

William Talbert

Chm 642

Professor Joel Dain

Monday November 25, 2013

Title: Effects of antioxidants on the color-stability and shelf life of meats

Abstract:

As populations continue to grow, the demand for food also grows. Many foods can be packaged and preserved, giving them a long shelf life, however, foods such as fresh meat do not last nearly as long. As a means of meeting a growing demand for fresh meat, methods of preservation have been examined, including both natural and synthetic means. The main cause of spoilage in meats is the oxidation of lipids and heme pigments present in the meat due to free radicals. The color in red meats associated with freshness is a result of oxygen binding to myoglobin, forming the unstable oxymyoglobin, which is oxidized to metmyoglobin and causes the brown color that is seen in spoiled meats. Practices such as vacuum sealing of freshly slaughtered meat is an effective way of slowing the oxidation of lipids, but this also causes an undesirable purplish color associated with the presence of deoxymyoglobin, making it unappealing to consumers. Modified atmosphere packaging is commonly used to preserve the color of meats, and involves placing the fresh meat in an atmosphere typically consisting of 80% oxygen and 20% CO₂. Synthetic antioxidants such as BHT and BHA have been shown to inhibit lipid oxidation in meats, however, concern over their toxicity and limited water solubility has led to the use of natural antioxidants (implemented primarily as a supplement in livestock feed), including α -tocopherols, selenium, sulfur, and phytic acid. While the selenium and sulfur supplements have not shown significant increases in antioxidation, both α -tocopherols and phytic acid have been effective as antioxidants for both oxymyoglobin and lipids in meats.