

RINGKASAN

Laju Proses Dekomposisi Sampah Kota dengan Effective Microorganisms 4 untuk Menghasilkan Pupuk Organik Berkualitas

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Sekitar 70 – 80 % sampah kota di Indonesia merupakan sampah organik yang dapat diubah menjadi pupuk organik. Pupuk organik sangat dibutuhkan dalam memperbaiki kesuburan lahan pertanian. Sebagian besar masyarakat beranggapan bahwa sampah merupakan bahan buangan yang tidak dapat dimanfaatkan dan menjijikkan, padahal sampah ini dapat dijadikan sebagai bahan baku pupuk organik dan pakan ternak.

Sampah menjadi masalah serius karena kecepatan pemusnahan dan pembuangan sampah oleh masyarakat sangat tidak berimbang, sehingga menyebabkan timbunan sampah di TPA semakin hari semakin banyak. Agar terjadi perimbangan pembuangan sampah dan pemusnahannya, diperlukan teknologi pengolahan dan pendaur ulangan sampah terutama sampah organik antara lain dengan menggunakan bioaktivator untuk meningkatkan laju proses dekomposisi sampah organik.

Dekomposisi sampah organik secara alami memerlukan waktu 3 – 4 bulan, sehingga tidak akan dapat mengatasi laju pembuangan sampah ke TPA. Upaya memperkecil ukuran sampah dan aplikasi bioteknologi EM4 sebagai bioaktivator merupakan salah satu cara untuk mempercepat proses dekomposisi sampah organik perkotaan menjadi kurang dari satu bulan.

Tujuan penelitian ini adalah untuk mengetahui pengaruh interaksi ukuran sampah dan kemampuan EM4 dalam meningkatkan laju proses dekomposisi sampah organik perkotaan, serta untuk mengetahui kualitas pupuk organik, hasil

dekomposisi sampah tersebut, melalui analisis kandungan unsur hara, dan aplikasinya terhadap tanaman paprika (*Capsicum annum var Grossum*).

Penelitian tahap I untuk menguji laju proses dekomposisi sampah organik perkotaan dengan indikator nilai CN rasio ≤ 20 . Penelitian dilakukan dengan uji faktorial berdasar rancangan acak lengkap (RAL). Faktor pertama ukuran sampah > 5 cm (U_1) dan sampah < 5 cm (U_2); faktor kedua konsentrasi EM4 (0ml, 25ml, 50ml, dan 75ml), lama pengamatan 25 hari. Penelitian tahap II untuk menguji kualitas pupuk organik pada tanaman paprika sebagai indikator. Penelitian dilakukan dengan rancangan acak lengkap (RAL) terdiri dari 5 perlakuan dan 5 ulangan, dilaksanakan dalam green house.

Hasil penelitian tahap I menunjukkan bahwa kombinasi ukuran sampah dengan konsentrasi EM4 yang berbeda dapat meningkatkan laju proses dekomposisi sampah organik perkotaan secara nyata, dalam waktu 5 hari CN rasio turun < 14 . Kombinasi yang paling efektif dan menguntungkan secara ekonomi adalah U_1EM4 50ml, dengan kombinasi perlakuan ini tidak perlu mencacah sampah. Hasilnya berdasarkan analisis statistik tidak berbeda dengan kombinasi perlakuan U_2EM4 25ml (sampah dicacah). Jadi dengan menaikkan dosis EM4 duakali dosis standar 1 liter per ton, sampah tidak perlu dicacah. Pupuk Organik BOKASOP dengan dosis tinggi secara umum dapat meningkatkan pertumbuhan vegetatif dan generatif tanaman paprika, tetapi tidak dapat meningkatkan jumlah panen buah paprika, hal ini diduga akibat kandungan unsur hara BOKASOP kurang lengkap

Kualitas pupuk BOKASOP perlu diperbaiki dengan menambahkan bahan organik yang mengandung unsur hara lengkap, dan untuk memperoleh informasi yang lebih akurat tentang proses dekomposisi dan kualitas pupuk organik, perlu dilakukan pengukuran semua faktor yang mempengaruhi proses dekomposisi dan analisis hasil dekomposisi secara lengkap..

SUMMARY

The rate of decomposition process of municipality organic waste using Effective Microorganisms- 4 to produce qualified Organic fertilizer

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About 70 – 80 % of municipality waste in Indonesia is as an organik waste wich can be changed in to organic fertilizers. The organic fertilizer is very important to improve of agricultural soil. As long as this, most of the people assumed that this organic waste unbenefit and disgusting, whereas it can be used as a raw material for organic fertilizer and animal feed.

