

**SOYBEAN SEED COMPONENTS AS AFFECTED BY NODAL POSITION,  
ENVIRONMENTAL CONDITIONS, AND IRRIGATION**

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**ABSTRACT**

Soybeans (*Glycine max* [L.] Merr.) are a major source of vegetable protein and edible oil. The nutritional quality of soybean seed depends upon the relative abundance of specific proteins and fatty acids. Additionally, secondary metabolites such as isoflavones, which are present in soybeans, have been shown to impact human health. Genetics, environmental conditions, and agronomic practices have a bearing on accumulation of each of these seed components. Work presented here reveals that the constituents of the protein and oil components vary with the nodal position of seed development and that irrigation significantly enhances accumulation of the isoflavones. Sodium dodecyl sulfate polyacrylamide gel electrophoresis provided evidence that proteins rich in the sulfur amino acids accumulate preferentially in seed from the basal nodes while proteins poor in these amino acids are found in the apical nodes. Fatty acid composition determined by gas chromatography showed a nodal dependent difference in the accumulation of monounsaturated and polyunsaturated fatty acids but no difference in that of the saturated fatty acids. Using two dimensional gel electrophoresis and gas chromatography, we determined that the protein and fatty acid profiles respectively, of soybeans cultivated in an early planting system were comparable to that of a traditionally cultivated crop. Continued research devoted to the elucidation of soybean genetics, physiology, and biochemistry is crucial for breeding and development of this vital food crop.