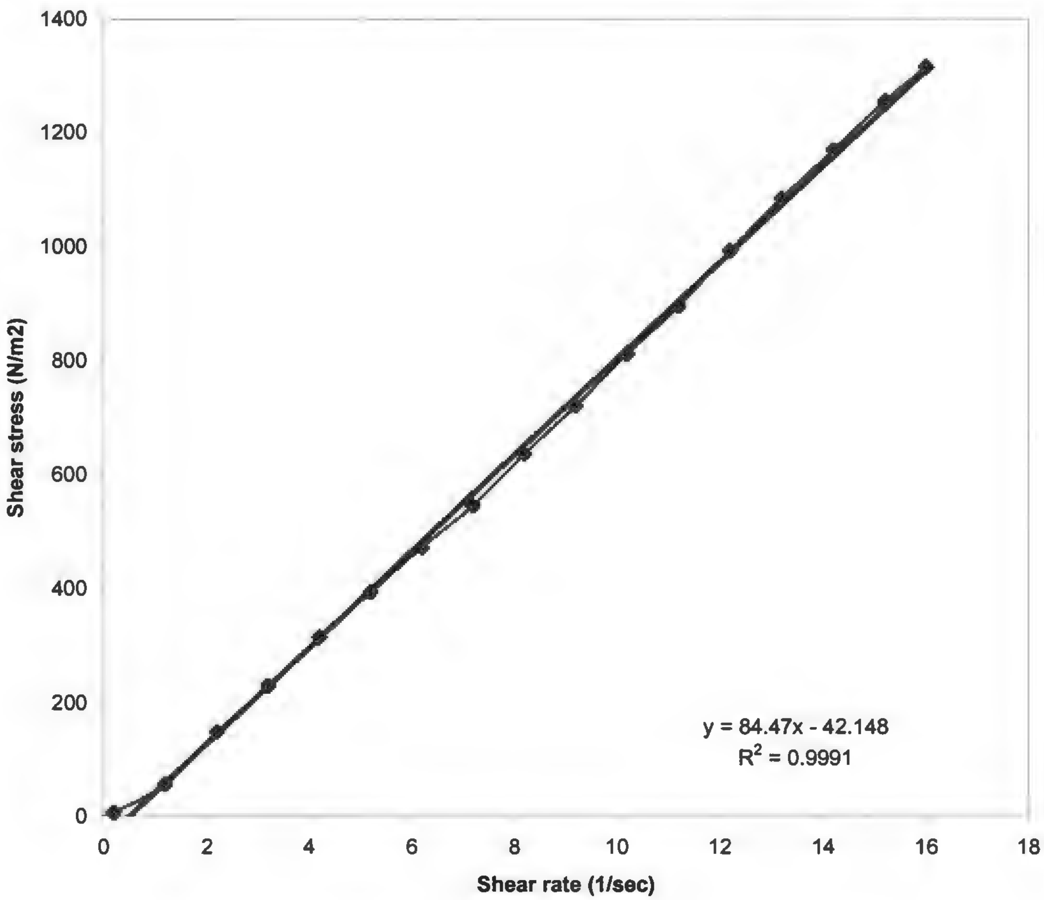


FIGURE 83. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 69. VISCOSITY OF LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.4	6.29	0.2	31456
0.6	4.7	73.9	1.2	61601
1.1	10.2	160.4	2.2	72921
1.6	15.8	248.5	3.2	77657
2.1	22	364	4.2	82385
2.6	27.5	432.5	5.2	83177
3.1	33.6	528.5	6.2	85236
3.6	39.1	615	7.2	85412
4.1	44.9	706.2	8.2	86120
4.6	50.5	794.3	9.2	86333
5.1	56.4	887.1	10.2	86967
5.6	62.1	976.7	11.2	87206
6.1	68.1	1071	12.2	87793
6.6	73.6	1158	13.2	87696
7.1	79.4	1249	14.2	87944
7.6	85.1	1338	15.2	88056
8	90.2	1419	16	88667

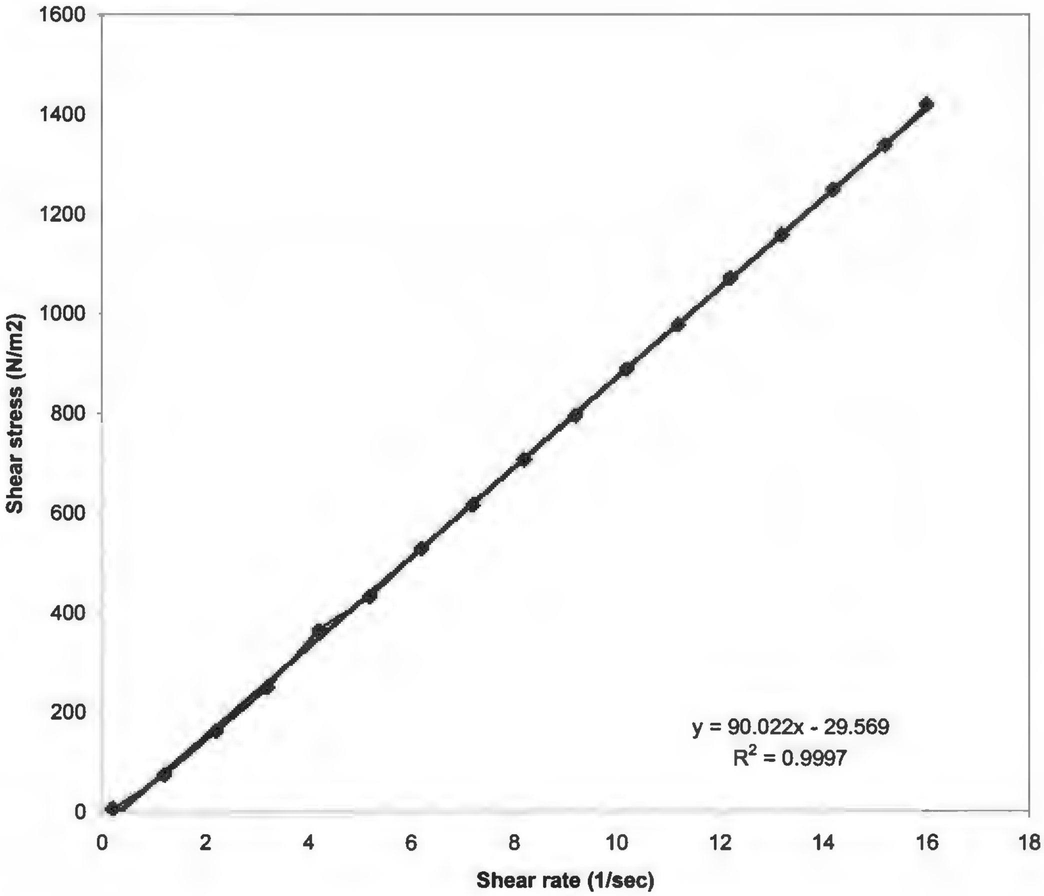


FIGURE 84. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 70. VISCOSITY OF LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5%KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.7	11	0.2	55048
0.6	4.6	72.3	1.2	60291
1.1	8.8	138.4	2.2	62912
1.6	14.7	231.2	3.2	72251
2.1	20.6	324	4.2	77142
2.6	25.7	404.2	5.2	77733
3.1	30.9	486	6.2	78386
3.6	35.8	563.1	7.2	78203
4.1	41.1	646.4	8.2	78832
4.6	46.3	728.2	9.2	79153
5.1	52.1	819.4	10.2	80336
5.6	57.7	907.5	11.2	81027
6.1	64.2	1010	12.2	82765
6.6	69.9	1099	13.2	83287
7.1	75.3	1184	14.2	83403
7.6	79.1	1244	15.2	81848
8	82.8	1302	16	81392

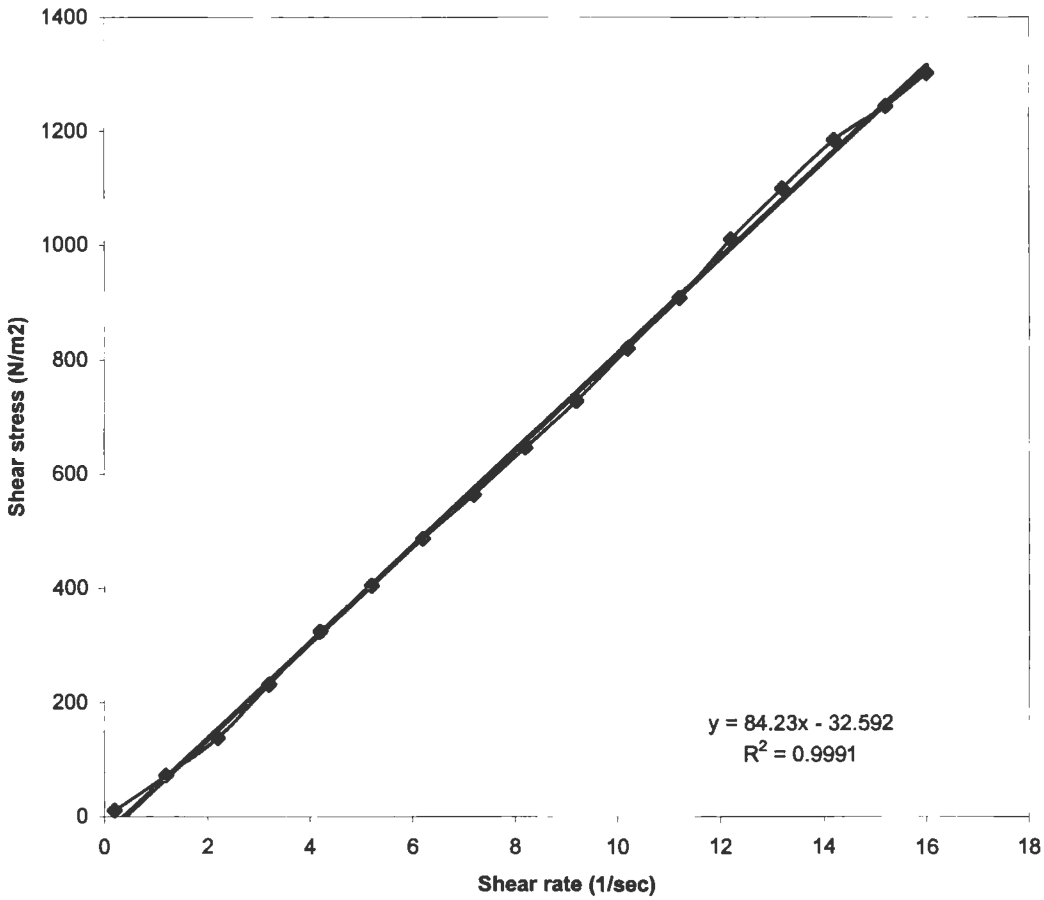


FIGURE 85. RHEOGRAM FOR LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 71. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5%KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	1.2	18.9	0.2	94368
0.3	4.2	66.1	0.6	110096
0.5	8	125.8	1	125824
0.7	14.6	229.6	1.4	164021
0.9	21.7	341.3	1.8	189610
1.1	29.2	459.3	2.2	208753
1.3	37	581.9	2.6	223822
1.5	44.2	695.2	3	231726
1.7	52.2	821	3.4	241471
1.9	60.7	954.7	3.8	251234
2.1	68.2	1073	4.2	255393
2.3	75.8	1192	4.6	259170
2.5	84.4	1327	5	265489

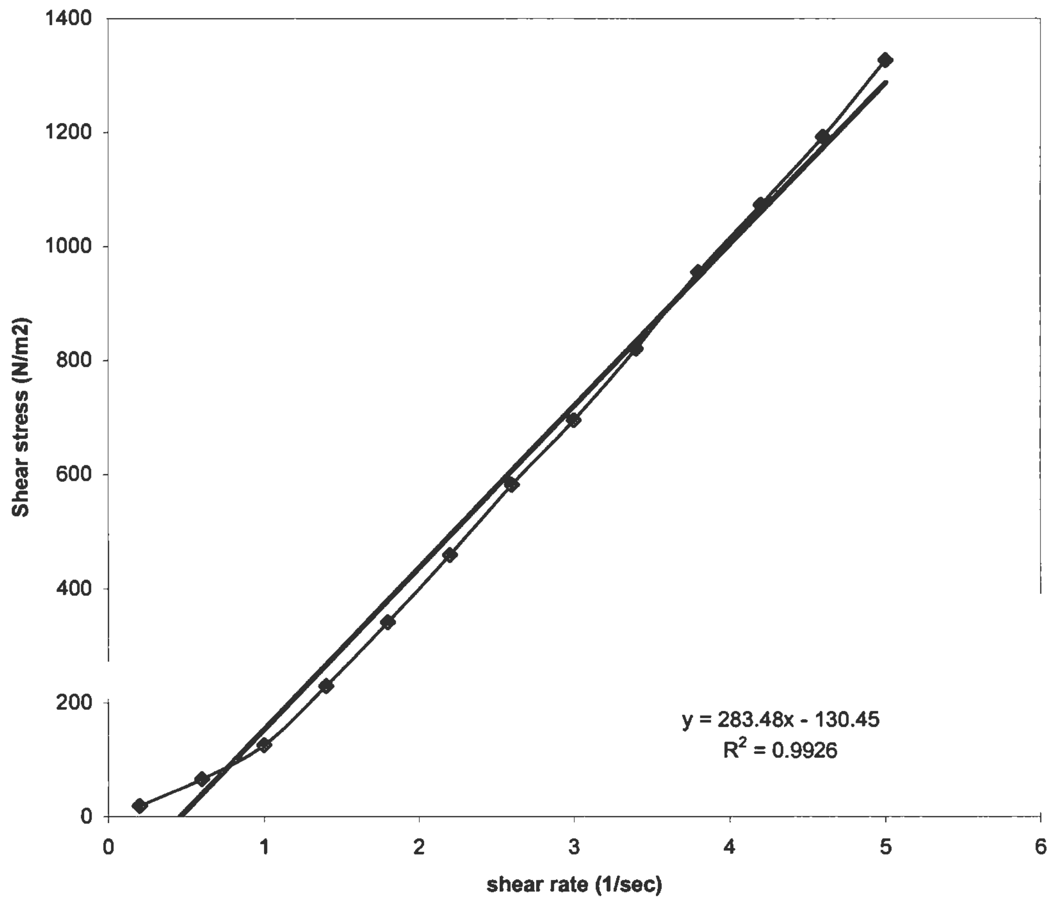


FIGURE 86. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 72. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	1.3	20.4	0.2	102232
0.3	3.6	56.6	0.6	94368
0.5	8.6	135.3	1	135261
0.7	15.7	246.9	1.4	176378
0.9	22.7	357	1.8	198348
1.1	30.4	478.1	2.2	217332
1.3	37.7	592.9	2.6	228056
1.5	45.8	720.3	3	240114
1.7	53.7	844.6	3.4	248410
1.9	60.8	956.3	3.8	251648
2.1	68.6	1079	4.2	256891
2.3	75.7	1191	4.6	258828
2.5	83.7	1316	5	263287

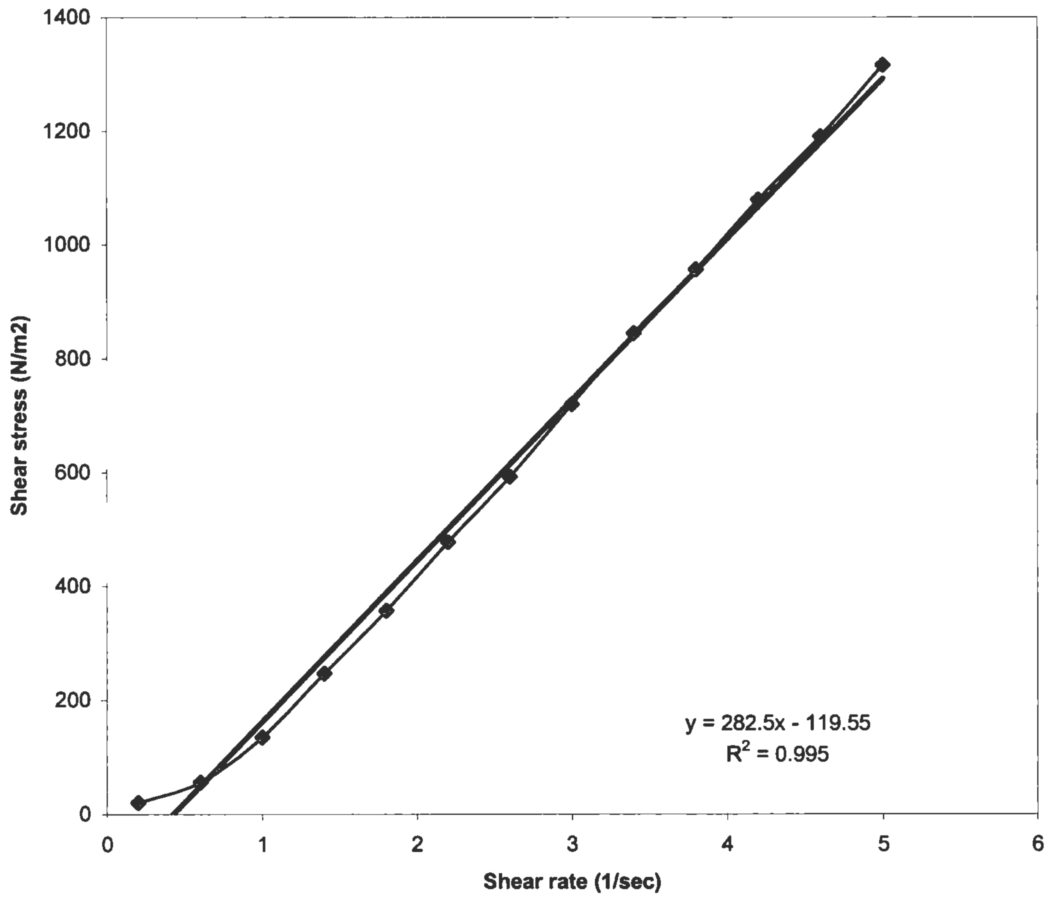


FIGURE 87. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 73. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.8	12.6	0.2	62912
0.3	3.8	59.8	0.6	99611
0.5	7.3	114.8	1	114814
0.7	13.3	209.2	1.4	149416
0.9	19.3	303.6	1.8	168639
1.1	25.5	401.1	2.2	182302
1.3	31.3	492.3	2.6	189341
1.5	37.8	594.5	3	198173
1.7	44.2	695.2	3.4	204464
1.9	50.3	791.1	3.8	208189
2.1	57	896.5	4.2	513451
2.3	63	990.9	4.6	215405
2.5	69.7	1096	5	219248

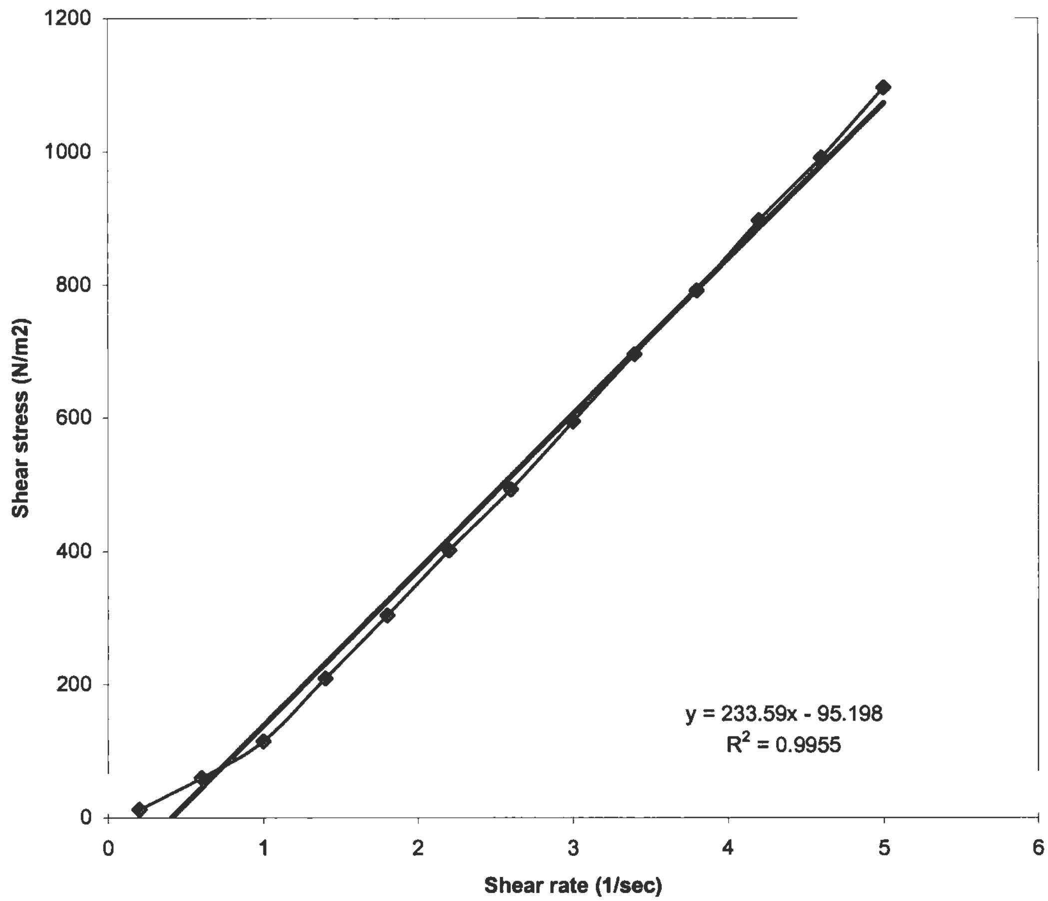


FIGURE 88. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 74. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.4	6.29	0.2	31456
0.3	3.6	56.6	0.6	94368
0.5	8.3	130.5	1	130542
0.7	13.7	215.5	1.4	153910
0.9	19.6	308.3	1.8	171260
1.1	26.3	413.6	2.2	188021
1.3	32.9	517.5	2.6	199020
1.5	39.7	624.4	3	208134
1.7	46.6	732.9	3.4	215566
1.9	52.8	830.4	3.8	218536
2.1	60.1	945.3	4.2	225060
2.3	66.4	1044	4.6	227030
2.5	73.5	1156	5	231202

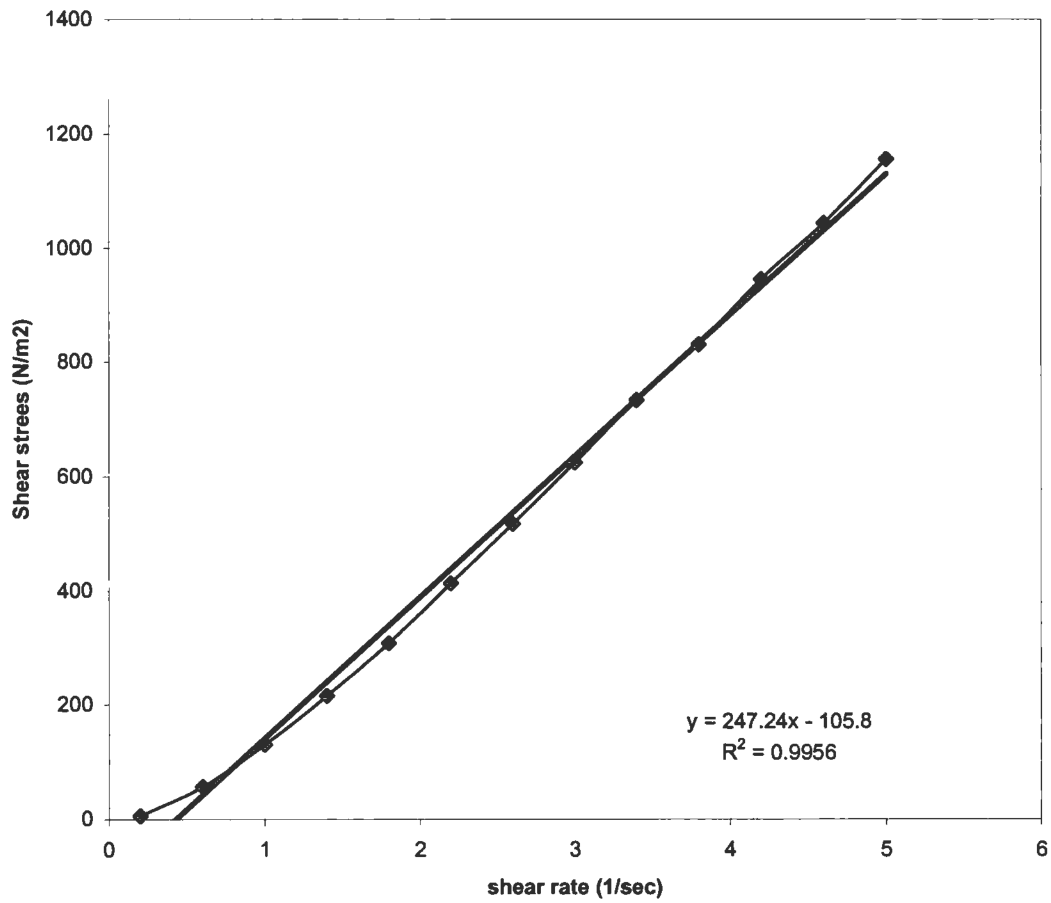


FIGURE 89. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 75. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.9	14.2	0.2	70776
0.3	3.9	61.3	0.6	102232
0.5	8.5	133.7	1	133688
0.7	13.5	212.3	1.4	151663
0.9	19.9	313	1.8	173882
1.1	25.8	405.8	2.2	184447
1.3	32.6	512.7	2.6	197205
1.5	39.3	618.1	3	206037
1.7	46	723.5	3.4	212791
1.9	52.2	821	3.8	216053
2.1	59.4	934.2	4.2	222439
2.3	65.7	1033	4.6	224637
2.5	72.8	1145	5	229000

