

ABSTRACT

THE EFFECT OF ADDING UREA FERTILIZER ON THE CHARACTERISTICS OF PELLET COMPOST FERTILIZER

BY

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Organic fertilizers and chemical fertilizers have their respective roles and work according to their functions to help maintain plants. Organic fertilizers and chemical fertilizers depend on each other. However, the application of chemical fertilizers and compost separately is very inconvenient because it requires additional costs and energy. If compost and chemical fertilizers can be combined into one in the form of pellets, the application will be more practical and efficient.

This research was carried out from December 2021 to June 2022. The composting was carried out at the Integrated Waste Management Site – Reduce Reuse Recycle (TPST 3R) University of Lampung, Agricultural Machinery and Equipment Resources Laboratory (DAMP), Water and Land Resources Engineering Laboratory (RSDAL), Laboratory of Basic Physics Department of Agricultural Engineering, Faculty of Agriculture, University of Lampung. This study used a factorial completely randomized design (RAL) consisting of N% urea fertilizer (0%, 3%, 6% and 9% of compost weight) and pulverizing time factor (10 minutes, 20 minutes, 30 minutes), with 3 replicated so that 36 experimental units were obtained. Parameters observed were bulk density, particle density, compressive strength, durability test, drop strength, water immersion test which includes the value of electrical conductivity (EC) and total destruction time of pellets, hygroscopicity, pH and nitrogen content of pellet compost fertilizer.

The results showed that the addition of urea was significant at the level of=0.05 ($P<5\%$) on the results of testing for bulk density, particle density, hygroscopicity, drop strength, durability test, pH, EC value, total destruction time of pellets, and nitrogen content. The pulverizing time was significant at the level of=0.05 ($P<5\%$) on the results of testing for bulk density and nitrogen content. The effect of the real interaction at the level of=0.05 ($P<5\%$) on the results of water immersion test which includes the value of electrical conductivity (EC) and total destruction time of pellets results. The results showed that the highest nitrogen content percentage was produced by the highest percentage addition of urea dose

which was 9% and the longest pulverizing time was 30 minutes. While the lowest nitrogen content was produced by a dose of 0% urea or without the addition of urea fertilizer with a pulverizing time of 20 minutes and 30 minutes. The crumb compost loses its nitrogen content as much as 16.67% with a difference of 0.07-0.08 when the pelletization process is carried out.

Keywords : Nitrogen, Pellet, Pulverizing, Urea

ABSTRAK

PENGARUH PENAMBAHAN PUPUK UREA TERHADAP KARAKTERISTIK PUPUK KOMPOS PELET

OLEH

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Pupuk organik dan pupuk kimia memiliki perannya masing-masing dan bekerja sesuai fungsinya untuk dapat membantu memelihara tanaman. Pupuk organik dan pupuk kimia saling bergantung satu sama lain. Namun, aplikasi pupuk kimia dan pupuk kompos secara terpisah sangat merepotkan karena membutuhkan biaya dan tenaga tambahan. Jika pupuk kompos dan pupuk kimia bisa digabungkan menjadi satu dalam bentuk pelet, maka aplikasinya akan lebih praktis dan efisien.

Penelitian ini dilaksanakan pada bulan Desember 2021 sampai Juni 2022. Pembuatan pupuk kompos dilakukan di Tempat Pengelolaan Sampah Terpadu – *Reduce Reuse Recycle* (TPST 3R) Universitas Lampung, Laboratorium Daya Alat dan Mesin Pertanian (DAMP), Laboratorium Rekayasa Sumberdaya Air dan Lahan (RSDAL), Laboratorium Fisika Dasar Jurusan Teknik Pertanian, Fakultas Pertanian, Universitas Lampung. Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) faktorial terdiri dari faktor pupuk urea N% (0%, 3%, 6% dan 9% dari bobot kompos) dan faktor waktu pelumatan (10 menit, 20 menit, 30 menit), dengan 3 kali ulangan sehingga diperoleh 36 unit percobaan. Parameter yang diamati yaitu uji massa jenis, kuat tekan, ketahanan getar, ketahanan banting, uji rendam air yang meliputi nilai *Electrical Conductivity* (EC) dan waktu kehancuran total pelet, higroskopisitas, pH dan kadar nitrogen yang terkandung pada pupuk pelet.

Hasil penelitian menunjukkan penambahan urea nyata pada taraf $\alpha=0,05$ ($P<5\%$) terhadap hasil pengujian massa jenis curah, massa jenis partikel, higroskopisitas, ketahanan banting, ketahanan getar, pH, nilai EC, waktu kehancuran total pelet, dan kadar nitrogen. Waktu pelumatan nyata pada taraf $\alpha=0,05$ ($P<5\%$) terhadap hasil pengujian massa jenis curah dan kadar nitrogen. Pengaruh interaksi nyata pada taraf $\alpha=0,05$ ($P<5\%$) terhadap hasil uji rendam air yang meliputi nilai EC dan waktu kehancuran total pelet. Hasil penelitian menunjukkan bahwa kadar nitrogen paling tinggi dihasilkan oleh persentase penambahan dosis urea yang

paling tinggi yaitu 9% dan waktu pelumatan paling lama yaitu 30 menit. Sedangkan kadar nitrogen paling rendah dihasilkan oleh dosis urea 0% atau tanpa penambahan pupuk urea dengan waktu pelumatan 20 menit dan 30 menit. Pupuk kompos remah kehilangan kadar nitrogennya sebanyak 16.67% dengan selisih 0.07-0.08 ketika dilakukan proses peletisasi.

Kata kunci : Nitrogen, Pelet, Pelumatan, Urea