

RINGKASAN

Sampah adalah bahan yang berasal dari sisa-sisa kegiatan domestik maupun industri. Volume sampah yang dihasilkan masyarakat meningkat secara signifikan setiap harinya. Tanpa pengolahan yang benar, sampah organik dapat menimbulkan pencemaran lingkungan dan menyebabkan polusi udara yang disebabkan oleh bau yang tidak sedap. Salah satu cara untuk meminimalisir kerugian akibat sampah organik adalah dengan pembuatan pupuk kompos menggunakan bioaktivator. Konsorsium bakteri terdiri atas isolat bakteri LG 73, LG 101, LG 113, LG 127, SA 126 memiliki kemampuan enzimatis hidrolitik dan bakteri nitrifikasi isolat Ntb 3.7. berpotensi sebagai bioaktivator pengomposan sampah organik. Kemampuan konsorsium bakteri tersebut dan waktu yang efektif dalam mendekomposisi sampah organik dan menghilangkan bau sampah belum pernah diteliti sebelumnya. Penelitian ini bertujuan untuk mengetahui kemampuan konsorsium bakteri LG 73, LG 101, LG 113, LG 127, SA 126, dan bakteri nitrifikasi Ntb 3.7 serta lama waktu yang efektif dalam mendekomposisi sampah organik dan menghilangkan bau sampah.

Penelitian dilakukan dengan metode eksperimental menggunakan rancangan acak lengkap (RAL) pola faktorial. Variabel bebas pada penelitian ini adalah konsorsium bakteri sebagai bioaktivator dan lama pengomposan. Variabel terikat pada penelitian ini adalah kemampuan konsorsium bakteri dalam mendekomposisi sampah organik dan menghilangkan bau sampah. Penelitian ini terdiri atas 2 faktor, yaitu dosis bioaktivator dengan taraf 0%, 5 %, 10%, 15 %, dan waktu inkubasi dengan taraf 15, 30, dan 45 hari. Masing-masing perlakuan dilakukan pengulangan sebanyak 3 kali sehingga diperoleh 36 unit percobaan. Substrat pengomposan terdiri atas bubur sampah, jerami, sekam, serasah dan kotoran sapi dengan perbandingan 1:1:1:1:1. Parameter utama yang diukur adalah rasio C/N dan kadar amonium, sedangkan parameter pendukung terdiri atas jumlah bakteri, nilai pH kompos, suhu kompos, kelembapan, kadar nitrat dan kualitas pupuk kompos meliputi performa pupuk kompos (warna, tekstur dan bau kompos). Data hasil penelitian berupa rasio C/N dan kadar amonium dianalisis dengan analisis ragam (*Analysis of variance/Anova*) dengan tingkat kepercayaan 95% kemudian dilakukan analisis lanjut menggunakan DMRT (*Duncan's Multiple Range Test*) dan data kualitatif dianalisis secara deskriptif.

Hasil penelitian diperoleh bahwa pemberian dosis bioaktivator LG 73, LG 101, LG 113, LG 127, SA 126, dan Ntb 3.7 memberikan pengaruh nyata terhadap kadar amonium yang ditandai dengan kompos sudah tidak berbau sampah, sementara waktu inkubasi memberikan pengaruh nyata terhadap penurunan rasio C/N. Interaksi kedua faktor tidak berpengaruh nyata terhadap penurunan baik rasio C/N maupun kadar amonium. Meskipun dosis bioaktivator bakteri tidak memberikan pengaruh nyata terhadap rasio C/N, kompos yang dihasilkan dapat dikategorikan matang setelah inkubasi 45 hari. Hasil pengamatan terhadap parameter lain turut mendukung bahwa seluruh perlakuan telah mencapai tahap kematangan kompos. Suhu kompos berkisar 31°C, pH kompos berkisar 7, dan kelembapan kompos sekitar 50%. Performa kompos dengan penambahan bioaktivator meliputi warna, tekstur, dan aroma juga menunjukkan ciri kompos yang matang, berbeda dengan performa kompos perlakuan kontrol yang masih memiliki warna coklat dan tekstur kurang remah, menandakan proses dekomposisi memerlukan waktu lebih lama dari pada dengan penambahan bioaktivator.

Kata kunci : *bakteri, bioaktivator, pupuk kompos, sampah organik.*

SUMMARY

Waste is the residual material from domestic and industrial activities. The volume of waste produced by the community increases significantly every day. Without proper processing, organic waste can pollute the environment and contribute to air pollution due to unpleasant odors. One way to minimize the damage caused by organic waste is by making compost using a bioactivator. The bacterial consortium of LG 73, LG 101, LG 113, LG 127, SA 126 has hydrolytic enzymatic ability and Ntb 3.7 has nitrification ability. The ability of the bacterial consortium, the effective time in decomposing organic waste and neutralization waste odors have not been studied previously. This study aims to determine the ability of the bacterial consortium of LG 73, LG 101, LG 113, LG 127, SA 126, and Nitrifying bacteria Ntb 3.7 as well as the effective time in decomposing organic waste and neutralization waste odors.

The study was conducted using an experimental method using a completely randomized design (RAL) with a factorial pattern. The independent variables in this study were the bacterial formula and the composting time, which were 15, 30, and 45 days. The dependent variable in this study was the ability of the bacterial consortium to decompose organic waste and neutralization waste odor. This study consisted of 2 factors, namely the bioactivator dose with levels of 0%, 5%, 10%, 15%, and the incubation time with levels of 15, 30, and 45 days. Each treatment was repeated 3 times to obtain 36 experimental units. The composting substrate consisted of waste pulp, straw, husks, leaf litter, and cow dung with a ratio of 1:1:1:1:1. The main parameters observed in this study were the C/N ratio and ammonium content, while the supporting parameters consisted of the number of bacteria, the pH value of the compost, the temperature of the compost, humidity, nitrate content, and the quality of the compost fertilizer including the performance of the compost fertilizer (color, texture, and odor). The research data in the form of C/N ratio and ammonium content analyzed using analysis of variance (Analysis of variance/Anova) with a confidence level of 95%. If the Anova results are significant, further analysis carried out using DMRT (Duncan's Multiple Range Test) and qualitative data will be analyzed descriptively.

The results of the study showed that the administration of bioactivator doses of LG 73, LG 101, LG 113, LG 127, SA 126, and Ntb 3.7 had a significant effect on ammonium levels, which was indicated by the compost no longer smelling like garbage, while the incubation time had a significant effect on the decrease in the C/N ratio. The interaction of the two factors did not significantly affect the decrease in either the C/N ratio or ammonium levels. Although the dosage of bacterial bioactivator did not significantly affect the C/N ratio, the resulting compost could be categorized as mature after 45 days of incubation. The results of observations on other parameters also supported that all treatments had reached the compost maturity stage. The compost temperature was around 31°C, the compost pH was around 7, and the compost moisture was around 50%. The performance of the compost with the addition of bioactivators, including color, texture, and scent, also showed characteristics of mature compost, in contrast to the performance of the control treatment compost which still had a brown color and a less crumbly texture, indicating that the decomposition process took longer than with the addition of bioactivators.

Keyword: *Bacteria, bioactivator, compost, organic waste*