（学位第３号様式）

学　位　論　文　要　旨

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題　目	Suppression effect of adenosine triphosphate on denaturation of fish myofibrillar protein （アデノシン三リン酸による魚類筋原線維タンパク質の変性抑制）

The value of fisheries products is evaluated by freshness. Fish which are frozen pre-rigor have a better quality on thawing than fish of lower initial freshness. On the other hand, there have been few scientific reports on why muscle protein of fresh fish is more stable during frozen storage than that of less fresh ones. In this study, the protective effect of adenosine triphosphate (ATP) on fish muscle proteins was investigated.

In the 1st chapter, the suppressive function of ATP on freeze denaturation of myofibrillar protein from Alaska Pollack and croaker surimi was investigated. Freeze denaturation of myofibrillar protein was suppressed by the addition of ATP. The suppression effect of ATP on freeze denaturation depended on the ATP concentration, freezing temperature and fish species. In the 2nd chapter, the effect of ATP on the denaturation of myosin in “burnt meat” was investigated. The suppression effect of ATP on acidic-thermal denaturation of tuna myosin subfragment-1 (S-1) by measuring the changes in turbidity of myosin S-1 solution and Ca-ATPase activity. The increase of turbidity of myosin S-1 solution and the inactivation of myosin S-1 Ca-ATPase during acidic-thermal treatment were suppressed strongly with the presence of physiological concentration of ATP. The rapid reduction of ATP during the early postmortem stage may act as a trigger of the acceleration of acidic-thermal denaturation of tuna myosin in burnt meat. In the 3rd chapter, the suppressive effect of ATP on urea denaturation of shark muscle was investigated. Urea is known as a powerful protein denaturant. Elasmobranches, such as sharks, retains large amount of urea in their body, but muscle proteins of sharks are maintained even in the presence of urea *in vivo*. The protection effect of ATP on fish muscle proteins was focused, and the suppressive effect of ATP on urea denaturation of myosin Ca-ATPase from scalloped hammerhead was studied. Myosin was incubated at various temperature in the presence of both urea and ATP. Both urea and ATP were removed from the incubated myosin by dialysis, and then Ca-ATPase activity of the incubated myosin was assayed. In the case of myosin incubated with both ATP and urea, its Ca-ATPase activity was higher than incubated with urea. This result suggested that ATP suppressed urea denaturation of myosin Ca-ATPase. ATP may act as a safeguard of muscle protein against urea *in vivo*. In the 4th chapter, the procedure for freeze-thawing of olive flounder for consumption of high quality raw fish as sashimi was investigated. Freeze-thawed meat which was frozen containing a high concentration ATP immediately after instantaneous killing and then thawed by slow thawing method showed high quality for sashimi and properties of myofibrillar protein were maintained considerably.

The above results indicate that ATP may protect of fish muscle protein against various denaturation *in vivo* and in fishery food processing. These results will contribute to keeping freshness and producing high quality fisheries products.