Compositional analysis and rheological characterization of gum tragacanth exudates from six species of Iranian Astragalus

The sugar composition and viscoelastic behaviour of Iranian gum tragacanth exuded by six species of Astragalus was investigated at a concentration of 1.3% and varying ionic strength using a controlled shear-rate rheometer. Compositional analysis of the six species of gum tragacanth by high-performance anion-exchange chromatography with pulsed amperometric detection suggested the occurrence of arabinose, xylose, glucose, galactose, fucose, rhamnose and galacturonic acid residues in the gum structure; however, the proportions of each sugar varied significantly among the gums from the different species of Astragalus, and this variation led to interesting differences in functional properties.

Rheological measurements performed on dispersions of the six species of gum tragacanth demonstrated viscoelastic properties. The mechanical spectra derived from strain sweep and frequency sweep measurements indicated that the different gum tragacanth dispersions had distinctive viscoelastic behaviours. Investigation of the viscoelastic properties of the different gum dispersions in the presence of NaCl revealed that the addition of NaCl could lead to slight to drastic decreases in the $G'$, $G''$ or $\eta^*$ values of the various gums. In general, the results indicated that the six varieties of gum tragacanth studied exhibited significantly different rheological properties; therefore, these different gums may find use in a variety of applications as stabilisers, thickeners, emulsifiers and suspending agents depending on their rheological behaviour.

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