

Applied microbiology in poultry industry: from nutrition to the gut microbiota

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Abstract

Poultry products (i.e., meat and eggs) are one of the major protein sources for the human diet. The animal's diet is one of the key elements that the poultry industry has been focused on, to improve the animal's performance, maintaining their healthy growth and, ultimately, high quality end products. The incorporation of functional ingredients in feed formulations, aiming to provide extra benefits and/or prevent diseases, has been considered efficient in maintaining the animal's productivity and simultaneously ensure its well-being. Nutrient's bioavailability varies throughout digestion and absorption within the poultry's gastrointestinal tract (GIT). A reliable *in vitro* model, as the one developed and used in this study, capable of mimicking all digestion, absorptive and cecal fermentation processes, is a useful tool to study the potential benefits of feed supplemented with functional and/or bioactive ingredients. The developed *in vitro* gastrointestinal model simulates the chemical, enzymatic, and mechanical conditions prevailing in the chicken's GIT, from beak to cecum. Fresh broiler's cecal samples were used as inoculum for batch cecal fermentation and the impact of different feed formulations, on bacteria modulation, organic acids, and total ammonia nitrogen production, were assessed. Overall, this approach enables to evaluate, as close to reality as possible, the potential of target additives, providing a trustworthy tool for the development of functional feeds.