8-2013

Isolation and Structural Elucidation of Phytochemicals Present in Red Maple Flowers

Holly Tran
University of Rhode Island, hollyltran@my.uri.edu

Natural medicines and the use of botanical extracts in the prevention and treatment of ailments is globally gaining interest (Mazzio and Soliman, 2009). Detrimental side effects may be reduced using natural therapies (Desai et al., 2008). Worldwide, there are about 120 different maple species. Of those, thirteen are native to eastern North America (Maple Field Guide, 2002). Maple syrup is a natural sweetener derived from collected and concentrated maple tree sap. It takes about 40 liters of sap to make one liter of syrup. Maple plant parts have been used by Native Americans for medicinal purposes. The University of Rhode Island's Bioactive Botanical Research Laboratory (BBRL) has evaluated the biological activities of maple parts including maple leaves, bark, sap, and syrup. Results include α-glucosidase inhibition, -one of the several strategies of diabetes management, from red maple (Acer rubrum) stems (Wan, et al. 2012) and the antiproliferative effects on colon cancer cells (González-Sarrías *et al,*. 2012) of compounds isolated from maple sap and syrup. Of the maple plant parts studied so far, the flowers are yet to be examined for phytochemicals and biological activity. This project explores the isolation and structural elucidation of phytochemicals present in red maple flowers.

Extractions were prepared using dried red maple flowers (866 grams) and methanol (x 3). Solvent was removed by rotary evaporation and the extract was reconstituted in water. Liquid-liquid partitioning was used with ethyl acetate followed by butanol to collect phenolic constituents and yielded 150 grams of crude extract. Compound isolation was completed using a combination of Sephadex LH-20 column and semi- preparative high-performance liquid chromatography (HPLC). Carbon-13 nuclear magnetic resonance (13C-NMR), mass spectrometry, and HPLC profile crosses were performed to identify a total of 12 isolated compounds. Future studies will include bioassays to explore the potential antioxidant, and antiproliferative effects of the isolates.

Works Cited

Desai AG, Qazi GN, Ganju RK, et al. 2008. Medicinal plants and cancer chemoprevention. Curr Drug Metab 9: 581-591.

González-Sarrías A, Li L, Seeram NP, 2012. Effects of maple (Acer) plant part extracts on proliferation, apoptosis and cell cycle arrest of human tumorigenic and non-tumorigenic colon cells. Phytother Res 26: 995-1002.

"Maple Field Guide for Vermont." Maple Field Guide. Department of Forests Parks & Recreation. Web. 20 Aug 2013. <http://www.mapleinfo.org/htm/resources_fieldguide.cfm>.

Mazzio EA, Soliman KF. 2009. In vitro screening for the tumoricidal properties of international medicinal herbs. Phytother Res 23: 385-398.

Wan C, Yuan T, Li L, *et al*. 2012. Maplexins, new α-glucosidase inhibitors from red maple (Acer rubrum) stems. Bioorg Med Chem Lett 22: 597-600.