

My honors project, titled Calf Health and Oxidative Stress, aimed to address the different factors that can decrease calf health and immunity, potentially causing disease and even mortality. With the growth of the beef cattle industry, non-predator death rates of calves has reached almost 89%. Maternal programming and oxidative stress are two factors that play a role in this high death rate. Maternal programming refers to how the intrauterine environment can impact the growth and development of the embryo. An insufficient intrauterine environment can lead to underdeveloped calves, that when born, are even more susceptible to disease. Oxidative stress, which can be brought on by transportation events has a similar effect. During transport, calves are exposed to conditions such as overcrowding, loud noises, and vibrations which result in an immunological response called oxidative stress. This response leads to the production of Malondialdehyde (MDA), which can then be measured in the blood as an oxidative stress biomarker. MDA has many detrimental effects to calves' health and their immune system by causing cell damage, decreasing enzyme activity, lipid fluidity, antioxidant capacity, circulating lymphocytes, and even lead to liver necrosis.

Originally, my plan was to use a Calorimetric MDA assay kit to detect MDA concentrations of 30 bull calves before and after transport, and then again at 24 and 48 hours. Although I was unable to run the full assay on all 30 calves due to COVID-19, I was able to obtain some trail data from a preliminary assay of 4 calves. The results showed that the assay was successful in detecting the MDA standards and that the first reading, after 15 minutes, had the highest overall absorbency. With further optimization, this assay would provide us with a more efficient and safer way to detect MDA concentrations in the blood. Overall, with calf health being such a prominent issue in this industry, producers need to minimize stressful events

that lead to decreased immune function and possibly even mortality, in turn making food animal operations more sustainable.