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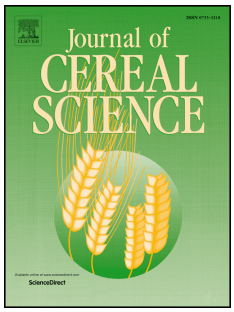

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LAOS Behavior of the Two Main Gluten Fractions: Gliadin and Glutenin

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ABSTRACT

Crude gliadin and glutenin fractions were studied using Large Amplitude Oscillatory measurements. LAOS measurements were carried out at three different frequencies (20, 10, 1 rad/sec) between the strain values of 0.01- 200%. The beginning of non-linearity for glutenin occurred at ~2.5%, while an initial region of strain hardening was observed for gliadin (2.5-10%) at 1 rad/sec frequency and up to 15% at the higher frequencies applied. Lissajous curves showed in the elastic analysis of both fractions glutenin was more elastically dominated since Lissajous curves were narrower, while for gliadin the ellipses were much broader suggesting more fluid-like behavior and each ellipse depended on the magnitude of frequency. Decreasing frequency increased the viscous behavior of both glutenin and gliadin in the non-linear region, but the change in gliadin was much more pronounced. Gliadin molecules only display intramolecular disulfide bonds creating a great deal of mobility whereas for glutenin molecules, which contain both intermolecular and intramolecular disulfide bonds, the strong network structure formed by this molecular arrangement results in very pronounced strain stiffening.

Key words: *glutenin, gliadin, LAOS, non-linear rheological behavior*