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# Gelling properties of hake muscle with addition of freeze-thawed and freeze-dried soy phosphatidylcholine liposomes protected with trehalose

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**Abstract**

Soy phosphatidylcholine liposomes made with addition of trehalose as cryoprotectant were subjected to freeze-thawing and freeze-drying treatments, and subsequently incorporated in salt-ground hake (*M. merluccius*) muscle to study their effects on protein aggregation, water binding and thermal gelation. Both liposomal preparations presented similar particle size (≈215 nm, expressed as z-average) and strong electronegative zeta potential (–46 mV). The addition of both types of liposomal preparations led to more water trapped within the myofibrillar protein in the salt-ground muscle, as observed by water holding capacity (WHC) and low field nuclear magnetic resonance (LF-NMR). However, the liposomes interfered strongly with the thermal gelation ability of the muscle protein. Differential scanning calorimetry (DSC) analysis of the salt-ground muscle showed that the liposomes caused an increase in the main transition temperature associated with the actin molecule, with a concomitant reduction in total enthalpy change. The hydration state of the trehalose-containing liposomes did not play a significant role in textural properties of the resulting gels. The detrimental role of liposomes in the texture of fish gels should be considered in the design of functional fish products.