



# Chemical and genetic diversity of high-seed-yield sorghum (*Sorghum bicolor* M.) germplasms

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**ABSTRACT.** This study evaluated the chemical and genetic diversity of high-seed-yield sorghum germplasms from Korea, the United States, and South Africa. We identified significant differences in the chemical contents of whole plants at the heading stage in all cultivars, including differences in crude protein, fat, fiber, ash, neutral detergent fiber, acid detergent fiber, mineral, and fatty acid contents. Our results suggest that Banwoldang is the most appropriate cultivar for roughage because of its high protein yield. We identified significant differences in the tannin, flavonoid, amylose, mineral, crude fat, fatty acid, and 3-deoxyanthocyanin contents in the whole grain from all cultivars, but not in the mineral or crude fat contents. Tannin levels were generally low. IS645 contained the highest levels of flavonoids and linolenic acid compounds, and Moptak had the highest amylose and deoxyanthocyanidin content in the grain. To assess genetic diversity, we used 10 simple sequence repeat (SSR) primer sets to identify 38

alleles with 3-8 alleles per locus. Based on phylogenetic analysis of the SSR markers, the sorghum cultivars were divided into three major groups. Comparison of clusters based on chemical compositions with those based on SSRs showed that the groups formed by the three native Korean cultivars clustered similarly in molecular dendrograms. Association analysis was conducted for the 10 SSR marker; 48 chemical and growth traits were present for two marker traits (seed color and whole plant fatty acid content) with significant marker-trait associations. These markers could be used to select sorghum cultivars for breeding programs.

**Key words:** Chemical analysis; SSR marker; Marker-trait associations; Sorghum