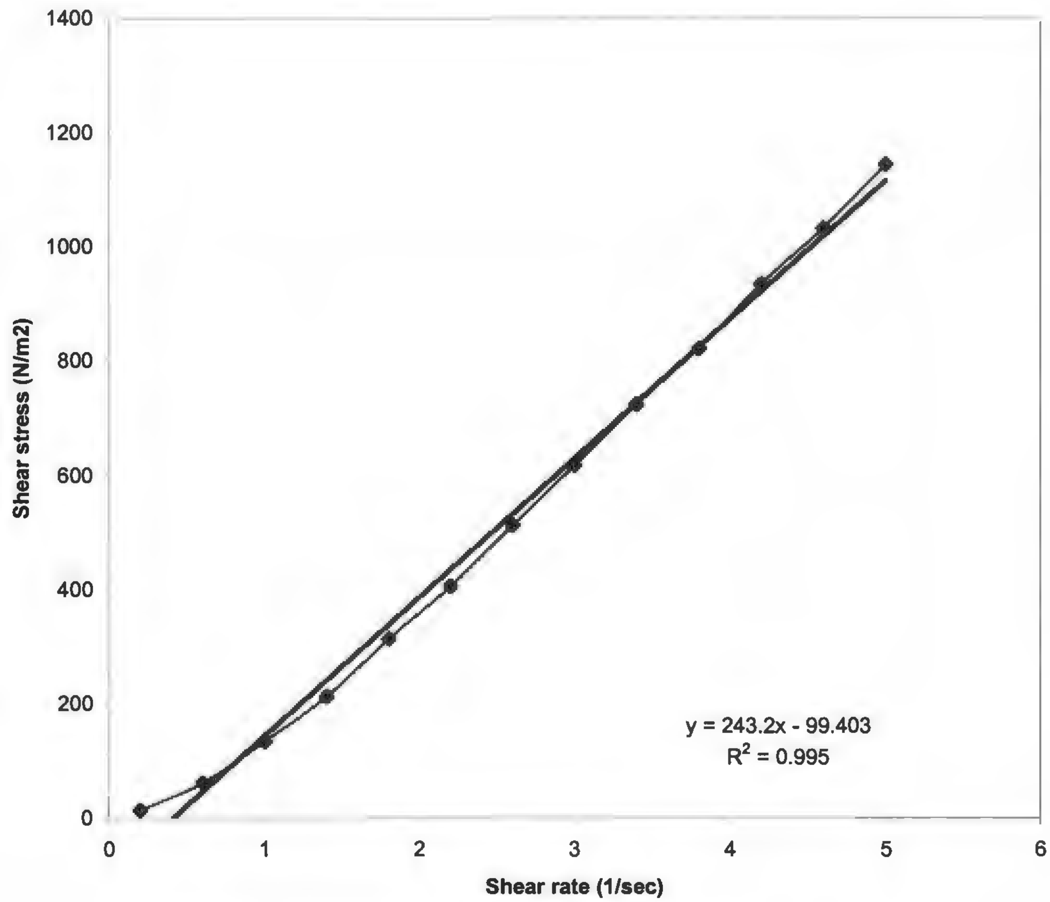


FIGURE 90. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 76. VISCOSITY OF LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RPM	Torque (%)	Sh Str (N/m2)	Sh Rt (1/Sec)	Viscosity (mPas)
0.1	0.8	12.6	0.2	62912
0.3	3	47.2	0.6	78640
0.5	7.5	118	1	117960
0.7	12.8	201.3	1.4	143799
0.9	18.2	286.2	1.8	159028
1.1	23.3	366.5	2.2	166574
1.3	29.2	459.3	2.6	176638
1.5	34.4	541	3	180348
1.7	40.1	630.7	3.4	185498
1.9	45.2	710.9	3.8	187080
2.1	50.8	799	4.2	190234
2.3	55.9	879.2	4.6	191129
2.5	61.7	970.4	5	194084

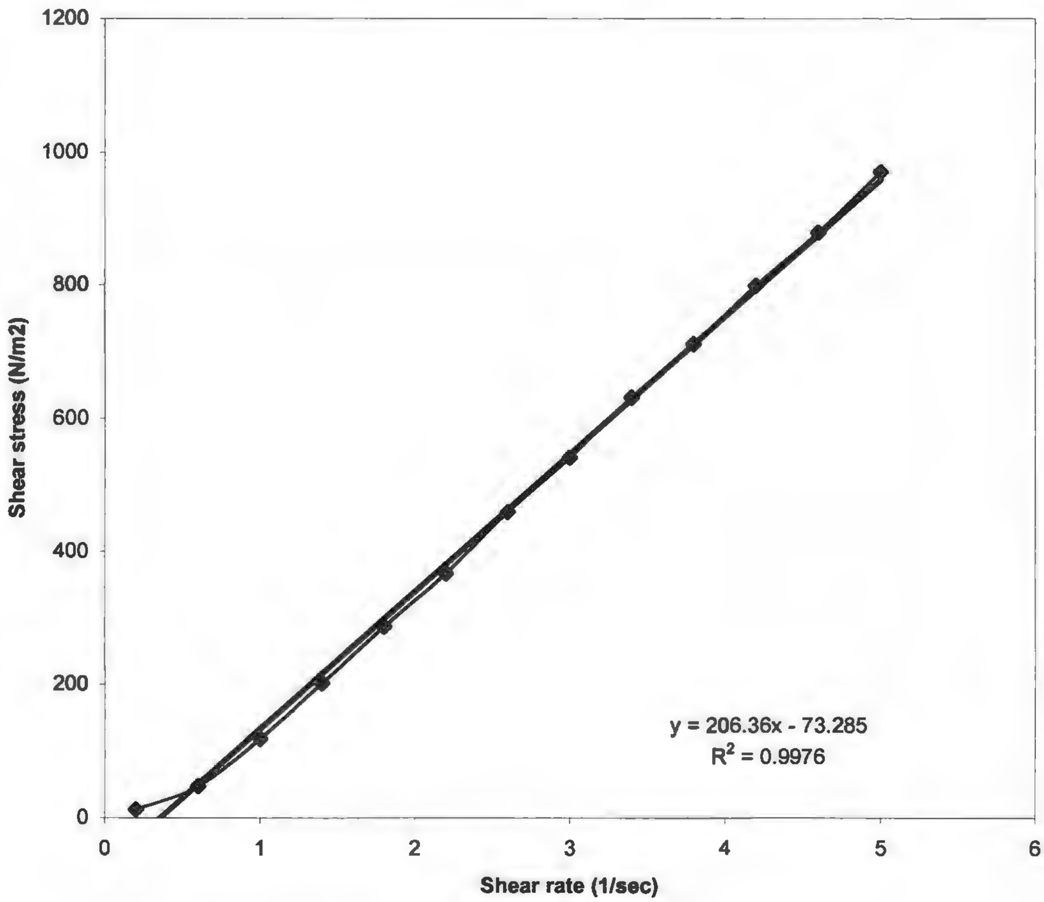


FIGURE 91. RHEOGRAM FOR LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

TABLE 77. RESULTS OF ONE-WAY ANOVA ON KT RELEASE FROM FORMULATIONS WITH DIFFERENT COMPOSITIONS

Lecithin:IPM (40:60) 0.1% w = 1
Lecithin:IPM (40:60) 0.25%w =2
Lecithin:IPM (40:60) 0.5% w = 3
Lecithin:IPM (40:60) 0.6% w = 4
Lecithin:IPM (40:60) 0.7% w = 5
Lecithin:IPM (40:60) 0.8% w = 6
Lecithin:IPM (50:50) 0.1%w, n12 = 7
Lecithin:IPM (50:50) 0.25%w = 8
Lecithin:IPM (50:50) 0.5% w = 9
Lecithin:IPM (50:50) 0.6% w = 10
Lecithin:IPM (50:50) 0.7% w = 11
Lecithin:IPM (50:50) 0.8% w = 12
Lecithin:IPM (60:40) 0.1%w, n12 = 13
Lecithin:IPM (60:40) 0.25%w =14
Lecithin:IPM (60:40) 0.5% w = 15
Lecithin:IPM (60:40) 0.6% w = 16
Lecithin:IPM (60:40) 0.7% w = 17
Lecithin:IPM (60:40) 0.8% w = 18
Lecithin:IPM (40:60) 0.1% w 1% KT Cellulose Acetate = 19
Lecithin:IPM (40:60) 0.1% w 1% KT Silicon Elastomer = 20

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	17	203748	11985	86.04	0.000
Error	102	14208	139		
Total	119	217955			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level    N    Mean    StDev -----+---------+---------+---------+-
 1       6  205.25    14.61              (-*-)
 2       6  190.94    16.01            (-*-)
```

```
3        6   175.38    9.50                 (-*-)
4        6   217.91   15.80                       (-*)
5        6   194.28   22.10                    (-*-)
6        6   198.66    8.94                    (-*-)
7       12   105.64    6.57      (*)
8        6   106.49   11.17     (-*-)
9        6   135.69   12.26         (-*-)
10       6   108.51   10.60      (-*-)
11       6   117.07    7.48       (*-)
12       6   106.14    5.22     (-*-)
13      12    99.99   11.98      (*)
14       6    85.95    9.78  (-*-)
15       6   127.73   12.49         (-*)
16       6   126.79    3.39        (-*-)
17       6   120.99   10.33        (-*-)
18       6   116.15   14.58       (-*-)
                          -----+---------+---------+---------+-
Pooled StDev =   11.80          100       150       200       250
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	614	614	2.62	0.137
Error	10	2349	235		
Total	11	2963			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level     N     Mean     StDev  ---+---------+---------+---------+---
1         6   205.25    14.61          (-----------*-----------)
2         6   190.94    16.01   (----------*-----------)
                                ---+---------+---------+---------+---
Pooled StDev =   15.33            180       192       204       216
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	2678	2678	17.63	0.002
Error	10	1519	152		
Total	11	4197			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level     N     Mean    StDev  -+---------+---------+---------+-----
1         6   205.25    14.61              (-------*------)
3         6   175.38     9.50  (-------*------)
                               -+---------+---------+---------+-----
Pooled StDev =   12.32         165       180       195       210
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	481	481	2.08	0.180
Error	10	2316	232		
Total	11	2796			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level     N     Mean    StDev  -+---------+---------+---------+-----
1         6   205.25    14.61  (----------*-----------)
4         6   217.91    15.80          (-----------*----------)
                               -+---------+---------+---------+-----
Pooled StDev =   15.22         192       204       216       228
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P

```
sample     1     361     361    1.03    0.334
Error     10    3510     351
Total     11    3871

                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N    Mean    StDev  --+---------+---------+---------+----
1          6  205.25    14.61        (-----------*----------)
5          6  194.28    22.10  (-----------*----------)
                               --+---------+---------+---------+----
Pooled StDev =   18.73           180       195       210       225
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS       F       P
sample     1     130     130    0.89   0.368
Error     10    1467     147
Total     11    1598

                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N    Mean    StDev  ------+---------+---------+---------+
1          6  205.25    14.61        (-------------*------------)
6          6  198.66     8.94  (------------*-------------)
                               ------+---------+---------+---------+
Pooled StDev =   12.11             192.0     200.0     208.0     216.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS       F       P
sample     1     727     727    4.20   0.068
Error     10    1732     173
Total     11    2459
```

```
                        Individual 95% CIs For Mean
                        Based on Pooled StDev
Level     N    Mean    StDev  ----+---------+---------+---------+--
2         6  190.94    16.01            (---------*---------)
3         6  175.38     9.50  (---------*---------)
                              ----+---------+---------+---------+--
Pooled StDev =   13.16           168       180       192       204
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	2182	2182	8.63	0.015
Error	10	2529	253		
Total	11	4711			

```
                        Individual 95% CIs For Mean
                        Based on Pooled StDev
Level     N    Mean    StDev  ----------+---------+---------+------
2         6  190.94    16.01  (--------*--------)
4         6  217.91    15.80              (--------*--------)
                              ----------+---------+---------+------
Pooled StDev =   15.90                 192       208       224
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	33	33	0.09	0.770
Error	10	3723	372		
Total	11	3757			

```
                        Individual 95% CIs For Mean
                        Based on Pooled StDev
Level     N    Mean    StDev  ------+---------+---------+---------+
```

```
2          6   190.94    16.01  (--------------*--------------)
5          6   194.28    22.10     (--------------*--------------)
                                 ------+---------+---------+---------+
Pooled StDev =    19.30             180       192       204       216
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	179	179	1.06	0.327
Error	10	1680	168		
Total	11	1859			

```
                                 Individual 95% CIs For Mean
                                 Based on Pooled StDev
Level      N     Mean     StDev  -+---------+---------+---------+-----
2          6   190.94    16.01  (-----------*-----------)
6          6   198.66     8.94        (-----------*----------)
                                 -+---------+---------+---------+-----
Pooled StDev =    12.96        180       190       200       210
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	5428	5428	31.95	0.000
Error	10	1699	170		
Total	11	7126			

```
                                 Individual 95% CIs For Mean
                                 Based on Pooled StDev
Level      N     Mean     StDev  ---------+---------+---------+-------
3          6   175.38     9.50  (-----*-----)
4          6   217.91    15.80                  (-----*-----)
                                 ---------+---------+---------+-------
Pooled StDev =    13.03                180       200       220
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1073	1073	3.71	0.083
Error	10	2893	289		
Total	11	3965			

```
                               Individual 95% CIs For Mean
                               Based on Pooled StDev
Level     N     Mean     StDev ----+---------+---------+---------+--
3         6   175.38     9.50  (---------*---------)
5         6   194.28    22.10           (----------*---------)
                               ----+---------+---------+---------+--
Pooled StDev =   17.01           165       180       195       210
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1626.6	1626.6	19.13	0.001
Error	10	850.2	85.0		
Total	11	2476.8			

```
                               Individual 95% CIs For Mean
                               Based on Pooled StDev
Level     N     Mean     StDev -+---------+---------+---------+-----
3         6   175.38     9.50  (------*------)
6         6   198.66     8.94                  (------*------)
                               -+---------+---------+---------+-----
Pooled StDev =    9.22         168       180       192       204
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1675	1675	4.54	0.059
Error	10	3690	369		
Total	11	5365			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level   N    Mean   StDev  ----------+---------+---------+------
4       6  217.91   15.80          (----------*----------)
5       6  194.28   22.10  (---------*----------)
                           ----------+---------+---------+------
Pooled StDev =  19.21              192       208       224
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1112	1112	6.75	0.027
Error	10	1647	165		
Total	11	2759			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level   N    Mean   StDev  -----+---------+---------+---------+-
4       6  217.91   15.80            (---------*--------)
6       6  198.66    8.94  (---------*--------)
                           -----+---------+---------+---------+-
Pooled StDev =  12.83         192       204       216       228
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source   DF     SS     MS     F      P
sample    1     57     57  0.20  0.662
Error    10   2841    284
Total    11   2899

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  --+---------+---------+---------+----
5        6  194.28   22.10  (--------------*---------------)
6        6  198.66    8.94    (---------------*--------------)
                            --+---------+---------+---------+----
Pooled StDev =   16.86          180       190       200       210
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source   DF      SS     MS     F      P
sample    1     2.9    2.9  0.04  0.839
Error    16  1098.7   68.7
Total    17  1101.6

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  --+---------+---------+---------+----
7       12  105.64    6.57    (------------*------------)
8        6  106.49   11.17  (-----------------*-----------------)
                            --+---------+---------+---------+----
Pooled StDev =    8.29        100.0     104.0     108.0     112.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source   DF      SS      MS      F      P
sample    1  3611.2  3611.2  47.12  0.000
Error    16  1226.3    76.6
```

```
Total      17    4837.5

                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N     Mean     StDev  -------+---------+---------+---------
7         12   105.64      6.57  (---*---)
9          6   135.69     12.26                   (-----*-----)
                                 -------+---------+---------+---------
Pooled StDev =     8.75             108       120       132
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	32.9	32.9	0.51	0.486
Error	16	1036.1	64.8		
Total	17	1069.1			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N     Mean     StDev  ---------+---------+---------+-------
 7        12   105.64      6.57  (-----------*-----------)
10         6   108.51     10.60    (----------------*-----------------)
                                 ---------+---------+---------+-------
Pooled StDev =     8.05             104.0     108.0     112.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	522.5	522.5	11.08	0.004
Error	16	754.6	47.2		
Total	17	1277.1			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
```

```
Level      N     Mean    StDev  -+---------+---------+---------+-----
 7        12   105.64     6.57  (------*------)
11         6   117.07     7.48              (---------*---------)
                                -+---------+---------+---------+-----
Pooled StDev =    6.87        102.0     108.0     114.0     120.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1.0	1.0	0.03	0.874
Error	16	610.7	38.2		
Total	17	611.7			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean    StDev  -----+---------+---------+---------+-
 7        12   105.64     6.57     (-----------*------------)
12         6   106.14     5.22  (-----------------*-----------------)
                                -----+---------+---------+---------+-
Pooled StDev =    6.18           102.0     105.0     108.0     111.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	2557	2557	18.59	0.002
Error	10	1375	138		
Total	11	3932			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean    StDev  -------+---------+---------+---------
8          6   106.49    11.17  (------*------)
9          6   135.69    12.26              (------*-------)
                                -------+---------+---------+---------
```

```
Pooled StDev =    11.73                105       120       135
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	12	12	0.10	0.755
Error	10	1185	119		
Total	11	1197			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean     StDev  ----------+---------+---------+------
 8         6   106.49    11.17  (--------------*---------------)
10         6   108.51    10.60     (---------------*--------------)
                                ----------+---------+---------+------
Pooled StDev =    10.89              102.0     108.0     114.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	335.5	335.5	3.71	0.083
Error	10	903.8	90.4		
Total	11	1239.3			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean     StDev  --------+---------+---------+--------
 8         6   106.49    11.17  (---------*---------)
11         6   117.07     7.48             (---------*---------)
                                --------+---------+---------+--------
Pooled StDev =    9.51             104.0     112.0     120.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	0.4	0.4	0.00	0.945
Error	10	759.9	76.0		
Total	11	760.3			

```
                             Individual 95% CIs For Mean
                             Based on Pooled StDev
Level     N     Mean    StDev  ----+---------+---------+---------+--
 8        6   106.49    11.17   (---------------*---------------)
12        6   106.14     5.22  (---------------*---------------)
                               ----+---------+---------+---------+--
Pooled StDev =    8.72          100.0     105.0     110.0     115.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	2216	2216	16.88	0.002
Error	10	1313	131		
Total	11	3529			

```
                             Individual 95% CIs For Mean
                             Based on Pooled StDev
Level     N     Mean    StDev  -----+---------+---------+---------+-
 9        6   135.69    12.26                (-----*------)
10        6   108.51    10.60  (------*------)
                               -----+---------+---------+---------+-
Pooled StDev =   11.46             105       120       135       150
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS      F      P
sample     1    1040    1040  10.08  0.010
Error     10    1031     103
Total     11    2071

                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level     N     Mean    StDev  -+---------+---------+---------+-----
9         6   135.69    12.26            (-------*-------)
11        6   117.07     7.48  (-------*------)
                               -+---------+---------+---------+-----
Pooled StDev =   10.16         108       120       132       144
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS      F      P
sample     1  2619.5  2619.5  29.51  0.000
Error     10   887.5    88.8
Total     11  3507.0

                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level     N     Mean    StDev  -----+---------+---------+---------+-
9         6   135.69    12.26               (----*-----)
12        6   106.14     5.22  (-----*----)
                               -----+---------+---------+---------+-
Pooled StDev =    9.42             105       120       135       150
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS      F      P
```

sample	1	219.8	219.8	2.61	0.137
Error	10	841.3	84.1		
Total	11	1061.1			

```
                               Individual 95% CIs For Mean
                               Based on Pooled StDev
Level    N    Mean    StDev  -------+---------+---------+---------
10       6  108.51    10.60  (-----------*-----------)
11       6  117.07     7.48          (-----------*-----------)
                             -------+---------+---------+---------
Pooled StDev =   9.17              105.0     112.0     119.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	16.9	16.9	0.24	0.633
Error	10	697.4	69.7		
Total	11	714.3			

```
                               Individual 95% CIs For Mean
                               Based on Pooled StDev
Level    N    Mean    StDev  ---+---------+---------+---------+---
10       6  108.51    10.60      (-------------*-------------)
12       6  106.14     5.22  (-------------*-------------)
                             ---+---------+---------+---------+---
Pooled StDev =   8.35          100.0     105.0     110.0     115.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	358.5	358.5	8.62	0.015
Error	10	415.9	41.6		
Total	11	774.4			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level    N    Mean   StDev  -------+---------+---------+---------
11       6  117.07    7.48            (-------*--------)
12       6  106.14    5.22  (--------*-------)
                            -------+---------+---------+---------
Pooled StDev =    6.45          105.0     112.0     119.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	789	789	6.13	0.025
Error	16	2058	129		
Total	17	2847			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level    N    Mean   StDev  ----+---------+---------+---------+--
13      12   99.99   11.98              (------*------)
14       6   85.95    9.78  (---------*---------)
                            ----+---------+---------+---------+--
Pooled StDev =   11.34          80        90       100       110
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	3078	3078	20.88	0.000
Error	16	2359	147		
Total	17	5438			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level    N    Mean   StDev  ---------+---------+---------+-------
13      12   99.99   11.98  (----*----)
```

