Effect of calcium propionate and coated sodium butyrate as an alternative to antibiotic growth promoters on the serum profile of commercial broiler chicken

S Naveen Kumar, N Karthikeyan, R Narendra Babu, P Veeramani, S Sivarama Krishnani and G Srinivasan

Abstract
An experiment was conducted with 240 day old commercial broiler chicks to evaluate the effectiveness of replacing antibiotic growth promoters with organic acid salts on the serum profile. Treatment diets were supplemented with lincomycin HCl (4.4 ppm), bacitracin methylene disalicylate (BMD; 50 ppm), each two levels (ppm) of calcium propionate (1000, 2000) and coated sodium butyrate (500, 1000) either alone or in combination (1000+500) with control. The results showed that there was no significant difference in kidney & liver function tests, serum protein and mineral profile among the treatment groups. And in case of lipid profile OAs supplementation showed significantly beneficial impact. The levels of serum profile parameters were in normal range, that suggesting good nutritional status of the birds in all the treatment groups. Salts of organic acids (OAs) could be safely supplemented as an alternative to antibiotic growth promoters (AGPs) in the commercial broiler diet to lower the risk of residues in the meat and to avoid the antibiotic resistance (if any) to the consumers without impair the serum profile and birds health.

Keywords: Organic acid, Calcium propionate, Sodium butyrate, Serum lipid profile, protein profile, mineral profile, kidney and liver function tests

1. Introduction
The use of in fed antibiotics for growth promotion had been arisen with the intensification of livestock farming. Administration of sub-therapeutic level of antibiotics and antimicrobial agents is widely practiced so as to control the infectious agents and to improve the productivity of food animals. Currently, there is a controversy surrounding the use of antibiotic growth promoters (AGPs) for animals destined for meat production, as overuse of any antibiotic over a period of time may lead to resistance of these bacterial populations to the antibiotic used. Which in-turn affect human health either directly through residues of an antibiotic in meat or indirectly through the selection of antibiotic resistance determinants that may spread to human pathogen.

In 2006, the European Union imposed a complete ban on the use of antibiotics in animal feed as growth promoters. World Health Organization (WHO) along with World Organization for Animal Health (OIE) encourages the health, agriculture, veterinary sector for reducing the injudicious use of antibiotics as growth promoters and further to decrease the spread of resistant bacteria (Cogliani et al. 2011) [3]. Therefore, other non-therapeutic alternatives such as probiotics, prebiotics, symbiotics, antimicrobial peptides, enzymes, essential oils, eucalyptus oil, organic acids, clay minerals, egg yolk antibodies, rare earth elements, recombinant enzymes and immuno-stimulants have been introduced as an alternative to the antibiotic growth promoters.

Among the alternatives, organic acids could be considered as the best possible choice for securing the supply of safe food. Acidification increases gastric proteolysis, protein and amino acid digestibility and utilization of minerals and thus improving the performance of the birds (Haque et al. 2009) [8]. Organic acids (propionic acid and butyric acid) effectively replace the antibiotics and improve the production performance like body weight gain and FCR (Vijayalakshmi et al. 2015; Adil et al. 2011; Deepa et al. 2016) [10, 4] and had good impact on serum biochemical profile (Kamal and Ragaa, 2014) [8].