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Screening of Soybean Germplasm Accessions for Low Lipoxygenase and Kunitz Trypsin Inhibitor Activities

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[Introduction]

In soybean [*Glycine max* (L.) Merr.], anti-nutritional factors such as Lipoxygenase (LOX) and Kunitz trypsin inhibitors (KTI) affects its protein quality and limit their utilization in food uses. Lipoxygenase is an enzyme for the beany flavor of soybeans and KTI functions as a protease inhibitor. In this study, we screened 908 soybean germplasms to identify soybean accessions containing low LOX and KTI activities.

[Materials and Methods]

A colorimetric assay suitable for mass spectrometry and consistent with the SDS-PAGE method was used to assay for lipoxygenase. LOX1 and LOX2 use Methylene blue (blue), and LOX3 uses Beta-carotene (yellow) to confirm the photobleaching reaction. KTI activity utilized the enzyme reaction with Trypsin and DL-BAPA. KTI activity was measured at 410nm absorbance. In addition, SDS-PAGE assay was used to confirm the low LOX and KTI activities.

[Results and Discussion]

Among 908 soybean germplasms, three null-LOX1 lines, three null-LOX2 lines were found. However, there was no null-LOX3 lines. In KTI activity test, reduction percentage of Trypsin activity ranged from 45.8% to 99.5%. Based on this result, we identified two soybean lines showing low KTI activities (45.8% and 49.3%). These null-LOX and low KTI soybean lines will be used for genetic studies to determine the molecular basis of these variations.

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