

## **ABSTRACT**

### **PHYSICAL CHARACTERISTICS AND WATER DIFFUSION COEFFICIENT OF FOUR SOYBEAN (*Glycine max*) VARIETIES AT DIFFERENT SOAKING TEMPERATURES**

**By**

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Soybean is a source of vegetable protein which is widely used as a food processed in Indonesia. Soaking is an the important process in the processing of soybeans into food products. The purposes of this research were to describe the physical characteristics and to calculate water diffusion coefficient as well as the activation energy of four varieties of soybean during soaking.

This research used a completely randomized design (CRD) with 5 treatments of soaking temperature which are 28°C, 35°C, 40°C, 45°C and 50°C and 4 replications for each treatment. Soybean varieties used were Anjasmoro, Argomulyo, Gepak Kuning and Grobogan. Soaking was performed for 300 minutes and every 20 minutes the samples were taken to be measured. Parameters measured were water content, dimensions of length, width, thickness and hardness.

The results showed that soaking temperature significantly affects the physical characteristics of soybean. The water absorption rate based on the Peleg's

equation increased with increasing of soaking temperature. Based on the Crank's equation, water diffusion coefficient of Anjasmoro was about  $(7,76 \text{ to } 11,50) \times 10^{-11} \text{ m}^2/\text{sec}$ , Argomulyo  $(7,59 \text{ to } 14,42) \times 10^{-11} \text{ m}^2/\text{sec}$ , Gepak Kuning  $(8,00 \text{ to } 14,83) \times 10^{-11} \text{ m}^2/\text{sec}$  and Grobogan  $(6,46 \text{ to } 15,18) \times 10^{-11} \text{ m}^2/\text{sec}$ . The activation energy in the diffusion process of water during soaking for Anjasmoro was 14,79 kJ/mol, Gepak Kuning 18,02 kJ/mol, Argomulyo 22,56 kJ/mol and Grobogan 32,37 kJ/mol.

**Keywords:** Physical characteristics, diffusion coefficient, soaking temperature, Anjasmoro, Argomulyo, Gepak Kuning, Grobogan

## **ABSTRAK**

### **KARAKTERISTIK FISIK DAN KOEFISIEN DIFUSI AIR EMPAT VARIETAS UNGGUL KEDELAI (*Glycine max*) PADA BEBERAPA SUHU PERENDAMAN**

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Kedelai merupakan sumber protein nabati yang banyak dijadikan olahan pangan di Indonesia. Perendaman merupakan salah satu proses penting dalam pengolahan kedelai menjadi produk pangan. Tujuan dari penelitian ini adalah untuk menjelaskan karakteristik fisik dan menghitung koefisien difusi air serta energi aktivasi empat varietas unggul kedelai selama perendaman.

Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) dengan 5 perlakuan suhu perendaman dan 4 ulangan yaitu suhu 28°C, 35°C, 40°C, 45°C dan 50°C. Varietas unggul kedelai yang digunakan yaitu Anjasmoro, Argomulyo, Gepak Kuning dan Grobogan. Parameter yang diamati adalah kadar air, dimensi panjang, lebar, tebal dan kekerasan. Perendaman dilakukan selama 300 menit dengan interval waktu pengamatan setiap 20 menit.

Hasil penelitian ini menunjukkan bahwa suhu perendaman berpengaruh nyata terhadap karakteristik fisik empat varietas unggul kedelai. Laju penyerapan dan kapasitas penyerapan air berdasarkan persamaan Peleg mengalami peningkatan dengan meningkatnya suhu perendaman. Berdasarkan persamaan Crank, koefisien difusi air varietas Anjasmoro sebesar  $(7,76-11,50) \times 10^{-11} \text{ m}^2/\text{detik}$ , Argomulyo sebesar  $(7,59-14,42) \times 10^{-11} \text{ m}^2/\text{detik}$ , Gepak Kuning sebesar  $(8,00-14,83) \times 10^{-11} \text{ m}^2/\text{detik}$  dan Grobogan sebesar  $(6,46-15,18) \times 10^{-11} \text{ m}^2/\text{detik}$ . Sedangkan energi aktivasi dalam proses difusi air selama perendaman varietas Anjasmoro sebesar 14,79 kJ/mol, Gepak Kuning sebesar 18,02 kJ/mol, Argomulyo sebesar 22,56 kJ/mol dan Grobogan sebesar 32,37 kJ/mol.

Kata kunci: Karakteristik fisik, koefisien difusi air, suhu perendaman, Anjasmoro, Argomulyo, Gepak Kuning, Grobogan