

Diversity Among “TURDA” Maize Germplasm Kernel Content, Especially in Starch as Source of Improving Bioethanol Production from Maize

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SUMMARY

Compared to other crops with biofuel potential, maize can provide both starch (seed) and cellulosic (stover) material for bioethanol production. Starch is the main product of maize and one of the traits the breeders want to change the most. Starch production is critical both to the yield and to the quality of the grain.

Selection for yield and better kernel quality and a better conversion of maize biomass into bioethanol may have contributed to the maize improvement process. In this study, an association approach was used to evaluate major kernel composition traits, such as protein, oil, fiber, ash and starch concentration. 265 local populations (landraces), 59 synthetics and 430 inbred lines, representative of the phenotypic diversity among “Turda” germplasm of importance to temperate breeding were assayed to estimate diversity in kernel composition. All maize germplasm are provided from the collection of maize germplasm of the Agricultural Research Station, Turda – Romania. Comparison of the inbred lines diversity is on average the most divergent in kernel starch concentration (range value 19.9) from landraces (range value 11.8) and synthetics (range value 12.5).

The mean starch concentration of inbred lines has the most value 67.5%, comparatively with local population 64.9% and synthetics 65.9%. CV values for kernel content reflect a lower diversity for starch and protein concentration of all germplasm analyzed, a medium diversity of local population and synthetics for fat and fiber concentration and a high diversity of inbred lines for fat and minerals concentration.

There have been identified genotypes with high ability in inheritance of starch and fat concentration and high yield.