```
15         6   127.73    12.49              (------*------)
                         ---------+---------+---------+-------
Pooled StDev =   12.14              105       120       135
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	2874	2874	28.08	0.000
Error	16	1637	102		
Total	17	4512			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N     Mean     StDev  --+---------+---------+---------+----
13        12    99.99    11.98  (----*----)
16         6   126.79     3.39                 (-------*------)
                                 --+---------+---------+---------+----
Pooled StDev =   10.12           96       108       120       132
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1765	1765	13.36	0.002
Error	16	2113	132		
Total	17	3878			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N     Mean     StDev  ---+---------+---------+---------+---
13        12    99.99    11.98  (-----*-----)
17         6   120.99    10.33              (-------*-------)
                                 ---+---------+---------+---------+---
Pooled StDev =   11.49            96       108       120       132
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1044	1044	6.32	0.023
Error	16	2642	165		
Total	17	3686			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level     N     Mean   StDev  --------+---------+---------+--------
13       12    99.99   11.98  (-------*-------)
18        6   116.15   14.58           (----------*----------)
                              --------+---------+---------+--------
Pooled StDev =   12.85              100       110       120
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	5237	5237	41.64	0.000
Error	10	1258	126		
Total	11	6495			

```
                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level     N     Mean   StDev  ---+---------+---------+---------+---
14        6    85.95    9.78  (----*----)
15        6   127.73   12.49                   (----*----)
                              ---+---------+---------+---------+---
Pooled StDev =   11.22          80       100       120       140
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS      F      P
sample     1  5005.5  5005.5  93.39  0.000
Error     10   536.0    53.6
Total     11  5541.5

                           Individual 95% CIs For Mean
                           Based on Pooled StDev
Level     N    Mean   StDev --------+---------+---------+--------
14        6   85.95    9.78  (---*----)
16        6  126.79    3.39                      (----*---)
                            --------+---------+---------+--------
Pooled StDev =   7.32              90       105       120
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS      F      P
sample     1    3685    3685  36.41  0.000
Error     10    1012     101
Total     11    4697

                           Individual 95% CIs For Mean
                           Based on Pooled StDev
Level     N    Mean   StDev ---------+---------+---------+-------
14        6   85.95    9.78 (-----*-----)
17        6  120.99   10.33                   (-----*-----)
                            ---------+---------+---------+-------
Pooled StDev =  10.06               90       105       120
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF     SS     MS      F      P
sample     1   2736   2736  17.76  0.002
Error     10   1541    154
Total     11   4277

                       Individual 95% CIs For Mean
                       Based on Pooled StDev
Level    N    Mean   StDev  -+---------+---------+---------+-----
14       6   85.95    9.78  (------*-------)
18       6  116.15   14.58                 (------*-------)
                            -+---------+---------+---------+-----
Pooled StDev =   12.41      75        90       105       120
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF     SS     MS     F      P
sample     1    2.6    2.6  0.03  0.863
Error     10  837.1   83.7
Total     11  839.7

                       Individual 95% CIs For Mean
                       Based on Pooled StDev
Level    N    Mean   StDev  ----+---------+---------+---------+--
15       6  127.73   12.49    (---------------*----------------)
16       6  126.79    3.39  (----------------*---------------)
                            ----+---------+---------+---------+--
Pooled StDev =    9.15       120.0     125.0     130.0     135.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF     SS     MS     F      P
sample     1    136    136  1.04  0.333
Error     10   1313    131
Total     11   1449
```

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  --+---------+---------+---------+----
15       6  127.73   12.49        (------------*------------)
17       6  120.99   10.33  (------------*------------)
                            --+---------+---------+---------+----
Pooled StDev =  11.46          112.0     120.0     128.0     136.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	403	403	2.19	0.170
Error	10	1842	184		
Total	11	2244			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  -------+---------+---------+---------
15       6  127.73   12.49          (------------*-----------)
18       6  116.15   14.58  (-----------*-----------)
                            -------+---------+---------+---------
Pooled StDev =  13.57                110       120       130
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	100.9	100.9	1.71	0.221
Error	10	591.2	59.1		
Total	11	692.1			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  -+---------+---------+---------+-----
```

```
16         6   126.79     3.39          (----------*-----------)
17         6   120.99    10.33   (-----------*----------)
                                -+---------+---------+---------+-----
Pooled StDev =    7.69       114.0     120.0     126.0     132.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	485	485	3.88	0.077
Error	10	1250	125		
Total	11	1735			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean     StDev  -------+---------+---------+---------
16         6   126.79     3.39            (---------*---------)
18         6   114.08    15.44   (---------*---------)
                                -------+---------+---------+---------
Pooled StDev =   11.18              110       120       130
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	71	71	0.44	0.521
Error	10	1596	160		
Total	11	1666			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean     StDev  ----------+---------+---------+------
17         6   120.99    10.33      (-------------*--------------)
18         6   116.15    14.58   (-------------*--------------)
                                ----------+---------+---------+------
Pooled StDev =   12.63              112.0     120.0     128.0
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS       F       P
sample     1   21396   21396  112.31   0.000
Error     10    1905     191
Total     11   23301

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level     N     Mean    StDev  ---------+---------+---------+-------
2         6   190.94    16.01                     (----*---)
8         6   106.49    11.17  (---*----)
                               ---------+---------+---------+-------
Pooled StDev =   13.80               120       150       180
```

One-way ANOVA: release versus sample

Analysis of Variance for release

```
Source    DF      SS      MS       F       P
sample     1   33072   33072  187.96   0.000
Error     10    1759     176
Total     11   34832

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level     N     Mean    StDev  ---------+---------+---------+-------
 2        6   190.94    16.01                       (---*--)
14        6    85.95     9.78  (---*--)
                               ---------+---------+---------+-------
Pooled StDev =   13.26               105       140       175
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	1266	1266	11.49	0.007
Error	10	1102	110		
Total	11	2369			

```
                             Individual 95% CIs For Mean
                             Based on Pooled StDev
Level     N     Mean    StDev  -------+---------+---------+---------
 8        6   106.49    11.17                (-------*-------)
14        6    85.95     9.78  (-------*-------)
                               -------+---------+---------+---------
Pooled StDev =   10.50                84        96       108
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	98893	98893	881.67	0.000
Error	10	1122	112		
Total	11	100014			

```
                             Individual 95% CIs For Mean
                             Based on Pooled StDev
Level     N     Mean    StDev  --------+---------+---------+--------
 1        6   205.25    14.61                            (*-)
19        6    23.69     3.28  (-*-)
                               --------+---------+---------+--------
Pooled StDev =   10.59                 60       120       180
```

One-way ANOVA: release versus sample

Analysis of Variance for release

Source	DF	SS	MS	F	P
sample	1	727.24	727.24	134.42	0.000
Error	10	54.10	5.41		
Total	11	781.35			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level    N     Mean    StDev  ----------+---------+---------+------
19       6   23.692    3.277                      (--*---)
20       6    8.122    0.281  (---*--)
                              ----------+---------+---------+------
Pooled StDev =   2.326                12.0      18.0      24.0
```

TABLE 77-1. RELEASE RATE VALUES OF KT FROM EIGHTEEN ORGANOGEL SAMPLES OF DIFFERENT COMPOSITIONS USING ANOVA ANALYSIS

Sample	Release
1	193.462
1	189.029
1	218.878
1	201.939
1	226.602
1	201.607
2	188.586
2	212.267
2	185.955
2	205.616
2	185.841
2	167.392
3	188.476
3	172.851
3	181.068
3	179.897
3	163.568
3	166.396
4	214.707
4	229.885
4	200.183
4	207.001
4	212.619
4	243.068
5	199.267
5	228.531
5	163.700
5	204.391
5	180.972
5	188.843
6	202.630
6	199.084
6	183.593
6	207.560
6	205.696
6	193.403
7	116.826
7	103.124
7	103.293
7	116.732
7	99.653
7	101.051
7	112.286
7	99.690
7	106.362

Sample	Release
7	107.806
7	97.370
7	103.477
8	112.276
8	108.578
8	93.037
8	118.538
8	114.197
8	92.329
9	129.893
9	134.513
9	114.461
9	145.110
9	145.842
9	144.296
10	100.848
10	120.845
10	114.105
10	118.335
10	101.666
10	95.249
11	105.571
11	123.302
11	110.272
11	120.191
11	124.084
11	118.989
12	109.824
12	109.23
12	105.747
12	111.725
12	97.945
12	102.349
13	104.238
13	119.666
13	117.554
13	90.995
13	108.509
13	113.943
13	90.983
13	92.111
13	93.054
13	89.537
13	88.406
13	90.869

Sample	Release
14	91.258
14	90.937
14	96.537
14	69.839
14	78.962
14	88.151
15	133.435
15	130.839
15	102.449
15	132.529
15	135.439
15	131.689
16	130.506
16	120.97
16	125.567
16	126.221
16	129.214
16	128.289
17	133.056
17	124.342
17	104.021
17	113.900
17	126.031
17	124.615
18	136.014
18	129.529
18	114.354
18	110.060
18	95.513
18	111.408

TABLE 77-1. CONT'D.

Sample1,2	Release1,2	Sample1,3	Release1,3	Sample1,4	Release 1,4
1	193.462	1	193.462	1	193.462
1	189.029	1	189.029	1	189.029
1	218.878	1	218.878	1	218.878
1	201.939	1	201.939	1	201.939
1	226.602	1	226.602	1	226.602
1	201.607	1	201.607	1	201.607
2	188.586	3	188.476	4	214.707
2	212.267	3	172.851	4	229.885
2	185.955	3	181.068	4	200.183
2	205.616	3	179.897	4	207.001
2	185.841	3	163.568	4	212.619
2	167.392	3	166.396	4	243.068

Sample1,5	Release1,5	Sample1,6	Release1,6	Sample2,3	Release2,3
1	193.462	1	193.462	2	188.586
1	189.029	1	189.029	2	212.267
1	218.878	1	218.878	2	185.955
1	201.939	1	201.939	2	205.616
1	226.602	1	226.602	2	185.841
1	201.607	1	201.607	2	167.392
5	199.267	6	202.630	3	188.476
5	228.531	6	199.084	3	172.851
5	163.700	6	183.593	3	181.068
5	204.391	6	207.56	3	179.897
5	180.972	6	205.696	3	163.568
5	188.843	6	193.403	3	166.396

Sample2,4	Release2,4	Sample2,5	Release2,5	Sample2,6	Release2,6
2	188.586	2	188.586	2	188.586
2	212.267	2	212.267	2	212.267
2	185.955	2	185.955	2	185.955
2	205.616	2	205.616	2	205.616
2	185.841	2	185.841	2	185.841
2	167.392	2	167.392	2	167.392
4	214.707	5	199.267	6	202.63
4	229.885	5	228.531	6	199.084
4	200.183	5	163.700	6	183.593
4	207.001	5	204.391	6	207.56
4	212.619	5	180.972	6	205.696
4	243.068	5	188.843	6	193.403

TABLE 77-1. CONT'D.

Sample1,2	Release1,2	Sample1,3	Release1,3	Sample1,4	Release 1,4
1	193.462	1	193.462	1	193.462
1	189.029	1	189.029	1	189.029
1	218.878	1	218.878	1	218.878
1	201.939	1	201.939	1	201.939
1	226.602	1	226.602	1	226.602
1	201.607	1	201.607	1	201.607
2	188.586	3	188.476	4	214.707
2	212.267	3	172.851	4	229.885
2	185.955	3	181.068	4	200.183
2	205.616	3	179.897	4	207.001
2	185.841	3	163.568	4	212.619
2	167.392	3	166.396	4	243.068

Sample1,5	Release1,5	Sample1,6	Release1,6	Sample2,3	Release2,3
1	193.462	1	193.462	2	188.586
1	189.029	1	189.029	2	212.267
1	218.878	1	218.878	2	185.955
1	201.939	1	201.939	2	205.616
1	226.602	1	226.602	2	185.841
1	201.607	1	201.607	2	167.392
5	199.267	6	202.630	3	188.476
5	228.531	6	199.084	3	172.851
5	163.700	6	183.593	3	181.068
5	204.391	6	207.56	3	179.897
5	180.972	6	205.696	3	163.568
5	188.843	6	193.403	3	166.396

Sample2,4	Release2,4	Sample2,5	Release2,5	Sample2,6	Release2,6
2	188.586	2	188.586	2	188.586
2	212.267	2	212.267	2	212.267
2	185.955	2	185.955	2	185.955
2	205.616	2	205.616	2	205.616
2	185.841	2	185.841	2	185.841
2	167.392	2	167.392	2	167.392
4	214.707	5	199.267	6	202.63
4	229.885	5	228.531	6	199.084
4	200.183	5	163.700	6	183.593
4	207.001	5	204.391	6	207.56
4	212.619	5	180.972	6	205.696
4	243.068	5	188.843	6	193.403

TABLE 77-1. CONT'D.

Sample7,8	Release7,8	Sample7,9	Release7,9	Sample7,10	Release7,10
7	116.826	7	116.826	7	116.826
7	103.124	7	103.124	7	103.124
7	103.293	7	103.293	7	103.293
7	116.732	7	116.732	7	116.732
7	99.653	7	99.653	7	99.653
7	101.051	7	101.051	7	101.051
7	112.286	7	112.286	7	112.286
7	99.69	7	99.69	7	99.690
7	106.362	7	106.362	7	106.362
7	107.806	7	107.806	7	107.806
7	97.370	7	97.37	7	97.370
7	103.477	7	103.477	7	103.477
8	112.276	9	129.893	10	100.848
8	108.578	9	134.513	10	120.845
8	93.037	9	114.461	10	114.105
8	118.538	9	145.11	10	118.335
8	114.197	9	145.842	10	101.666
8	92.329	9	144.296	10	95.249

Sample7,11	Release7,11	Sample7,12	Release7,12	Sample8,9	Release8,9
7	116.826	7	116.826	8	112.276
7	103.124	7	103.124	8	108.578
7	103.293	7	103.293	8	93.037
7	116.732	7	116.732	8	118.538
7	99.653	7	99.653	8	114.197
7	101.051	7	101.051	8	92.329
7	112.286	7	112.286	9	129.893
7	99.69	7	99.690	9	134.513
7	106.362	7	106.362	9	114.461
7	107.806	7	107.806	9	145.110
7	97.370	7	97.370	9	145.842
7	103.477	7	103.477	9	144.296
11	105.571	12	109.824		
11	123.302	12	109.23		
11	110.272	12	105.747		
11	120.191	12	111.725		
11	124.084	12	97.945		
11	118.989	12	102.349		

TABLE 77-1. CONT'D.

Sample8,10	Release8,10	Sample8,11	Release8,11	Sample8,12	Release8,12
8	112.276	8	112.276	8	112.276
8	108.578	8	108.578	8	108.578
8	93.037	8	93.037	8	93.037
8	118.538	8	118.538	8	118.538
8	114.197	8	114.197	8	114.197
8	92.329	8	92.329	8	92.329
10	100.848	11	105.571	12	109.824
10	120.845	11	123.302	12	109.23
10	114.105	11	110.272	12	105.747
10	118.335	11	120.191	12	111.725
10	101.666	11	124.084	12	97.945
10	95.249	11	118.989	12	102.349

Sample9,10	Release9,10	Sample9,11	Release9,11	Sample9,12	Release9,12
9	129.893	9	129.893	9	129.893
9	134.513	9	134.513	9	134.513
9	114.461	9	114.461	9	114.461
9	145.11	9	145.110	9	145.110
9	145.842	9	145.842	9	145.842
9	144.296	9	144.296	9	144.296
10	100.848	11	105.571	12	109.824
10	120.845	11	123.302	12	109.230
10	114.105	11	110.272	12	105.747
10	118.335	11	120.191	12	111.725
10	101.666	11	124.084	12	97.945
10	95.249	11	118.989	12	102.349

Sample10,11	Release10,11	Sample10,12	Release10,12	Sample11,12	Release11,12
10	100.848	10	100.848	11	105.571
10	120.845	10	120.845	11	123.302
10	114.105	10	114.105	11	110.272
10	118.335	10	118.335	11	120.191
10	101.666	10	101.666	11	124.084
10	95.249	10	95.249	11	118.989
11	105.571	12	109.824	12	109.824
11	123.302	12	109.230	12	109.23
11	110.272	12	105.747	12	105.747
11	120.191	12	111.725	12	111.725
11	124.084	12	97.945	12	97.945
11	118.989	12	102.349	12	102.349

TABLE 77-1. CONT'D.

Sample13,14	Release13,14	Sample13,15	Release13,15	Sampe13,16	Release13,16
13	104.238	13	104.238	13	104.238
13	119.666	13	119.666	13	119.666
13	117.554	13	117.554	13	117.554
13	90.995	13	90.995	13	90.995
13	108.509	13	108.509	13	108.509
13	113.943	13	113.943	13	113.943
13	90.983	13	90.983	13	90.983
13	92.111	13	92.111	13	92.111
13	93.054	13	93.054	13	93.054
13	89.537	13	89.537	13	89.537
13	88.406	13	88.406	13	88.406
13	90.869	13	90.869	13	90.869
14	91.258	15	133.435	16	130.506
14	90.937	15	130.839	16	120.970
14	96.537	15	102.449	16	125.567
14	69.839	15	132.529	16	126.221
14	78.962	15	135.439	16	129.214
14	88.151	15	131.689	16	128.289

Sample13,17	Release13,17	Sample13,18	Release13,18	Sample14,15	Release14,15
13	104.238	13	104.238	14	91.258
13	119.666	13	119.666	14	90.937
13	117.554	13	117.554	14	96.537
13	90.995	13	90.995	14	69.839
13	108.509	13	108.509	14	78.962
13	113.943	13	113.943	14	88.151
13	90.983	13	90.983	15	133.435
13	92.111	13	92.111	15	130.839
13	93.054	13	93.054	15	102.449
13	89.537	13	89.537	15	132.529
13	88.406	13	88.406	15	135.439
13	90.869	13	90.869	15	131.689
17	133.056	18	136.014		
17	124.342	18	129.529		
17	104.021	18	114.354		
17	113.900	18	110.060		
17	126.031	18	95.513		
17	124.615	18	111.408		

TABLE 77-1. CONT'D.

Sample14,16	Release14,16	Sample14,17	Release14,17	Sample14,18	Release14,18
14	91.258	14	91.258	14	91.258
14	90.937	14	90.937	14	90.937
14	96.537	14	96.537	14	96.537
14	69.839	14	69.839	14	69.839
14	78.962	14	78.962	14	78.962
14	88.151	14	88.151	14	88.151
16	130.506	17	133.056	18	136.014
16	120.970	17	124.342	18	129.529
16	125.567	17	104.021	18	114.354
16	126.221	17	113.900	18	110.060
16	129.214	17	126.031	18	95.513
16	128.289	17	124.615	18	111.408

Sample15,16	Release15,16	Sample15,17	Release15,17	Sample15,18	Release15,18
15	133.435	15	133.435	15	133.435
15	130.839	15	130.839	15	130.839
15	102.449	15	102.449	15	102.449
15	132.529	15	132.529	15	132.529
15	135.439	15	135.439	15	135.439
15	131.689	15	131.689	15	131.689
16	130.506	17	133.056	18	136.014
16	120.970	17	124.342	18	129.529
16	125.567	17	104.021	18	114.354
16	126.221	17	113.900	18	110.060
16	129.214	17	126.031	18	95.513
16	128.289	17	124.615	18	111.408

Sample16,17	Release16,17	Sample16,18	Release16,18	Sample17,18	Release17,18
16	130.506	16	130.506	17	133.056
16	120.97	16	120.97	17	124.342
16	125.567	16	125.567	17	104.021
16	126.221	16	126.221	17	113.900
16	129.214	16	129.214	17	126.031
16	128.289	16	128.289	17	124.615
17	133.056	18	133.61	18	136.014
17	124.342	18	124.639	18	129.529
17	104.021	18	119.301	18	114.354
17	113.900	18	107.949	18	110.060
17	126.031	18	89.265	18	95.513
17	124.615	18	109.717	18	111.408

TABLE 77-1. CONT'D.

Sample2,8	Release2,8	Sample2,14	Release2,14	Sample8,14	Release8,14
2	188.586	2	188.586	8	112.276
2	212.267	2	212.267	8	108.578
2	185.955	2	185.955	8	93.037
2	205.616	2	205.616	8	118.538
2	185.841	2	185.841	8	114.197
2	167.392	2	167.392	8	92.329
8	112.276	14	91.258	14	91.258
8	108.578	14	90.937	14	90.937
8	93.037	14	96.537	14	96.537
8	118.538	14	69.839	14	69.839
8	114.197	14	78.962	14	78.962
8	92.329	14	88.151	14	88.151

Sample1,19	Release1,19	Sample19,20	Release19,20
1	193.462	19	27.174
1	189.029	19	23.954
1	218.878	19	27.424
1	201.939	19	22.108
1	226.602	19	18.781
1	201.607	19	22.712
19	27.174	20	8.163
19	23.954	20	7.899
19	27.424	20	8.602
19	22.108	20	8.256
19	18.781	20	7.8700
19	22.712	20	7.945

TABLE 78. RESULTS OF ONE - WAY ANOVA ON KT RELEAES THROUGH HAIRLESS GUINEA PIG SKIN

Lecithin:IPM (40:60) 0.1%water 6.5% KT Guinea pig skin = 1
Lecithin:IPM (40:60) 0.1%water 1% KT Guinea pig skin = 2

One-way ANOVA: Release versus Sample

Analysis of Variance for Release

Source	DF	SS	MS	F	P
Sample	1	899	899	6.09	0.033
Error	10	1477	148		
Total	11	2376			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean    StDev  -+---------+---------+---------+-----
1        6   27.84   16.74            (--------*--------)
2        6   10.53    3.87   (--------*--------)
                             -+---------+---------+---------+-----
Pooled StDev =   12.15        0        12        24        36
```

TABLE 78-1. RELEASE RATE VALUES OF KT THROUGH GUINEA PIG SKIN USING ONE-WAY ANOVA ANALYSIS

Sample	Release
1	18.77
1	21.14
1	51.06
1	13.05
1	47.17
1	15.88
2	10.68
2	12.18
2	10.37
2	7.77
2	5.46
2	16.75

TABLE 79. RESULTS OF ONE-WAY ANOVA ON VISCOSITY OF FORMULATIONS WITH DIFFERENT COMPOSITIONS

Lecithin:IPM (40:60) 0.1% w = 1
Lecithin:IPM (40:60) 0.25%w = 2
Lecithin:IPM (40:60) 0.5% w = 3
Lecithin:IPM (40:60) 0.6% w = 4
Lecithin:IPM (40:60) 0.7% w = 5
Lecithin:IPM (40:60) 0.8% w = 6
Lecithin:IPM (50:50) 0.1% w = 7
Lecithin:IPM (50:50) 0.25%w = 8
Lecithin:IPM (50:50) 0.5% w = 9
Lecithin:IPM (50:50) 0.6% w = 10
Lecithin:IPM (50:50) 0.7% w = 11
Lecithin:IPM (50:50) 0.8% w = 12
Lecithin:IPM (60:40) 0.1% w = 13
Lecithin:IPM (60:40) 0.25%w = 14
Lecithin:IPM (60:40) 0.5% w = 15
Lecithin:IPM (60:40) 0.6% w = 16
Lecithin:IPM (60:40) 0.7% w = 17
Lecithin:IPM (60:40) 0.8% w = 18

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	8	16819301	2102413	27.23	0.000
Error	18	1389548	77197		
Total	26	18208849			

```
                        Individual 95% CIs For Mean
                        Based on Pooled StDev
Level    N    Mean    StDev  -+---------+---------+---------+-----
 1       3   598.8   155.1     (--*--)
 2       3   476.5   128.5   (---*--)
 3       3   623.9   130.8     (--*---)
 5       3   355.9   158.9  (---*--)
```

```
6        3   286.8    144.2  (---*--)
7        3  1005.8    133.7         (--*--)
8        3   959.4     22.5       (---*--)
13       3  2659.2    424.3                        (---*--)
14       3  2163.5    626.6                     (---*--)
                       -+---------+---------+---------+-----
Pooled StDev =    277.8            0      1000      2000     3000
```

One-way ANOVA: viscosity versus sample

Analysis of Variance for viscosity

Source	DF	SS	MS	F	P
sample	1	22414	22414	1.10	0.353
Error	4	81156	20289		
Total	5	103570			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level    N    Mean    StDev  -----+---------+---------+---------+-
1        3   598.8    155.1       (-------------*--------------)
2        3   476.5    128.5   (-------------*-------------)
                              -----+---------+---------+---------+-
Pooled StDev =    142.4            320       480       640       800
```

One-way ANOVA: viscosity versus sample

Analysis of Variance for viscosity

Source	DF	SS	MS	F	P
sample	1	947	947	0.05	0.841
Error	4	82356	20589		
Total	5	83302			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
```

```
Level      N     Mean    StDev  ------+---------+---------+---------+
1          3    598.8    155.1  (--------------*--------------)
3          3    623.9    130.8   (---------------*--------------)
                                ------+---------+---------+---------+
Pooled StDev =    143.5             450       600       750       900
```

One-way ANOVA: viscosity versus sample

Analysis of Variance for viscosity

Source	DF	SS	MS	F	P
sample	1	88457	88457	3.59	0.131
Error	4	98636	24659		
Total	5	187093			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean    StDev  ------+---------+---------+---------+
1          3    598.8    155.1         (---------*---------)
5          3    355.9    158.9  (---------*---------)
                                ------+---------+---------+---------+
Pooled StDev =    157.0             250       500       750      1000
```

