Full Length Research Paper

Alteration of gut microflora through citric acid treated drinking water in preslaughter male broilers

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This experiment was conducted to evaluate feed withdrawal and addition of citric acid in drinking water on the pH and microflora of gizzard, ceca and feces in preslaughter broiler chickens. A total of 24 male Ross 308 broiler chickens at the age of 42 days with almost equal weight were randomly divided into six treatments with four replicates each. Control group had free access to feed and water, but without supplemental citric acid during preslaughter period. Another group was kept 8 h without feed, but with ad libitum access to unsupplemented drinking water. For other treatments, four concentrations of citric acids were added to the drinking water (1.5, 3, 4.5, and 6%) of broilers with feed withdrawal for 8 h. Fecal samples were collected 1 h before slaughter. After slaughter, gizzard and cecal contents were obtained and used for microbiological studies. The number of clostridium, bacillus, coliform and other bacteria were enumerated on appropriate bacterial media. The pH of gizzard, ceca and feces was significantly (P<0.05) lessened in birds that drank acidified water particularly at 4.5 and 6% citric acid as compared with control and feed withdrawal groups without citric acid supplementation. Also, the addition of citric acid to drinking water resulted in significant (P<0.05) reduction of bacillus, clostridium, coliform, facultative aerobic, and other bacteria in gizzard, cecal and fecal contents of birds with acidified water in comparison to the control and feed withdrawal treatments. Under the condition of this study, addition of citric acid in the drinking water 8 h before slaughter could reduce intestinal microflora colonization and might be a fruitful strategy against bacterial contamination of broiler products during processing.

Key words: Citric acid, feed withdrawal, intestinal bacteria, broiler.

INTRODUCTION

Microorganisms in alimentary tract of animals are small players of the great games as diverse as digestion and diseases. Nowadays, various approaches such as biotechnological procedures (Esmaeilzadeh et al., 2012) and nutritional modifications (Jahani-Azizabadi et al., 2011) have been appraised for special microbiological aims in animal husbandry. In spite of the above mentioned advances, bacterial contamination of poultry products remained to be of great concern for consumers.

Moreover, feed withdrawal before transport of the birds to abattoir is common to avoid contamination of the carcass with excreta during slaughter and processing. However, it has been reported that intestinal tissues from fasted birds are more susceptible to pathogen attachment than tissues from control birds (Burkholder et al., 2008). For this reason, different workers have evaluated suitable and acceptable decontaminant chemicals or processes to reduce or eliminate enteric pathogens from poultry products in recent years (Antunes et al., 2003; Luckstadt, 2007). On the other hand, a vast variety of bactericides have been assessed for their efficacy to reduce microbial loads on poultry carcasses. Various organic acids which are particularly effective...