

INTISARI

ANALISIS MATEMATIS PENGARUH VARIASI JENIS BIJI DAN KADAR AIR TERHADAP KARAKTERISTIK FISIK DAN MEKANIS JAGUNG (*Zea mays L.*)

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Pengujian sifat fisik maupun mekanis biji jagung sangat dibutuhkan sebagai informasi awal dalam perancangan alat dan mesin industri pertanian berbahan baku jagung. Sifat fisik bahan yang berbeda memerlukan jenis penanganan yang berbeda. Tujuan dari penelitian ini yaitu menganalisis secara statistik pengaruh variasi jenis biji jagung dan kadar air terhadap parameter sifat fisik dan mekanis biji jagung serta menetapkan hubungan matematis dari sifat-sifat tersebut terhadap kadar airnya. Pengujian dilakukan menggunakan tiga jenis biji jagung, yakni *dent corn*, *flint corn*, dan *popcorn* dengan kandungan kadar air 14 – 25 % basis basah (wb). Beberapa parameter sifat fisik yang diukur meliputi dimensi, *mean geometric diameter*, *sphericity*, berat 1000 butir, warna, kekerasan, *bulk density*, *particle density*, dan porosity, sedangkan parameter sifat mekanis yang diuji, yaitu *terminal velocity*, *angle of internal friction*, dan *angle of wall friction*. Hasil penelitian menunjukkan jagung jenis popcorn yang memiliki dimensi paling kecil menghasilkan nilai *bulk density*, *particle density*, kekerasan, *terminal velocity*, *angle of internal friction*, dan *angle of wall friction* rerata paling besar. Hasil sebaliknya ditemukan pada jagung jenis *dent corn* yang memiliki ukuran paling besar. 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 demikian, penurunan nilai justru terjadi pada kekerasan, *bulk density*, dan *particle density*.

Kata kunci: Jenis biji jagung, kadar air, sifat fisik, sifat mekanis

ABSTRACT

MATHEMATICAL ANALYSIS OF THE EFFECT OF GRAIN TYPE AND MOISTURE CONTENT ON PHYSICAL AND MECHANICAL PROPERTIES OF CORN (*Zea mays L.*)

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The testing of physical and mechanical properties of corn seed is needed as the initial information in designing the tools and machines in agricultural industry that uses corn seed as their raw material. Physical properties which are different one and another need the different treatment as well. The objective of this research is to analyse statistically the influence of corn seed variants and the moisture content towards the parameters of the physical and mechanical properties of corn seed and applying the mathematical relation in the three type of corn seed which are dent corn, flint corn, and popcorn which have the moisture content in the range of 14-25% of wet basis. The parameters of physical characteristics that are measured are including the dimension, mean geometric diameter, sphericity, weight of 1000 grains, colour, firmness, bulk density, particle density, and porosity. The parameters of physical characteristics that are examined include the terminal velocity, angle of internal friction and angle of wall friction. The result of the research shows that the popcorn that has the smallest dimension produces the highest value in bulk density, particle density, solidity, terminal velocity, angle of internal friction, and angle of wall friction. The opposite result occurs in dent corn which has the bigger size. In the other side, the increase of water content causes the the increase of physical and mechanical properties in the value of the dimension, mean geometric diameter, weight of 1000 grains, lightness, porosity, terminal velocity, angle of internal friction, and angle of wall friction. However, the value of firmness, bulk density and particle density are decreasing.

Keyword: corn type, moisture content, physical properties, mechanical properties.