

PRODUKTIVITAS, ASAM LEMAK RANTAI PENDEK, HISTOMORFOLOGI
JEJUNUM, DAN EKSPRESI GEN TIGHT JUNCTION BROILER YANG DIBERI
PAKAN SORGUM FERMENTASI DENGAN MENGGUNAKAN
Limosilactobacillus fermentum BN21

INTISARI

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Penelitian ini bertujuan untuk mengetahui potensi penggunaan sorgum fermentasi terhadap produktivitas, produksi asam lemak rantai pendek (SCFA) di sekum, morfologi usus halus (jejunum), dan ekspresi gen *tight junction* (TJ) pada ayam broiler. Sebanyak 240 *day-old chicks* (DOC) broiler strain Indian River ditempatkan secara acak dalam lima perlakuan: kontrol (KTRL) dengan pakan basal, 10% sorgum tanpa fermentasi (STF10), 20% sorgum tanpa fermentasi (STF20), 10% sorgum fermentasi (SF10), dan 20% sorgum fermentasi (SF20). Setiap perlakuan terdiri dari 6 ulangan dengan 8 ekor ayam. Pemeliharaan dilakukan selama 35 hari dengan pakan dan minum ad libitum. Data performa yang diambil meliputi konsumsi pakan, pertambahan bobot badan, konversi pakan, mortalitas, dan indeks performa. Satu ekor ayam diambil dari setiap pen pada akhir pemeliharaan. Sampel digesta sekum digunakan untuk analisis produksi SCFA, sementara sampel jejunum digunakan untuk analisis histomorfologi dan ekspresi gen *tight junction*. Data dianalisis dengan analisis variansi mengikuti Rancangan Acak Lengkap dengan pola searah dan uji lanjut menggunakan uji *orthogonal contrast* bila terdapat perbedaan nyata. Hasil penelitian menunjukkan bahwa penambahan 20% sorgum fermentasi dapat meningkatkan konsumsi pakan, bobot badan, dan pertambahan bobot badan ($P < 0,05$). Selain itu, penambahan sorgum fermentasi mampu meningkatkan pertumbuhan panjang vili jejunum ($P < 0,05$), tetapi tidak berpengaruh terhadap lebar vili, kedalaman kript, dan rasio vili:kript. Namun, sorgum fermentasi tidak meningkatkan produksi SCFA di sekum ($P > 0,05$). Pemberian sorgum fermentasi dapat meningkatkan ekspresi gen *occludin* (OCLN) ($P < 0,05$), tetapi tidak berpengaruh terhadap ekspresi gen *claudin-1* (CLND-1), *junctional adhesion molecule-2* (JAM-2), maupun *zonula occludens-1* (ZO-1) ($P > 0,05$). Kesimpulan penelitian ini adalah substitusi 20% sorgum dalam pakan dapat meningkatkan performa pertumbuhan, morfologi usus, dan ekspresi gen tight junction pada ayam broiler.

Kata kunci : sorgum, fermentasi, morfologi usus, scfa, ekspresi gen.

EFFECTS OF FERMENTED SORGHUM UTILIZING *Limosilactobacillus fermentum* BN21 ON PRODUCTIVITY, INTESTINAL MORPHOLOGY, CECAL SHORT-CHAIN FATTY ACIDS, AND INTESTINAL TIGHT JUNCTION GENE EXPRESSION OF BROILER CHICKENS.

ABSTRACT

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This study aimed to evaluate the potential of fermented sorghum on productivity, short-chain fatty acid (SCFA) production in the cecum, small intestine (jejunum) morphology, and tight junction (TJ) gene expression in broiler chickens. A total of 240 day-old chicks (DOC) of the Indian River broiler strain were randomly assigned to five treatments: control (KTRL) with a basal diet, 10% unfermented sorghum (STF10), 20% unfermented sorghum (STF20), 10% fermented sorghum (SF10), and 20% fermented sorghum (SF20). Each treatment consisted of six replicates with eight chickens per replicate. The rearing period lasted 35 days with ad libitum access to feed and water. Performance data collected included feed intake, body weight gain, feed conversion ratio, mortality, and performance index. One chicken from each pen was sampled at the end of the rearing period. Cecal digesta samples were analyzed for SCFA production, while jejunum samples were analyzed for histomorphology and tight junction gene expression. Data were analyzed using analysis of variance (ANOVA) following a completely randomized design with a one-way pattern. If significant differences were found, orthogonal contrast tests were performed for further analysis. The results showed that adding 20% fermented sorghum significantly increased feed intake, body weight, and body weight gain ($P < 0.05$). Additionally, fermented sorghum supplementation enhanced the growth of jejunal villi length ($P < 0.05$) but had no effect on villi width, crypt depth, or villi-to-crypt depth ratio. However, fermented sorghum did not increase SCFA production in the cecum ($P > 0.05$). The inclusion of fermented sorghum significantly upregulated the expression of the occludin (OCLN) gene ($P < 0.05$) but had no significant effect on the expression of claudin-1 (CLND-1), junctional adhesion molecule-2 (JAM-2), or zonula occludens-1 (ZO-1) genes ($P > 0.05$). In conclusion, substituting 20% of the diet with fermented sorghum can enhance growth performance, intestinal morphology, and tight junction gene expression in broiler chickens.

Keywords : sorghum, fermentation, intestinal morphology, scfa, gene expression.