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Choice feeding of fermented rice polish in broilers: Impacts on growth, physiology, metabolism, and meat quality

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Abstract

ABSTRACT

This study looked at how fermentation affects the nutritional quality of rice polish and its role as a supplementary feed for broilers in a free-choice feeding system. The goal was to find the best fermentation duration. Rice polish was fermented with 2% yeast at 60% moisture in an anaerobic condition between 29 to 33 °C temperature. After fermentation, the rice polish was dried and made into pellets. 192 broiler chicks were randomly assigned into four groups, each with 48 birds having 6 replication of 8 birds per cage: (1) control (commercial diet), (2) commercial feed plus unfermented rice polish, (3) commercial feed plus rice polish fermented for 24 hours, and (4) commercial feed plus rice polish fermented for 48 hours. Fermented rice polish was provided separately and allowed unlimited access. Fermentation significantly improved the nutritional profile of rice polish ($p < 0.001$). The crude protein jumped from 15.6% in the raw material to 21.0% after 48 hours of fermentation. Meanwhile, crude fiber decreased from 11.0% to 7.4%. The highest metabolisable energy was found in the 48-hour group (3726 kcal/kg), followed by 24 hours (3513 kcal/kg) and unfermented rice polish (3298 kcal/kg). Total amino acids increased from 12.57 to 14.42 g/100 g, with significant boosts in -aminobutyric acid and ornithine. Growth performance was similar among the control, unfermented, and 24-hour groups. The 24-hour group achieved the highest body weight gain of 2167 g. However, the 48-hour group showed slightly lower performance of 1977 g ($p > 0.05$), even with a significantly higher intake of fermented feed (154 g compared to 105 g; $p = 0.045$). Meat ether extract decreased steadily from 2.70% in the control group to 1.21% in the 48-hour group ($p < 0.001$), while carcass yield stayed about the same (62–64%). Serum tests showed improved calcium and HDL levels and lower alkaline phosphatase in the fermented groups ($p < 0.05$). Overall, fermentation boosted the nutritional value of rice polish and enhanced certain health and meat quality traits. Fermentation for 24 hours seems optimal, supporting better growth while keeping feed quality high. This suggests that fermented rice polish can be a promising and sustainable supplementary feed for broilers.

Keywords: Broiler, fermentation, free-choice feeding, nutritional enhancement, performance, rice polish