One-way ANOVA: viscosity versus sample

Analysis of Variance for viscosity

Source	DF	SS	MS	F	P
sample	1	146013	146013	6.51	0.063
Error	4	89698	22424		
Total	5	235710			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N     Mean    StDev  ---------+---------+---------+-------
1          3    598.8    155.1            (---------*---------)
6          3    286.8    144.2  (--------*---------)
```

```
                      ---------+---------+---------+-------
Pooled StDev =    149.7            250       500       750
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	32572	32572	1.94	0.236
Error	4	67250	16813		
Total	5	99823			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level     N     Mean     StDev  ----+---------+---------+---------+--
2         3    476.5    128.5  (------------*------------)
3         3    623.9    130.8         (------------*------------)
                                ----+---------+---------+---------+--
Pooled StDev =    129.7           320       480       640       800
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	21817	21817	1.04	0.365
Error	4	83530	20883		
Total	5	105347			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level     N     Mean     StDev  ---+---------+---------+---------+---
2         3    476.5    128.5       (-------------*-------------)
5         3    355.9    158.9  (-------------*--------------)
                                ---+---------+---------+---------+---
Pooled StDev =    144.5           160       320       480       640
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

```
Source    DF      SS      MS      F      P
Sample     1   54011   54011   2.90  0.164
Error      4   74592   18648
Total      5  128604

                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level     N    Mean   StDev  -------+---------+---------+---------
2         3   476.5   128.5       (----------*----------)
6         3   286.8   144.2  (----------*----------)
                             -------+---------+---------+---------
Pooled StDev =   136.6             200       400       600
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

```
Source    DF      SS      MS      F      P
Sample     1  107704  107704   5.08  0.087
Error      4   84730   21183
Total      5  192434

                         Individual 95% CIs For Mean
                         Based on Pooled StDev
Level     N    Mean   StDev  ----+---------+---------+---------+--
3         3   623.9   130.8          (----------*-----------)
5         3   355.9   158.9  (-----------*----------)
                             ----+---------+---------+---------+--
Pooled StDev =   145.5          200       400       600       800
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	170471	170471	9.00	0.040
Error	4	75792	18948		
Total	5	246264			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level   N    Mean   StDev  --------+---------+---------+--------
3       3   623.9   130.8           (--------*--------)
6       3   286.8   144.2  (-------*--------)
                           --------+---------+---------+--------
Pooled StDev =  137.7            250       500       750
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	7174	7174	0.31	0.606
Error	4	92072	23018		
Total	5	99246			

```
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level   N    Mean   StDev  --------+---------+---------+--------
5       3   355.9   158.9     (--------------*--------------)
6       3   286.8   144.2  (--------------*--------------)
                           --------+---------+---------+--------
Pooled StDev =  151.7            160       320       480
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source DF SS MS F P

```
Sample     1    3231     3231    0.35   0.585
Error      4   36783     9196
Total      5   40014

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level      N     Mean     StDev  ----------+---------+---------+------
7          3   1005.8     133.7     (--------------*--------------)
8          3    959.4      22.5  (--------------*--------------)
                                 ----------+---------+---------+------
Pooled StDev =    95.9                900      1000      1100
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

```
Source    DF        SS        MS       F       P
Sample     1    368627    368627    1.29   0.320
Error      4   1145312    286328
Total      5   1513939

                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level      N     Mean     StDev  ---------+---------+---------+-------
13         3   2659.2     424.3       (-------------*--------------)
14         3   2163.5     626.6  (-------------*-------------)
                                 ---------+---------+---------+-------
Pooled StDev =   535.1               1800      2400      3000
```

———— 2/1/2002 1:58:45 PM ————————————————————

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	349716	349716	41.10	0.003
Error	4	34034	8509		
Total	5	383750			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level    N    Mean    StDev  -------+---------+---------+---------
2        3   476.5    128.5  (-----*-----)
8        3   959.4     22.5               (-----*-----)
                             -------+---------+---------+---------
Pooled StDev =   92.2              500       750      1000
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	4268667	4268667	20.87	0.010
Error	4	818294	204573		
Total	5	5086960			

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level    N    Mean    StDev  ---+---------+---------+---------+---
 2       3   476.5    128.5   (------*------)
14       3  2163.5    626.6              (-------*------)
                             ---+---------+---------+---------+---
Pooled StDev =  452.3           0      1000      2000      3000
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	2174761	2174761	11.06	0.029
Error	4	786277	196569		
Total	5	2961038			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  -------+---------+---------+---------
 8       3   959.4    22.5  (--------*--------)
14       3  2163.5   626.6           (--------*--------)
                            -------+---------+---------+---------
Pooled StDev =  443.4            800      1600      2400
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	349716	349716	41.10	0.003
Error	4	34034	8509		
Total	5	383750			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  -------+---------+---------+---------
2        3   476.5   128.5  (-----*-----)
8        3   959.4    22.5             (-----*-----)
                            -------+---------+---------+---------
Pooled StDev =   92.2            500       750      1000
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

Source	DF	SS	MS	F	P
Sample	1	4268667	4268667	20.87	0.010
Error	4	818294	204573		
Total	5	5086960			

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level    N    Mean   StDev  ---+---------+---------+---------+---
 2       3   476.5   128.5  (------*------)
```

```
14         3   2163.5    626.6              (-------*------)
                                   ---+---------+---------+---------+---
Pooled StDev =    452.3            0      1000      2000      3000
```

One-way ANOVA: Viscosity versus Sample

Analysis of Variance for Viscosity

