

PENINGKATAN EFISIENSI PUPUK NITROGEN MELALUI REKAYASA KELAT UREA-ZEOLIT-ASAM HUMAT

**(Increasing Nitrogen Efficiency through Chelate Engineering of Urea-Zeolite-
Humic Acid)**

Suwardi, Darmawan

Dep. Ilmu Tanah dan Sumberdaya Lahan, Fakultas Pertanian IPB

ABSTRAK

Nitrogen merupakan salah satu unsur hara yang sangat penting bagi pertumbuhan tanaman. Namun demikian, nitrogen mudah tercuci dari tanah dalam bentuk nitrat, menguap ke udara dalam bentuk gas amoniak, atau berubah bentuk yang sulit diserap tanaman. Untuk meningkatkan efisiensi pupuk nitrogen, pupuk dibuat dalam bentuk tersedia lambat. Telah diketahui bahwa zeolit adalah mineral yang mempunyai KTK tinggi dan kemampuan untuk menyerap nitrogen dalam bentuk ion amonium. Di pihak lain asam humat yang diekstrak dari bahan organik mempunyai kemampuan untuk merangsang pertumbuhan tanaman. Tujuan penelitian ini adalah untuk mempelajari peranan zeolit dan asam humat sebagai agen pelepasan lambat dari pupuk nitrogen. Penelitian dilakukan dengan metode inkubasi selama 14 minggu. Ratio urea dan zeolit adalah 70%:30% kemudian ditambahkan asam humat dengan jumlah 0, 2, 3, 4, and 5% dengan simbol UZA-1, UZA-2, UZA-3,-UZA-4, dan UZA-5. Pupuk kimia diberikan setara dengan 50 mg/kg lalu dimasukkan ke dalam botol plastik yang telah diisi tanah setara 100g BKM. Pupuk dan tanah dicampur merata pada kadar air kapasitas lapang. Kadar N-amonium dan N-nitrat dianalisa pada minggu ke 1,2, 3, 4, 6, 8, 10, 14 periode inkubasi. Hasil penelitian menunjukkan bahwa N-amonium telah terdeteksi pada minggu pertama inkubasi dan menurun sampai mendekati nol pada minggu ketiga inkubasi. Namun demikian, N-nitrat menunjukkan peningkatan selama periode inkubasi. Pelepasan nitrogen paling lambat ditunjukkan oleh UZA-5. Pada percobaan rumah kaca dengan tanaman indikator padi menunjukkan UZA-3 memberikan performa pertumbuhan terbaik.

Kata Kunci: N-amonium, N-nitrat, slow release fertilizer, zeolit, asam humat.

ABSTRACT

Nitrogen is one of plant nutrients which are most important for plant growth. However, nitrogen is easy leaching from the soil as nitrate, volatilizing as ammonia gas, or change to other forms which are difficult to be absorbed by crops. To increase the nitrogen efficiency, the fertilizer is made as slow release form. It is well known that zeolite is mineral having high cation exchange capacity (CEC) and capability to adsorb nitrogen as ammonium ion. On the other hand, humic acid extracted from organic matter has capability to stimulate plant growth. The objectives of this research were to study the role of zeolite and humic acid as slow release agent of nitrogen fertilizer. The experiment was carried out by incubation method during 14 weeks. The ratio of urea and zeolite was 70%:30% then added by humic acid of 0, 2, 3, 4, and 5% resulting UZA-1, UZA-2, UZA-3,-UZA-4, AND UZA-5. The fertilizers were given equivalent to 50 mg/kg and put them into plastic bottle containing equivalent to 100g oven-dry soil. The fertilizer and soil then mixed homogenously under field capacity soil moisture. The contents of ammonium-N and nitrate-N were analyzed at 1, 2, 3, 4, 6, 8, 10, 14 week of incubation period. The results indicated that ammonium-N had been detected at the first week incubation and decrease until near zero at the third week incubation. Meanwhile, the nitrate-N showed a continuous increase during the incubation period. The slowest

nitrogen release showed by UZA-5. In green house experiment using rice plant showed that UZA-3 gave the best performance of rice growth.

Keywords : Ammonium-N, nitrate-N, slow release fertilizer, zeolite, humic acid.