

KOMPOSIT ALGINAT-KITOSAN SEBAGAI *CONTROLLED RELEASE* MAKRONUTRISI NPK

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INTISARI

Komposit alginat-kitosan sebagai *controlled release* NPK telah dilakukan. Penelitian ini bertujuan untuk mempelajari pelepasan NPK dari komposit berdasarkan variasi massa alginat dan kitosan, konsentrasi NPK serta pH larutan. Komposit dibuat dengan menggunakan alginat, kitosan, larutan pupuk dan larutan CaCl_2 0,5 M. Karakterisasi komposit dilakukan menggunakan spektrofotometri FTIR (*Fourier Transform Infrared*) dan SEM (*Scanning Electron Microscope*). Konsentrasi NPK yang terlepas dianalisis menggunakan spektrofotometer UV-Vis dan AAS. Kinetika pelepasan NPK dikaji menggunakan model orde satu, dua, tiga, satu semu, dua semu dan Korsmeyer-Peppas.

Hasil penelitian menunjukkan bahwa penambahan kitosan ke dalam komposit membuat pelepasan nutrisi menjadi lebih lambat. Pelepasan nutrisi dipengaruhi oleh konsentrasi NPK dan pH larutan. Semakin tinggi konsentrasi NPK maka semakin banyak nutrisi yang lepas, sedangkan semakin asam pH larutan maka semakin banyak nutrisi yang lepas. Mekanisme pelepasan nutrisi mengikuti persamaan Korsmeyer-Peppas.

Kata kunci: *controlled release fertilizer*, nitrogen, fosfor, kalium, komposit alginat-kitosan.

***ALGINATE-CHITOSAN COMPOSITE AS CONTROLLED RELEASE OF NPK
MACRONUTRIENT***

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ABSTRACT

Alginate-chitosan composite as controlled release of NPK have been performed. The research aims to study the release of N, P, K compound from composite with the variation of alginate and chitosan mass, NPK concentration and pH solution. Composite was prepared by mixing alginate, chitosan, liquid fertilizer. The obtained composite was characterized by FTIR (Fourier Transform Infrared) and SEM (Scanning Electron Microscope). The amount of release NPK was measured by UV-Vis spectrophotometer and Atomic Absorption Spectrophotometer (AAS). Kinetics study of the release NPK evaluated using first, second, third, pseudo first, pseudo second order, and Korsmeyer-Peppas equation.

Results of the study showed that addition of chitosan into composite causes a decrease of release NPK. The release of NPK affected by NPK concentration and pH solution. The higher of concentration NPK and lower pH solution causes an increase of release rate of NPK. Mechanism of release NPK followed Korsmeyer-Peppas equation.

Keywords: controlled release fertilizer, nitrogen, phosphor, potassium, composite alginate-chitosan.