```
Source    DF       SS        MS        F       P
Sample     1   2174761   2174761    11.06    0.029
Error      4    786277    196569
Total      5   2961038
                              Individual 95% CIs For Mean
                              Based on Pooled StDev
Level      N     Mean    StDev  -------+---------+---------+---------
 8         3    959.4     22.5  (--------*--------)
14         3   2163.5    626.6             (--------*--------)
                              -------+---------+---------+---------
Pooled StDev =    443.4             800      1600      2400
```

TABLE 79-1. VISCOSITY VALUES OF VARIOUS FORMULATIONS CONTAINING DIFFERENT COMPOSITIONS USING ONE-WY ANOVA ANALYSIS

Sample	Viscosity	Sample1,2	Viscosity1,2	Sample1,3	Viscosity1,3
1	585.91	1	585.91	1	585.91
1	450.46	1	450.46	1	450.46
1	759.92	1	759.92	1	759.92
2	591.98	2	591.98	3	748.96
2	338.08	2	338.08	3	488.00
2	499.51	2	499.51	3	634.69
3	748.96				
3	488.00				
3	634.69				
5	536.66				
5	293.00				
5	238.11				
6	448.86				
6	172.89				
6	238.55				
7	851.35				
7	1083.00				
7	1083.00				
8	974.61				
8	933.58				
8	969.93				
13	2834.8				
13	2175.3				
13	2967.5				
14	2825.00				
14	1578.9				
14	2086.5				

TABLE 79-1. CONT'D.

Sample1,5	Viscosity,1,5	Sample1,6	Viscosity1,6	Sample2,3	Viscosity2,3
1	585.91	1	585.91	2	591.98
1	450.46	1	450.46	2	338.08
1	759.92	1	759.92	2	499.51
5	536.66	6	448.86	3	748.96
5	293.00	6	172.89	3	488.00
5	238.11	6	238.55	3	634.69

Sample2,5	Viscosity2,5	Sample2,6	Viscosity2,6	Sample3,5	Viscosity3,5
2	591.98	2	591.98	3	748.96
2	338.08	2	338.08	3	488.00
2	499.51	2	499.51	3	634.69
5	536.66	6	448.86	5	536.66
5	293.00	6	172.89	5	293.00
5	238.11	6	238.55	5	238.11

Sample3,6	Viscosity3,6	Sample5,6	Viscosity5,6	Sample7,8	Viscosity7,8
3	748.96	5	536.66	7	851.35
3	488.00	5	293.00	7	1083.00
3	634.69	5	238.11	7	1083.00
6	448.86	6	448.86	8	974.61
6	172.89	6	172.89	8	933.58
6	238.55	6	238.55	8	969.93

Sample13,14	Viscosity13,14	Sample2,8	Viscosity2,8	Sample2,14	Viscosity2,14
13	2834.8	2	591.98	2	591.98
13	2175.3	2	338.08	2	338.08
13	2967.5	2	499.51	2	499.51
14	2825.00	8	974.61	14	2825.00
14	1578.9	8	933.58	14	1578.9
14	2086.5	8	969.93	14	2086.5

Sample8,14	Viscosity8,14
8	974.61
8	933.58
8	969.93
14	2825.00
14	1578.9
14	2086.5

TABLE 80. VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 04:23
Sample: 40601W File: 40601W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.4	31456	6.29	0.20	25.0	00:02
002	0.6	3.6	47184	56.6	1.20	25.0	00:02
003	1.1	7.2	51473	113.2	2.20	25.0	00:02
004	1.6	10.8	53082	169.9	3.20	25.0	00:02
005	2.1	14.6	54674	229.6	4.20	25.0	00:02
006	2.6	18.1	54746	284.7	5.20	25.0	00:02
007	3.1	21.7	55048	341.3	6.20	25.0	00:02
008	3.6	25.4	55485	399.5	7.20	25.0	00:02
009	4.1	29.0	55623	456.1	8.20	25.0	00:02
010	4.6	32.9	56245	517.5	9.20	25.0	00:02
011	5.1	36.6	56436	575.6	10.2	25.0	00:02
012	5.6	40.6	57014	638.6	11.2	25.0	00:02
013	6.1	44.2	56982	695.2	12.2	25.0	00:02
014	6.6	47.8	56954	751.8	13.2	25.0	00:02
015	7.1	51.7	57263	813.1	14.2	25.0	00:02
016	7.6	55.8	57738	877.6	15.2	25.0	00:02
017	8.1	59.3	57572	932.7	16.2	25.0	00:02
018	8.6	62.9	57517	989.3	17.2	25.0	00:02
019	9.1	66.8	57727	1051	18.2	25.0	00:02
020	9.6	70.8	57997	1114	19.2	25.0	00:02
021	10.0	73.6	57879	1158	20.0	24.9	00:02
022	9.5	71.4	59104	1123	19.0	25.0	00:02
023	9.0	67.9	59330	1068	18.0	25.0	00:02
024	8.5	64.2	59396	1010	17.0	25.0	00:02
025	8.0	60.5	59472	951.5	16.0	25.0	00:02
026	7.5	56.9	59662	894.9	15.0	25.0	00:02
027	7.0	53.1	59654	835.2	14.0	25.0	00:02
028	6.5	49.4	59766	777.0	13.0	25.0	00:02
029	6.0	45.6	59766	717.2	12.0	25.0	00:02
030	5.5	42.0	60052	660.6	11.0	25.0	00:02
031	5.0	38.3	60238	602.4	10.0	25.0	00:02
032	4.5	34.7	60640	545.8	9.00	25.0	00:02
033	4.0	30.8	60553	484.4	8.00	25.0	00:02
034	3.5	27.1	60890	426.2	7.00	25.0	00:02
035	3.0	23.1	60553	363.3	6.00	25.0	00:02
036	2.5	19.5	61339	306.7	5.00	25.0	00:02
037	2.0	15.6	61339	245.4	4.00	25.0	00:02
038	1.5	12.1	63436	190.3	3.00	25.0	00:02
039	1.0	8.3	65271	130.5	2.00	25.0	00:02
040	0.5	4.6	72349	72.3	1.00	25.0	00:02
041	0.1	1.9	149416	29.9	0.20	25.0	00:02

FIGURE 92. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

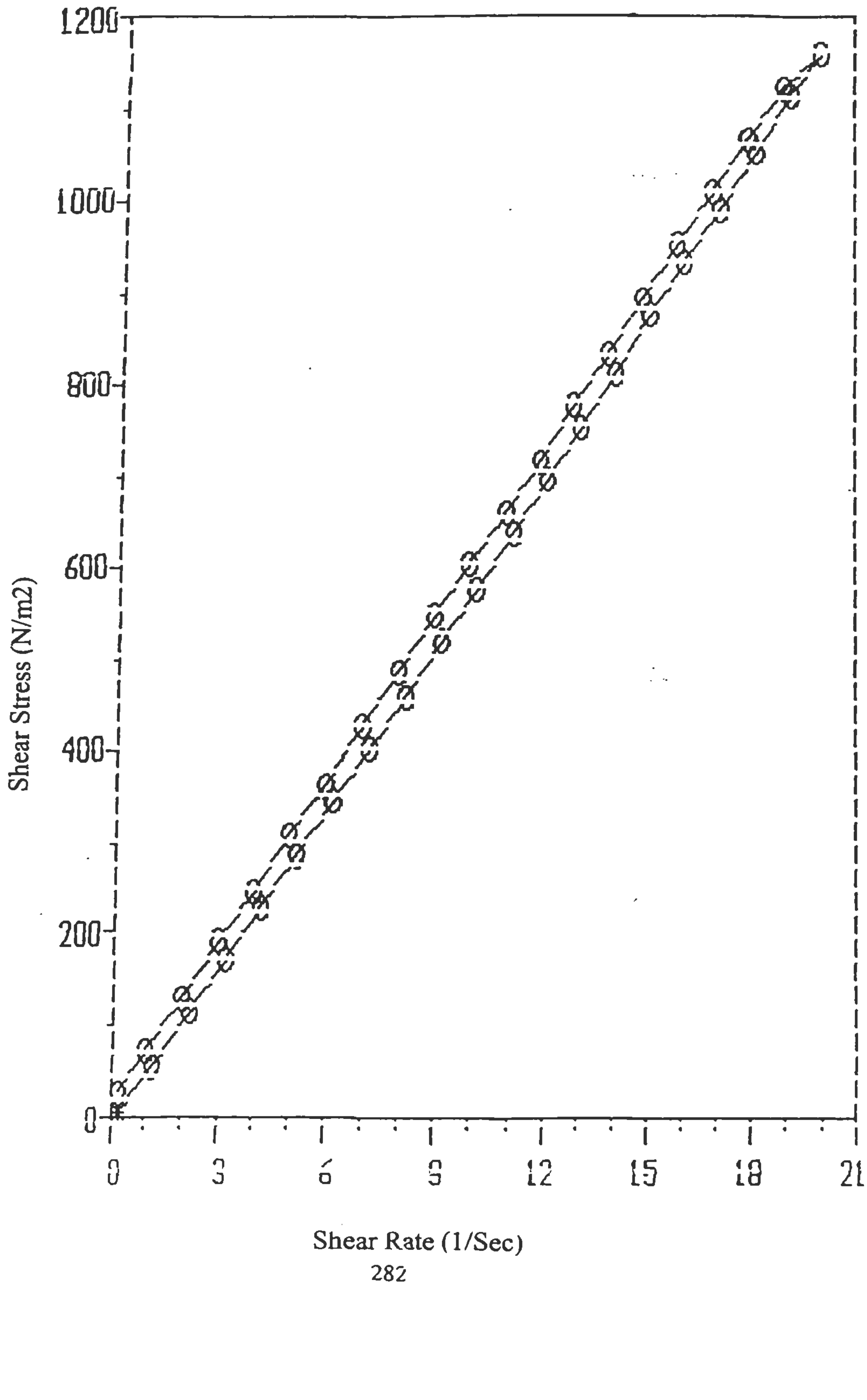


TABLE 81. VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 04:15
Sample: 406025W File: 406025W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.6	47184	9.44	0.20	25.0	00:02
002	0.6	4.2	55048	66.1	1.20	25.0	00:02
003	1.1	8.9	63627	140.0	2.20	25.1	00:02
004	1.6	13.7	67336	215.5	3.20	25.0	00:02
005	2.1	18.5	69278	291.0	4.20	25.0	00:02
006	2.6	23.3	70474	366.5	5.20	25.0	00:02
007	3.1	28.2	71537	443.5	6.20	25.0	00:02
008	3.6	33.0	72087	519.0	7.20	25.0	00:02
009	4.1	37.5	71927	589.8	8.20	25.0	00:02
010	4.6	42.5	72657	668.4	9.20	25.0	00:02
011	5.1	47.5	73243	747.1	10.2	25.0	00:02
012	5.6	51.9	72882	816.3	11.2	25.0	00:02
013	6.1	56.6	72968	890.2	12.2	25.0	00:02
014	6.6	61.6	73397	968.8	13.2	25.0	00:02
015	7.1	66.8	73988	1051	14.2	25.0	00:02
016	7.6	71.1	73570	1118	15.2	25.0	00:02
017	8.1	75.6	73397	1189	16.2	25.0	00:02
018	8.6	80.6	73702	1268	17.2	25.0	00:02
019	9.1	85.3	73714	1342	18.2	25.0	00:02
020	9.6	90.1	73807	1417	19.2	25.0	00:02
021	10.0	94.1	74000	1480	20.0	25.0	00:02
022	9.5	92.5	76571	1455	19.0	25.0	00:02
023	9.0	87.7	76630	1379	18.0	25.0	00:02
024	8.5	82.7	76512	1301	17.0	25.0	00:02
025	8.0	78.1	76772	1228	16.0	25.0	00:02
026	7.5	73.6	77172	1158	15.0	25.0	00:02
027	7.0	68.7	77180	1081	14.0	25.0	00:02
028	6.5	63.9	77309	1005	13.0	25.0	00:02
029	6.0	59.0	77329	928.0	12.0	25.0	00:02
030	5.5	54.7	78211	860.3	11.0	25.0	00:02
031	5.0	49.9	78483	784.8	10.0	25.0	00:02
032	4.5	44.9	78465	706.2	9.00	25.0	00:02
033	4.0	40.2	79033	632.3	8.00	25.0	00:02
034	3.5	35.3	79314	555.2	7.00	25.0	00:02
035	3.0	30.7	80475	482.8	6.00	25.0	00:02
036	2.5	25.8	81156	405.8	5.00	25.0	00:02
037	2.0	21.2	83358	333.4	4.00	25.0	00:02
038	1.5	16.2	84931	254.8	3.00	25.0	00:02
039	1.0	11.5	90436	180.9	2.00	25.0	00:02
040	0.5	6.7	105378	105.4	1.00	25.0	00:02
041	0.1	2.4	188736	37.7	0.20	25.0	00:02

FIGURE 93. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

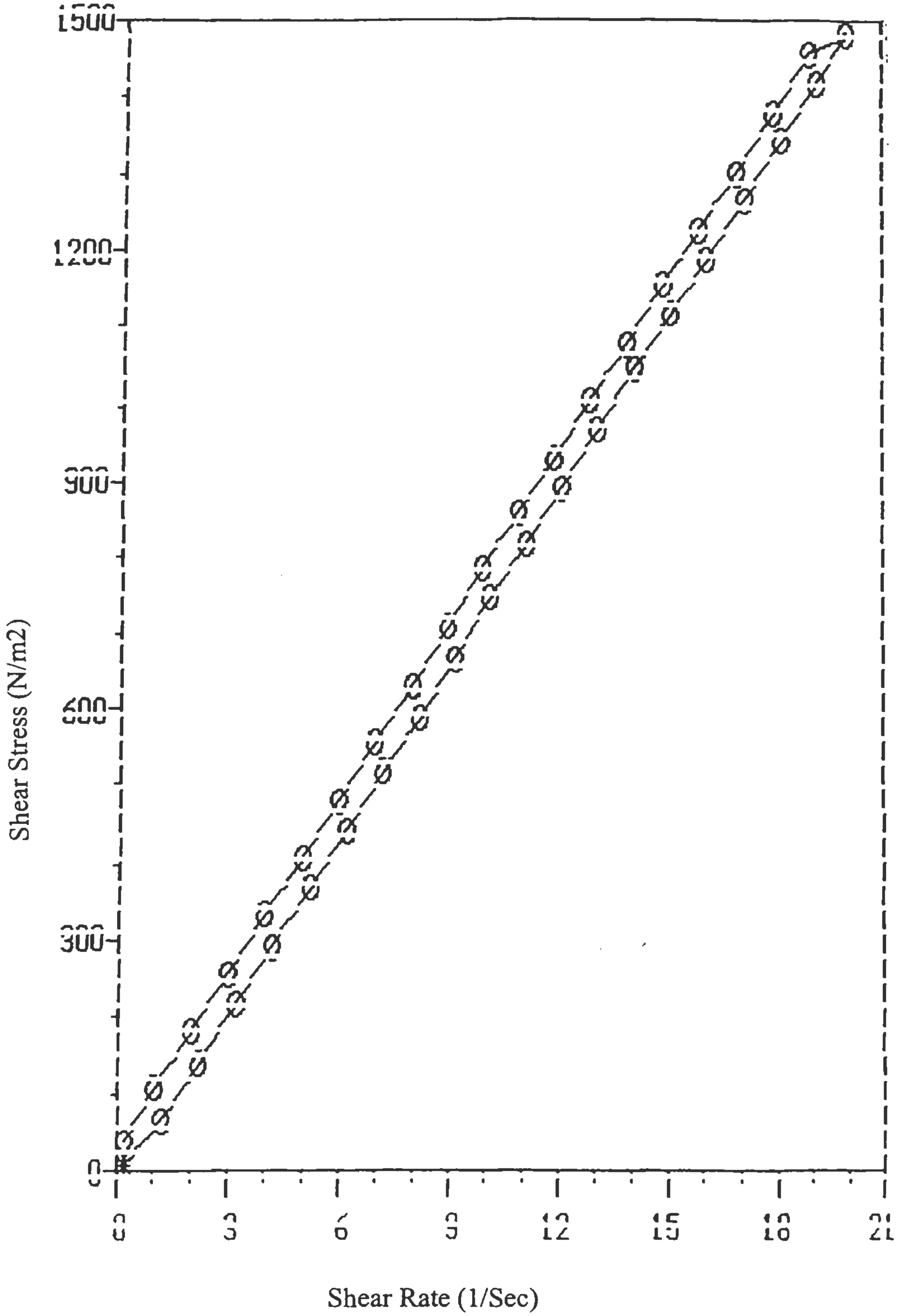


TABLE 82a. VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 04:08
Sample: 40605W File: 40605W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.5	39320	7.86	0.20	25.0	00:02
002	0.6	3.7	48495	58.2	1.20	25.0	00:02
003	1.1	6.8	48614	107.0	2.20	25.0	00:02
004	1.6	10.5	51608	165.1	3.20	25.0	00:02
005	2.1	14.7	55048	231.2	4.20	25.0	00:02
006	2.6	18.4	55653	289.4	5.20	25.0	00:02
007	3.1	22.1	56063	347.6	6.20	25.0	00:02
008	3.6	25.6	55922	402.6	7.20	25.0	00:02
009	4.1	29.4	56391	462.4	8.20	25.0	00:02
010	4.6	33.2	56758	522.2	9.20	25.0	00:02
011	5.1	36.8	56744	578.8	10.2	25.0	00:02
012	5.6	40.9	57435	643.3	11.2	25.0	00:02
013	6.1	44.7	57626	703.0	12.2	25.0	00:02
014	6.6	48.7	58027	766.0	13.2	25.0	00:02
015	7.1	52.6	58260	827.3	14.2	25.0	00:02
016	7.6	56.0	57945	880.8	15.2	25.0	00:02
017	8.1	59.9	58155	942.1	16.2	25.0	00:02
018	8.6	63.7	58248	1002	17.2	25.0	00:02
019	9.1	67.5	58332	1062	18.2	25.0	00:02
020	9.6	70.9	58079	1115	19.2	25.1	00:02
021	10.0	74.4	58508	1170	20.0	25.0	00:02
022	9.5	72.0	59601	1132	19.0	25.0	00:02
023	9.0	68.2	59592	1073	18.0	25.0	00:02
024	8.5	64.9	60044	1021	17.0	25.0	00:02
025	8.0	61.0	59963	959.4	16.0	25.0	00:02
026	7.5	57.3	60081	901.2	15.0	25.0	00:02
027	7.0	53.6	60216	843.0	14.0	25.0	00:02
028	6.5	50.2	60734	789.5	13.0	25.0	00:02
029	6.0	46.3	60684	728.2	12.0	25.0	00:02
030	5.5	42.7	61053	671.6	11.0	25.0	00:02
031	5.0	38.9	61182	611.8	10.0	25.0	00:02
032	4.5	35.1	61339	552.1	9.00	25.0	00:02
033	4.0	31.2	61339	490.7	8.00	25.1	00:02
034	3.5	27.7	62238	435.7	7.00	25.0	00:02
035	3.0	23.7	62126	372.8	6.00	25.0	00:02
036	2.5	20.1	63227	316.1	5.00	25.0	00:02
037	2.0	16.0	62912	251.6	4.00	25.0	00:02
038	1.5	12.5	65533	196.6	3.00	25.0	00:02
039	1.0	8.5	66844	133.7	2.00	25.0	00:02
040	0.5	5.1	80213	80.2	1.00	25.0	00:02
041	0.1	1.6	125824	25.2	0.20	25.0	00:02

FIGURE 94. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

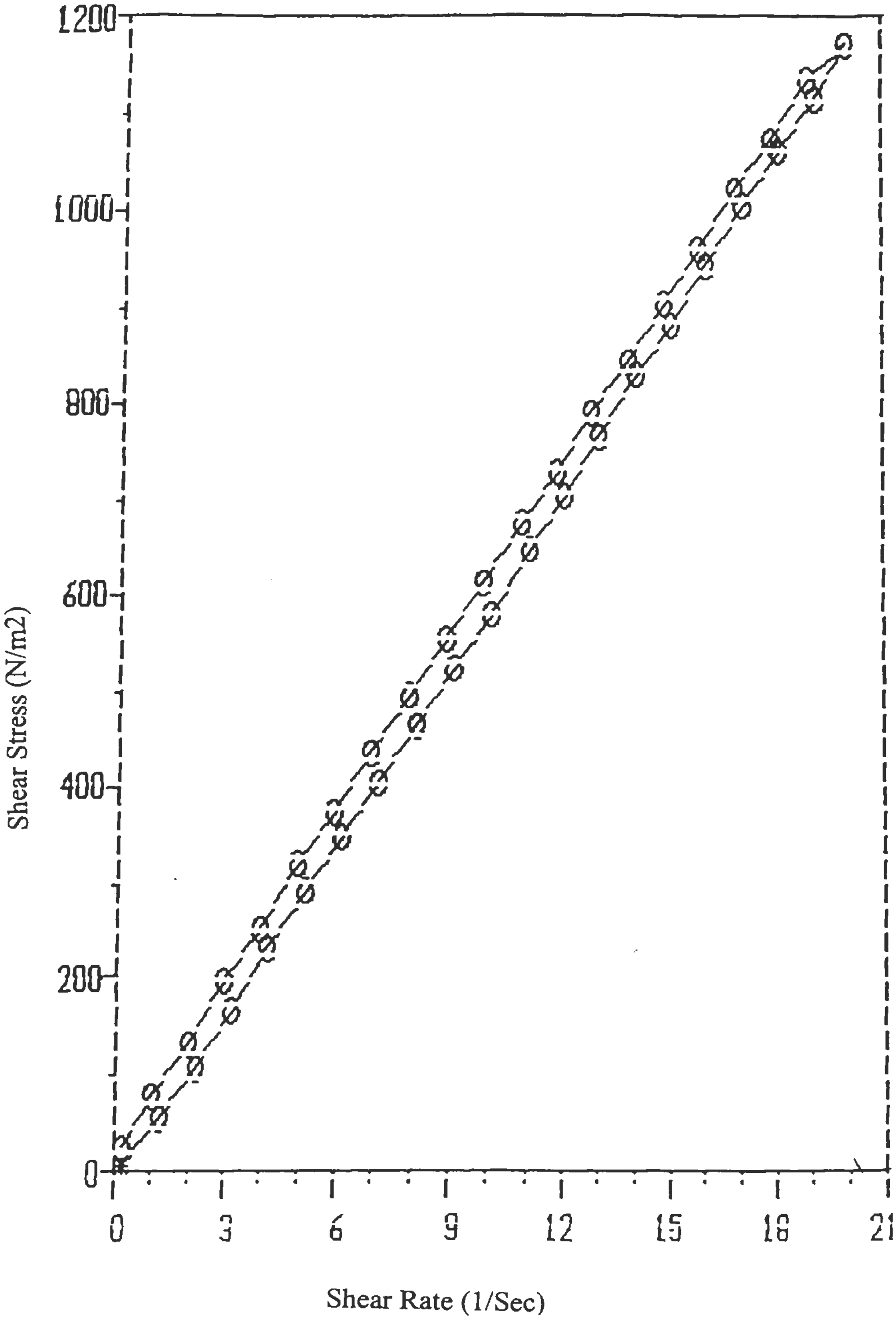


TABLE 83: VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 04:01
