ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

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International Journal of Poultry Science 2 (6): 446-448, 2003

The Using of Organic Acids in California Turkey Chicks and its Effects on Performance Before Pasturing

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Abstract: The experiment described evaluated the effect of a commercial in-feed preparation (Biotronic® SE) involving a mixture of organic acids and salts on California turkey chicks performance. In these experiments, 1-d-old commercial white turkey poults were placed into battery brooders and were given turkey starter feed and water ad libitum. Biotronic® SE had very small effect on the body weight gain (BWG) when included in the feed and live bird performance was not adversely affected by feeding up to 2.0%. from 0 to 60 days as based groups.

Key words: Organic acids, turkey poults, Biotronic® SE

Introduction

Besides the nutritional value, high quality feed also has a positive effect on the health status of animals. Feed ingredients contain high populations of bacteria, fungi and yeast. Thermal treatments during feed production help to reduce the microbial load but cannot prevent a recontamination afterwards. Moulds spoil feed, especially when storage conditions are faulty. All moulds reduce the nutritive value of feed, while those that produce mycotoxins pose a serious threat to animal and human health. Acids with an anti-fungal activity provide an efficient way to ensure the quality of stored cereals, other feed raw materials and compound feed. The most efficient way to keep compound feed at a high hygienic status is the use of organic acids. Propionic acid is known to be very effective against moulds, and formic acid eliminates bacteria and yeast. Bacteria and yeast contamination in compound feed have a negative impact on the intestinal flora, resulting in nutrient losses and negatively influencing the feed intake of animals Nir and Senköylü (2000). All these effects result in a reduction of animal performance. With the use of organic acids the microbial contamination levels of feed will be reduced, proliferation of pathogens prevented and animal performance improved. In compound feed or their single components, basic contamination of moulds, bacteria and yeast are always present Heindl (2002).

The multiplication of these micro-organisms depends on the basic germ content, the moisture level, ambient temperature and the storage time of the feed or feed ingredients. The efficacy of organic acids is defined as the ability to inhibit a broad spectrum of mould, bacteria and yeast. The minimum inhibition concentration (MIC) of organic acids has been established as a standard to determine the effectiveness against different micro-organisms. Propionic acid has been proven to show the broadest efficacy of all organic acids against fungi. Therefore propionic acid effectively prevents the formation of mycotoxins. However, formic acid is the most efficacious acid against bacteria and yeast. Organic acids control micro-organisms by intervention in the energy metabolism by blocking the enzyme pyruvatedecarboxylase and by influencing DNA synthesis Adams (1999). The multiplication of bacteria and yeast is more effectively reduced by formic acid. Other acids like acetic, butyric and benzoic acid show a lower efficacy than propionic or formic acid. high microbial counts in feedstuffs not only result in a reduced nutrient value, but they also have a negative impact on palatability, which consequently results in a reduced feed intake and reduced performance. High microbial counts also have a negative influence on the process of digestion and often cause diarrhea problems by shifting the microbial flora from commensally to pathogenic germs. Organic acids, which have a strong pH reducing effect, are extremely efficient against bacteria and yeast. This results in a reduction of the number of coliform germs in feeds, which lowers the microbial stress for the animal. Formic acid in particular prohibits bacteria multiplication in the digestive tract. The mode of action of organic acids takes place in three different areas: in the feed, in the intestinal tract and in the metabolism. Feed, even under favourable conditions always has a certain load of microorganisms. The application of organic acid depresses the metabolic activity of susceptible germs and therefore reduces the microbial load of feed. Besides this preservative effect it is also very likely that direct effects in the animal are responsible for the positive nutritive effects of organic acids. This survey was carried out to determine the effect of the organic acid and salts on California turkey's performance via processed feeds before pasturing.

Materials and Methods

Chicks and Diets: 50, 1-d-old male white California turkeys obtained from commercial hatcheries and were selected by weight and divided into control and treatment with equal average body weights and raised for 8 weeks in battery brooders situated in a temperature controlled room. The feeds were obtained from a feed factory as declared according to National Research Council (1994) recommendations (Table 1) and treatment consisted of 2.0%. Biotronic® SE (Table 2) from 0 to 60 days. Feed and water were supplied *ad libitum* to groups. At weekly intervals, body weights and feed intake were recorded on a group basis, respectively. At the age of 8 weeks birds were taken to pasture in the farm.

