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Analisis Matematis Pengaruh Jenis dan Kadar Air Terhadap Karakteristik Fisik dan Mekanis Biji Kedelai (Glycine max)
ALDHAYU SAM SAFIRA, Dr. Ir. Nursigit Bintoro, M.Sc;Dr. Joko Nugroho Wahyu Karyadi, STP, M.Eng
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INTISARI

ANALISIS MATEMATIS PENGARUH JENIS DAN KADAR AIR TERHADAP KARAKTERISTIK FISIK DAN MEKANIS BIJI KEDELAI *(Glycine max)*

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Kacang kedelai merupakan salah satu sumber protein nabati yang paling populer di Indonesia yaitu dalam bentuk tahu dan tempe. Tingginya tingkat konsumsi pangan ini memerlukan pemenuhan akan kedelai yang berkualitas. Studi tentang sifat fisik dan mekanis kedelai merupakan salah satu upaya yang dapat dilakukan agar produksi kedelai yang dihasilkan bermutu baik sehingga mampu meningkatkan produksi dan penerapan mekanisasi pertanian. Pada penelitian ini dalam mengetahui pengaruh jenis biji kedelai dan kadar air terhadap parameter sifat fisik dan mekanis biji kedelai digunakan metode rancangan faktorial 3x3 dengan tiga ulangan pada setiap kombinasi perlakuan menggunakan statistika SPSS uji anova dua arah dan perbandingan rata-rata perlakuan menggunakan uji Duncan's Multiple Range Test (DMRT). Terdapat tiga jenis biji kedelai dalam pengujian yakni kedelai lokal (Galunggung), kedelai import (Amerika) dan kedelai hitam (Malika) dengan kandungan air 10-16% (wb). Beberapa parameter sifat fisik yang diukur meliputi dimensi, *mean geometric diameter*, *sphericity*, berat 1000 butir, *bulk density*, *particle density*, *porosity*, warna dan kekerasan sedangkan parameter sifat mekanis yang diuji, yaitu *terminal velocity, angle of internal friction,* dan *angle of wall friction.* Hasil penelitian menunjukkan secara umum jenis biji kedelai dan kadar air mempengaruhi nilai semua parameter sifat fisik dan mekanis biji kedelai, tetapi kadar air tidak mempengaruhi nilai *sphericity.* Sedangkan interaksi antara jenis dan kadar air mempengaruhi nilai panjang, lebar, *mean geometric diameter*, *sphericity*, berat 1000 butir, *bulk density*, porositas *tapped density*, warna, kekerasan, *angle of internal friction* dan *angle of wall friction*. Di sisi lain adanya peningkatan kadar air menyebabkan sifat fisik maupun mekanis mengalami peningkatan yaitu pada nilai dimensi, *mean geometric diameter*, berat 1000 butir, *lightness*, porositas, *terminal velocity*, *angle of internal friction*, dan *angle of wall friction* namun penurunan nilai terjadi pada kekerasan, *chroma, bulk density*, dan *particle density.*

Kata kunci: biji kedelai, sifat fisik, sifat mekanis, jenis, kadar air

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ABSTRACT

MATHEMATICAL ANALYSIS OF THE EFFECT OF GRAIN TYPE AND MOISTURE CONTENT ON PHYSICAL AND MECHANICAL PROPERTIES OF SOYBEAN *(Glycine max)*

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Soybean is one of the most popular sources of vegetable protein in Indonesia, namely in the form of tofu and tempeh. This high level of food consumption has created a demand for quality soybeans. The study of physical and mechanical properties of soybeans is one of the efforts that can be done so that the soybeans produced are of good quality in order to increase the production and application of agricultural mechanization. In this research, to determine the effects of the types soybean seeds and moisture content on the parameters of physical and mechanical properties of soybean seeds, a 3x3 factorial design method was used with three replicates in each treatment combination using the SPSS statistics with two-way ANOVA and comparison of the treatment averages using the Duncan's Multiple Range Test (DMRT). There were three varieties of soybean seeds used in this research, namely local soybeans (Galunggung), imported soybeans (American) and black soybeans (Mallika) with a moisture content of 10-16% (wb). The parameters of physical properties measured in this research included dimensions, mean geometric diameter, sphericity, weight of 1000 grains, bulk density, particle density, porosity, color and hardness, while the parameters of mechanical properties were terminal velocity, angle of internal friction, and angle of wall friction. The results showed that in general the types of soybean seeds and moisture content affected the values of all parameters of the physical and mechanical properties of soybean seeds, but the moisture content did not affect the sphericity value. On the other hand, the interaction between types of soybean seeds and moisture content affected the values of length, width, mean geometric diameter, sphericity, weight of 1000 grains, bulk density, porosity of tapped density, color, hardness, angle of internal friction and angle of wall friction. The increase in moisture content caused both physical and mechanical properties to increase, namely in the values of dimensions, mean geometric diameter, weight of 1000 grains, lightness, porosity, terminal velocity, angle of internal friction, and angle of wall friction, but there was a decrease in the values of hardness, chroma, bulk density, and particle density.

Keywords: soybean seeds, physical properties, mechanical properties, types, moisture content