

## Structure and Property of Electrolyte Food Polysaccharide in Aqueous Solution with High Concentration of Salt

Yoshiaki Yuguchi

Faculty of Engineering, Osaka Electro-Communication University

### Summary

Polysaccharides are widely applied for food additives as thickener or gelling agent. Carrageenan extracted from seaweeds is one of useful ionic polysaccharides with sulfate groups. The carrageenan aqueous solution forms gel by cooling. The gelation mechanism is explained by formation of double helix structure of carrageenan molecular chains and subsequent association to build cross-linking zone. In this process the gelation behavior is influenced by the counter cation and added salt. In this study k-carrageenan aqueous solutions with different concentrations of salt, especially very high, are examined. The gelation behavior is found to be very characteristic, as around 50-100 mM of NaCl the 0.25% k-carrageenan solution takes place gelation, while around 500-1,000 mM it shows turbid solution state, and higher concentration around 2,500 mM gives gelation again. These gels and solutions were observed by means of small angle X-ray scattering (SAXS) at nano-scale level. The SAXS behavior of around 50-100 mM of NaCl suggests the rod-like structure from double helix of k-carrageenan, while the SAXS from samples around 500-1,000 mM indicated the upturn in smaller angle region, to form large aggregation. It was noted that the diffraction peak appeared, suggesting that carrageenan helices can be arranged to some ordered structure. Around much higher concentration of NaCl, 2,500 mM, the upturn deducing from the large aggregation disappeared according SAXS profile.