Sample: 40606W File: 40606W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.5	39320	7.86	0.20	25.0	00:02
002	0.6	3.4	44563	53.5	1.20	25.0	00:02
003	1.1	6.3	45039	99.1	2.20	25.0	00:02
004	1.6	9.9	48658	155.7	3.20	25.0	00:02
005	2.1	13.8	51678	217.0	4.20	25.0	00:02
006	2.6	17.2	52023	270.5	5.20	25.0	00:02
007	3.1	20.6	52258	324.0	6.20	25.0	00:02
008	3.6	24.0	52427	377.5	7.20	25.0	00:02
009	4.1	27.4	52555	430.9	8.20	25.0	00:02
010	4.6	30.7	52484	482.8	9.20	25.0	00:02
011	5.1	34.3	52889	539.5	10.2	25.0	00:02
012	5.6	37.7	52942	592.9	11.2	25.0	00:02
013	6.1	41.4	53372	651.1	12.2	25.0	00:02
014	6.6	44.7	53261	703.0	13.2	25.0	00:02
015	7.1	48.2	53387	758.1	14.2	25.0	00:02
016	7.6	51.6	53392	811.6	15.2	25.0	00:02
017	8.1	55.1	53495	866.6	16.2	25.0	00:02
018	8.6	58.5	53493	920.1	17.2	25.0	00:02
019	9.1	61.9	53492	973.6	18.2	25.1	00:02
020	9.6	65.3	53492	1027	19.2	25.0	00:02
021	10.0	68.1	53554	1071	20.0	25.0	00:02
022	9.5	65.7	54386	1033	19.0	25.0	00:02
023	9.0	62.6	54698	984.6	18.0	25.0	00:02
024	8.5	59.4	54955	934.2	17.0	25.0	00:02
025	8.0	56.0	55048	880.8	16.0	25.0	00:02
026	7.5	52.6	55153	827.3	15.0	25.0	00:02
027	7.0	49.5	55610	778.5	14.0	25.0	00:02
028	6.5	45.9	55532	721.9	13.0	25.0	00:02
029	6.0	42.5	55703	668.4	12.0	25.0	00:02
030	5.5	39.0	55763	613.4	11.0	25.0	00:02
031	5.0	35.7	56149	561.5	10.0	25.0	00:02
032	4.5	32.2	56271	506.4	9.00	25.0	00:02
033	4.0	28.9	56817	454.5	8.00	25.0	00:02
034	3.5	25.3	56845	397.9	7.00	25.0	00:02
035	3.0	21.9	57407	344.4	6.00	25.0	00:02
036	2.5	18.2	57250	286.2	5.00	25.0	00:02
037	2.0	14.8	58194	232.8	4.00	25.0	00:02
038	1.5	11.2	58718	176.2	3.00	25.0	00:02
039	1.0	7.9	62126	124.3	2.00	25.0	00:02
040	0.5	4.2	66058	66.1	1.00	25.0	00:02
041	0.1	1.4	110096	22.0	0.20	25.0	00:02

FIGURE 95L RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

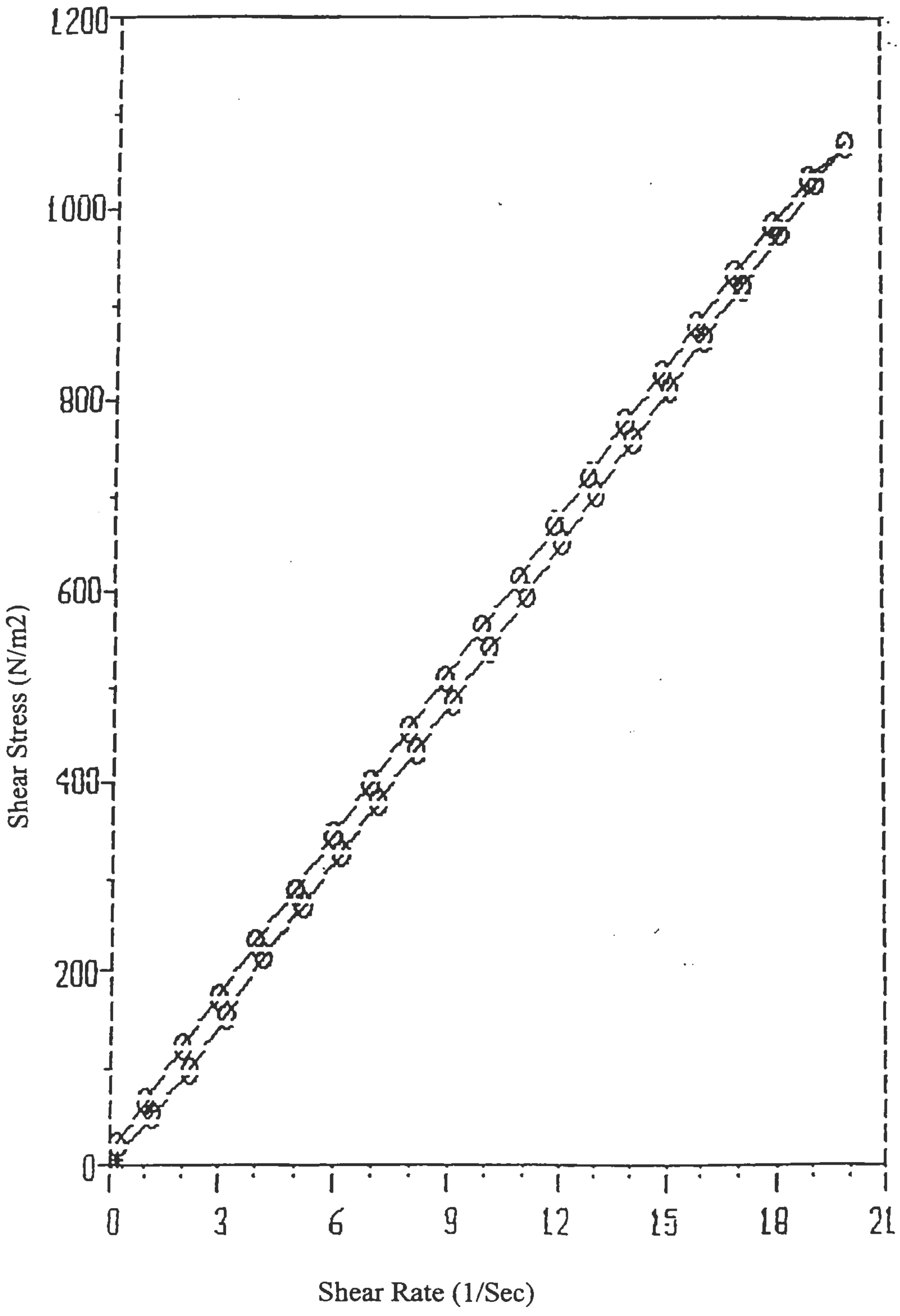


TABLE 84: VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/28/02 Time: 22:12
Sample: 40607 File: 40607.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m^2	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.6	47184	9.44	0.20	24.8	00:02
002	0.6	3.5	45873	55.0	1.20	24.9	00:02
003	1.1	7.0	50044	110.1	2.20	24.8	00:02
004	1.6	10.4	51116	163.6	3.20	24.8	00:02
005	2.1	14.1	52801	221.8	4.20	24.9	00:02
006	2.6	17.6	53233	276.8	5.20	24.8	00:02
007	3.1	21.0	53272	330.3	6.20	24.9	00:02
008	3.6	24.5	53519	385.3	7.20	24.8	00:02
009	4.1	28.1	53897	442.0	8.20	24.8	00:02
010	4.6	31.5	53851	495.4	9.20	24.9	00:02
011	5.1	34.9	53814	548.9	10.2	24.9	00:02
012	5.6	38.0	53363	597.7	11.2	24.8	00:02
013	6.1	41.4	53372	651.1	12.2	24.9	00:02
014	6.6	45.2	53856	710.9	13.2	24.8	00:02
015	7.1	48.4	53608	761.2	14.2	24.8	00:02
016	7.6	51.9	53703	816.3	15.2	24.9	00:02
017	8.1	54.9	53300	863.5	16.2	24.8	00:02
018	8.6	58.4	53402	918.5	17.2	24.8	00:02
019	9.1	62.0	53579	975.1	18.2	24.8	00:02
020	9.6	64.8	53082	1019	19.2	24.8	00:02
021	10.0	67.8	53318	1066	20.0	24.8	00:02
022	9.5	65.7	54386	1033	19.0	24.8	00:02
023	9.0	62.3	54436	979.9	18.0	24.8	00:02
024	8.5	58.8	54400	924.8	17.0	24.9	00:02
025	8.0	55.6	54655	874.5	16.0	24.8	00:02
026	7.5	52.1	54629	819.4	15.0	24.8	00:02
027	7.0	48.6	54599	764.4	14.0	24.8	00:02
028	6.5	45.3	54806	712.5	13.0	24.9	00:02
029	6.0	42.3	55441	665.3	12.0	24.9	00:02
030	5.5	38.9	55620	611.8	11.0	24.9	00:02
031	5.0	35.2	55363	553.6	10.0	24.8	00:02
032	4.5	32.0	55922	503.3	9.00	24.9	00:02
033	4.0	28.3	55638	445.1	8.00	24.8	00:02
034	3.5	25.2	56621	396.3	7.00	24.8	00:02
035	3.0	21.7	56883	341.3	6.00	24.8	00:02
036	2.5	18.0	56621	283.1	5.00	24.9	00:02
037	2.0	14.9	58587	234.3	4.00	24.9	00:02
038	1.5	11.1	58194	174.6	3.00	24.8	00:02
039	1.0	7.9	62126	124.3	2.00	24.8	00:02
040	0.5	4.3	67630	67.6	1.00	24.8	00:02
041	0.1	1.4	110096	22.0	0.20	24.8	00:02

FIGURE 96. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

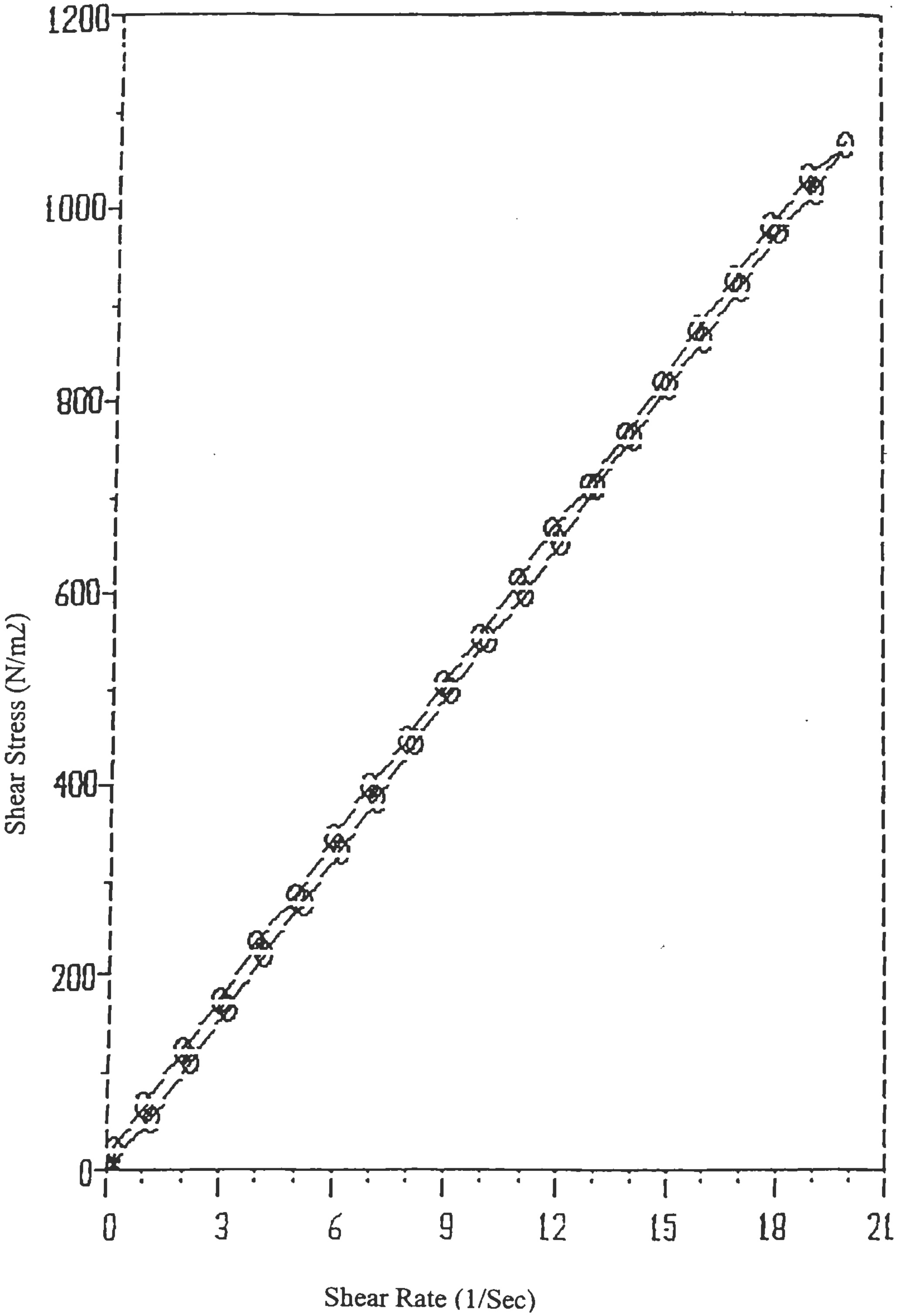


TABLE 85. VISCOSITY VALUES FOR LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 03:54
Sample: 40608W File: 40608W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.4	31456	6.29	0.20	25.0	00:02
002	0.6	2.9	38009	45.6	1.20	25.0	00:02
003	1.1	5.8	41465	91.2	2.20	25.0	00:02
004	1.6	8.5	41778	133.7	3.20	25.0	00:02
005	2.1	11.3	42316	177.7	4.20	25.0	00:02
006	2.6	14.1	42647	221.8	5.20	25.0	00:02
007	3.1	16.9	42871	265.8	6.20	25.0	00:02
008	3.6	19.6	42815	308.3	7.20	25.0	00:02
009	4.1	22.3	42772	350.7	8.20	25.0	00:02
010	4.6	25.0	42739	393.2	9.20	25.0	00:02
011	5.1	27.9	43021	438.8	10.2	25.0	00:02
012	5.6	30.5	42831	479.7	11.2	25.0	00:02
013	6.1	33.3	42930	523.7	12.2	25.0	00:02
014	6.6	36.2	43133	569.4	13.2	25.0	00:02
015	7.1	39.3	43529	618.1	14.2	25.0	00:02
016	7.6	42.6	44080	670.0	15.2	25.0	00:02
017	8.1	45.7	44368	718.8	16.2	25.0	00:02
018	8.6	48.4	44258	761.2	17.2	25.0	00:02
019	9.1	51.6	44591	811.6	18.2	25.0	00:02
020	9.6	54.5	44645	857.2	19.2	25.0	00:02
021	10.0	57.0	44825	896.5	20.0	25.0	00:02
022	9.5	55.0	45528	865.0	19.0	25.0	00:02
023	9.0	52.5	45873	825.7	18.0	25.0	00:02
024	8.5	49.6	45889	780.1	17.0	25.0	00:02
025	8.0	47.1	46299	740.8	16.0	25.0	00:02
026	7.5	44.3	46450	696.8	15.0	25.0	00:02
027	7.0	41.6	46735	654.3	14.0	25.0	00:02
028	6.5	38.7	46821	608.7	13.0	25.0	00:02
029	6.0	35.9	47053	564.6	12.0	25.0	00:02
030	5.5	33.0	47184	519.0	11.0	25.0	00:02
031	5.0	30.3	47656	476.6	10.0	25.0	00:02
032	4.5	27.4	47883	430.9	9.00	25.0	00:02
033	4.0	24.4	47970	383.8	8.00	25.0	00:02
034	3.5	21.4	48083	336.6	7.00	25.0	00:02
035	3.0	18.3	47970	287.8	6.00	25.0	00:02
036	2.5	15.5	48757	243.8	5.00	25.0	00:02
037	2.0	12.5	49150	196.6	4.00	25.0	00:02
038	1.5	9.7	50854	152.6	3.00	25.0	00:02
039	1.0	6.7	52689	105.4	2.00	25.0	00:02
040	0.5	3.5	55048	55.0	1.00	25.0	00:02
041	0.1	1.0	78640	15.7	0.20	25.0	00:02

FIGURE 97. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (40:60) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

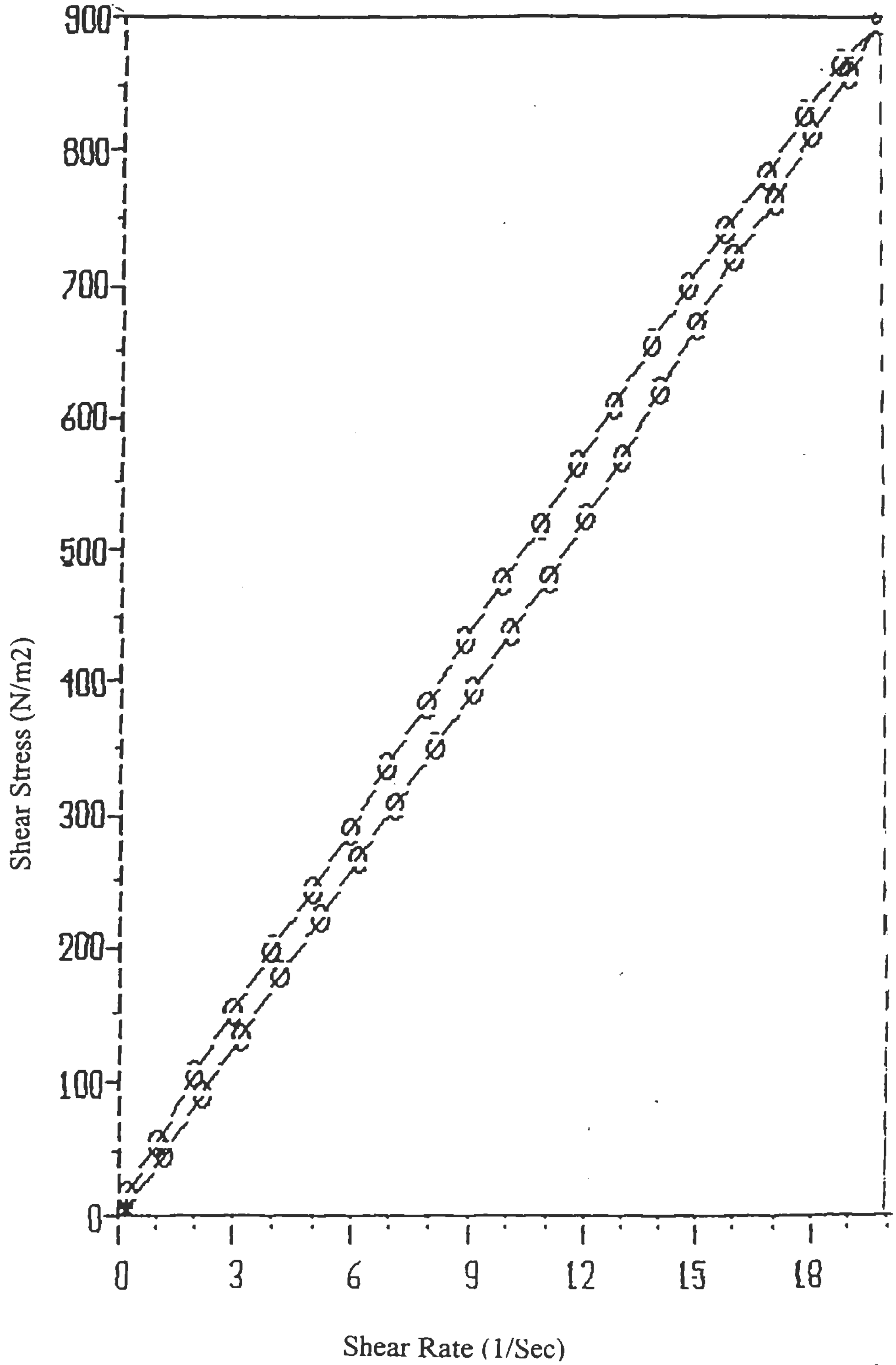


TABLE 86. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40   BROOKFIELD ENGINEERING LABS

Model: HB   Spindle: CP52   Date: 01/29/02   Time: 03:47
Sample: 50501W   File: 50501W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.5	39320	7.86	0.20	25.0	00:02
002	0.6	4.4	57669	69.2	1.20	25.0	00:02
003	1.1	9.3	66487	146.3	2.20	25.0	00:02
004	1.6	14.3	70285	224.9	3.20	25.0	00:02
005	2.1	19.9	74521	313.0	4.20	25.0	00:02
006	2.6	25.3	76523	397.9	5.20	25.0	00:02
007	3.1	30.6	77625	481.3	6.20	25.0	00:02
008	3.6	35.9	78422	564.6	7.20	25.0	00:02
009	4.1	40.8	78256	641.7	8.20	25.0	00:02
010	4.6	46.5	79495	731.4	9.20	25.0	00:02
011	5.1	52.2	80490	821.0	10.2	25.0	00:02
012	5.6	57.6	80887	905.9	11.2	25.0	00:02
013	6.1	63.2	81476	994.0	12.2	25.0	00:02
014	6.6	69.1	82334	1087	13.2	25.0	00:02
015	7.1	74.9	82960	1178	14.2	25.0	00:02
016	7.6	80.2	82986	1261	15.2	25.0	00:02
017	8.0	85.3	83850	1342	16.0	25.0	00:02
018	7.5	83.4	87448	1312	15.0	25.0	00:02
019	7.0	78.5	88189	1235	14.0	25.0	00:02
020	6.5	73.8	89287	1161	13.0	25.0	00:02
021	6.0	68.6	89912	1079	12.0	25.0	00:02
022	5.5	63.3	90507	995.6	11.0	25.0	00:02
023	5.0	58.0	91222	912.2	10.0	25.0	00:02
024	4.5	52.3	91397	822.6	9.00	25.0	00:02
025	4.0	47.0	92402	739.2	8.00	25.0	00:02
026	3.5	41.4	93020	651.1	7.00	25.0	00:02
027	3.0	36.2	94892	569.4	6.00	25.0	00:02
028	2.5	30.3	95312	476.6	5.00	25.0	00:02
029	2.0	25.1	98693	394.8	4.00	25.0	00:02
030	1.5	19.4	101708	305.1	3.00	25.0	00:02
031	1.0	14.0	110096	220.2	2.00	25.0	00:02
032	0.5	8.6	135261	135.3	1.00	25.0	00:02
033	0.1	3.3	259512	51.9	0.20	25.0	00:02

FIGURE 98. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

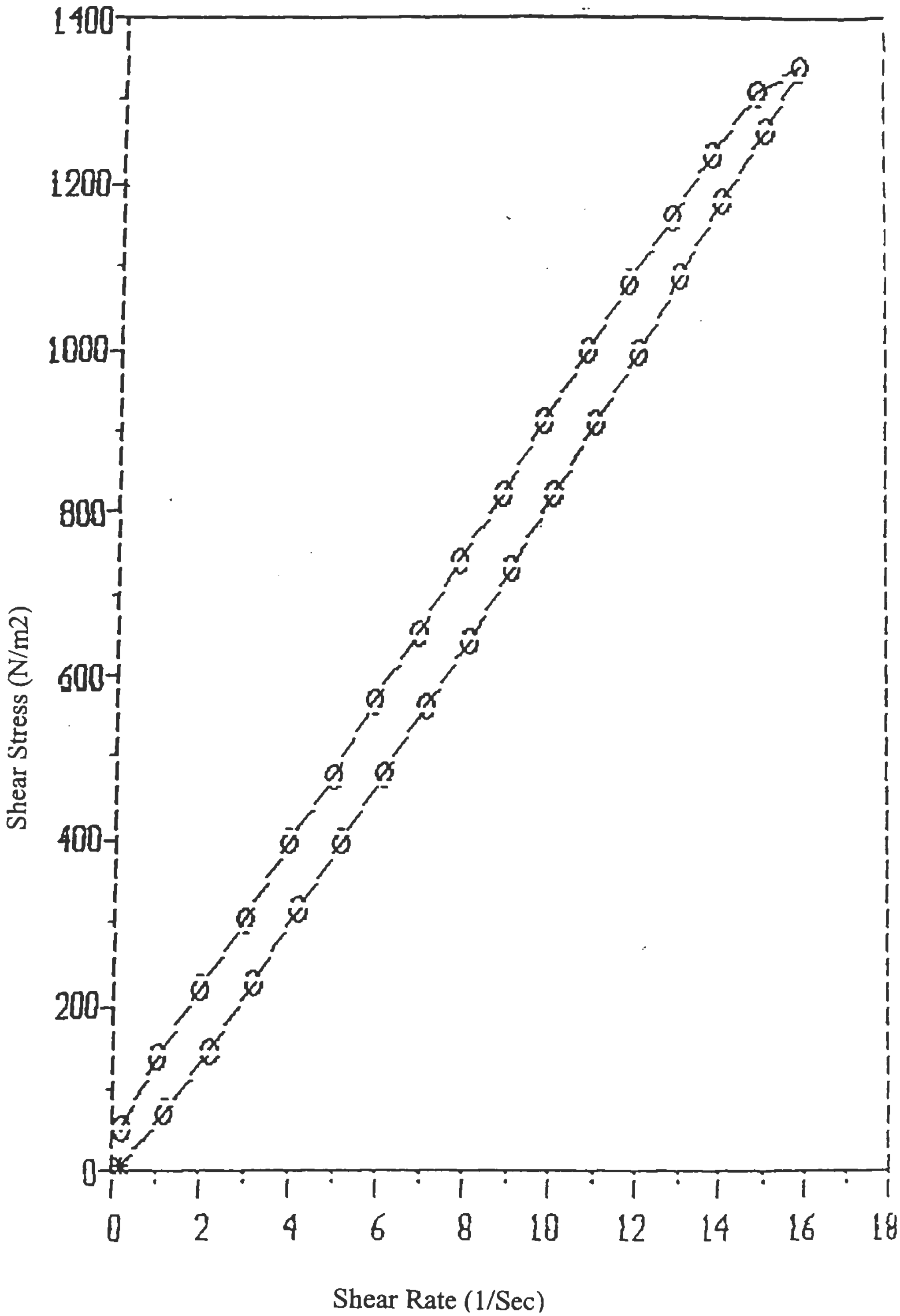


TABLE 87. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/28/02 Time: 22:49
Sample: 505025 File: 505025.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.6	47184	9.44	0.20	24.9	00:02
002	0.6	4.7	61601	73.9	1.20	24.8	00:02
003	1.1	10.6	75780	166.7	2.20	24.8	00:02
004	1.6	16.8	82572	264.2	3.20	24.9	00:02
005	2.1	23.0	86130	361.7	4.20	24.8	00:02
006	2.6	29.1	88016	457.7	5.20	24.8	00:02
007	3.1	35.1	89041	552.1	6.20	24.9	00:02
008	3.6	41.2	89999	648.0	7.20	24.9	00:02
009	4.1	47.3	90724	743.9	8.20	24.9	00:02
010	4.6	53.5	91462	841.4	9.20	24.8	00:02
