

**KEMAMPUAN KONSORSIUM MIKROBIA INDIGENOUS
TERHADAP PROSES OKSIDASI AMONIA
LIMBAH INDUSTRI PETERNAKAN**

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INTISARI

Penelitian ini bertujuan untuk mengetahui kemampuan oksidasi oleh konsorsium mikrobia terhadap amonia limbah peternakan, untuk mengurangi jumlah gas amonia dari limbah peternakan. Penelitian terdiri dari lima perlakuan, yaitu perlakuan kontrol, perlakuan kedua *Pseudomonas* sp. LS3K, perlakuan ketiga *Candida* sp. LS3T, perlakuan keempat *Arthrobacter* sp. LM1KK, perlakuan kelima Konsorsium. Parameter yang diamati yaitu pertumbuhan isolat konsorsium mikrobia; dan oksidasi oleh konsorsium mikrobia terhadap konsentrasi amonia. Data yang diperoleh dianalisis dengan variansi pola searah dan apabila terdapat perbedaan maka dilanjutkan uji beda rerata dengan *Duncan's Multiple Range Test* (DMRT). Hasil penelitian menunjukkan diameter koloni isolat Konsorsium mikrobia dengan penambahan 2,50% dan 5% $(\text{NH}_4)_2\text{SO}_4$ jam ke-24 dan ke-96 berturut-turut 0,29 cm dan 0,32 cm; dan 0,59 cm dan 0,54 cm. *Optical Density* (OD) konsorsium mikrobia mampu tumbuh pada stressor amonia sampai 10% dengan nilai μ max 4,02/jam. Ukuran mikrobia hasil pengujian SEM antara 0,30 sampai 1 μm . Jumlah koloni ($P < 0,05$) yang tumbuh pada penambahan 0; 2,50; 5; 7,50; dan 10% $(\text{NH}_4)_2\text{SO}_4$ berturut-turut $1,03 \times 10^5$, $0,94 \times 10^5$, $1,60 \times 10^5$, $0,82 \times 10^5$, dan $0,86 \times 10^5$ cfu/ml. Penurunan konsentrasi amonia pada medium cair $(\text{NH}_4)_2\text{SO}_4$ sebanyak 15,37 ppm. Produksi amonia ekskreta ($P > 0,05$), feses sapi perah ($P < 0,05$), dan feses sapi potong ($P < 0,05$) lebih rendah dengan penambahan isolat Konsorsium mikrobia berturut-turut 28,72; 71,47; dan 56,50 ppm dibanding Kontrol masing-masing dengan nilai pH sebelum dan sesudah oksidasi oleh konsorsium mikrobia berturut-turut 7,53 dan 7,28; 6,86 dan 6,67; 6,62 dan 6,27. Kesimpulan penelitian ini adalah kemampuan oksidasi oleh konsorsium mikrobia optimal dalam mengoksidasi amonia limbah feses sapi potong. Kemampuan oksidasi konsorsium mikrobia mengurangi amonia sebanyak 15,34 ppm dari limbah feses sapi potong.

Kata Kunci : Konsorsium mikrobia, Amonia, Limbah peternakan

THE ABILITY OF INDIGENOUS MICROBIAL CONSORTIUM TO THE PROCESS OF AMMONIA OXIDATION OF LIVESTOCK INDUSTRY WASTE

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ABSTRACT

This study aims to determine the ability of the microbial oxidation of ammonia by a consortium of farm waste, to reduce the amount of ammonia gas from farm waste. The study consisted of five treatments, namely the control treatment, the treatment of *Pseudomonas* sp. LS3K, the treatment of *Candida* sp. LS3T, the treatment *Arthrobacter* sp. LM1KK, and the treatment Consortium. Parameters observed were the growth of microbial isolates consortium; and oxidation by a consortium of microbes to the concentration of ammonia. The data were analyzed using variance analysis of one way anova. The mean differences were tested by Duncan's Multiple Ranges Test (DMRT). The results showed the diameter of the colony of isolates microbial consortium with the addition of 2.50% and 5% $(\text{NH}_4)_2\text{SO}_4$ at 24th and 96th hour were respectively 0.29 cm and 0.32 cm; and 0.59 cm and 0.54 cm. Optical Density (OD) microbial consortium were capable to grow in the stressor ammonia up to 10% with a value of maximum of growth (μ max) 4.02/h. SEM results of testing microbial were size between 0.30 to 1 μm . The number of colonies ($P < 0.05$) that grew on the addition of 0%, 2.50%, 5%, 7.50%, and 10% $(\text{NH}_4)_2\text{SO}_4$ respectively 1.03×10^5 , 0.94×10^5 , 1.60×10^5 , 0.82×10^5 , and 0.86×10^5 cfu/ml. A reduction in the concentration of ammonia in the liquid medium $(\text{NH}_4)_2\text{SO}_4$ as much as 15.37 ppm. Ammonia production of excreta ($P > 0.05$), dairy cows feces ($P < 0.05$), and beef cattle feces ($P < 0.05$) were lower with the addition of microbial Consortium isolates respectively 28.72, 71.47, and 56.50 ppm as compared to the respective control with the pH value before and after oxidation by microbial consortium respectively 7.53 dan 7.28; 6.86 dan 6.67; 6.62 dan 6.27. The conclusion of this study is the ability of microbial consortium was optimum in the oxidize ammonia waste of beef cattle feces. The ability of the oxidation by microbial consortium reduced ammonia as much as 15.34 ppm of beef cattle feces.

Keywords : Microbial consortium, Ammonia, Livestock waste