Table 1: Nutrients Composition of Turkey diet used in study

Feed	Starter	Starter	Grower
Weeks	1-2	3-5	6-9
Crude Protein %	29.0	26.5	24.0
M.E, MJ / kg	11.6	11.8	12.1
Methionine	0.67	0.62	0.56
Methionine+Cystine.,%	1.15	1.05	0.95
Lysine, %	1.85	1.60	1.45
Calcium, %	1.40	1.30	1.20
Phosphor, %	1.00	1.00	0.80

Table 2: Composition of Biotronic® SE	(%)
Formic acid	17,4
Ammonium Format	14,1
Propionic acid	12,4
Ammonium propionate	8,4
Filled material	47,7

Results and Discussion

In recent years, there has been an increased interest in the effect of organic acids on feed efficiency and bird performance. This experiment was conducted to determine if any differences in cumulative body weight and feed intake of turkey chicks. Growth data (Fig 1-2) indicate that the 2.0% organic acids (Biotronic® SE) tended to improve body weight and decrease feed intake. As has been previously reported Heindl, (2002) supplemental organic acid causes an effect to BWG. As evident from figure 2, the turkey chicks were heavier than the control chicks in groups. A series of studies with poultry obtained an indication that organic acids in their undissociated forms are able to pass through the cell membrane of bacteria. Once inside the cell, the acid dissociates to produce H^+ ions which lowers the pH of the cell causing the organism to use its energy in trying restore the normal balance. (Nursey, 1997).

Cave, (1984), reported that when propionic acid was included in the feed up to levels of 100 g/kg, from 0 to 28 days, voluntary feed intake of broiler chicks was

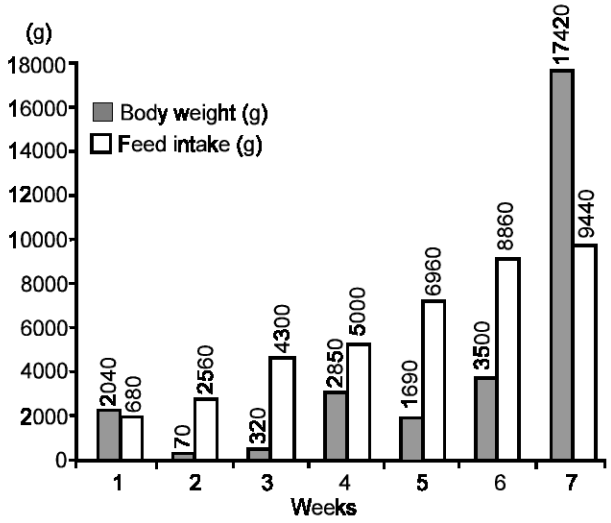

Fig. 1: Cumulative body weight and feed intake of control group

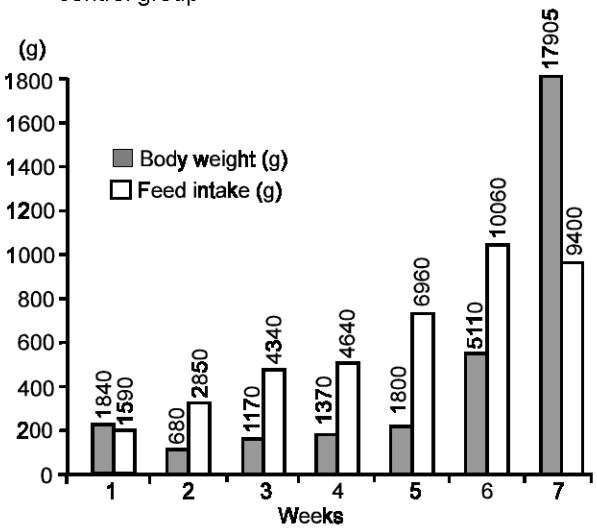

Fig. 2: Cumulative body weight and feed intake of treatment group

decreased with increasing dietary levels of acid. Similar result was observed at 200g/kg level in turkey chicks in the present study. Patten and Waldroup, 1988 reported that addition of 0.5 or 1.0% calcium formate had no significant effect on weight gains or feed utilization. Addition of 1.5% calcium formate significantly reduced body weights of both male and female broilers at 21 and 42 days. These facts, together with the observation of field cases of organic acid using in poultry (Roy, 2002), (Thompson and Hinton, 1997). But the effectiveness of organic acids in poultry may also depend on the composition of the diet and its buffering capacity is well known recently.

Thompson and Hinton (1997) reported that the inclusion of formic and propionic acids in the form of Bio-add to

the feed of hens made no difference to the pH of the intestinal tract, but resulted in higher concentrations of these acids in the contents of the crop and gizzard. But organic acids in the crop contents were bactericidal for Salmonella serotype Enteritides and this indicate that birds given organic acids had heavier than entreatment group. This results support the findings of Roy (2002) that when using organic acids as a feed additive to inhibit growth of many bacteria and toxin-producing molds.

Under the conditions of the this experiment appears that intake at the level of 2.0%. Biotronic® SE in the feeds may give a very small rise to body weight and decreased total feed intake from 0 to 60 days in treatment group.

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