

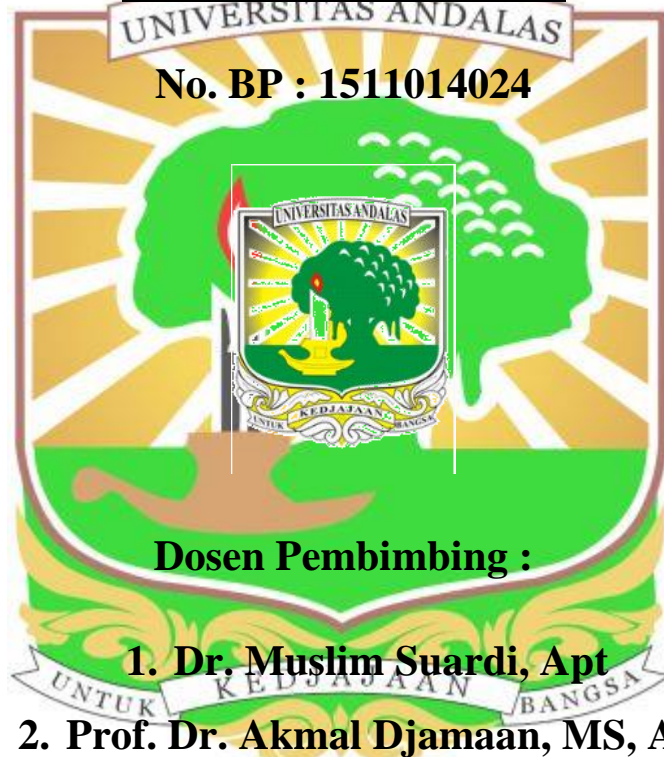
**FORMULASI, KARAKTERISASI DAN UJI  
EFEKTIFITAS GRANUL PUPUK NITROGEN FOSFOR  
LEPAS LAMBAT**

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# FORMULASI, KARAKTERISASI DAN UJI EFEKTIFITAS GRANUL PUPUK NITROGEN FOSFOR LEPAS LAMBAT

## ABSTRAK

Penyalutan pada pupuk berperan dalam meningkatkan efektifitas dan meminimalkan pencemaran lingkungan. Penelitian ini bertujuan untuk mengetahui pengaruh penyalutan pupuk *coating bioblend polistiren(PS) microcrystalline cellulose(MCC)* rasio 99:1(F1), 95:5(F2), 90:10(F3), *coating MCC 5%(F0)*, dan kontrol(C) terhadap pertumbuhan tanaman bawang daun (*Allium fistulosom L.*). Metode yang digunakan yaitu teknik *spray coating* terhadap granul pupuk dan dilakukan karakterisasi *in-vitro* berupa karakterisasi morfologi permukaan granul dengan *Scanning Electron Microscopy(SEM)*, analisis gugus fungsi dengan *Fourier Transform Infrared Spectroscopy(FTIR)* dan uji penetapan kadar dan pelepasan pupuk menggunakan Spektrofotometer UV-Vis serta karakterisasi *in-planta*. Hasil yang diperoleh pada uji SEM yaitu bentuk morfologi dari pupuk pada tampak granul utuh dan dipotong melintang masing-masing formula, analisis FTIR menunjukkan tidak terdapat interaksi kimia antara pupuk Nitrogen Fosfor(NP) dengan penyalut dan pelepasan pupuk NP dalam medium *aquadest* formula C, F0, F1 menunjukkan profil pada model kinetika pelepasan Higuchi dan formula F2,F3 mengikuti Orde 1. Karakteristik *in-planta* formula 1 menunjukkan efektifitas paling baik dibandingkan formula lainnya. Sehingga dapat disimpulkan formulasi granul pupuk NP lepas lambat menggunakan *coating bioblend PS:MCC* lebih efektif dan efisien dibandingkan granul pupuk NP konvensional.

Kata kunci: pupuk Nitrogen Fosfor (NP), pupuk lepas lambat (*Slow Release Fertilizer*), polistiren (PS), *microcrystalline cellulose* (MCC), model pelepasan kinetika, bawang daun (*Allium fistulosom L.*)

# FORMULATION, CHARACTERIZATION AND EFFECTIVENESS TEST OF GRANUL PHOSPHOROUS NITROGEN FERTILIZER

## ABSTRACT

Coatings on fertilizers play a role in increasing effectiveness and minimizing environmental pollution. This study aims to determine the effect of coating on fertilizers by bio blend polystyrene-microcrystalline cellulose (MCC) coating ratio of 99: 1 (F1), 95: 5 (F2), 90:10 (F3), 5% MCC coating (F0), and control (C) on the growth of spring onion plants (*Allium fistulosom* L.). The method used was a spray coating technique on fertilizer granules, and in-vitro characterization was carried out in the form of characterization of granule surface morphology by Scanning Electron Microscopy (SEM), functional group analysis by Fourier Transform Infrared Spectroscopy (FTIR) and assay determination and fertilizer release using a spectrophotometer Uv-Vis and characterization in-planta. The results obtained in the SEM test were morphological forms of fertilizers on the appearance of intact granules and cut across each formula, FTIR analysis showed no chemical interaction between Nitrogen, Phosphorus (NP) fertilizer and coating and release of NP fertilizer in aquadest formula C, F0, F1 shows the profile in Higuchi release kinetic model and formula F2, F3 following Order 1. Characteristics of in-planta formula 1 show the best effectiveness compared to other formulas. So that it can be concluded that the NP fertilizer granule formulation is slow release using a bio blend PS: MCC is more effective and efficient than conventional NP fertilizer granules.

Keywords: Nitrogen Phosphorus (NP) fertilizer, slow release fertilizer (Slow Release Fertilizer), polystyrene (PS), microcrystalline cellulose (MCC), kinetics release model, spring onion (*Allium fistulosom* L.)