

EVALUASI PENGGUNAAN HASIL FERMENTASI LIMBAH UDANG DALAM PAKAN TERHADAP PERFORMAN DAN KUALITAS DAGING BROILER

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04 / 1503 / PS

INTISARI

Penelitian ini dilakukan untuk mengkaji pengaruh fermentasi terhadap peningkatan nilai nutritif limbah udang sebagai bahan pakan unggas dengan menggunakan mikroba *Bacillus sp* dan *Aspergillus sp.* (*A.niger*, FCNN 6018; *A.oryzae*, FCNN 6004; dan *A.sojae*, FCNN 6084). Tiga percobaan secara berurutan yaitu fermentasi limbah udang yang tepat sebagai pakan broiler, kemudian mengkaji perubahan nilai pencernaan *in-vivo* nutrisi dan asam aminonya, serta *feeding trial* penggunaan limbah udang terfermentasi terbaik pada pakan broiler. Hasil penelitian pertama menunjukkan sel mikroba dan aktivitas protease meningkat dengan semakin lamanya inkubasi. Jumlah sel mikroba dan aktivitas protease maksimal *Bacillus sp.*, *A. niger*, *A. oryzae* dan *A. sojae* yaitu $4,2 \cdot 10^7$; $1,8 \cdot 10^5$; $1,6 \cdot 10^5$ dan $2,2 \cdot 10^5$; dan 1,0645; 0,6683; 0,7473 dan 0,7414 masing-masing pada inkubasi 20, 72, 48 dan 120 jam. Kandungan bahan kering (BK) dan serat kasar (SK) meningkat (3,33 dan 0,386%), tetapi protein kasar (PK), lemak kasar (LK), kitin dan N-kitin limbah udang menurun (5,06; 4,85; 21,65 dan 6,81%). Semua asam amino (kecuali lisin) limbah udang meningkat pada perlakuan dengan *Aspergillus sp.* (rata-rata 21,41%), tetapi menurun dengan *Bacillus sp.* (7,94%). Hasil penelitian kedua menunjukkan pencernaan limbah udang terfermentasi meningkat pada BK, bahan organik (BO), SK dan LK masing-masing 28,2; 38,7; 136,6 dan 2%, sedangkan pencernaan PK meningkat tetapi tidak berbeda nyata dengan kontrol. Pencernaan LK menurun pada *Bacillus sp.* dan *A.oryzae*. Peningkatan pencernaan sejati asam amino (AA) esensial tertinggi dan terendah pada metionin dan lisin (33,5 dan 20,3%) dan , sedangkan pada AA non-esensial terjadi pada alanin dan asam glutamat (45,9 dan 12,18%). Penelitian *feeding trial* menunjukkan penggunaan limbah udang terfermentasi pada pakan broiler menurunkan bobot badan (BB) 3 dan 5 minggu, nilai *cooking loss*, *water-holding capacity* (WHC), kadar lemak daging, kolesterol, trigliserida, dan LDL-kolesterol serum; meningkatkan konversi pakan, konsumsi pakan, nilai *lightness* dan *redness*, pH, kadar air, BK, dan abu daging, dan HDL-kolesterol serum ($P < 0,05$), tetapi tidak berpengaruh pada % karkas, nilai tekstur, *yellowness* dan kadar protein daging dibandingkan dengan kontrol. Pengaruh level penggunaan LUF berpengaruh sangat nyata pada bobot gizzard, proventrikulus dan jejunum ($P < 0,01$), dan tidak ada perbedaan pada bobot organ pencernaan lainnya. Pengaruh jenis mikroba *A.niger* dan *Bacillus sp.* berpengaruh pada BB 3 minggu, konsumsi pakan, kadar air, BK, abu dan protein ($P < 0,01$) daging, BB 5 minggu, nilai WHC daging, bobot gizzard ($P < 0,05$). Interaksi level penggunaan dan jenis mikroba terjadi pada konversi pakan, % karkas, nilai tekstur, *redness*, *cooking loss*, WHC, kadar air, BK, dan abu daging. Hasil penelitian ini menunjukkan penggunaan limbah udang terfermentasi dengan *A.niger* dan *Bacillus sp.* dapat digunakan sampai level 7,5% total pakan broiler untuk menjaga kinerja produksi, profil lemak darah, organ pencernaan dan kualitas daging pada tingkat yang baik.

