

Effects of salt on physical properties of food protein gels

Michiyo MURATA (Kacho Junior College)

The effects of sodium salt on turbidity, hardness, and microstructure of gels from two food proteins, ovalbumin (OVA) and bovine serum albumin (BSA) were examined. Two heating procedures were used; one-step heating method and two-step heating method. In the former a protein solution was heated at 85°C for 20 min in the presence of salt ranging in its concentration from 0 to 500 mM. In the latter a protein solution was first heated under the salt-free, or at a quite low concentration of salt and then the transparent sol obtained was heated again after mixing with various amounts of salt. Gel turbidity was evaluated by measuring the absorbance at 600 nm. A transparent gel was usually produced only at a low concentration of salt in the medium when the one-step heating method was used. However, using the two-step heating procedure markedly broadened the range of salt concentration to produce a transparent gel. On gel hardness, a BSA transparent gel was much harder than an OVA transparent gel. The hardness of a transparent gel produced by the one-step heating method was comparable with that by the two-step heating method. Molecular association involved in the heat processing was examined by transmission electron microscopy (TEM). TEM observation for the OVA and BSA transparent sols showed that protein molecules were heat-denatured to polymerize into a linear orientation. Furthermore, the scanning electron microscopy revealed directly that the OVA and BSA transparent gels were composed of three-dimensional networks of those linear polymers. Gel formation was also examined for the mixture of OVA and BSA.