sedimentation velocity and equilibrium methods at 20°C. The plots of $1/s_c$ vs c of both GAL and GLI–GAL mixtures after incubation show no significantly different shape suggesting the presence of no interaction products. According to the equation $1/s_c = s^0_{20}(1 + k_s c)$ values of s^0_{20} of $(4{\cdot}9 \pm 0{\cdot}4)$ S, $k_s = (664 \pm 47)$ ml/g and $(4{\cdot}7 \pm 0{\cdot}2)$ *S*, $k_s = (776 \pm 33)$ ml/g for GAL and GLI–GAL, respectively, were obtained. The concentration ranges of GAL ranged from 0·75 to 3·0 mg/ml for GAL alone and from 0·34 to 1·50 mg/ml in the incubated mixtures.

Low speed sedimentation equilibrium runs (Optima XL-A, Beckman) using the MSTARA computer evaluation program (Harding *et al.*, 1992) gave point (apparent) weight average molecular weights $M_{w,app}$ of ≅ 20,000 g/mol for GLI and 200,000 g/mol for GAL. Investigating the GLI–GAL incubation mixtures, two non-interacting components were found with the same molecular weights as above.

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THE EFFECTS OF SOLUTES ON THE GELATINIZATION OF SMOOTH PEA STARCHES

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When water is heated with a suspension of starch it undergoes a co-operative endothermic transition known as gelatinization. The molecular events responsible for this transition are uncertain, but entail melting of crystallites. Solute acts as a plasticiser in this process. Low concentrations of inorganic salts are known to raise the gelatinization temperature for both A- and B-types of starches, namely corn and potato starches. This study investigates the influence of inorganic neutral salts on the gelatinization process of C-type starches, isolated from smooth peas.

The starches of five peas varieties were studied. Wide-angle X-ray diffraction analysis shows that all of the starches have a similar degree of crystallinity (27–31%), however, they differ in the content of 'A' and 'B' polymorphs. So the content of 'B' polymorphs changes from 26 to 49%.

Quasi-equilibrium studies of the thermodynamic parameters of gelatinization of pea as well as potato and corn starches were made by DSC. On raising salt concentration both specific heat capacity increment (ΔC_p) and the specific enthalpy (ΔH) of gelatinization decreases for potato starch whereas this slightly increases for corn starch. At the same time both peak temperature (T_p) and the difference between the termination and onset temperatures (ΔT) increases in a different manner for both starches. The addition of salt to C-type starches also results in the intake in T_p, at the same time the single peak becomes double.

A model was proposed, which represents the C-type starches as composed of two different types of independent cooperative structures, which contain either 'A' or 'B' polymorphs. The comparative analysis of T_p, ΔT, ΔC_p, and ΔH for both pea starches with different contents of 'A' and 'B' polymorphs and potato as well as corn starches under different salt concentration was given. This analysis confirms the proposed model.

RHEOLOGY OF GUAR GALACTOMANNAN/RICE STARCH MIXTURES

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Biopolymer mixtures are of increasing importance in the design of model foods, for example, in the low fat spread area. Much of this work has been dedicated to mixed gel systems. However, the equally important area of dispersions of a soft filler phase in a biopolymer solution has been less well studied. For example, *in vitro* model systems are likely to be useful in studying the nutritional properties of water-soluble non-starch polysaccharides ('dietary fibre') in man. Foods containing guar gum are thought to reduce the postprandial rise in blood glucose and insulin levels (Ellis *et al.*, 1991) through the increase in viscosity of digesta in the stomach and small intestine (Roberts *et al.*, 1990). The presence of particulate material is likely to modify the rheological behaviour of guar gum and other such biopolymers dispersed in the aqueous phase of digesta.

In the present work, guar solutions, well recognised to be a model entanglement network system, were measured in both steady and oscillatory shear. A rice starch filler, selected for size and homogeneity of starch grain, was then added in small increments and the same experimental scheme applied. As the amount of filler is increased we would expect that the dispersion would begin to develop some additional features. Steady shear measurements of the pure guar galactomannan system show a Newtonian plateau at low shear rates followed by increasing shear rate dependence at high shear rates; the so-called 'power law' behaviour. This power law behaviour would be expected to become more pronounced at low shear rates as the starch filler concentration is increased. In oscillatory measurements, as the concentration of starch filler is increased, G' would be expected to increase faster than G'' but with a reduction in the cross-over frequency. This suggests that the liquid-like behaviour at low frequencies changes to a more solid-like response at lower frequencies than the pure galactomannan system. In this poster we will present such data and discuss the interpretation in terms of, for example, a yield stress modified Cross equation.

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