

Influence of processing conditions on the properties of alginate solutions and wet edible calcium alginate coatings

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Abstract

Two alginates with different viscosities (η -low and η -high) were used to study the effects of processing conditions (pH, addition of sodium chloride, addition of CaCl_2 , mixing speed, mixing temperature, gelation time, gelation temperature) on the viscosity of sodium alginate solutions and the properties of wet calcium alginate films. No differences in the monomeric fractions proportion (M/R ratio) between alginates were observed. η -high presented higher values of estimated average length of G- and MG-blocks than η -low alginate. The viscosity of the alginate solution was increased in the presence of calcium traces. The impact of CaCl_2 addition on alginate viscosity was much stronger for η -low alginate. However, no improvement of the mechanical properties was observed. The presence of NaCl in alginate solutions also increased the viscosity and had a negative impact on the puncture properties of calcium alginate films. On the contrary, the use of high mixing speeds resulted in less viscous sodium alginate solutions and stronger films. Finally, the use of neutral pH values and refrigeration temperatures during the co-extrusion process would be advisable in order to prevent a detrimental effect on the mechanical properties of alginate films.