

ORIGINAL ARTICLE

EFFECT OF REPLACING SOYBEAN MEAL WITH SYNBIOTIC-FORTIFIED FERMENTED AZOLLA IN LOCAL DUCK DIETS ON MEAT CHEMICAL COMPOSITION AND STORAGE STABILITY UNDER FREEZING CONDITIONS

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ABSTRACT : The aim of this study was to evaluate the effect of the substitution of fermented Azolla plant fortified with a Synbiotic mixture and beta-glucanin domestic duck feeds on the chemical qualities of meat and its storage qualities under freezing conditions. In the experiment, 240 one-day-old domesticated domestic ducklings were distributed to eight treatments with three replicates for each treatment. The treatments included different substitution ratios of azolla (fermented and non-fermented) for soybean meal with the addition of the Synbiotic mixture. Treatments were assigned as follows T₁. Standard diet (control treatment). T₂ standard diet fortified with a Synbiotic mixture of 5 g/kg. T₃ treatment of Azolla plant (unfermented) with soybean meal by 25%. T₄ treatment of fermented Azolla plant fortified with Synbiotic mixture by 5 g/kg soybean meal by 25%. T₅ treatment of Azolla (unfermented) plant with soybean meal by 50%. T₆ treatment of fermented Azolla plant fortified with Synbiotic mixture by 5 g / kg soybean meal by 50%. T₇ 75% treatment of Azolla (unfermented) soybean meal. T₈ treatment of fermented Azolla plant and fortified with the Synbiotic mixture by 5 g/kg to replace soybean meal by 75% Chemical properties (crude protein, crude fat, moisture, ash) as well as storage properties (peroxide number, free fatty acids, thiobarbituric acid (TBA) were estimated during storage periods of 0, 20, 40 and 60 days at -18°C. The results showed that the coefficients fortified with the Synbiotic mixture, especially (T₂, T₄ and T₆) recorded a significant superiority in protein content and an improvement in the oxidative stability of the meat compared to the control treatment. The addition of fermented azolla also reduced the values of peroxide, free fatty acids, and TBA during storage, which reflected positively on the quality of the meat and its shelf life. The results indicate that fortified fermented azolla can be adopted as a partial economic alternative to soybean gain in duck feeds while maintaining the quality of the final product.

Key words : Azolla, fermentation, synbiotic, local duck, freezing, meat quality.

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INTRODUCTION

The poultry industry is one of the most vital sectors in food security as it provides a major source of animal protein with high nutritional value and at affordable prices compared to red meat (Alabi *et al*, 2020). The efficiency of poultry production depends largely on the quality and cost of the feed used, with nutrition accounting for approximately 65-70% of the total cost of production. (Marzouq and Saad, 2025). Soybean meal is the most widely used source of protein in poultry feeds due to its high content of essential amino acids and high biological value, but its high prices and the dependence of most developing countries on its import pose significant

economic challenges (Al-hummod *et al*, 2025). Hence, there is a need to look for cheap local and protein-rich alternatives that can partially or completely replace soybean gain. *Azolla pinnata* is a promising resource, with its high content of crude protein (20–30%) as well as amino acids, vitamins and minerals (Becerra *et al*, 1990). The bio-fermentation process of azolla by bacteria or fungi also contributes to improving digestibility and reducing crude fibers and anti-nutrients, which increases its nutritional value for poultry. (Sreelatha *et al*, 2018). Several studies have shown that the introduction of fresh or dried azolla in poultry feeds has improved production performance, increased protein content in meat, reduced