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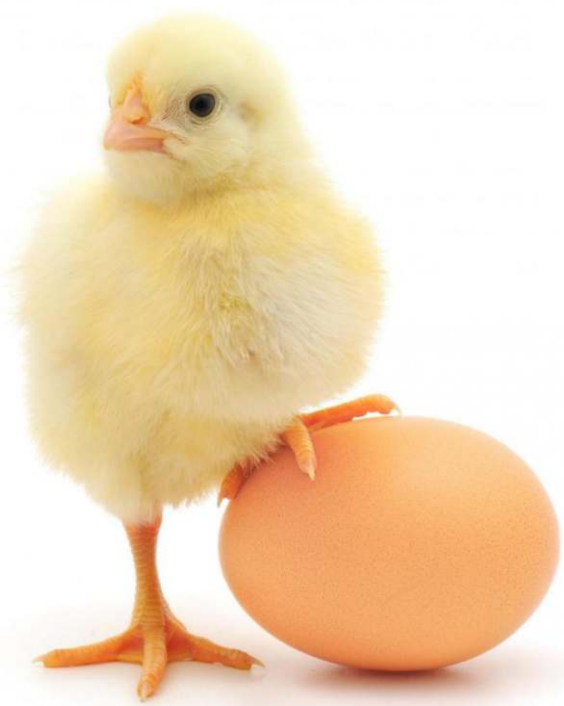

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Effect of Drinking Labaneh Whey on Growth Performance of Broilers

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Abstract: The present study was conducted in the poultry farm of Al-Shouback University College in the campus of Al-Balqa Applied University to evaluate the effect of drinking Labaneh whey on broiler performance. Fresh labaneh whey was mixed with the drinking water of broilers at rates of 0, 25, 50 and 75%. The experimental treatments of labaneh whey were offered *ad libitum* during the age 4-8 weeks of lohman broilers reared in an open-sided poultry house. At the end of the experiment, the results showed that, growth rate, body gain, feed consumption, feed efficiency and dressing percentage were significantly ($p<0.05$) reduced of broilers supplemented with Labaneh whey in the drinking water. Cumulative mortality rate of broilers was significantly ($p<0.05$) increased by increasing the level of labaneh whey above 25%. These results indicated that, using the labaneh whey as a by-product feed additive in the drinking water has a significant ($p<0.05$) negative effect on the performance of 4-8 week-old broilers reared in an open-sided poultry house.

Key words: Broiler, Jordan, labaneh-whey, performance, sweet-whey

Introduction

Many feed additives are routinely used word wide as growth promoters to increase feed efficiency and growth rate of broilers. In the past, the major growth promoters added to the feed of broilers were antibiotics. However, the current research trend is to look for natural alternatives to antibiotics because of the public concerns to their residues and subsequent occurrence of antibiotic-resistant bacteria (Lee *et al*., 2004; Clark, 1996).

Whey is defined as a natural liquid by-product serum or watery part of milk remaining after separation of the curd that results from the coagulation of milk by acid or proteolysis enzymes (Thivend, 1978; Abu-Fisheh, 1995). In 1986, the first International Whey Conference was conducted in USA. They pointed that, whey is a high nutritional value natural by-product, a nutrient-rich protein source composed of four main protein fractions i.e. beta-lactoglobulin (55% beta-Lg), alpha-lactalbumin (25% alpha-La), bovine serum albumin (10% BSA) and immunoglobulin (10% Ig). They are a source of all essential amino acids, growth factors. Moreover, they are utilized to protect against and fight microbial infections (Ha, 2001).

There are two types of whey produced: Sweet and acid whey. Sweet whey results from the production of many ripened cheeses, while acid whey results from acidification of milk (Glass and Hedrick, 1977; Zadow, 1990). Labaneh is a major foodstuff in Jordan which is a type of fermented milk product in the Eastern Mediterranean countries resembling in many respects soft cottage cheese, the produced liquid whey is of the acidic type (Abu-Fisheh, 1995). The chemical composition of Labaneh Whey (LW) is 5% dry matter, 7.5% ash, 0.90% crude protein, 4% lactose and 0.80 lactic acid (Batshoon, 1980).

Most of the previous animal feeding studies showed that sweet whey which is a by-product of cheese production has a significant effect of improving the performance of farm animals by increasing its feed efficiency and body gain (Schingoethe, 1976: Matserushka, 1995: Lammers *et al*., 1998). However, there is little published information about the use of labaneh whey as a natural feed additive in poultry nutrition. Therefore, this study was designed to evaluate the effect of drinking labaneh whey on the performance of 4-8 wk old broilers by which it's expected to improve feed efficiency and growth rate of broiler birds.

