

## **GWAS Combining with Principal Component Analysis Identifies QTLs Associated with Flavor Related Traits in Peanuts**

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Peanut flavor is a complex trait affected by raw material and processing technology and it is an important research area due to its significant influence on consumer preference. In this study, principle component analysis (PCA) on 33 typical traits associated with flavor revealed that the first three principle components (PCs): total sugars, sucrose, and total tocopherols, provided more information related to peanut flavor. Genome wide association studies (GWAS) using 102 U.S. peanut mini core collection were performed to study associations between 12,526 single nucleotide polymorphic (SNP) markers and the three PCs. A total of seven significant quantitative trait loci (QTLs) and four genes nearby were identified for total sugars and 22 significant QTLs with eight genes for sucrose were also obtained. In addition, two and five stable QTLs were identified for total sugars and sucrose in both years separately. No significant QTLs were detected for total tocopherols. Results from this research provide useful knowledge about the genetic control of peanut flavor, which will aid in elucidating the genetic and molecular mechanisms of flavor research in peanut.