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Identification of Soybean Accessions with Low Kunitz Trypsin Inhibitor Activity in Korean Soybean Germplasms

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[Introduction]

Soybean Kunitz Trypsin inhibitor (KTi) is a non-nutritive factor that reduces the food availability of soybean processed foods. KTi causes indigestion by inhibiting trypsin digesting enzymes secreted by the pancreas of mammals. High-temperature treatment (100°C, 40min) can reduce KTi activity, but this treatment also can destroy the nutrients. In this study, Korean soybean germplasm was evaluated to find low KTi activity.

[Materials and Methods]

A colorimetric analysis method based on a substrate and enzyme reaction suitable for large-scale analysis of KTi activity was used. The extracted soybean dilution was reacted with the substrate (_{DL}-BAPA). After addition of Bovine trypsin, the absorbance was measured at 410nm, and the KTi activity was calculated. To investigate the KTi gene mutation, the CDS part of KTi 1 gene and KTi 3 gene were sequenced with ABI 3730xl DNA Analyzer (Macrogen, Korea), and the KTi gene sequences were compared with BioEdit (Biological Sequence Alignment Editor).

[Results and Discussion]

Among 908 Korean soybean accessions, the KTi activity ranged from 45.8% to 99.5%, with an average of 89.2%. A total of 6 soybean accessions having less than 60% KTi activity were selected for targeted sequencing. In this study, three accessions had same genetic mutation with PI157440 (KTi 3 null gene). However, the other three accessions had no genetic variation within coding regions of KTi 3 gene. Further analysis will be performed to find genetic variation associated with low KTi activity.

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