INTISARI

Kinetika Perubahan Sifat Fisik dan Kadar Tanin Biji Sorgum (*Sorghum bicolor* L.) Selama Perendaman

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Perendaman merupakan proses penting dalam pengolahan biji sorgum untuk memperbaiki nutrisi dengan cara menurunkan kandungan tanin. Beberapa penelitian telah dilakukan untuk mengkaji proses perendaman biji sorgum dan penurunan kadar tanin, namun belum mengkaji tentang kinetika reaksi perubahan selama perendaman. Penelitian ini bertujuan mempelajari kinetika perubahan sifat fisik biji sorgum selama proses perendaman.

Penelitian ini menggunakan biji sorgum merah sosoh dan non sosoh yang direndam selama 24 jam dalam larutan aquades dan alkali pada suhu 30, 45, dan 60 ^{o}C. Parameter yang diamati meliputi kadar air, kadar tanin, kekerasan, volume, dan tingkat kecerahan (*lightness*) yang kemudian dilakukan analisa data statistik dan kinetika laju perubahan parameter.

Hasil penelitian menunjukkan perlakuan suhu berpengaruh nyata terhadap perubahan seluruh parameter biji sorgum selama perendaman. Peningkatan suhu mempercepat proses difusi dengan nilai koefisien difusi (D*eff*) berkisar 6,6345 x 10^{-12} m^2/detik sampai dengan 13,5519 x 10^{-12} m^2/detik dan nilai energi aktivasi 8,054 kJ/mol; 3,274 kJ/mol; 3,183 kJ/mol; dan 7,290 kJ/mol pada perlakuan biji non sosoh perendaman aquades, biji non sosoh perendaman alkali, biji sosoh perendaman aquades, dan biji sosoh perendaman alkali. Penurunan kadar tanin tertinggi sebesar 77,90% diperoleh pada perlakuan biji sosoh dalam perendaman alkali pada suhu 60 ^{o}C. Penurunan kekerasan biji sorgum tertinggi terjadi pada perlakuan biji sosoh dalam perendaman alkali (76,0%). Dan peningkatan volume terbesar diperoleh pada perlakuan biji non sosoh dalam perendaman aquades.

Nilai konstanta laju reaksi cenderung meningkat seiring dengan peningkatan suhu proses perendaman. Hal tersebut bermakna perubahan parameter berlangsung lebih cepat pada suhu yang lebih tinggi sehingga energi aktivasi yang digunakan lebih kecil. Persamaan kinetika Orde 2 memiliki konsistensi terbaik dalam perhitungan nilai konstanta laju reaksi perubahan dan energi aktivasi semua parameter pengamatan biji sorgum selama perendaman.

Kata kunci : sorgum, kinetika, perendaman, difusi.

ABSTRACT

Kinetics of Changes on Physical Characteristics and Tannin Level of Sorghum Seeds (*Sorghum bicolor* L.) During Soaking.

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Soaking is an important process on sorghum seeds processing to improve nutrition by reducing the tannin content. Some studies have been done to examine the soaking process of sorghum seeds decrease in tannin level, but have not examined the kinetics of reaction changes during soaking yet. The aim of this experiment is to study the kinetics of changes on physical characteristics and tannin level of sorghum seeds during soaking.

This experiment used milled and not milled red sorghum seeds which were soaked for 24 hours in distilled and alkaline solution at 30, 45, and 60 ^{o}C. Parameters observed included water content, tannin content, hardness, volume, and lightness level, which analized with statistical data and the kinetics of parameter change rate.

The results showed that the temperature treatment had a significant effect on the changes in all parameters of sorghum seeds during soaking. The increasing in temperature accelerated the diffusion coeffisient (D*eff*) in range 6,6345x10^{-12} m^2/second to 13,5519x10^{-12} m^2/second and energy activation 8,054 kJ/mol; 3,274 kJ/mol; 3,183 kJ/mol; and 7,29 kJ/mol on the distilled water soaking treatment of not milled sorghum seeds, alkaline soaking treatment of not milled seeds, the distilled water soaking treatment of milled sorghum seeds, alkaline soaking treatment of milled seeds. The highest decrease in tannin content was 77,9% that obtained in the treatment of alkaline soaking treatment of milled seeds at 60 ^{o}C. The highest increase in volume occured in the treatment of alkaline soaking treatment of milled seeds (76,0%). And the biggest increase in volume was obtained from the disstilled water soaking treatment of not milled seeds.

The value of the constant rate tended to increase with increasing the temperature of soaking process. This means that the changes in parameter is faster at higher temperature so the energy activation used is lower.

The Orde 2 kinetic equation has the best consistency in the calculating of the constant reaction change rate and the energy activation for all of the parameters of observation of sorghum seeds during soaking.

Key words: sorghum, kinetics, soaking, diffusion.