

## ABSTRACT

**Putri Fauzatun Nadhira. 24020220140068. In Silico Analysis of DNA Fingerprint of Indonesian Soybean Varieties (*Glycine max* (L.) Merr) Based on SNP (Single Nucleotide Polymorphism) Markers. Under the guidance of Hermin Pancasakti Kusumaningrum and Dani Satyawan.**

Soybean ranks third after rice and corn as a food consumed in Indonesia. But until now, 90% of the national soybean needs must be imported from abroad. One of the causes is the low productivity of national soybean. Efforts to improve the local competitiveness of national soybeans are using SNP markers. Soybean varieties that have unique SNPs in each soybean genotype will serve as a unique identity or fingerprint of each genotype. DNA fingerprint analysis using SNP markers has advantages over other molecular markers, including a high level of polymorphism, co-dominance, wide distribution, and high stability from generation to generation. This study aims to identify a set of SNP markers that can be used to characterize the identity of Indonesian soybean varieties. LD (linkage disequilibrium) analysis of 192 Indonesian soybean strains and varieties was conducted with TASSEL software, followed by phylogeny analysis of Indonesian soybean kinship relationships visualized using MEGA-X software. PCA analysis of Indonesian soybean with USDA global soybean collection was conducted using R studio. Genotyping maps of 20 soybean chromosomes were constructed with GGT2 software. The soybean identity SNP marker set was formulated using MinimalMarker software. The LD decay curve shows an average value of  $r^2 = 0.1$  at a distance of 244 kb. The genetic diversity of Indonesian soybeans is still centered in one small cluster of the entire genetic diversity of soybeans in the world. SNP marker-based genotyping maps have diverse patterns on each chromosome, making them useful for selecting polymorphic markers and useful for plant variety protection purposes as well as tracking the linkage of markers with superior traits in soybean breeding. Minimal SNP markers that can be used to characterize the identity of 192 soybeans from Indonesia were found to be 19 sets of SNP markers.

**Keywords:** *Soybean, DNA Marker, DNA Fingerprinting, SNPs*