

Effect of Addition of Salt for Molecular Aggregates in Food Polysaccharide Gels

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Summary

Polysaccharides are widely applied for food additives as thickener or gelling agent. For example seaweed contains ionic polysaccharides with carboxylic groups or sulfate as alginate or carrageenan. Alginates yield gel by adding with calcium ions, and carrageenan forms gel by cooling. These gelation properties are influenced by type or concentration of metal ions. In this study effect of addition of sodium chloride (NaCl) for molecular aggregation in food polysaccharide gels were examined by means of small angle X-ray scattering (SAXS). For alginate gel with calcium ions the gel strength decreased with concentration of NaCl increasing. Alginate gel without adding NaCl indicated the rod like structure of bundle of alginate chains from SAXS results. The large aggregation in alginate gel at higher concentration of NaCl was observed. So the addition of salt promotes the aggregation of alginate molecular chain, as a result the network structure tends to be broken by this effect. For kappa-carrageenan gel large aggregation was also observed at higher concentration of NaCl. It was noted that the diffraction peak appeared at 500mM and 1000mM NaCl conditions. It suggests that carrageenan helices can be arranged to some ordered structure. For iota-carrageenan such kind of phenomena could not be found at present experimental conditions.