



From Processing to Performance: Hydrobarothermal Treatment Enhances Protein Utilization in Laying Hens

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Abstract

Soybean meal (SBM) is the primary protein source in poultry diets; however, its nutritional value can be limited by the presence of anti-nutritional factors and variability in protein digestibility, particularly in non-genetically modified (non-GMO) sources. Processing techniques play a critical role in improving nutrient availability, and hydrobarothermal processing has emerged as a promising method to enhance the feeding value of SBM. This review aims to evaluate the effects of hydrobarothermal treatment on amino acid digestibility and protein utilization in laying hens. Hydrobarothermal processing, which combines heat, moisture, and pressure, has been shown to effectively reduce anti-nutritional compounds such as trypsin inhibitors and lectins, while promoting structural modifications in protein matrices. These changes facilitate improved enzymatic access and nutrient absorption in the gastrointestinal tract. Evidence from recent studies indicates that such processing can significantly enhance standardized ileal digestibility of essential amino acids, leading to improved protein efficiency and overall performance in laying hens. Furthermore, the review highlights the potential of hydrobarothermal treatment to improve the consistency and nutritional quality of non-GMO SBM, thereby supporting sustainable and efficient poultry production systems. However, the extent of these benefits depends on processing conditions, including temperature, pressure, and duration, which must be carefully optimized to avoid heat damage and amino acid degradation. In conclusion, hydrobarothermal processing represents an effective strategy to enhance the nutritional value of SBM, with significant implications for improving protein utilization in laying hens. Further research is warranted to standardize processing parameters and evaluate long-term effects on productivity and egg quality under commercial conditions.

Key Words: *Hydrobarothermal processing; soybean meal; amino acid digestibility; protein utilization; laying hens; non-GMO; anti-nutritional factors; poultry nutrition; feed processing; ileal digestibility*