011	5.1	59.7	92055	939.0	10.2	24.8	00:02
012	5.6	65.1	91419	1024	11.2	24.9	00:02
013	6.1	71.1	91661	1118	12.2	24.8	00:02
014	6.6	77.8	92700	1224	13.2	24.9	00:02
015	7.1	83.2	92153	1309	14.2	24.8	00:02
016	7.6	90.1	93230	1417	15.2	24.8	00:02
017	8.0	94.1	92500	1480	16.0	24.8	00:02
018	7.5	92.9	97409	1461	15.0	24.8	00:02
019	7.0	88.3	99199	1389	14.0	24.8	00:02
020	6.5	82.3	99570	1294	13.0	24.9	00:02
021	6.0	76.0	99611	1195	12.0	24.8	00:02
022	5.5	69.8	99801	1098	11.0	24.8	00:02
023	5.0	63.8	100345	1003	10.0	24.8	00:02
024	4.5	58.4	102057	918.5	9.00	24.8	00:02
025	4.0	52.4	103018	824.1	8.00	24.9	00:02
026	3.5	45.7	102681	718.8	7.00	24.8	00:02
027	3.0	40.3	105640	633.8	6.00	24.8	00:02
028	2.5	33.4	105063	525.3	5.00	24.9	00:02
029	2.0	28.0	110096	440.4	4.00	24.8	00:02
030	1.5	21.9	114814	344.4	3.00	24.8	00:02
031	1.0	15.0	117960	235.9	2.00	24.8	00:02
032	0.5	9.7	152562	152.6	1.00	24.8	00:02
033	0.1	4.0	314560	62.9	0.20	24.8	00:02

FIGURE 99. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

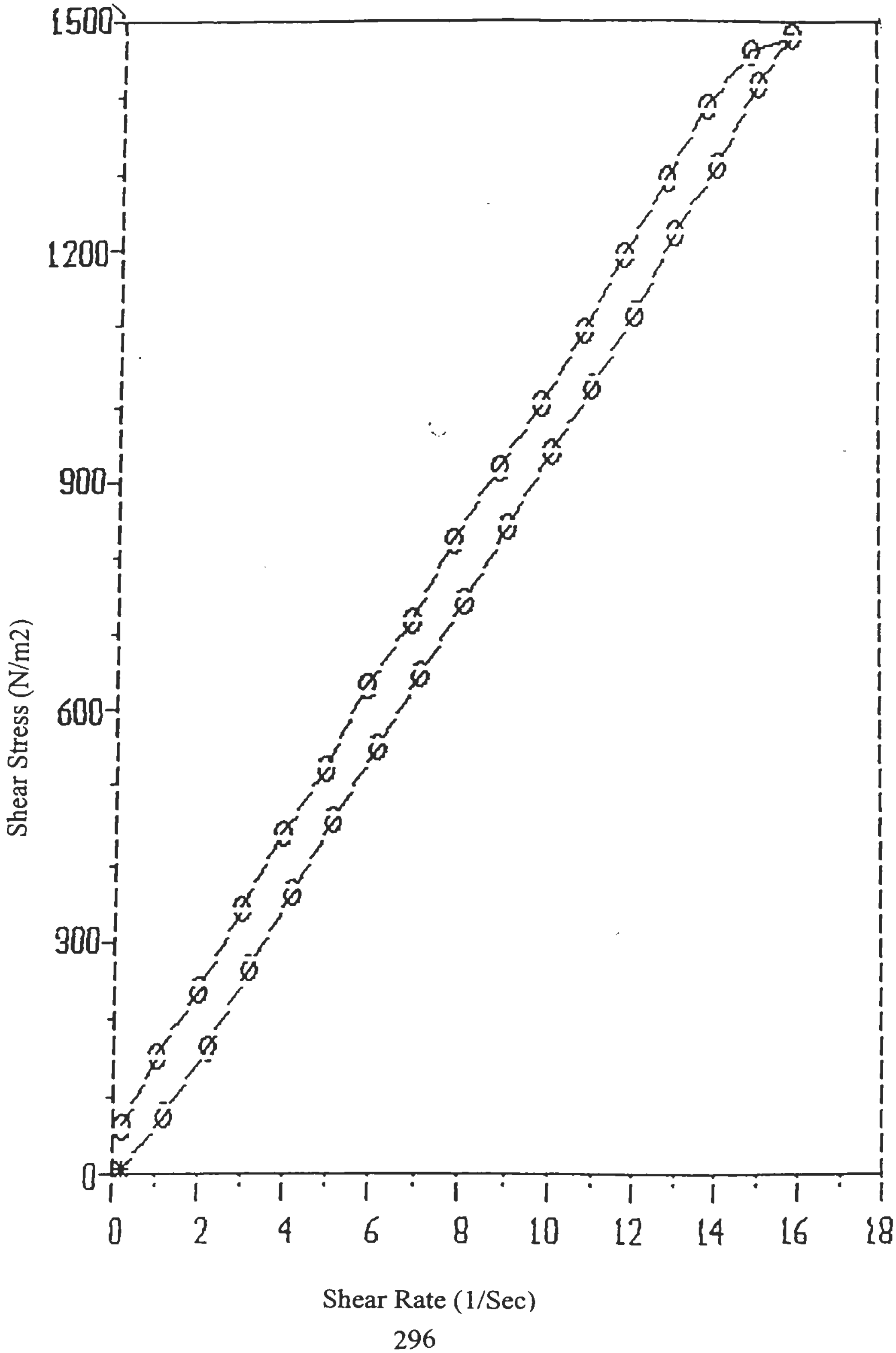


TABLE 88. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40   BROOKFIELD ENGINEERING LABS

Model: HB   Spindle: CP52   Date: 01/29/02   Time: 01:15
Sample: 50505   File: 50505.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.6	47184	9.44	0.20	25.1	00:02
002	0.6	4.4	57669	69.2	1.20	25.1	00:02
003	1.1	9.3	66487	146.3	2.20	25.1	00:02
004	1.6	14.0	68810	220.2	3.20	25.1	00:02
005	2.1	19.2	71899	302.0	4.20	25.0	00:02
006	2.6	24.4	73801	383.8	5.20	25.1	00:02
007	3.1	29.4	74581	462.4	6.20	25.1	00:02
008	3.6	34.2	74708	537.9	7.20	25.1	00:02
009	4.1	39.2	75188	616.5	8.20	25.1	00:02
010	4.6	44.4	75905	698.3	9.20	25.1	00:02
011	5.1	49.7	76635	781.7	10.2	25.1	00:02
012	5.6	55.8	78359	877.6	11.2	25.1	00:02
013	6.1	61.3	79027	964.1	12.2	25.1	00:02
014	6.6	67.5	80427	1062	13.2	25.1	00:02
015	7.1	73.0	80855	1148	14.2	25.1	00:02
016	7.6	78.7	81434	1238	15.2	25.1	00:02
017	8.0	83.0	81589	1305	16.0	25.0	00:02
018	7.5	80.8	84721	1271	15.0	25.1	00:02
019	7.0	76.9	86392	1209	14.0	25.1	00:02
020	6.5	71.5	86504	1125	13.0	25.1	00:02
021	6.0	66.7	87421	1049	12.0	25.1	00:02
022	5.5	61.5	87934	967.3	11.0	25.1	00:02
023	5.0	56.2	88391	883.9	10.0	25.0	00:02
024	4.5	51.3	89650	806.8	9.00	25.0	00:02
025	4.0	45.9	90239	721.9	8.00	25.1	00:02
026	3.5	40.6	91222	638.6	7.00	25.0	00:02
027	3.0	35.0	91747	550.5	6.00	25.1	00:02
028	2.5	29.7	93424	467.1	5.00	25.1	00:02
029	2.0	24.2	95154	380.6	4.00	25.1	00:02
030	1.5	18.8	98562	295.7	3.00	25.1	00:02
031	1.0	13.2	103805	207.6	2.00	25.0	00:02
032	0.5	8.0	125824	125.8	1.00	25.1	00:02
033	0.1	3.1	243784	48.8	0.20	25.1	00:02

FIGURE 100, RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

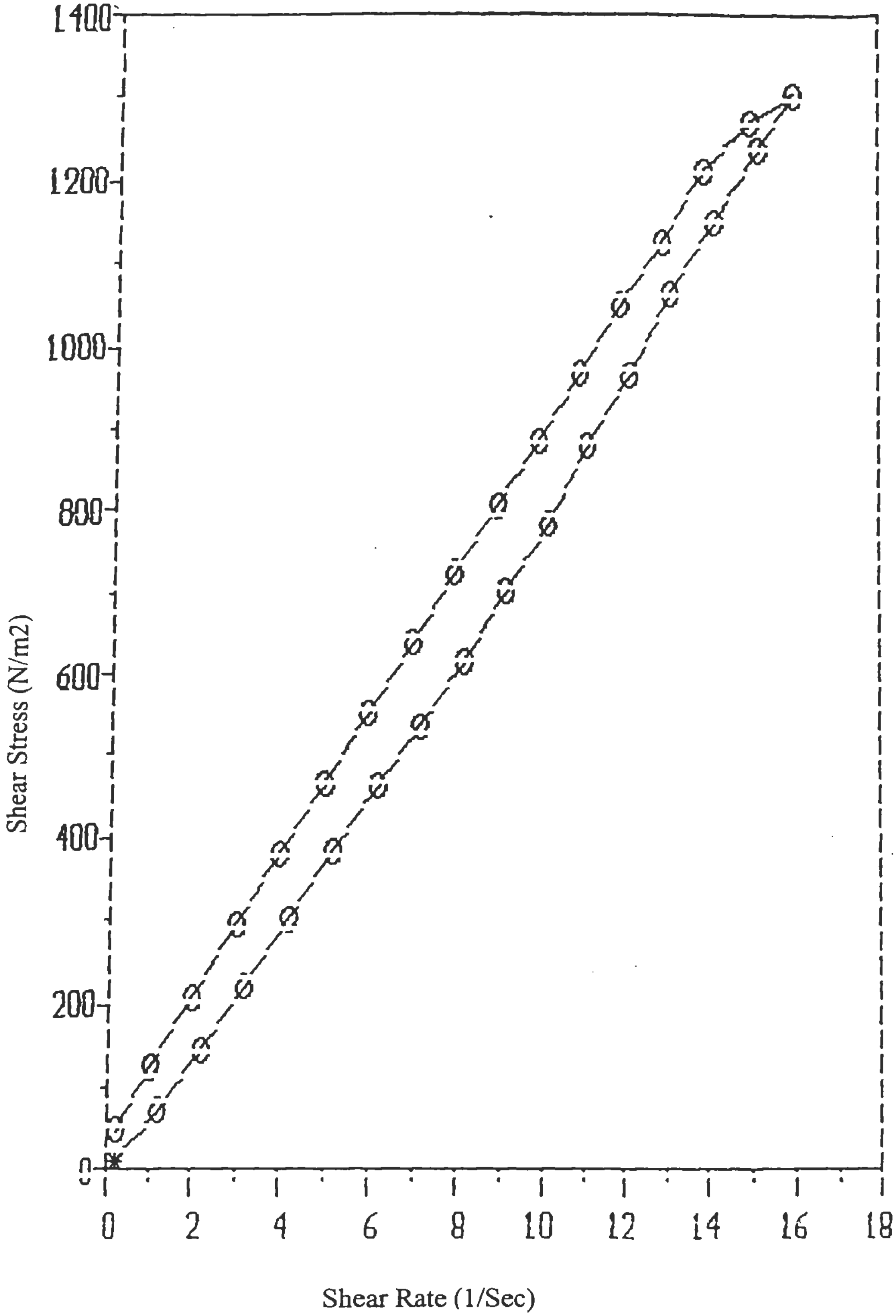


TABLE 89. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40   BROOKFIELD ENGINEERING LABS

Model: HB   Spindle: CP52   Date: 01/29/02   Time: 01:29
Sample: 50506W   File: 50506W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.4	31456	6.29	0.20	25.1	00:02
002	0.6	3.6	47184	56.6	1.20	25.0	00:02
003	1.1	9.4	67201	147.8	2.20	25.0	00:02
004	1.6	14.6	71759	229.6	3.20	25.0	00:02
005	2.1	20.0	74895	314.6	4.20	25.1	00:02
006	2.6	25.0	75615	393.2	5.20	25.0	00:02
007	3.1	30.0	76103	471.8	6.20	25.1	00:02
008	3.6	34.6	75582	544.2	7.20	25.1	00:02
009	4.1	40.4	77489	635.4	8.20	25.1	00:02
010	4.6	45.8	78298	720.3	9.20	25.1	00:02
011	5.1	51.6	79565	811.6	10.2	25.1	00:02
012	5.6	56.9	79904	894.9	11.2	25.0	00:02
013	6.1	63.1	81347	992.4	12.2	25.1	00:02
014	6.6	68.9	82095	1084	13.2	25.1	00:02
015	7.1	74.3	82295	1169	14.2	25.1	00:02
016	7.6	79.8	82572	1255	15.2	25.1	00:02
017	8.0	83.6	82179	1315	16.0	25.1	00:02
018	7.5	81.1	85036	1276	15.0	25.1	00:02
019	7.0	76.9	86392	1209	14.0	25.1	00:02
020	6.5	71.5	86504	1125	13.0	25.1	00:02
021	6.0	67.0	87815	1054	12.0	25.1	00:02
022	5.5	61.8	88363	972.0	11.0	25.1	00:02
023	5.0	57.0	89650	896.5	10.0	25.0	00:02
024	4.5	51.5	89999	810.0	9.00	25.0	00:02
025	4.0	46.5	91419	731.4	8.00	25.0	00:02
026	3.5	41.2	92571	648.0	7.00	25.0	00:02
027	3.0	35.7	93582	561.5	6.00	25.1	00:02
028	2.5	30.5	95941	479.7	5.00	25.0	00:02
029	2.0	24.8	97514	390.1	4.00	25.0	00:02
030	1.5	19.5	102232	306.7	3.00	25.1	00:02
031	1.0	13.7	107737	215.5	2.00	25.0	00:02
032	0.5	8.5	133688	133.7	1.00	25.0	00:02
033	0.1	3.3	259512	51.9	0.20	25.1	00:02

FIGURE101. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

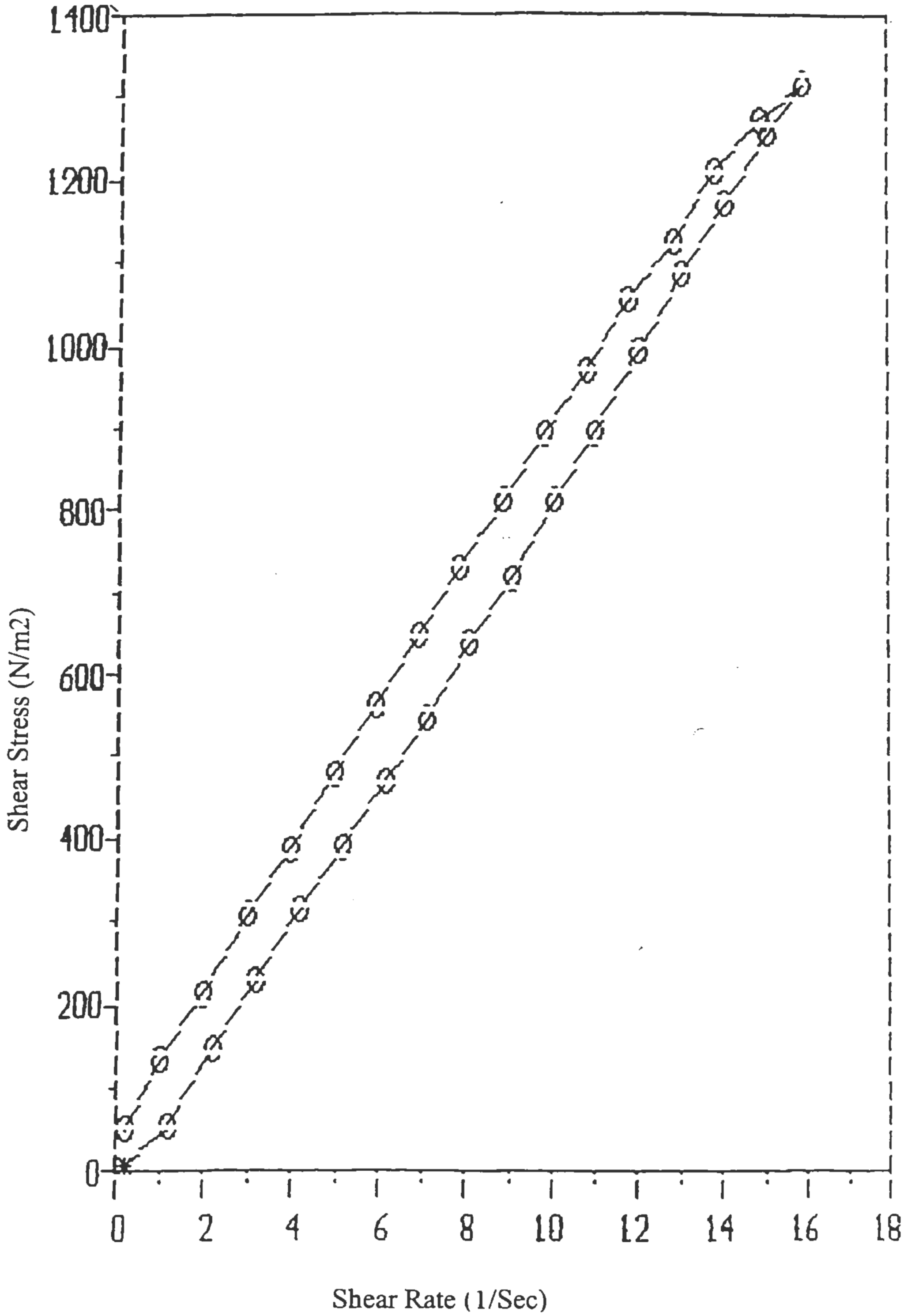


TABLE 90. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 01:38
Sample: 50507W File: 50507W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.4	31456	6.29	0.20	25.0	00:02
002	0.6	4.7	61601	73.9	1.20	25.0	00:02
003	1.1	10.2	72921	160.4	2.20	25.0	00:02
004	1.6	15.8	77657	248.5	3.20	25.0	00:02
005	2.1	22.0	82385	346.0	4.20	25.0	00:02
006	2.6	27.5	83177	432.5	5.20	25.0	00:02
007	3.1	33.6	85236	528.5	6.20	25.0	00:02
008	3.6	39.1	85412	615.0	7.20	25.0	00:02
009	4.1	44.9	86120	706.2	8.20	25.1	00:02
010	4.6	50.5	86333	794.3	9.20	25.0	00:02
011	5.1	56.4	86967	887.1	10.2	25.0	00:02
012	5.6	62.1	87206	976.7	11.2	25.0	00:02
013	6.1	68.1	87793	1071	12.2	25.1	00:02
014	6.6	73.6	87696	1158	13.2	25.1	00:02
015	7.1	79.4	87944	1249	14.2	25.0	00:02
016	7.6	85.1	88056	1338	15.2	25.0	00:02
017	8.0	90.2	88667	1419	16.0	25.0	00:02
018	7.5	88.0	92271	1384	15.0	25.0	00:02
019	7.0	82.8	93020	1302	14.0	25.0	00:02
020	6.5	77.8	94126	1224	13.0	25.0	00:02
021	6.0	71.9	94237	1131	12.0	25.1	00:02
022	5.5	66.6	95226	1047	11.0	25.0	00:02
023	5.0	60.6	95312	953.1	10.0	25.1	00:02
024	4.5	55.3	96640	869.8	9.00	25.1	00:02
025	4.0	49.7	97710	781.7	8.00	25.0	00:02
026	3.5	43.8	98412	688.9	7.00	25.0	00:02
027	3.0	38.2	100135	600.8	6.00	25.0	00:02
028	2.5	32.3	101603	508.0	5.00	25.0	00:02
029	2.0	26.6	104591	418.4	4.00	25.1	00:02
030	1.5	20.5	107475	322.4	3.00	25.1	00:02
031	1.0	14.7	115601	231.2	2.00	25.0	00:02
032	0.5	8.8	138406	138.4	1.00	25.0	00:02
033	0.1	3.6	283104	56.6	0.20	25.0	00:02

FIGURE 102. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

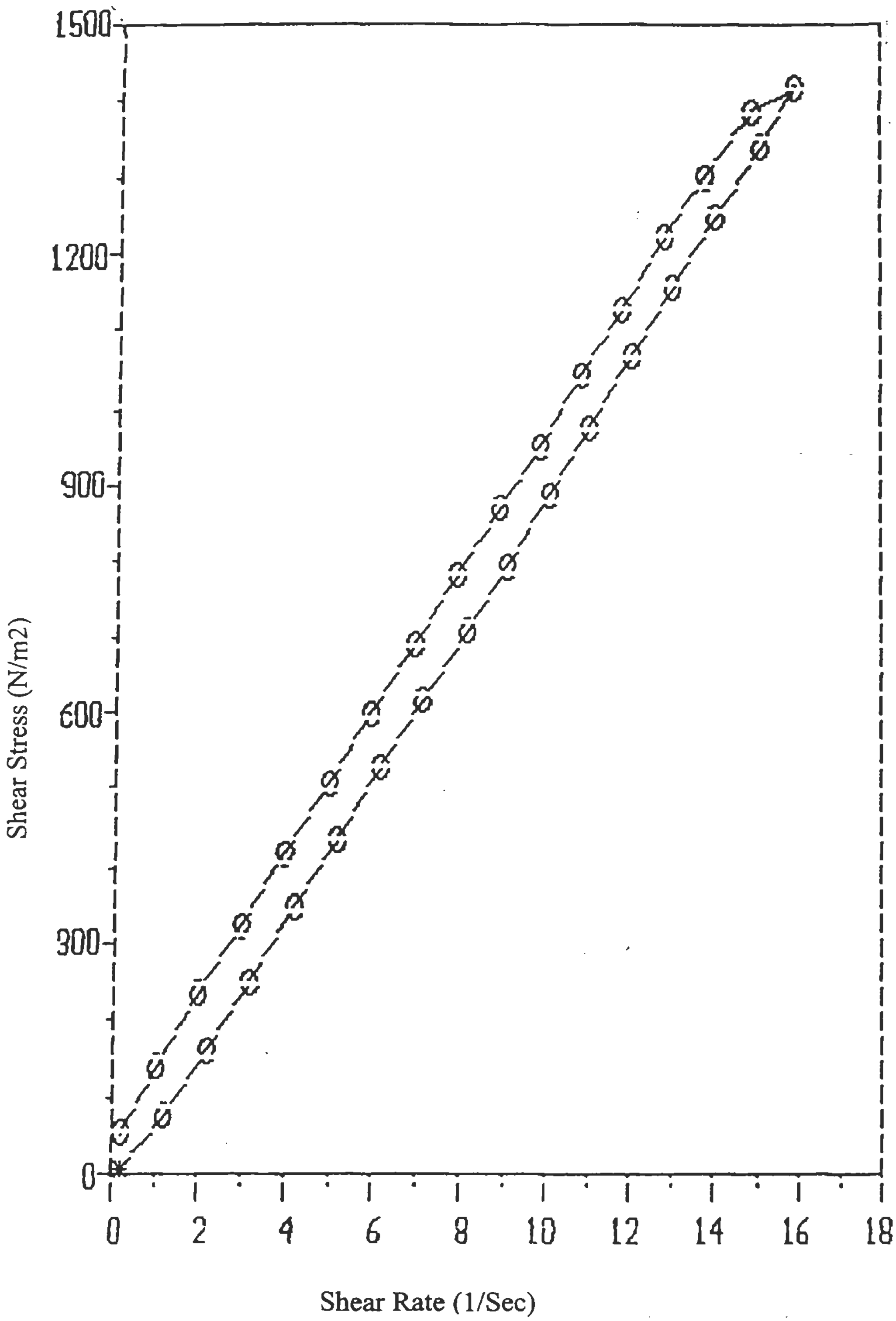


TABLE 91. VISCOSITY VALUES FOR LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 01:50
Sample: 50508W File: 50508W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m^2	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.7	55048	11.0	0.20	25.0	00:02
002	0.6	4.6	60291	72.3	1.20	25.0	00:02
003	1.1	8.8	62912	138.4	2.20	25.1	00:02
004	1.6	14.7	72251	231.2	3.20	25.0	00:02
005	2.1	20.6	77142	324.0	4.20	25.1	00:02
006	2.6	25.7	77733	404.2	5.20	25.0	00:02
007	3.1	30.9	78386	486.0	6.20	25.0	00:02
008	3.6	35.8	78203	563.1	7.20	25.1	00:02
009	4.1	41.1	78832	646.4	8.20	25.0	00:02
010	4.6	46.3	79153	728.2	9.20	25.0	00:02
011	5.1	52.1	80336	819.4	10.2	25.0	00:02
012	5.6	57.7	81027	907.5	11.2	25.0	00:02
013	6.1	64.2	82765	1010	12.2	25.0	00:02
014	6.6	69.9	83287	1099	13.2	25.0	00:02
015	7.1	75.3	83403	1184	14.2	25.0	00:02
016	7.6	79.1	81848	1244	15.2	25.0	00:02
017	8.0	82.8	81392	1302	16.0	25.0	00:02
018	7.5	79.8	83673	1255	15.0	25.1	00:02
019	7.0	74.7	83920	1175	14.0	25.0	00:02
020	6.5	69.4	83963	1092	13.0	25.1	00:02
021	6.0	64.0	83883	1007	12.0	25.1	00:02
022	5.5	59.7	85360	939.0	11.0	25.0	00:02
023	5.0	54.9	86347	863.5	10.0	25.1	00:02
024	4.5	50.8	88776	799.0	9.00	25.0	00:02
025	4.0	46.1	90633	725.1	8.00	25.0	00:02
026	3.5	40.8	91672	641.7	7.00	25.0	00:02
027	3.0	35.6	93319	559.9	6.00	25.1	00:02
028	2.5	30.3	95312	476.6	5.00	25.1	00:02
029	2.0	25.2	99086	396.3	4.00	25.1	00:02
030	1.5	19.6	102756	308.3	3.00	25.1	00:02
031	1.0	14.2	111669	223.3	2.00	25.1	00:02
032	0.5	8.5	133688	133.7	1.00	25.0	00:02
033	0.1	4.2	330288	66.1	0.20	25.0	00:02

FIGURE 103. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (50:50) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

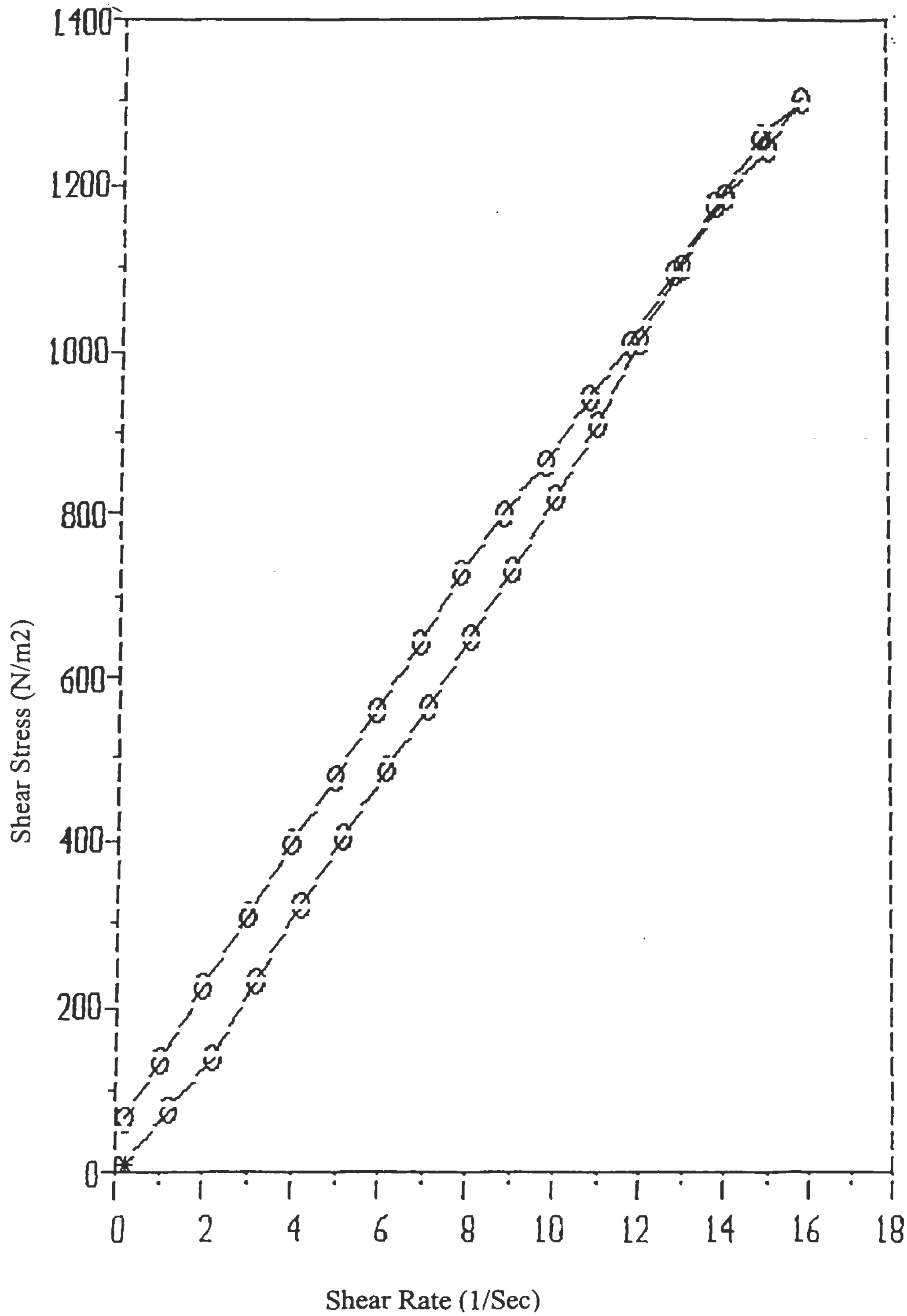


TABLE 92. VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 02:11
Sample: 60401W File: 60401W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	1.2	94368	18.9	0.20	25.0	00:02
002	0.3	4.2	110096	66.1	0.60	25.0	00:02
003	0.5	8.0	125824	125.8	1.00	25.0	00:02
004	0.7	14.6	164021	229.6	1.40	25.1	00:02
005	0.9	21.7	189610	341.3	1.80	25.1	00:02
