

## **Feed potential of small cereal grains in poultry production in semi-arid areas: A review**

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### **Abstract**

A review of available literature shows that small grains are widely used across the globe for human and livestock feed. Sustainable chicken production can significantly contribute to dietary needs and resolve food insecurity in the smallholder sector. It is estimated that local chickens constitute 80% of poultry production in sub-Saharan countries, 28% in America, 15% in Europe, and 60% in Asia. The success of production of small grains such as sorghum (*Sorghum bicolor*), finger millet (*Eleusine coracana*), and pearl millet (*Pennisetum glaucum*) has been attributed to their drought resilience and adaptability to climate change. Sorghum, in particular, is the fifth most important global cereal crop after maize. Chicken producers use local small grains as major components for inclusion in poultry diets in order to decrease the cost of production and increase the profits. The potential use of small grain as a major source of native chicken is attributed to their richness in the composition of diverse nutrients. Small grains contain diverse amino acids and energy levels. Millets, in particular, are high in minerals such as calcium, iron, and pyridoxine (vitamin B6). Sorghum has metabolizable energy, calcium, and phosphorus for supporting chicken growth and production. Studies reviewed on the performance of broilers on varying degrees of small grain inclusion have been made using broiler chickens fed on varying degrees of small grain inclusion in various diets. Studies showed that a diet containing 12.34 MJ ME/kg dry matter (DM) to 12.91 MJ ME/kg DM is recommended for growth performance during the starter and grower phases of Venda spotted breed chicks. Furthermore, indigenous naked neck chickens aged between 1 and 6 weeks were reported to require a diet containing an energy level of 14 MJ ME/kg DM for optimal growth and carcass quality. Chicken feed formulation through least cost feed formulation recommended small grain inclusion at 13.9 ME (MJ/kg) to obtain diets with 11.8% crude protein. Physical (such as grain germination, soaking, and grinding) and chemical (such as fermentation, urea treatment, and use of alkali substance) strategies can enhance the utilization of small grains by chickens. There is a greater scope for improving small grain utilization by chickens by establishing convenient and accurate levels of inclusion in the diets and adding their value through biofortification interventions.

**Keywords:** chicken feed, crude protein, *Gallus domesticus*, small grains, total digestible nutrients