

**DETERMINANTS OF SUNFLOWER SEED QUALITY FOR
PROCESSING**

by

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ABSTRACT

The low and varying protein content and high crude fibre content of sunflower oil cake produced from sunflower seed create problems for the South African oil expelling industry. This prompted research into factors that may affect the seed quality for processing purposes. The seed quality characteristics are the seed oil and protein contents and the hullability. Analysis of the kernel-rich fraction produced after dehulling gives an indication of the potential oil yield, oil cake yield and oil cake protein and crude fibre contents and thus the processed value. Seed hullability and potential losses of oil and protein were affected by seed moisture content and seed size. Drying seed resulted in increased hullability, and sifting it into size classes proved to be a mechanism for differentiating in terms of oil cake quality. The effects of cultivar, environment and selected environmental variables on seed yield and processing quality were investigated by means of field trials. Seed yield and quality were more affected by environment than by cultivar. Seed size and hullability, and as a result also the protein content of the potential oil cake, were affected by plant population, with lower populations associated with better quality. Increased nitrogen application improved seed yield and seed protein content but lowered seed oil content, with no effect on hullability. Boron fertilisation improved seed yield in one trial but suppressed yield in a second trial. Hullability declined in one trial due to boron fertilisation. A mild water stress during the grain-filling stage reduced seed yield by 23% and hullability by 14%. Optimising the seed oil:seed protein ration through breeding may be the most advisable option for improving seed quality for processing. Due to the need for a seed grading system based on seed quality, regression analyses between easily measurable seed characteristics and seed quality parameters

were done. The relatively low mean deviation between measured and predicted values indicate that seed oil content, protein content and hullability can be estimated with reasonable accuracy. These relationships must still be validated.

Keywords: Boron, cultivar, hullability, nitrogen, oil, plant population, protein, seed quality, sunflower, water stress.

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