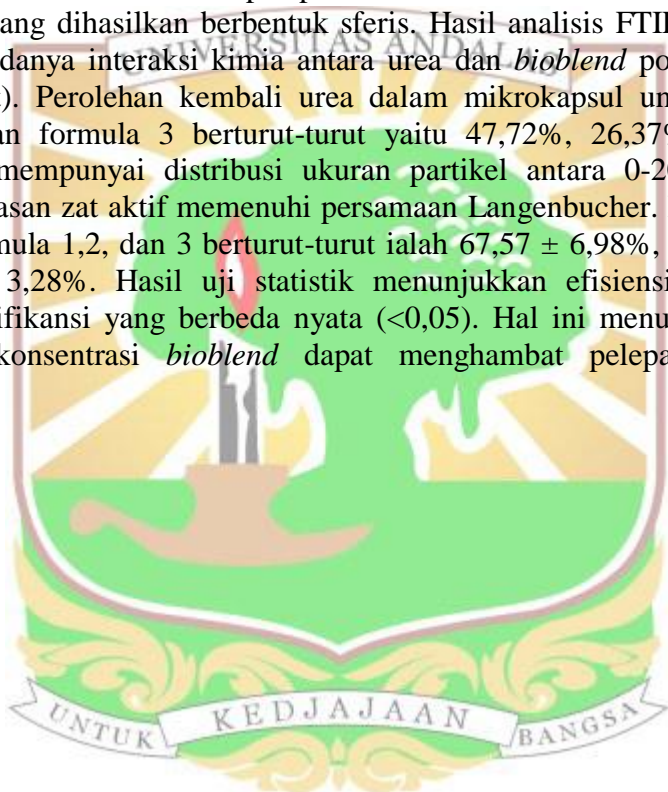


## ABSTRAK

Formulasi sediaan pupuk urea lepas lambat dengan teknik mikroenkapsulasi menggunakan *bioblend* polistirena dan poli(3-hidroksibutirat) telah dilakukan. Pembuatan mikrokapsul dilakukan menggunakan teknik emulsifikasi penguapan pelarut dengan perbandingan urea dan *bioblend* 1:1, 1:1,5, dan 1:2. Sementara perbandingan polistirena dan poli(3-hidroksibutirat) pada tiap formula adalah 1:1, 2:1, dan 3:1. Evaluasi mikrokapsul yang dihasilkan meliputi *Scanning Electron Microscope* (SEM), spektroskopi *Fourier Transform Infra Red* (FTIR), distribusi ukuran partikel, penetapan kadar urea dalam mikrokapsul, uji pelepasan, dan model kinetika pelepasan zat aktif. Hasil SEM menunjukkan mikrokapsul yang dihasilkan berbentuk sferis. Hasil analisis FTIR menunjukkan bahwa tidak adanya interaksi kimia antara urea dan *bioblend* polistirena-poli(3-hidroksibutirat). Perolehan kembali urea dalam mikrokapsul untuk formula 1, formula 2, dan formula 3 berturut-turut yaitu 47,72%, 26,37%, dan 20,1%. Mikrokapsul mempunyai distribusi ukuran partikel antara 0-200  $\mu\text{m}$ . Model kinetika pelepasan zat aktif memenuhi persamaan Langenbucher. Persen efisiensi pelepasan formula 1,2, dan 3 berturut-turut ialah  $67,57 \pm 6,98\%$ ,  $50,43 \pm 2,98\%$ , dan  $41,44 \pm 3,28\%$ . Hasil uji statistik menunjukkan efisiensi uji pelepasan memiliki signifikansi yang berbeda nyata ( $<0,05$ ). Hal ini menunjukkan bahwa peningkatan konsentrasi *bioblend* dapat menghambat pelepasan urea dari mikrokapsul.



## ABSTRACT

Formulation of urea slow released fertilizers using polystyrene and poly(3-hydroxybutyrate) bioblend as matrix by microencapsulation technique have been studied. Microcapsules were prepared by solvent evaporation method. The ratio of urea and bioblend were 1:1, 1:1.5, and 1:2, while the ratio of polystyrene and poly(3-hydroxybutyrate) were 1:1, 2:1, and 3:1 respectively. Evaluation of microcapsules included Scanning Electron Microscope (SEM), Fourier Transform Infra Red spectroscopy (FTIR), particle size distribution, amount of urea in microcapsules, release test, and release kinetic study. SEM showed that microcapsules were spherical in shape. There was no chemical interaction between urea, polystyrene, and poly(3-hydroxybutyrate). The percentages of drug loading for formula 1, 2, and 3 were 47.72%, 26.37%, and 20.1%. Particle size distribution of urea microcapsules were 0-200  $\mu\text{m}$ . The release kinetic model of urea from microcapsules followed Langenbucher equation. The percentage of dissolution efficiencies for each formulas were  $67.57 \pm 6.98\%$ ,  $50.43 \pm 2.98\%$ , and  $41.44 \pm 3.28\%$ . Statistical analysis using One Way ANOVA showed that dissolution efficiencies among formula were different significantly ( $<0.05$ ). It concludes that the increase of bioblend concentration could decrease urea release from microcapsules.

