

Toward Sustainable Poultry Nutrition: A Review of Agricultural By-Product and Waste Valorization

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Abstract

In recent years, the substantial rise in agri-food production has led to the accumulation of large volumes of agro-industrial wastes and by-products, thereby exacerbating environmental pollution. Consequently, the reutilization of these non-edible by-products as alternative feed ingredients in animal nutrition has gained significant attention. This approach not only reduces reliance on conventional feedstuffs but also alleviates land-use pressure and mitigates food-feed competition, thus supporting environmental, economic, and social sustainability. Moreover, these underutilized resources are rich in bioactive compounds such as polyphenols, dietary fiber, essential oils, vitamins, and minerals. Their valorization has been increasingly promoted through innovative strategies aligned with the European Union's circular economy and green biorefinery models. Among these strategies, the development of cost-effective, nutritious, and sustainable animal feeds represents a key solution. Furthermore, various fruit and vegetable by-products such as dried orange pulp from the fruit juice industry, olive pomace, pomegranate husks, and tomato processing residues have been successfully incorporated into poultry diets. These by-products not only serve as functional feed ingredients but also exhibit nutraceutical properties that enhance poultry health and welfare. In this context, the present review aims to provide a comprehensive synthesis of the potential of diverse agri-food wastes and by-products for poultry feeding. It explores their bioactive components, their functional roles as feed additives, and the associated health-promoting effects, thereby underscoring their relevance in advancing sustainable poultry production.

Key Words: *Fruit juice industry leftovers, Dried orange waste, Olive oil industry by-products, Pomegranate by-products, Tomato processing by-products, Bioactive compounds*