A Green Bioactive Copper–Phenolic Feed Hygiene Solution for Mold Control and Performance Optimization in Commercial Broiler Production

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Abstract

Fungal contamination in poultry feed, primarily caused by A*spergillus, Fusarium*, and *Penicillium* species, contributes significantly to mycotoxin production, resulting in reduced nutrient utilization, impaired gut health, oxidative stress, and compromised broiler productivity. Conventional feed hygiene approaches such as aluminosilicate binders, organic acids, and synthetic antifungal agents often exhibit limitations including non-selective nutrient binding, restricted efficacy spectrum, and reduced stability during feed processing. This study evaluated a novel green bioactive feed hygiene additive comprising bioactive copper chelates and botanical phenolic compounds designed to provide dual-action antifungal and gut-protective benefits.

A 42-day controlled broiler trial was conducted at Veterinary College, Hebbal (KVAFSU; IAEC: VCH/IAEC/2026/04) using 360 Vencobb broiler chicks randomly allocated into Control, TBCC reference, and proprietary bioactive copper additive groups at an inclusion rate of 250 g/ton feed. Birds supplemented with the proprietary additive demonstrated superior feed conversion ratio (1.638) and achieved higher final body weight (2,507 g) compared to the control group (2,439 g). Intestinal morphometry further revealed significantly improved ileal villi height, enhanced villi height-to-crypt depth ratio, and reduced jejunal crypt depth, indicating improved absorptive efficiency and reduced intestinal stress. Immunity, survivability, hepatic safety parameters, and antibody titres remained comparable across all groups, confirming the additive's safety profile.

The findings demonstrate that the bioactive copper–phenolic feed additive serves as a sustainable and scientifically validated feed hygiene solution capable of supporting mold control, mycotoxin mitigation, intestinal health, and overall broiler performance in commercial poultry production systems.

Keywords

Bioactive copper chelate, feed hygiene, mycotoxin mitigation, poultry nutrition, intestinal health.