Title The effect of antioxidants on the quality changes of cuttlefish (*Sepia pharaonis*) muscle during frozen storage

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Abstract

The changes in quality of cuttlefish (*Sepia pharaonis*) treated with 5% NaCl and 0.3% H_2O_2 and soaked with and without different antioxidants during frozen storage at –18 °C for 16 weeks were investigated. Thiobarbituric acid reactive substances (TBARS) in all cuttlefish samples increased when the storage time increased ($P<0.05$). Ascorbate (ASC) and erythorbate (ERT) showed a prooxidative effect while EDTA and tripolyphosphate (TPP) had no antioxidative effect in frozen cuttlefish. Soaking the cuttlefish in 5% NaCl and 0.3% H_2O_2 for 15 min could improve the color of cuttlefish by increasing the L^*-value and decreasing the a^*-value. ASC, ERT, EDTA and TPP solutions had no impact on the a^*-value and L^*-value of cuttlefish during frozen storage. However, the treated samples, which were soaked in ASC and ERT solutions had an increased b^*-value during frozen storage. Surface hydrophobicity (S_0ANS) of cuttlefish natural actomyosin increased when the frozen storage period increased up to 12 weeks. The increase in disulfide bond content was generally coincidental with the decrease in sulfhydryl content. ASC, ERT, EDTA and TPP had no significant effect on those changes. Protein solubility decreased slightly during prolonged storage. Soaking cuttlefish with 5% NaCl and 0.3% H_2O_2 together with 0.5% TPP could retard the decreases in solubility and increase in thaw drip of frozen cuttlefish. However, ASC, ERT and EDTA showed no impact on the solubility and thaw drip of frozen cuttlefish.