

## DEVELOPMENT OF SOYBEAN VARIETIES WITH SPECIFIC NUTRITIONAL COMPOSITION OF GRAIN

Vesna Peric<sup>1\*</sup>, Mirjana Srebric<sup>1</sup>, Vesna Dragicevic<sup>1</sup>, Ana Nikolic<sup>1</sup>, Aleksandar Mikic<sup>2</sup>, Snezana Mladenovic Drinic<sup>1</sup>

<sup>1</sup>Maize Research Institute "Zemun Polje", Slobodana Bajica 1, 11185 Zemun Polje, Belgrade, Serbia

<sup>2</sup>Institute of Field and Vegetable Crops, Maksima Gorkog 30, 21000 Novi Sad, Serbia

\*e-mail: vperic@mrizp.rs

### Abstract

The major limitation to use row soybean grain in animal feed is presence of protease inhibitors - Kunitz trypsin inhibitor (KTI) and Bowman - Birk inhibitor (BBI), the main anti-nutritional factors of soybeans. They are responsible for the reduced digestibility of seed proteins and may cause disruption in animal's development. About 80% of tryptic activity inhibition is caused by KTI. Grain of conventional soybean varieties requires heat processing to break down trypsin inhibitor's activity before using as food or animal feed. The excessive heat treatments (uncontrolled temperature; long period of time) may decrease protein solubility and lower amino acid availability. The genetic control of presence of (Ti) has been reported as a co-dominant multiple allelic series at a single locus, while lack of KTI is inherited as a recessive allele designated ti.

A section of soybean breeding program in Maize Research Institute Zemun Polje is aimed at reducing trypsin inhibitor activity, by crossing parent donor of desirable character (variety Kunitz-titi line) with adapted high yielding varieties (Ti line). Presence/absence of KTI in progeny was done by protein electrophoresis of mature seed from the individual plants in several segregating generations. After field trials over years and different locations, high-yielding soybean lines lacking KTI were identified.

As a result of this breeding program, two varieties lacking KTI - Lana (maturity group II) and Laura (maturity group I), were released. Trypsin inhibitor content ranged from and 15.01 mg g<sup>-1</sup> in Laura to 15.35 mg g<sup>-1</sup> in Lana, which was about 50% less than in the genotypes of standard grain type. Grain yield of varieties is equal to high yielding varieties from the same maturity groups. Soybean lines with reduced protease inhibitor content could reduce or eliminate the need for expensive heat treatments and lessen the chance of lowering amino acid availability.

This type of varieties might be suitable for small farms with direct feed production and animal growing.

**Key words:** Soybean, Breeding, Kunitz trypsin inhibitor, Animal feed.