006	1.1	29.2	208753	459.3	2.20	25.0	00:02
007	1.3	37.0	223822	581.9	2.60	25.1	00:02
008	1.5	44.2	231726	695.2	3.00	25.0	00:02
009	1.7	52.2	241471	821.0	3.40	25.0	00:02
010	1.9	60.7	251234	954.7	3.80	25.0	00:02
011	2.1	68.2	255393	1073	4.20	25.1	00:02
012	2.3	75.8	259170	1192	4.60	25.0	00:02
013	2.5	84.4	265489	1327	5.00	25.0	00:02
014	2.3	87.8	300200	1381	4.60	25.1	00:02
015	2.1	87.8	328790	1381	4.20	25.0	00:02
016	1.9	85.0	351811	1337	3.80	25.0	00:02
017	1.7	80.2	370996	1261	3.40	25.1	00:02
018	1.5	74.6	391103	1173	3.00	25.1	00:02
019	1.3	67.6	408928	1063	2.60	25.0	00:02
020	1.1	60.9	435380	957.8	2.20	25.1	00:02
021	0.9	52.9	462228	832.0	1.80	25.0	00:02
022	0.7	45.4	510037	714.1	1.40	25.0	00:02
023	0.5	36.9	580363	580.4	1.00	25.0	00:02
024	0.3	29.4	770672	462.4	0.60	25.0	00:02
025	0.1	21.1	1659304	331.9	0.20	25.1	00:02

FIGURE 104. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.1% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

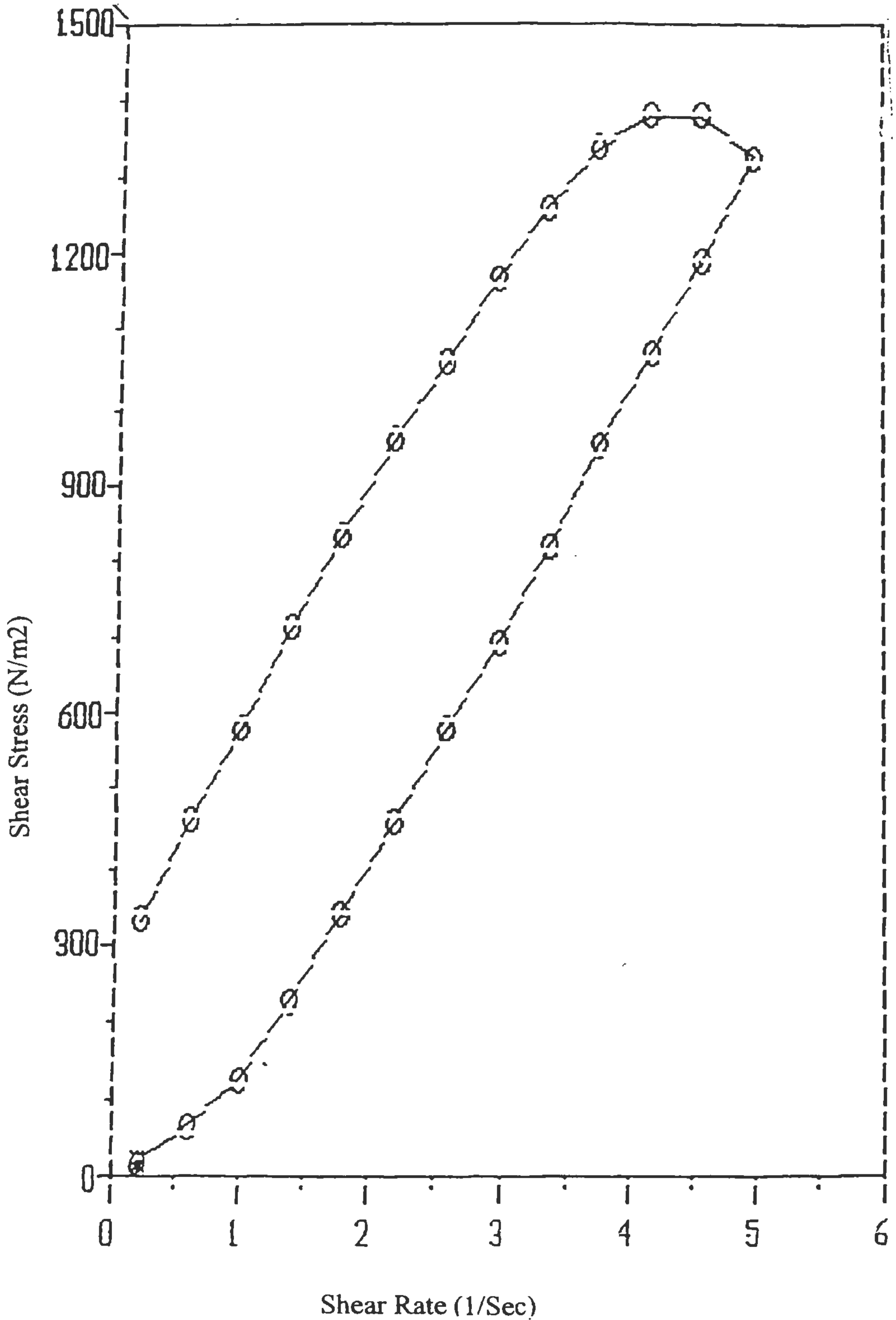


TABLE 93. VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 02:38
Sample: 604025W File: 604025W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	1.3	102232	20.4	0.20	25.0	00:02
002	0.3	3.6	94368	56.6	0.60	25.0	00:02
003	0.5	8.6	135261	135.3	1.00	25.0	00:02
004	0.7	15.7	176378	246.9	1.40	25.0	00:02
005	0.9	22.7	198348	357.0	1.80	25.0	00:02
006	1.1	30.4	217332	478.1	2.20	25.0	00:02
007	1.3	37.7	228056	592.9	2.60	25.0	00:02
008	1.5	45.8	240114	720.3	3.00	25.0	00:02
009	1.7	53.7	248410	844.6	3.40	25.0	00:02
010	1.9	60.8	251648	956.3	3.80	25.1	00:02
011	2.1	68.6	256891	1079	4.20	25.0	00:02
012	2.3	75.7	258828	1191	4.60	25.0	00:02
013	2.5	83.7	263287	1316	5.00	25.0	00:02
014	2.3	86.7	296439	1364	4.60	25.0	00:02
015	2.1	86.1	322424	1354	4.20	25.0	00:02
016	1.9	82.9	343119	1304	3.80	25.0	00:02
017	1.7	77.8	359894	1224	3.40	25.0	00:02
018	1.5	72.7	381142	1143	3.00	25.0	00:02
019	1.3	66.1	399854	1040	2.60	25.0	00:02
020	1.1	59.9	428231	942.1	2.20	25.0	00:02
021	0.9	52.4	457860	824.1	1.80	25.1	00:02
022	0.7	45.7	513407	718.8	1.40	25.0	00:02
023	0.5	37.9	596091	596.1	1.00	25.0	00:02
024	0.3	30.8	807371	484.4	0.60	25.0	00:02
025	0.1	22.5	1769400	353.9	0.20	25.0	00:02

FIGURE 105. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.25% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

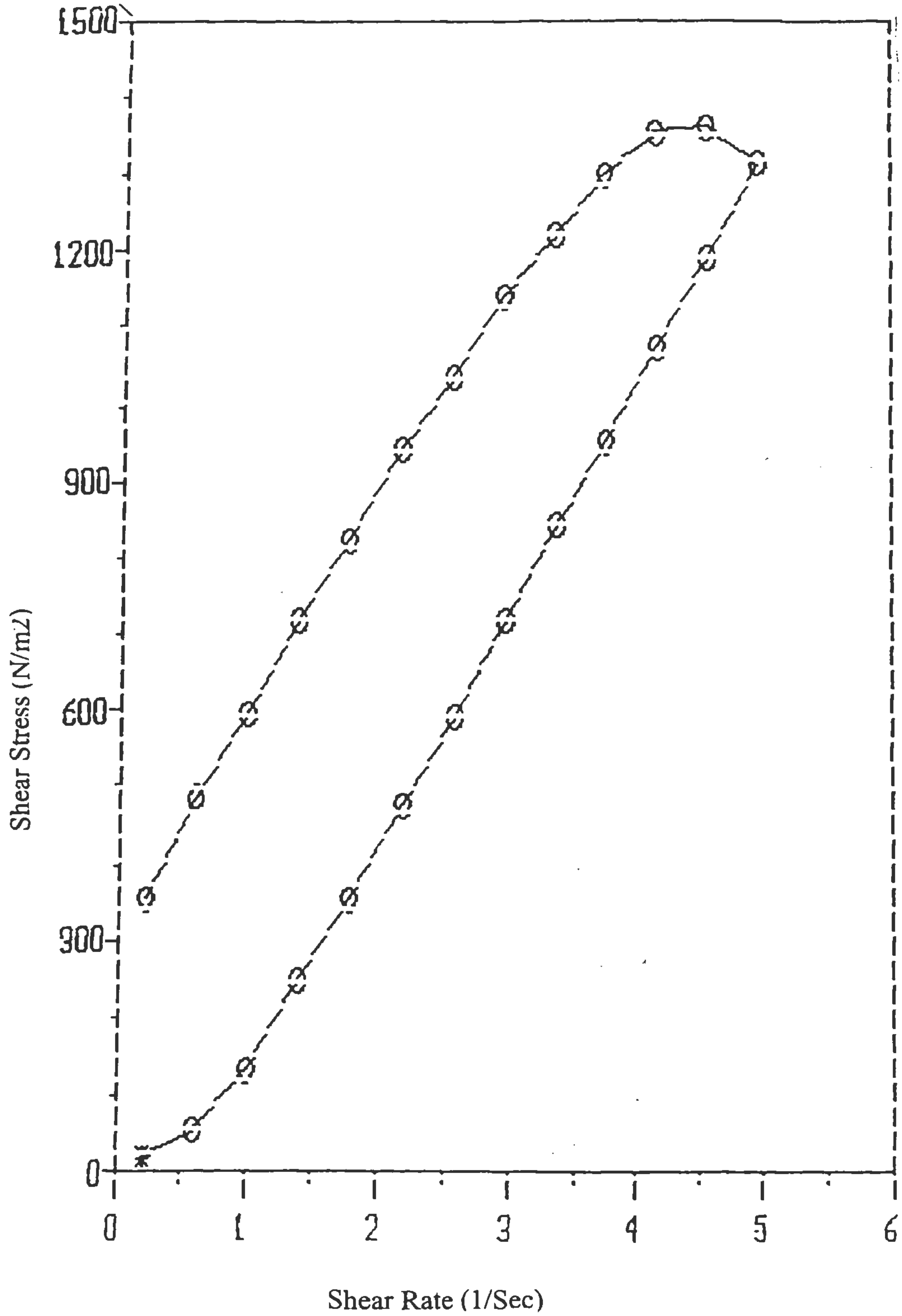


TABLE 94. VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 02:55
Sample: 60405W File: 60405W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.8	62912	12.6	0.20	25.0	00:02
002	0.3	3.8	99611	59.8	0.60	25.0	00:02
003	0.5	7.3	114814	114.8	1.00	25.0	00:02
004	0.7	13.3	149416	209.2	1.40	25.0	00:02
005	0.9	19.3	168639	303.6	1.80	25.0	00:02
006	1.1	25.5	182302	401.1	2.20	25.0	00:02
007	1.3	31.3	189341	492.3	2.60	25.0	00:02
008	1.5	37.8	198173	594.5	3.00	25.1	00:02
009	1.7	44.2	204464	695.2	3.40	25.0	00:02
010	1.9	50.3	208189	791.1	3.80	25.0	00:02
011	2.1	57.0	213451	896.5	4.20	25.0	00:02
012	2.3	63.0	215405	990.9	4.60	25.0	00:02
013	2.5	69.7	219248	1096	5.00	25.0	00:02
014	2.3	71.6	244810	1126	4.60	25.0	00:02
015	2.1	70.4	263631	1107	4.20	25.0	00:02
016	1.9	67.2	278137	1057	3.80	25.0	00:02
017	1.7	62.4	288655	981.4	3.40	25.0	00:02
018	1.5	57.3	300405	901.2	3.00	25.0	00:02
019	1.3	51.1	309116	803.7	2.60	25.0	00:02
020	1.1	45.5	325284	715.6	2.20	25.0	00:02
021	0.9	39.1	341647	615.0	1.80	25.0	00:02
022	0.7	33.1	371855	520.6	1.40	25.0	00:02
023	0.5	26.4	415219	415.2	1.00	25.0	00:02
024	0.3	20.6	539995	324.0	0.60	25.0	00:02
025	0.1	13.9	1093096	218.6	0.20	25.0	00:02

FIGURE 106. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.5% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

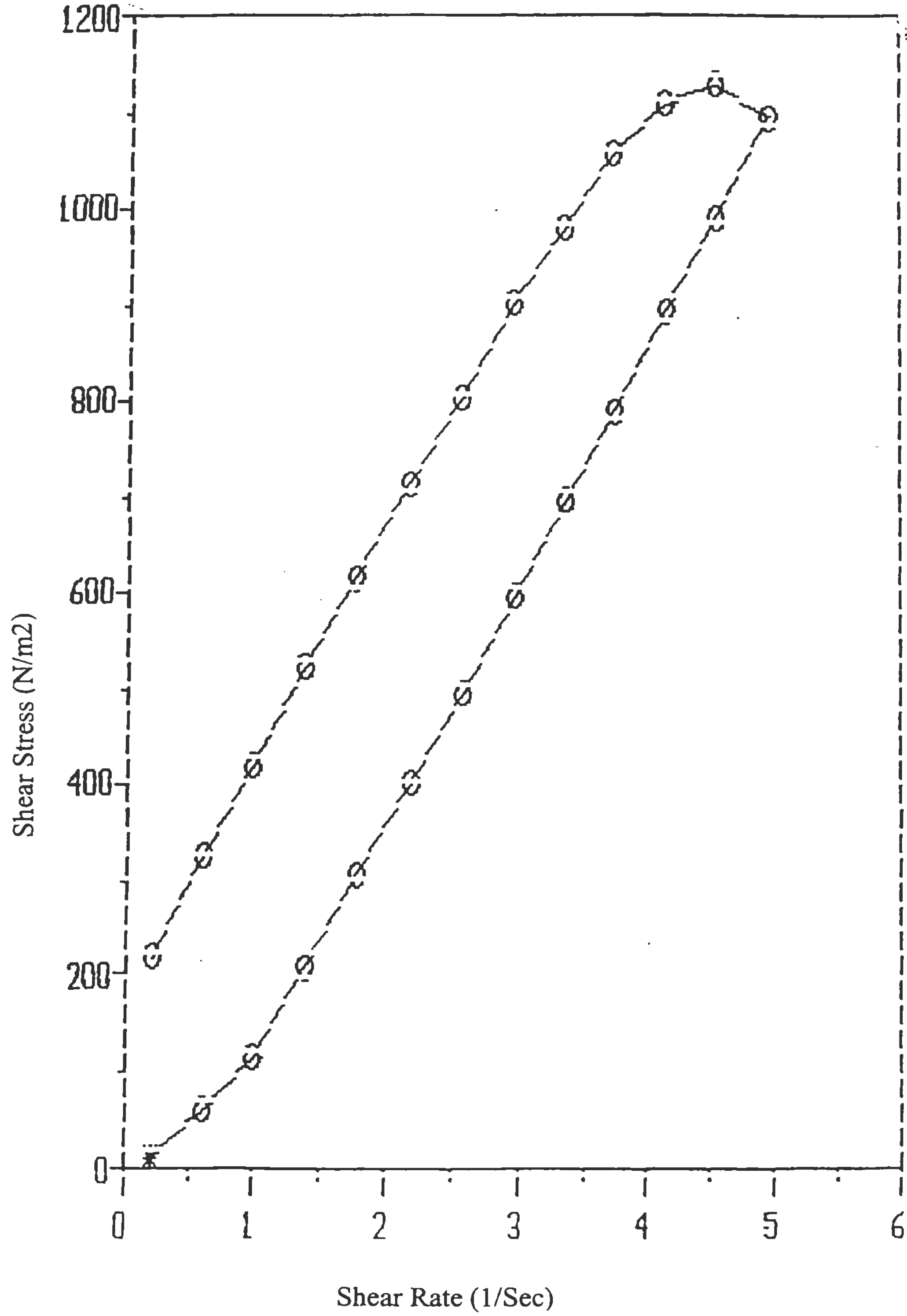


TABLE 95: VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 03:07
Sample: 60406W File: 60406W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m^2	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.4	31456	6.29	0.20	25.0	00:02
002	0.3	3.6	94368	56.6	0.60	25.0	00:02
003	0.5	8.3	130542	130.5	1.00	25.0	00:02
004	0.7	13.7	153910	215.5	1.40	25.1	00:02
005	0.9	19.6	171260	308.3	1.80	25.1	00:02
006	1.1	26.3	188021	413.6	2.20	25.1	00:02
007	1.3	32.9	199020	517.5	2.60	25.1	00:02
008	1.5	39.7	208134	624.4	3.00	25.1	00:02
009	1.7	46.6	215566	732.9	3.40	25.1	00:02
010	1.9	52.8	218536	830.4	3.80	25.0	00:02
011	2.1	60.1	225060	945.3	4.20	25.1	00:02
012	2.3	66.4	227030	1044	4.60	25.1	00:02
013	2.5	73.5	231202	1156	5.00	25.1	00:02
014	2.3	75.7	258828	1191	4.60	25.1	00:02
015	2.1	74.3	278236	1169	4.20	25.1	00:02
016	1.9	71.2	294693	1120	3.80	25.0	00:02
017	1.7	66.1	305771	1040	3.40	25.1	00:02
018	1.5	61.0	319803	959.4	3.00	25.1	00:02
019	1.3	54.5	329683	857.2	2.60	25.1	00:02
020	1.1	48.8	348876	767.5	2.20	25.0	00:02
021	0.9	42.5	371356	668.4	1.80	25.1	00:02
022	0.7	35.5	398817	558.3	1.40	25.0	00:02
023	0.5	29.3	460830	460.8	1.00	25.0	00:02
024	0.3	22.2	581936	349.2	0.60	25.1	00:02
025	0.1	15.7	1234648	246.9	0.20	25.1	00:02

FIGURE 107. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.6% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

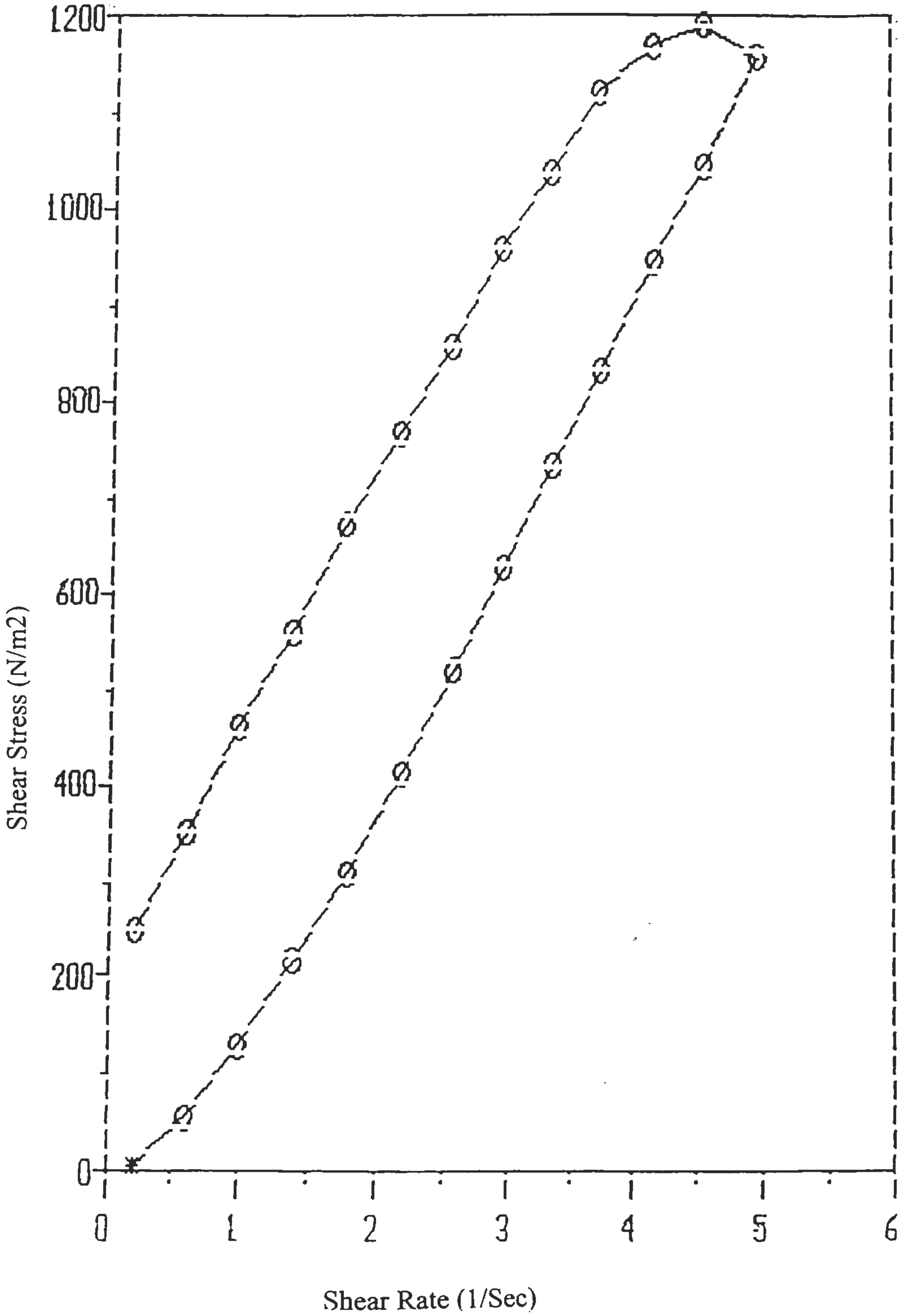


TABLE 96. VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 03:15
Sample: 60407W File: 60407W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m²	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.9	70776	14.2	0.20	25.0	00:02
002	0.3	3.9	102232	61.3	0.60	25.0	00:02
003	0.5	8.5	133688	133.7	1.00	25.1	00:02
004	0.7	13.5	151663	212.3	1.40	25.1	00:02
005	0.9	19.9	173882	313.0	1.80	25.1	00:02
006	1.1	25.8	184447	405.8	2.20	25.0	00:02
007	1.3	32.6	197205	512.7	2.60	25.0	00:02
008	1.5	39.3	206037	618.1	3.00	25.0	00:02
009	1.7	46.0	212791	723.5	3.40	25.0	00:02
010	1.9	52.2	216053	821.0	3.80	25.1	00:02
011	2.1	59.4	222439	934.2	4.20	25.0	00:02
012	2.3	65.7	224637	1033	4.60	25.1	00:02
013	2.5	72.8	229000	1145	5.00	25.0	00:02
014	2.3	74.9	256093	1178	4.60	25.0	00:02
015	2.1	73.5	275240	1156	4.20	25.1	00:02
016	1.9	70.3	290968	1106	3.80	25.1	00:02
017	1.7	65.2	301608	1025	3.40	25.0	00:02
018	1.5	60.1	315084	945.3	3.00	25.0	00:02
019	1.3	53.9	326054	847.7	2.60	25.0	00:02
020	1.1	48.2	344586	758.1	2.20	25.0	00:02
021	0.9	41.2	359996	648.0	1.80	25.1	00:02
022	0.7	35.2	395447	553.6	1.40	25.1	00:02
023	0.5	28.2	443530	443.5	1.00	25.1	00:02
024	0.3	22.0	576693	346.0	0.60	25.1	00:02
025	0.1	14.8	1163872	232.8	0.20	25.1	00:02

FIGURE 108. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.7% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

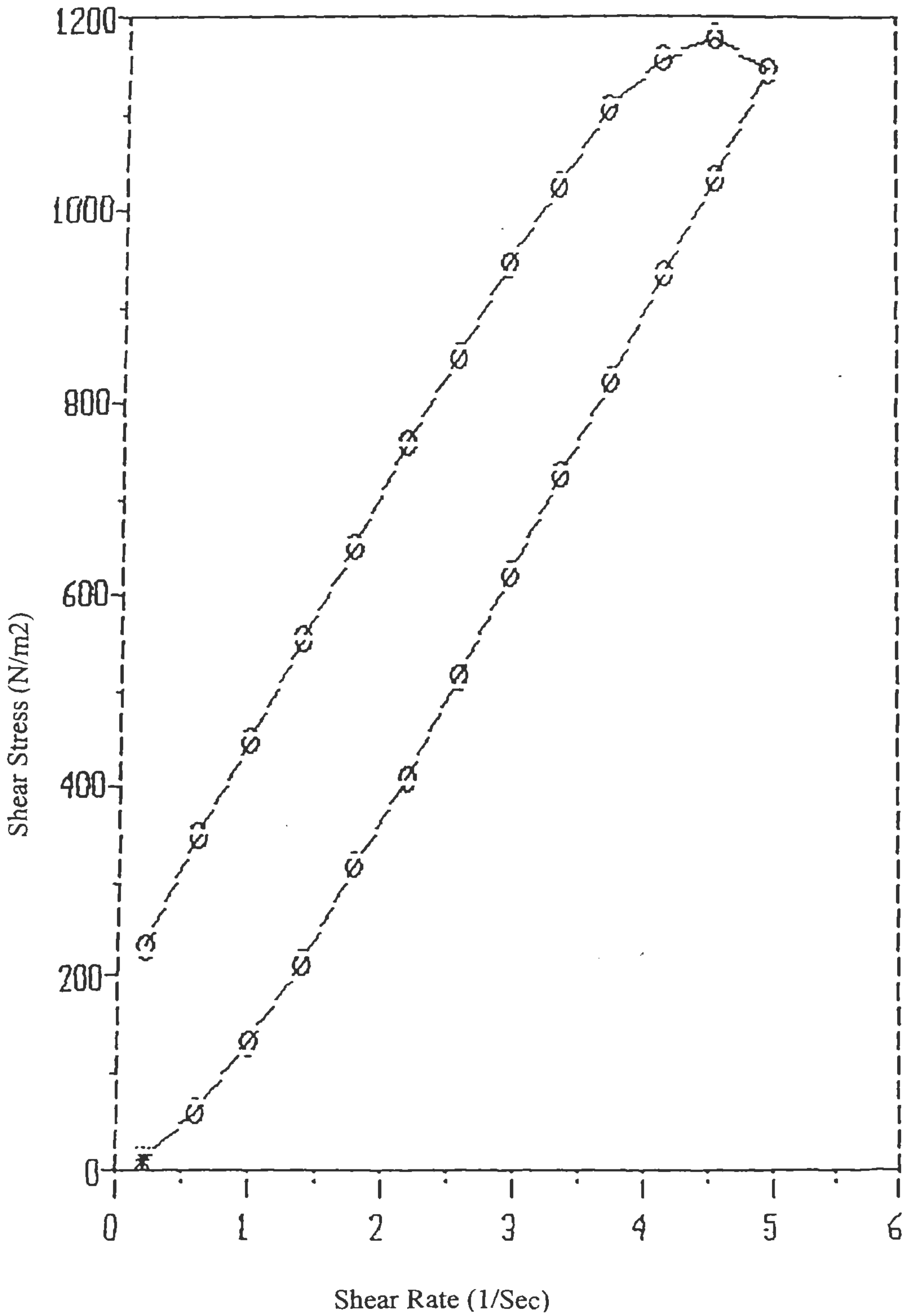


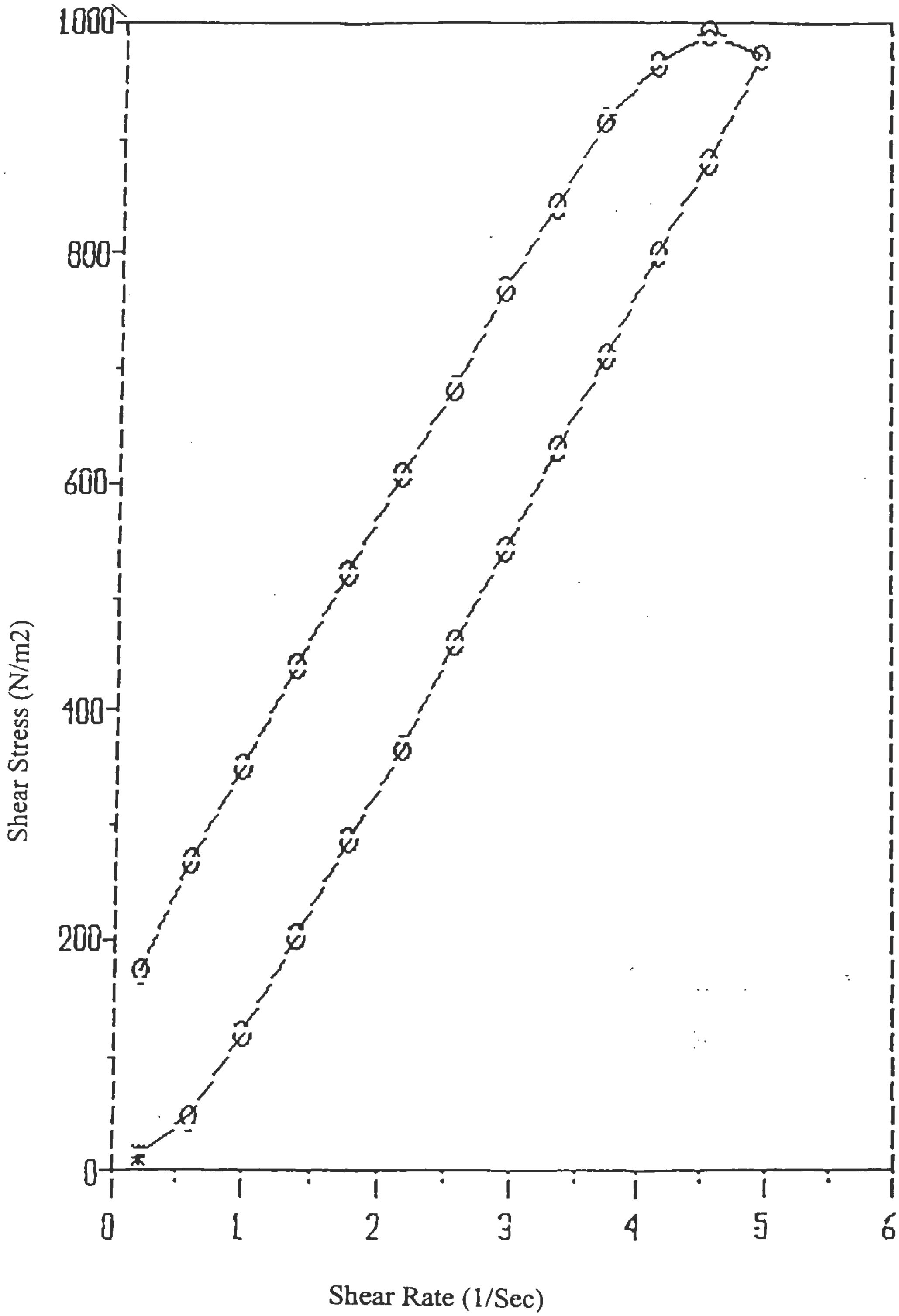
TABLE 97. VISCOSITY VALUES FOR LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER

RHEOCALC V1.40 BROOKFIELD ENGINEERING LABS

Model: HB Spindle: CP52 Date: 01/29/02 Time: 03:21
Sample: 60408W File: 60408W.DV3

#	RPM	Torque %	Viscosity mPas	Sh Str N/m^2	Sh Rt 1/Sec	Temp °C	Time MM:SS
001	0.1	0.8	62912	12.6	0.20	25.0	00:02
002	0.3	3.0	78640	47.2	0.60	25.0	00:02
003	0.5	7.5	117960	118.0	1.00	25.0	00:02
004	0.7	12.8	143799	201.3	1.40	25.0	00:02
005	0.9	18.2	159028	286.2	1.80	25.0	00:02
006	1.1	23.3	166574	366.5	2.20	25.0	00:02
007	1.3	29.2	176638	459.3	2.60	25.0	00:02
008	1.5	34.4	180348	541.0	3.00	25.0	00:02
009	1.7	40.1	185498	630.7	3.40	25.0	00:02
010	1.9	45.2	187080	710.9	3.80	25.0	00:02
011	2.1	50.8	190234	799.0	4.20	25.0	00:02
012	2.3	55.9	191129	879.2	4.60	25.0	00:02
013	2.5	61.7	194084	970.4	5.00	25.0	00:02
014	2.3	63.0	215405	990.9	4.60	25.0	00:02
015	2.1	61.3	229554	964.1	4.20	25.0	00:02
016	1.9	58.1	240473	913.8	3.80	25.0	00:02
017	1.7	53.5	247485	841.4	3.40	25.0	00:02
018	1.5	48.9	256366	769.1	3.00	25.0	00:02
019	1.3	43.4	262537	682.6	2.60	25.0	00:02
020	1.1	38.6	275955	607.1	2.20	25.0	00:02
021	0.9	33.2	290094	522.2	1.80	25.0	00:02
022	0.7	28.0	314560	440.4	1.40	25.0	00:02
023	0.5	22.2	349162	349.2	1.00	25.1	00:02
024	0.3	17.1	448248	268.9	0.60	25.0	00:02
025	0.1	11.1	872904	174.6	0.20	25.0	00:02

FIGURE 109. RHEOGRAM SHOWING RHEOPEXY BEHAVIOR FOR LECITHIN:IPM (60:40) CONTAINING 0.8% WATER AND 6.5% KT BY CONE AND PLATE VISCOMETER



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