Municipality waste became seriously problem because very imbalance between decrease or destroyed and increase of it, therefore make a pile of waste more abundance in TPA. In order that to make a balance between increase and decrease of waste, needed the engineering of management waste and recycling technology , especially for organic waste by using bioactivator to increase the rate of its decomposition process. Decomposition of organic waste, naturally needed 3 – 4 months, so that the increase a pile of waste in TPA can not stop or reduce. Reduce the particle size of waste an aplication biotechnology EM4 as a bioactivator to constitute one of the way for rapidly decomposition process of organic waste less than a months.

The purpose of this research was to find out the effect of the particle size of waste and the ability of EM4 within increasingly the rate of decomposition process of municipality organic waste, quality of organic fertilizer with analyze of fertilizer content an aplicated to paprika (*Capsicum annum var grossum*) as a plant indicator.

Research carried out with two step, fisrt, to test the rate of decomposition process of municipality organic waste, with indicator of ratio $CN \leq 20$. The research was done by using factorial based on CRD with two factors namely particle size of waste $> 5\text{cm}$ (U_1) and $< 5\text{cm}$ (U_2); EM4 consentratin (0ml, 25ml, 50ml, 75ml) observed 25 days. Second, to test of quality organic fertilizer, the growth of paprika as an indicator of quality, research was applied in green house.

The first result showed that combination of the different particle size of waste and different concentration of EM4 could accelerated of decomposition process rate, after 5 days value of ratio CN decrease < 14 . The most effective and profitable of treatment combination are U_1EM4 50ml, in these treatment the particle size of waste it was not to reduce. Based on statistical analyses ($\alpha=0,05$) both ratio CN of the treatment combinatio U_2EM4 25ml = 11,0267 and U_1EM4 50ml = 11,3167 are not different.

BOKASOP as an organic fertilizer, generally in higher dosage could increased the vegetative and generative growth of paprika, but it was not good to improve the quantities of paprika production. This was caused by uncompleted of the macronutrient in BOKASOP contents.

The quality of BOKASOP could be improved with added the organic material with complete macronutrient contents. To get the information completely and also more accurately of decomposition process, the quality of this organic fertilizers, needed to measure of all of factors which affect of decomposition process.

ABSTRACT

The rate of decomposition process of municipality organic waste using Effective Microorganisms-4 to produce qualified Organic fertilizer

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The objective of this research was to find out : (1) concrete data of the effect of combination of different waste particle size with concentration of bioactivator EM4 toward the rate of decomposition of municipality organic waste; (2) concrete data of organic fertilizer quality resulted by EM4 decomposition to enclose contents of N, P, K, KTK; (3) concrete data of organic fertilizer which resulted by EM4 decomposition to enclose contents of C-organic, ratio CN, and pH; (4) concrete data of the ability of organic fertilizer to improve the vegetative and generative growth with the paprika production (*Capsicum annum var grossum*).

This research was carried out into two steps. The first step, testing the rate of decomposition process of municipality organic waste, with indicator of ratio $CN \leq 20$. The research was done by using factorial design based on CRD with two factors namely : particle size of waste $> 5\text{cm}$ (U_1) and $< 5\text{cm}$ (U_2), concentration of EM4 (0ml, 25ml, 50ml, 75ml), observed within 25 days. The second step, testing the organic fertilizer quality, the growth of paprika as an indicator. This research was applied in green house during 4 months.

The result of the first research showed that: (1) the combination of the different particle size of organic waste with different concentration of bioactivator EM4, could accelerated decomposition process significantly, after 5 days resulted ratio $CN < 14$. The effective and profitable combination are U_1EM4 50ml, these combinations were most economic than the other combination, because in these treatments were not to reduce the particle size of waste; (2) the contents of macronutrient in BOKASOP only different in N nutrient, higher than N by decomposed without EM4. The other macronutrients P, K, and KTK, it was not different on both decompositions resulted; (3) fertilizer resulted by EM4 decomposition and without EM4 have the same contents of the high C-organic, ratio $CN < 14$ equal with soil, which riches of nutrient, and pH in neutral range; (4) BOKASOP could increased the vegetative and generative growth quality but it was not better to improve the quantities of paprika harvest.

Keywords: rate of decomposition process, municipality, organic waste, Effective Microorganisms-4, organic fertilizer quality.