

Public Abstract

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Genotype, Environment and GE Interaction Effect on Soybean Oil Composition

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Changing the content of the five major soy-oil fatty acids which include palmitic, stearic, oleic, linoleic and linolenic acid is important to enhance food, fuel and other applications of soybean oil. In addition to genetic effects, the growth environment can significantly affect oil composition. This study addressed the influence of location, planting date, and irrigation on the fatty acid composition of soybean seed oil in genotypes with normal and modified fatty acid levels and evaluated stability of fatty acid composition across environments for the same set of genotypes. Irrigation consistently affected the content of saturated fatty acids. Significant interactions of planting date with locations and genotypes were found for all fatty acids. Genotypes differed in stability of fatty acid profile across environments. Reduced linolenic genotypes were more stable in linolenic acid content than common genotypes. On the other hand, mid-oleic genotypes were less stable for oleate content than lower oleic acid types. However, differences in oleic stability were found among mid-oleic genotypes. Soybean germplasm higher in oleate content with high stability will be useful to breed mid-oleic genotypes adapted to a wide range of growing conditions. Soybean cultivars with novel fatty acid profiles, like reduced linolenate and mid-oleate content, will likely be introduced for production in the near future. Knowing the best growing conditions regarding adaptation, planting dates, response to irrigation, along with other agronomic practices will insure that the specific environment for expression of a desirable fatty acid profile of the seed oil is consistently met.