

Some Studies on the Beneficial Effects of Lactobacillus Concentrate Supplementation on Broiler Performance

H.H.Hussein and M.A. El-Ashry

Radioimmunology and Biochemistry Unit, Radiobiology Department, Atomic Energy Authority, Cairo, Egypt and Animal Prod. Depart., Faculty of Agriculture, Ain Shams Univer., Cairo, Egypt.

IN this investigation, interest was focused on Lactobacillus concentrate (LBC) and its beneficial role on broiler performance. Total live body weight, average daily gain, feed consumed/bird/day, and feed conversion were estimated in this study. Lactobacillus concentrate supplemented chicks were higher in their live body weight than the control ($P < .001$). Also, their average daily gain was more than that of the unsupplemented group. In spite of supplemented chicks had consumed less than the unsupplemented chicks, treated chicks showed a better feed conversion than the control. The use of LBC led to decrease the percentage of diarrhoea infection in the treated chicks. Mortality rate was 10 and 5% in control and treated chick respectively. The lower mortality and feed consumption values and the better feed conversion had led to increase meat yield from supplemented chicks more than the unsupplemented chicks. Supplemented chicks gained heavier weights by 26.7%. Each one kg gain was costed in the tested group less than in the control group by 16.3%.

Keywords: Broiler Chicks, Lactobacillus and growth Performance.

Lactobacillus has been shown to improve gastrointestinal disorders (Hawle *et al.*, 1959). Evidence suggests that many diseases caused by pathogenic bacteria invading the digestive tract could have been prevented if proper intestinal flora were maintained (Watkins *et al.*, 1982).

Other workers have investigated the benefits of *L.acidophilus** implantation in broiler and Leghorn chicks (Tortuero, 1973 and Watkins and Kraizer, 1984). Such implantation resulted in improving weight gains and feed efficiency. This is might be due to the creating of balanced microbial population in the intestinal tract (Fuller, 1977) and to the role of Lactobacillus in preventing the harmful bacteria which invade and populate in the digestive tract of the chicken.

It was also reported that the addition of *L.acidophilic** to poultry feeds showed similar effects to those obtained from antibiotics (Watkins *et al.*, 1982).

Therefore, the present study was carried out to investigate the beneficial effects of Lactobacillus concentrate supplementation (LBC) on broiler chicks performance.

Material and Methods

A total of 10,500 un-sexed one-day-old hubbard chicks were used in the present study. Chicks were randomly divided into two groups: Control group (5500 birds) and Lactobacillus concentrate supplemented group (5000 birds). Lactobacillus concentrate was added to diet at the rate of 0.5 gm/1 kg starter ration. The chemical analysis revealed that, the ration contained; . crude protein 20.8%, crude fat 3.2% and crude fiber 2.6%. Diets were offered twice daily at 8.00 a.m. and 4.00 p.m. ad lib. Water was available at all times. All chicks were reared in a thermostatic controlled broiler houses with a photoperiod of 18 hs/day.

The experiment lasted for 8 weeks and data of total body weight, feed consumption, average daily gain, feed conversion (Feed/gain), percentage of birds infected with diaharrea and growth rate were reported and calculated to clarify the effects of LBC supplementation.

Results and Discussion

Total live body weight, average daily gain, feed consumed/bird/day, and feed conversion for the control and LBC supplemented chicks are presented in Table 1.

It can be observed that total live body weight was increased gradually in both control and supplemented chicks as a function of age progress. Starting from the third week and up to the end of this study, live body weight of the supplemented group was significantly ($P < .001$) higher than the unsupplemented group.

Appreciable differences were noticed at the last three weeks, where the differences in mean body weight between the LBC group and the control reached 400gm. Such increase represents more than 30% of the total weight gain for control broilers achieved through 8 weeks which is attributed to a function of LBC supplementation. This improvement in live body weight is mainly due to maintaining the beneficial bacteria such as lactobacillus in the intestinal tract of the birds. Lactobacillus in their natural environment compete with the undesirable organisms for space and nutrients as reported by Donaldson (1978).

TABLE (1) . Live body weight, average daily gain, feed consumed, feed conversion and percentage of birds infected with diarrhoea in both control and lactobacillus concentrate supplemented chick groups.

