Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Immunological response and adaptation of kano brown buckling goats fed diets containing pleurotus ostreatus biodegraded sugarcane scrapings

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Abstract

Ruminant production in sub-Saharan African is principally constrained by dearth and unsteady quantity and quality of the year-round feed availability which affect both the growth (productive) and sexual (reproductive) performance of the animal. This problem of soaring cost of conventional feedstuffs used in ration formulation necessitates quest by animal nutritionists for alternative, non or less competitive, available and cheap feedstuffs, particularly lignocellulosic residues constituting environmental hazard due to improper disposal. This study evaluated the impact of replacing corn bran with biodegraded sugarcane scrapings (BSS) treated with Pleurotus ostreatus on the physiological and immunological responses of growing goats. Twenty-one healthy Kano Brown bucklings (aged 6–7 months; average body weight 9.40 ± 0.39 kg) were randomly assigned to three dietary treatments: 0 % (T1), 15 % (T2), and 30 % (T3) BSS inclusion levels in a completely randomised design over a 16-week feeding trial. The primary focus was to assess the immune response—specifically levels of immunoglobulins A, M, and G; triiodothyronine (T3); total antioxidant capacity (TAC); and key antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), and glutathione reductase (GR). Results indicated that the inclusion of BSS had no significant effect on these immunological or oxidative stress markers, all of which remained within physiologically normal ranges across the treatment groups. The biodegradation process significantly improved the nutritive profile of sugarcane scrapings, and dietary inclusion at 15 % supported adequate nutrient intake and physiological stability without compromising immune function. Moreover, the 30 % inclusion level was found to be safe and effective, promoting optimal health and performance in the goats. These findings highlight the potential of BSS as a sustainable, non-conventional feed resource in small ruminant nutrition.

Keywords: Immune status, Pleurotus ostreatus, small ruminant welfare, solid state fermentation, sugarcane scrapings

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