In this study, rheological properties of cress seed gum (CSG) and its fractions (F1, F2, F3; fractionated using stepwise extraction with water) were investigated. Cress seed gum and its fractions revealed random coil conformation in dilute regimes; chain flexibility and intrinsic viscosity increased from F1 to F2 to F3. The mechanical spectra derived from strain sweep and frequency sweep measurements indicated that the gum dispersions had viscoelastic behavior; all of them were classified as weak gels and the gel network got stronger along the series of F1, F2 and F3. Arrhenius-type model was used to describe the effect of temperature; F2 and F1 showed the highest and the lowest activation energy, respectively. All gum dispersions displayed thixotropic behavior; hysteresis loop area and structural recovery increased significantly along the series of F1, F2 and F3. In general, the results indicated that CSG and the fractions exhibited significantly different rheological properties.