Short Paper

Thermal Gelation of Striped Marlin
and Sardine MyosinsHiroshi Hirahara,* Munehiko Tanaka,*
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Though myosin has been considered to contribute substantially to the gel-forming ability for gel type protein foods such as kamaboko,¹⁻³⁾ whether the difference in gel-forming ability among fish species depends upon the action of myosin is not known. With model systems using muscle proteins, useful information about the thermal gelation of fish myosin also is rarely available. The present study deals with the thermal gelation of myosins from striped marlin and sardine muscles under various pHs.

Frozen blocks of 3–5 kg striped marlin *Makaira mitsukurii* and sardine *Sardinops melanostictus* weighing about 100 g each in full-rigor state were purchased from a local retail store. Each muscle was excised carefully from thawed striped marlin or from fresh sardine. Myosin was prepared from each by the method of Mackie and Connell⁴⁾ with some modifications. The myosin solution containing 0.5 M KCl, 5 mM ATP, and 20 mM Tris-maleate buffer (pH 7.5) was clarified by centrifugation at 100,000×g for 3 h, and then myosin in the supernatant was collected by ammonium sulfate fractionation (giving 40–55% saturation). After dialyzing against 0.03 M KCl-10 mM phosphate buffer (pH 6.8), the dialyzate was adjusted at pH 6.5 and immediately centrifuged at 30,000×g for 30 min to remove the residual moisture. Finally, the myosin paste adjusted to pHs 5.8–6.5 containing 90% moisture and 2.5% NaCl (w/w) was obtained. The pastes thus prepared were packed in stainless steel tubes (diameter 2.0 cm×height 1.5 cm) and heated at 70°C for 10 min. The gels formed in the tubes after heat treatment were subjected to jelly strength measurement with a rheometer (Type R-UDJ, San Kagaku Co. Ltd., plunger: ball type with diameter of 0.5 cm). The jelly strength was expressed as the product of breaking load and breaking strain (g·cm). The standard errors are given from five experiments.

Fig. 1 shows the thermal gelation of striped marlin and sardine myosins under various pHs. It has been reported by Ishioroshi *et al.*⁵⁾ that thermal gelation of

Fig. 1. Thermal gelation of striped marlin and sardine myosins under various pHs.

○: Striped marlin, ●: Sardine

myosin is affected remarkably by pH. As shown in Fig. 1, a maximum jelly strength at 70°C was observed over pH 5.9–6.2 for striped marlin, around pH 6.2 for sardine. The value of striped marlin myosin was more than twice that of sardine myosin, though the moisture content of both myosins was 90%. This difference may be due to the difference in heat or pH stability between myosin tail (rod) portions, since the rod portion plays the most important role in the thermal gelation of myosin. At this point, further study would be necessary.

References

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