

Title           Determination of soybean antioxidant potential under different storage conditions and its effects on soy food quality

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### **Abstract**

Soybeans are subjected to changes after harvest, such as storage and transportation, before processing into soy products. Long-term storage may result in degradation of lipid compounds through oxidation reactions. Antioxidants are inhibitors that prevent formation of hydroperoxides by scavenging the free radicals in soy. Soybeans that are exposed to various levels of stress during transit and storage can challenge the consumer's health, and the quantity and quality of food produced. Oxidative stress can influence the antioxidant level in the food and its shelf-life. Therefore, the objective of this study is to ascertain the antioxidant potential in soybeans under different storage conditions and its effects on soy food quality. Soybean antioxidants can be quantified by photochemical luminescence. Free radicals are generated by a photosensitizer dye and are detected by their reaction with a chemiluminogenic agent through measurement of the emitted light. This technique was used to determine the antioxidant potential in 3 different soybean cultivars that have been stored under different temperature (20 °C, 30 °C and 40 °C), humidity (75% RH and 32% RH) and storage times (0-6 mo). There was a difference in antioxidant potential due to storage conditions and soybean cultivars. The results indicated that the higher protein soybean cultivar had a lower luminescence. Lower temperature storage resulted in a lower luminescence since the soybeans were less prone to degradation whereas higher temperature storage increased luminescence. Changes in the composition (protein and lipids) and quality (color, texture, flavor) of the soy foods produced from soybeans stored under high temperature and humidity storage conditions were found. High temperature storage produced off-color soymilk and poor textured tofu. Results from this antioxidant study correlated with other biochemical changes occurring in the soybeans under adverse storage conditions and suggest that low temperature soybean storage should be used to obtain the best quality soy product.