Materials and Methods

Experimental room: An open-sided poultry house located in the poultry farm of Al-Shouback University College in the campus of Al-Balq`a Applied University was used in this study. The house consists of 12 identical pens. Each pen measures 2.750×1.40 m, supplied with a trough feeder and automatic-cup drinker. Artificial light, during the night was used which was controlled by the automatic-clock timer switched on at 00190 hr and off at 0500 hr during the morning time. Environmental conditions inside the house were not controlled and thus varied with the outside natural conditions.

Experiment: This experiment was conducted to study the effects of drinking labaneh whey on the performance of 4-8 wk-old broilers. A total of 300 day-old lohman

Table 1: Ingredients and calculated composition of the basal diets

Ingredients and composition	Starter (%)	Finisher (%)
Yellow Corn	63.80	72.20
Soy bean meal (44% CP)	28.00	21.50
Fish meal (72% CP)	5.00	3.00
Lime stone	1.60	1.60
Dicalcium phosphate	1.00	1.20
Premix (Vitamin + Minerals)*	0.10	0.10
DL-Methionine	0.20	0.10
Sodium Chloride	0.30	0.30
Coccidiostat	0.05	0.05
Calculated Composition		
Metabolizable Energy (kcal/kg)	2921	2994
Crude Protein %	21.40	18.10
Lysine %	1.19	0.93
Methionine %	0.55	0.33
Methionine and Cystine %	0.89	0.62
Calcium %	1.09	1.08
Total Phosphorus %	0.98	0.68

*Supplies the required vitamins and microminerals

broiler chicks was obtained from a local hatchery and reared from one day to four weeks of age as group using the standard brooding practices. They reared on litter with feed and water provided *ad libitum* in the brooding house and fed a commercial standard starter diet from 0 to 4 weeks of age (Table 1).

At four weeks of age, a total of 240 chicken broilers were weighed and moved from the brooding house to the experimental room. Birds were distributed in the different treatments at random basis in a Complete Randomized Design (CRD). There were 3 replicates of 20 birds each, for each treatment in the room; with 10 birds/m^2.

Fresh labaneh whey was delivered from the milk processing lab to the poultry farm every day. It was mixed with the drinking water at rates of 0, 25, 50 and 75%. The product LW solutions were prepared every day and provided to the different broiler treatments as a source of whey and drinking water throughout the experimental period which was lasted for 4 weeks. Control group received the drinking water free of whey and any additive. All birds received a complete finisher diet (Table 1) provided for *ad libitum* consumption.

Statistical analysis: All the means of experimental treatments were analyzed by ANOVA using the General Linear Model (GLM) procedure of Statistical Analysis System (SAS). When a significant F statistic was noted, treatment means were separated using Duncan's multiple range test (SAS Institute, 1987).

Results

Data on growth performance of finisher-broiler birds are presented in Table (2). Broiler performance was significantly ($p<0.05$) reduced by increasing the levels from 25 to 75% of Labaneh Whey (LW) in the drinking water. Broilers offered 75% LW, had significantly ($p<0.05$) the lowest growth rate and feed consumption with a poorest feed conversion ratio. On the other hand, broilers offered 25% LW, had higher growth rate and lower feed efficiency than those of control group. The best growth rate and feed efficiency were observed in the control group when compared with the birds kept at any other labaneh whey treatment. The poorest dressing percentage was significantly ($p<0.05$) observed in the broilers of 75% labaneh whey treatment. Moreover, it was observed that, mortality rate of broilers was significantly ($p<0.05$) increased by increasing the level of labaneh whey.

Discussion

The results of this experiment illustrate clearly the adverse effects of drinking Labaneh Whey (LW) on growth rate, feed intake, feed to gain ratio, mortality rate and dressing percentage of broiler birds. Broiler performance was significantly ($p<0.05$) reduced by increasing the concentration of LW above 25% in the drinking water. The loss of body weight gain of broilers offered 50% LW was -25%, while it was increased to -67% in 75% LW treatment compared with the body weight gain of control birds. This difference in growth depression data indicated that the performance depression at high levels of LW may be not only due to the effect of low feed consumption, but also, other factors responsible for growth rate depression mainly related to the effect of LW on feed efficiency. This is confirmed, since the broilers given 50% LW in the drinking water consumed more feed with a significant lower body gain and slower growth rate than control group. The accumulated values of feed to gain ratio (FCR) were 4.76, 3.93, 2.77 and 2.48 for 75, 50, 25 and 0% LW treatments, respectively. The birds given 75% LW in the drinking water had significantly ($p<0.05$) the highest and the poorest feed to gain ratio so that broilers provided more than 25% LW in the drinking water are expected to need longer time to reach the same slaughter weights of the control group. This is confirmed by the results of dressing percentages which indicated that high levels of LW in the drinking water have a significant ($p<0.05$) effect on reducing the dressing percentage of broilers (Table 2). The same findings were observed by Pourreza and Alipour (2004).

