

**Title** Assessment of commercial milling potential of hard wheat by measurement of the rheological properties of whole grain

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**Citation** Journal of Cereal Science, Volume 45, Issue 2, March 2007, Pages 122-127

**Keywords** Genomics; Milling quality; Grain rheology; Wheat

#### **Abstract**

The single-kernel characterisation system (SKCS) 4100 instrument has previously been shown to provide in situ measurements of the rheological properties of the bran and endosperm layers of wheat, otherwise only possible following their isolation by dissection or machining. The current study has confirmed that endosperm maximum stress (endosperm strength (ES) as measured using the SKCS 4100 correlates highly ( $r=0.898$ ) with compressive strength (maximum stress,  $\sigma_{\max}$ ) measurements performed on specimens of endosperm tissues of known dimensions, isolated from different subsamples of the same bulk wheat samples. This provides a means of scaling the stress axis of the crush–response profile plots to the Instron scale (MPa) so that the SKCS endosperm stress/strain curves for hard wheat, soft wheat and durum can be compared with Instron results presented in the literature. In addition, a simple method for the measurement of ES and stiffness, using the SKCS 4100, has been developed. The method has been shown to rank wheat samples according to their performance when processed on a 650 kg/h pilot mill. The criterion against which the SKCS-derived rankings were compared was the Milling Quality Index, which uses both the percentage flour extraction and Branscan speck count measurements.