

ABSTRAK

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OPTIMASI PENGOMPOSAN, ISOLASI DAN IDENTIFIKASI MIKROORGANISME TERMOFILIK DARI LIMBAH TANAMAN

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(xvii + 82 halaman; 16 gambar; 4 tabel; 20 lampiran)

Pengomposan merupakan salah satu cara yang dapat dilakukan untuk mengurangi jumlah penumpukan sampah dilingkungan. Selama proses pengomposan, terdapat aktivitas metabolisme mikroorganisme yang berperan dalam dekomposisi bahan organik yang terjadi pada fase termofilik. Penelitian ini bertujuan untuk mempelajari proses pengomposan yang dipengaruhi oleh suhu, pH, kelembaban, oksigen dan aerasi dan pengadukan; serta mengidentifikasi mikroorganisme termofilik yang berpengaruh pada proses pengomposan. Pengomposan dilakukan dengan 2 percobaan yaitu skala 100 kg untuk menghasilkan kompos dan skala 10 kg untuk mempelajari pengaruh ventilasi udara selama pengomposan, kemudian dilakukan isolasi, identifikasi dan uji biokimia pada mikroorganisme termofilik dari tumpukan kompos saat mencapai suhu diatas 50°C. Perlakuan percobaan pada kompos baik pada skala 100 kg dan skala 10 kg diamati perubahan suhu, pH, dan kelembaban dan pada perlakuan skala 10 kg dipelajari pengaruh ventilasi udara; kemudian dilakukan isolasi mikroorganisme dari tumpukan kompos, identifikasi morfologi koloni dan sel, dan uji biokimia berdasarkan *Bergey's Manual* antara lain motilitas, katalase, *Voges Proskauer*, sitrat, reduksi nitrat, hidrolisis pati, pertumbuhan pada beragam konsentrasi NaCl dan pH, serta hidrolisis selulosa. Hasil pengomposan skala 100 kg, didapat kompos matang setelah 120 hari, dan kompos tidak mencapai suhu optimal (>60°C, <70°C). Pengomposan skala 10 kg pada ventilasi udara 100% (24 lubang) dapat tercapai peningkatan suhu diatas 50°C, sedangkan ventilasi udara 50% (12 lubang) tidak dapat mencapai suhu 50°C. Hasil isolasi didapat 5 isolat bakteri (JTk2, JTk3, JTk4, JTb1 dan JTb3). Sementara usaha karakterisasi tidak berhasil dilakukan, hanya dapat diduga kelima isolat bakteri dapat berupa *Bacillus circulans*, *Bacillus coagulans*, dan *Bacillus schlegelii*.

Kata Kunci: Kompos, Mikroorganisme, Termofilik, Uji Biokimia, *Bacillus*

Referensi : 54 (1996-2022)

ABSTRACT

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OPTIMIZATION OF COMPOSTING, ISOLATION AND IDENTIFICATION OF THERMOPHILIC MICROORGANISMS FROM PLANT WASTE

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Composting is one way that can be done to reduce the amount of garbage accumulation in the environment. During the composting process, there are metabolic activities of microorganisms that play a role in the decomposition of organic matter that occurs in the thermophilic phase. This study aims to study the composting process which is influenced by temperature, pH, humidity, oxygen and aeration and stirring; and identify thermophilic microorganisms that affect the composting process. Composting was carried out with 2 experiments, namely a scale of 100 kg to produce compost and a scale of 10 kg to study the effect of air ventilation during composting, then isolation, identification and biochemical tests were carried out on thermophilic microorganisms from compost piles when they reached temperatures above 50°C. Experimental treatments on compost both on a scale of 100 kg and a scale of 10 kg observed changes in temperature, pH, and humidity and on a treatment scale of 10 kg studied the effect of air ventilation; then isolated microorganisms from the compost pile, identification of colony and cell morphology, and biochemical tests based on *Bergey's Manual* including motility, catalase, *Voges Proskauer*, citrate, nitrate reduction, starch hydrolysis, growth at various concentrations of NaCl and pH, and cellulose hydrolysis. The results of composting on a 100 kg scale showed that the compost was mature after 120 days, and the compost did not reach the optimal temperature (>60°C, <70°C). Composting on a 10 kg scale on air vent 100% (24 holes) can achieve an increase in temperature above 50°C, while air vent 50% (12 holes) cannot reach a temperature of 50°C. The isolation results obtained 5 bacterial isolates (JTk2, JTk3, JTk4, JTb1 and JTb3). While the characterization efforts were not successful, it can only be assumed that the five bacterial isolates could be *Bacillus circulans*, *Bacillus coagulans*, and *Bacillus schlegelii*.

Keywords : Compost, Microorganisms, Thermophilic, Biochemical Test, *Bacillus*

References: 54 (1996-2022)