

## Fiber in Poultry Feeding: Enhancing Health, Productivity and Sustainability

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### Introduction

In the realm of poultry nutrition, the focus has traditionally been on protein, energy, vitamins, and minerals. However, the role of dietary fiber in poultry feeding is increasingly recognized as crucial for maintaining gut health, improving nutrient utilization, and enhancing overall productivity. Fiber, once overlooked, is now gaining prominence as researchers and producers alike discover its multifaceted benefits



in poultry diets. This comprehensive article explores the importance of fiber in poultry feeding, its sources, effects on health and performance, management considerations, and future directions in poultry nutrition.

### Understanding Dietary Fiber

Dietary fiber comprises a diverse group of compounds resistant to digestion in the small intestine of poultry. It includes non-starch polysaccharides (NSPs) such as cellulose, hemicellulose, pectins, and  $\beta$ -glucans, as well as oligosaccharides and resistant starches. While non-essential for poultry nutrition in terms of energy and protein, fiber plays pivotal roles in gastrointestinal health, nutrient absorption, and metabolic functions. Types and sources of fiber in poultry diets are:

1. **Insoluble Fiber:** Found in wheat bran, oat hulls, and soybean hulls, insoluble fiber adds bulk to digesta, promoting gut motility and aiding in the passage of feed through the digestive tract.



2. **Soluble Fiber:** Sources like beet pulp, citrus pulp, and guar gum form viscous gels in the gut, slowing digestion and nutrient absorption, thereby stabilizing blood glucose levels and improving nutrient utilization.
3. **Fermentable Fiber:** Found in sources such as chicory root, fructooligosaccharides (FOS), and inulin, fermentable fiber supports beneficial gut microflora, enhancing gut health and immune function.

### Importance of Fiber in Poultry Nutrition

Fiber promotes the development of a robust gastrointestinal tract, reducing the incidence of digestive disorders such as necrotic enteritis and improving overall gut health. It acts as a substrate for microbial fermentation in the caeca, producing short-chain fatty acids (SCFAs) like butyrate, which serve as an energy source for enterocytes and enhance nutrient absorption. Soluble fibers modulate glucose and lipid metabolism, contributing to metabolic health and reducing the risk of metabolic disorders in poultry. Fiber-rich diets also help to stimulate the immune system, promoting a balanced inflammatory response and enhancing resistance to pathogens.

### Effects of Fiber on Poultry Performance

1. **Growth and Feed Efficiency:** Optimal levels of dietary fiber improve growth rates and feed conversion ratios by enhancing nutrient absorption and reducing digestive inefficiencies.
2. **Egg Production and Quality:** Fiber influences eggshell quality, yolk composition, and overall egg production parameters, contributing to profitability in layer operations.
3. **Meat Quality:** Fiber-enriched diets can improve meat texture, moisture retention, and shelf-life, enhancing consumer satisfaction and economic value in broiler production.
4. **Cannibalism:** Optimum level of dietary fibre is essential to prevent cannibalism in birds.

### Management Considerations for Fiber in Poultry Diets

1. **Formulation and Ingredient Selection:** Balancing fiber levels with other nutrients is essential to meet the specific nutritional requirements of different poultry species and production stages.
2. **Processing and Pelleting:** Fiber characteristics affect feed processing efficiency and pellet quality, necessitating adjustments in processing parameters to ensure optimal feed performance.



- 3. Health and Performance Monitoring:** Regular assessment of gut health indicators, performance metrics, and nutrient utilization parameters helps optimize fiber inclusion levels in poultry diets.

### Challenges and Considerations

- 1. Anti-Nutritional Factors:** Some fibers contain anti-nutritional factors like phytates and lectins, which can impair nutrient absorption and digestive function if not properly managed.
- 2. Digestive Tolerance:** High levels of certain fibers may lead to digestive disturbances or impact feed intake, requiring careful evaluation and adjustment in poultry diets.
- 3. Cost and Availability:** The cost-effectiveness and availability of fiber sources can vary regionally, influencing their practical application in commercial poultry operations.

### Future Directions in Fiber Research and Application

- 1. Functional Fiber Ingredients:** Research is ongoing to explore novel fiber sources and functional ingredients that offer specific health benefits and improve performance outcomes in poultry.
- 2. Precision Nutrition:** Advancements in precision feeding technologies aim to tailor fiber inclusion levels based on individual bird requirements, optimizing nutrient utilization and health outcomes.
- 3. Sustainable Poultry Production:** Integrating fiber-rich by-products from agricultural and food processing industries supports sustainable poultry production practices, reducing waste and environmental impact.

### Conclusion

Dietary fiber is a cornerstone of poultry nutrition, offering multifaceted benefits that extend beyond simple digestive health to encompass growth, performance, and sustainability in poultry production. As the poultry industry evolves to meet global demand for safe, nutritious food, understanding and harnessing the potential of fiber in poultry feeding will continue to be a critical area of research and innovation. By embracing the holistic benefits of fiber-rich diets, producers can enhance the health, welfare, and profitability of poultry operations while contributing to sustainable agricultural practices.