

Denaturation of Fish Muscle Proteins During Frozen Storage

JUICHIRO J. MATSUMOTO

Department of Chemistry, Sophia University, Kioi-cho 7, Chiyoda-ku, Tokyo, Japan 102

Studies on the freeze denaturation of fish muscle proteins were reviewed with emphasis given to changes in their physico-chemical and biochemical properties during frozen storage. Denaturation of actomyosin commonly occurs during frozen storage and the side-to-side aggregation of myosin molecules appears to play a major role in this reaction. The author's group performed freezing studies with isolated preparations of proteins from fish muscle, i.e., actomyosin, myosin, H-meromyosin (HMM), L-meromyosin (LMM), and actin. Freeze denaturation occurred with individual proteins as well as with their subunits. Not only aggregation but also some conformational changes were observed. Denaturation was inhibited significantly in the presence of added monosodium glutamate (MSG). About 30 compounds were found to inhibit denaturation and their mechanisms of action are discussed.

Changes in the Sensory Attributes of Fish Muscle

Studies of protein denaturation in fish muscle during frozen storage have been carried out to gain scientific knowledge and to provide a basis for supplying foods of better quality. Early studies with fish demonstrated that frozen storage is an excellent means of preventing putrefaction and autolysis of this perishable commodity. However, it was soon learned that frozen fish deteriorates more rapidly than frozen bovine muscle. Frozen fish can exhibit several kinds of quality deterioration depending on the state at which it is examined. For example, a fish that