The total amounts of feed consumed by different LW broiler treatments were 2759, 5084.3, 4835.7 and 4239.3 gram/bird at 75, 50, 25 and 0%, respectively. These values are significantly ($p<0.05$) different when compared with each other. Thus, increasing labaneh whey up to level 75% reduced feed consumption after 4 weeks of experiment by -35%, compared with control group. Therefore, there was a 0.7% reduction in appetite for each 1% rise between 50 and 75% levels of labaneh whey. This decrease in appetite might be one of the reasons for the significant decrease in the feed

Table 2: Means±S.E of live body weight (gram/bird), body gain (gram/bird), total feed consumption (gram/bird), accumulative Feed Conversion Ratio (FCR) and mortality rate of 8 week-old broilers supplied with different levels of Labaneh Whey (LW) in drinking water

	-------------- Drinking Labaneh Whey (LW) Treatments --------------			
Performance Parameter	Control	LW (25%)	LW (50%)	LW (75%)
Live body weight	2773.33^{a}±49	2836.67^{a}±34	2361.67^{b}±41	1681.67^{c}±43
Live body gain	1713.33^{a}±30	1745.00^{a}±21	1291.67^{b}±24	578.33^{c}±35
Total feed consumption	4239.3^{b}±44	4835.7^{ba}±106	5084.3^{a}±73	2759.0^{c}±100
Accumulated FCR	2.48^{d}±0.03	2.77^{c}±0.05	3.93^{b}±0.05	4.76^{a}±0.06
Accumulated Mortality rate	3.00^{c}±1.0	4.00^{c}±1	8.00^{b}±0.58	12.00^{a}±1.15
Dressing %	0.72^{a}±1	0.71^{a}±0.01	0.73^{a}±0.01	0.59^{b}±0.02

^{a,b,c}Means with different superscripts in the same row are significantly different at ($p < 0.05$)

consumption of the birds recorded at high level of 75% LW. The loss of appetite of broilers given 75% labaneh whey may be caused by the presence of high ash content (7.5%) in the labaneh whey which indicates the presence of high salt content in the drinking water. This is supported by the results of high accumulated mortality rate in 50 and 75% LW treatments which indicated clearly that a significant ($p<0.05$) high mortality rate occurred when the level of LW exceeds 25%. Increasing mortality rate might be due to the toxicity of sodium chloride in high levels of LW given in the drinking water. These results are in agreement with the findings reported by previous researchers (Seyle, 1943; Blaxland, 1946; Erener *et al*., 2003).

Lactose intolerance is another main factor may be responsible for negative effects of labaneh whey on growth performance (Shariatmadari and Forbes, 2005). Labaneh whey has a relatively high lactose content (4%) (Batchoon, 1980). Lenenthal *et al*. (1974) reported that lactose intolerance is caused by a considerably reduced lactase activity in the mucosa of the small intestine. As a result, lactose is not split and the increase in the lactose concentration inside the intestine produces an increased osmotic pressure which causes water to enter the lumen of the intestine. The resulting symptoms are abdominal pressure, flatulence, colic and diarrhea. The results of this experiment are in agreement with the results of Kaneko *et al*. (2004) who found that the growth rate of broilers was significantly ($p<0.05$) reduced by increasing levels of whey more than 25% in the drinking water. The same findings were observed by Pourreza and Alipour (2004). On the contrary, Shariatmadari and Forbes (2005) found that, whey offered as drinking fluid had an adverse effect on broiler performance but feeding whey improved weight gain and feed efficiency significantly ($p<0.05$), they concluded that, whey can be used in diets for broilers chicken by incorporating it in the broiler feed as long as drinking water is offered *ad libitum*. This is confirmed by the results of Al-Shawabkeh (1996) who found that there was a significant ($p<0.05$) improvement in body weight, body weight gain and feed conversion ratio in the broiler treatments received whey in feed in stead of drinking water. Similar conclusion was reported by Kermanshahi and Rostam (2006); Samie *et al*. (2004).

In conclusion, supplementation of natural labaneh whey in the drinking water of 4-8 week-old broilers has negative effects on its performance. Moreover, it will increase the market age and mortality rate. Subsequently increasing the productive cost. Further studies are needed to study the effect of labaneh whey as a by-product feed additive on broiler performance.

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