

## Wentz Research Scholar Program Proposal

Proposed Project: Effects of lipid oxidation products on metmyoglobin reductase activity.

Background: Myoglobin is the protein that is responsible for the color of the meat. There are 3 forms that contribute to meat color; deoxymyoglobin (purple), oxymyoglobin (bright cherry red), and metmyoglobin (brown). The color that is most preferred by consumers, is the bright cherry red color that is found with oxymyoglobin. When deoxymyoglobin and oxymyoglobin are oxidized, they turn the meat into the brown color yielding it to be unwanted by the consumers. The major components of meat are lipids, protein, and fat. When lipids are oxidized they yield products that are either primary, which is short lived, or secondary, which is long lived. Secondary products very reactive and lead to the meat changing from the bright cherry red color to the brown color. The enzyme reductase, reverses the process, which means that it is able to turn metmyoglobin back to deoxymyoglobin or oxymyoglobin. This means that it can create a longer shelf life for the product.

Specific Goals: Previous Wentz support has helped me to isolate and characterize the reductase enzyme. The overall goal of this project is to understand the role of lipid oxidation on enzyme reductase and color of the meat. More specifically, the effects of temperature and pH on the enzyme in myoglobin. As well as, the effects of three secondary products of oxidized lipids 4-hydroxy-2-nonenal (HNE), malondialdehyde (MDA), and hexenal will be determined on metmyoglobin reductase activity. Reductase is an enzyme that is critical for conversion of metmyoglobin to oxymyoglobin. .

Timeline: I will be working on the effects of different temperatures and pH's (simulating meat storage temperature and pH conditions) on reductase and its effect of the color on the meat. Also, I will gather data, create a poster, and a report on my findings in professional meetings.

Research Methods: I have been working as an Animal Science Scholar over two years and have gained useful laboratory techniques, experience, and knowledge that will help me complete the project within the deadline. Last year I was able to isolate the enzyme reductase from beef cardiac muscle, which I will be able to use to incubate at different temperatures and pH. Using the spectrometer I will be able to see the enzymes activity for the different conditions.

Resources: I will be working in the Muscle Biology Laboratory at the department of Animal Science in room 119. This laboratory has all the necessary equipment to complete my project including but not limited to: spectrophotometer, water bath, centrifuge, chemicals, and other supplies. For any additional information that I might need I will use the Edmon Low Library.

Expected Results: Upon completion of my project, I should be able to better understand the different effects on the enzyme reductase. These lipid oxidation products should effect the color and meat shelf life to a great degree.

Benefits: The proposed research will help to better understand oxidation of lipids, how this effects the color of the meat, and in what time frame. This will help extend the shelf life of meat and will save a lot of money in the market. As well as the benefits of my project, Wentz scholarship will enable me to gain more exposure in the research field and better understand what it all entails. It will also provide me with more hands of experience that will be useful throughout my career.