

Effect of supplementing clove essential oil to the diet on microflora population, intestinal morphology, blood parameters and performance of broilers

Einfluss eines Zusatzes von essentiellen Ölen der Nelke zum Futter auf die Mikroflora und die Morphologie im Darm sowie auf Blutparameter und Leistung von Broilern

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Introduction

Antibiotics have been used in poultry feed for improving growth performance, preventing some specific pathogenic microorganism and increasing some useful microorganism in intestinal microflora over years (MILES et al., 2006). Antibiotics have generated resistant strains by transferring resistance to other species especially in shared strains between humans and animals, and made serious problems in public health and livestock. In 2006, the European Union (EU) approved a resolution to ban the use of antibiotics as growth promoters for animals (HONG et al., 2012). Nowadays, the possibility of using new natural alternative additives instead of antibiotics in animal diets is being researched. In recent years, products containing essential oils derived from several spices and herbs are used as growth promoting feed additives in animal nutrition but more studies are needed to optimize their use

(BRENES and ROURA, 2010). These phytogetic additives may have more than one mode of action, including improving feed intake and flavor, stimulating the secretion of digestive enzymes, increasing gastric and intestinal motility, endocrine stimulation, antimicrobial (MITSCH et al., 2004), antiviral, anthelmintic and coccidiostat activities (JAMROZ et al., 2005), immune stimulation and anti-inflammatory and anti-oxidative activity (BOTSOGLOU et al., 2004). Several studies have shown antimicrobial properties of herb extracts which can improve intestinal microflora population and enhance health in birds' digestive systems through reduction in number of disease-making bacteria (MITSCH et al., 2004; JAMROZ et al., 2005). Intestinal health is of great importance in poultry for improved performance and feed conversion ratio. Nutrient absorption in the gastrointestinal tract is more effective with increase in the size and height of intestinal villi. Factors, such as diet were found to influence the morphology of the intestinal villi. In various domestic birds, there was a correlation between the morphology of the intestinal villi and food habits (ZULKIFLI et al., 2009). Phenolic compounds, such as carvacrol, thymol or eugenol, are used as additives in animal nutrition because of their antimicrobial activity. Eugenol is a major component of clove extract and exhibits a wide range of antimicrobial activity in vitro (EHRICH et al., 1995). Clove, and its essential oil, is one of the plant extracts that has been found effective in poultry to improve growth performance, control some intestinal pathogens, acts antiseptic and as digestion stimulant, and shows strong antimicrobial and antifungal, anti-inflammatory, anesthetic, anti-carcinogenic, antiparasitic and antioxidant effects (NAJAFI and TORKI, 2010; MITSCH et al., 2004; KAMEL, 2001; EHRICH et al., 1995). Cinnamaldehyde and eugenol have been reported to possess antibacterial activity against a wide range of bacteria and inhibitory properties against *Aspergillus flavus* (STEINER, 2010; TOGHYANI et al., 2011). Therefore, the present study was conducted to evaluate the effect of increasing dietary levels of clove oil on growth performance, some blood parameters, intestinal microbiology and histological characteristics in broiler chickens.