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Hydrodynamic investigation of the oligomeric state for kappa carrageenan in solution

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The oligomeric and conformational state of the kappa carrageenan in different solvents are investigated using analytical ultracentrifugation (AUC), size exclusion chromatography coupled to multi angle light scattering (SEC-MALS), capillary viscometry and micro differential scanning calorimetry (DSC). The sedimentation coefficient distribution was determined under conditions that promote either coil (0.1 M NaCl, 0.1 M phosphate buffered saline, PBS or dimethyl sulfoxide, DMSO) or helical (0.1 M NaI) conformations. The weight average sedimentation coefficient observed for kappa carrageenan in 0.1 M NaCl was higher compared to those in 0.1 M NaCl and DMSO indicator consistent with a dimeric (double helical) form. In addition the weight average molecular weights were observed for kappa carrageenan in 0.1 M NaI compared with 0.1 M NaCl or DMSO, confirming the sedimentation coefficient data. Evidence for dimeric behavior was therefore seen in kappa carrageenan based on the highest intrinsic viscosity observed at helix form compared to coil, which as well reflected a greater stiffness.

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