(Kata kunci: Limbah udang, Fermentasi, Broiler, Kinerja produksi, dan Kualitas daging)



EVALUATION OF UTILIZATION OF FERMENTED SHRIMP WASTE IN BROILER FEED ON PERFORMANCES AND MEAT QUALITY

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ABSTRACT

The research was carried out to examine effect of fermentation on increasing nutritive value of shrimp waste (LU) as broiler feed by using microbes, namely *Bacillus* sp and *Aspergillus* sp. (*A.niger*, FCNN 6018; *A.oryzae*, FCNN 6004; and *A.sojae*, FCNN 6084). investigated under three consecutive experiments. Three consecutive experiments were carried out, namely a proper fermentation of LU as broiler feed; evaluating improvement of *in-vivo* nutrient and amino acid digestibilities; then feeding trial assay on utilization of fermented LU as broiler feed. The result of the first experiment showed that microbe cell and protease activity was increased at longer incubation time. The maximum microbe cell at 20, 72, 48 and 120 hours time incubation were $4.2 \cdot 10^7$, $1.8 \cdot 10^5$, $1.6 \cdot 10^5$ and $2.2 \cdot 10^5$, respectively. The respective maximum protease activity of *Bacillus* sp., *Aspergillus niger*, *A. oryzae* and *A. sojae* were 1.0645, 0.6683, 0.7473 and 0.7414. Dry matter (DM) and crude fiber (CF) contents were increased by 3.33 and 0.386%, respectively. However, crude protein (CP), lipid, chitin and N-chitin were decreased by 5.06, 4.85, 21.65 and 6.81%, respectively. All of the amino acids (except lysine) of LU increased with *Aspergillus* sp. treatment (21.41% on average), on the other hand it decreased by 7.94% when *Bacillus* sp. was used. The result of second experiment showed that DM, organic matter (OM), CF and lipid digestibilities of fermented LU increased (28.2, 38.7, 136.6 and 2%, respectively), though CP digestibility increased it did not significantly differ from control. Lipid digestibility decreased with *Bacillus* sp. and *A.oryzae*. The highest and lowest increases of true digestibility values of essential amino acids of fermented LU were methionine and lysine (by 33.5 and 20.3%), respectively. While for non-essential amino acids, the respective highest and lowest increases in true digestibility values were alanine and glutamic acid were (45.9 and 12.18%) respectively. The result of third experiment (feeding trial) showed that utilization of fermented LU decreased body weight (BW) at 3 and 5 weeks, cooking loss, water-holding capacity (WHC), lipid content of broiler meat, and cholesterol, triglyceride, and LDL-cholesterol of blood serum, increased feed conversion and consumption and meat lightness, redness, pH, water, and ash contents, and HDL-cholesterol of serum ($P < 0.05$), but it did not affect carcass percentage, texture, yellowness and protein of broiler meat compared to control. Inclusion level of LUF significantly affected weights of gizzard, proventriculus and jejunum ($P < 0.01$), but not other digestive organs weight. The effect of microbial species, *A.niger* and *Bacillus* sp., highly significantly increased 3 weeks BW, feed consumption and water, DM, ash and protein meat contents ($P < 0.01$), significantly increased 5 weeks BW, meat WHC, and gizzard weight ($P < 0.05$). The significant interaction effect of LU utilization level and microbe were for feed conversion, carcass percentage and meat texture, redness, cooking loss, WHC, water and ash. The present result indicated that LU fermented with *A.niger* and *Bacillus* sp. could be used up to 7.5% of total broiler feed ingredients on performances, serum lipid profiles, digestive organs and meat qualities.

(Key word: Shrimp waste, Fermentation, Broiler, Performance, and Meat quality).