	Weeks of experiment															
	1		2		3		4		5		6		7		8	
	LBC	Cont	LBC	Cont	LBC	Cont	LBC	Cont	LBC	Cont	LBC	Cont	LBC	Cont	LBC	Cont
L.B.W., gm bird*	102	200	200	200	400**	350	600**	500	900**	750	1250**	900	1500**	1100	1650**	1250
	+2.3	+2.6	+3.5	+3.5	+5.7	+3.5	+7.1	+5.0	+10.1	+7.91	+11.4	+17.0	+50.0	+57.0	+50.0	+4.4
A.D.G., (gm)	4.14	3.86	14.0	14.29	28.57	21.43	28.57	21.43	42.86	35.71	50.0	21.43	35.71	28.57	21.43	21.43
F.Consumption bird/day, (gm)	13.6	16.5	28.6	26.9	52.0	44.16	74.2	90.4	63.6	103.9	96.0	103.9	96.0	129.87	96.0	129.97
F.c.Index	3.3	4.3	2.0	1.9	1.8	2.1	2.6	4.2	1.5	2.9	1.92	4.9	2.7	4.6	4.5	6.1
B.D.(%)	----	----	10	30	70	----	55	----	10	----	----	----	----	----	----	----

L.B.W.: Live body weight

A.D.G.: Average daily gain.

F.: Feed.

F.c.: Feed conversion.

B.D.: Birds with diarrhoea.

* Values are presented as Mean \pm S.E.M. (mean was calculated from 5 weight groups each of 100 birds)

** P < .001.

Initial B.Wt. was 73.5 and 73.0 gm for LBC and control group, respectively.

Supplemented chicks had higher average daily gain than the control, especially from starting from the third to the seventh week of age by 33.3, 33.3, 20.0, 133.3 and 25.0%, respectively. This increment in average daily gain in supplemented chicks is mainly due to lactobacillus concentrate offered to one day old chicks which had led to establish lactobacilli in the bird's crop immediately after hatching. Such treatment led chicks to perform better than the control. The present findings are in agreement with that reported by Fuller (1977) on a mixed progeny from Light Sussex hens and Rhode Island Red cocks.

As regards to feed consumed/bird/day, there was a gradual increase as a function of live body weight progress and increase bird's ability to consume more diet. No consistent trend was noticed between groups during the first three weeks. After which, great differences were observed as a function of LBC supplementation. Supplemented chicks consumed less diet than the controls by 38.3, 26.1 and 26.1% at the 5th, 7th and 8th week of experiment, respectively.

In spite of less consumption of supplemented diet, treated chicks showed a better feed conversion rate than the control chicks which consumed more diet. Feed conversion rate was improved by 38.4, 49.1, 60.4, 40.9 and 26.1% for the 4th, 5th, 6th, 7th and 8th week, respectively.

Such numerical improvement in feed conversion rate which was observed in the present study was mainly due to LBC supplementation and subsequently the improvement in the gastrointestinal conditions against the pathogenic bacteria which invade the digestive tract. These findings are in agreement with previous findings of Francis *et al.*, (1978) and Watkins *et al.*, (1982).

In addition, LBC supplement had led to decrease the percentage of diaharrea infection in the treated chicks. Diaharrea was observed only in 30% of the treated chicks at the 3rd week and lasted for one week. While in the control chicks, diaharrea was observed in 10, 70, 55 and 10% of birds at the 2nd, 3rd, 4th and 5th week, respectively. As a therapeutic treatment, one kilogram of Niphtine was added to the supplemented chicks, while 2 kgs were used for the control. Also, Aminovite, a multi-vitamins and amino acids mixture was added in a rate of 1gm/liter drinking water. Chemical constituents of Aminovite are shown in Table 2.

TABLE 2 . Chemical constituents of aminovite/kg.

Vit. A	: 20,000,000	I.U.	Asp.	: 2.200	mg.
Vit. D ₃	: 4,000,000	I.U.	Glu.	: 3.600	mg.
Vit. E	: 10,000	I.U.	Ala.	: 1.700	mg.
Vit. B ₁	: 2,000	I.U.	Arg.	: 1.600	mg.
Vit. B ₂	: 5,000	I.U.	Cys.	: 2.000	mg.
Vit. B ₆	: 4,000	I.U.	Gly.	: 20.000	mg.
Vit. C	: 1,500	mg.	His.	: 4.600	mg.
Vit. K	: 2,000	mg.	Isolu.	: 17.000	mg.
Lys.	: 30,000	mg.	Met.	: 25.000	mg.
Phe	: 7,000	mg.	Pro.	: 12.000	mg.
Ser.	: 11,000	mg.			

Aminovite was added for 3 days in a rate of 1 mg/liter drinking water with AD₃ + Vit. B-complex + K + Choline chloride + 1 kg Niphine for LBC supplemented and 2 kg Niphine for the control group.

The present investigation showed that, diaharrea was noticed only at the 3rd week in about 30% of the supplemented chicks and lasted for one week. However, in the untreated chicks it started at the same age and lasted for about four weeks with high frequency. Such an observation is mainly due to the profelactive effect of lactobacillus concentrate supplement, which provide an inoculum for ingested food and prevent a sour crop and thus help to prevent harmful bacteria which invade and populate in the digestive tract of the chicken. Such suggestion had been reported by Fuller (1977).

All previous observations were reflected on the growth rate, which increased in the supplemented chicks more than in the control chicks. Such differences are illustrated in Fig.1.

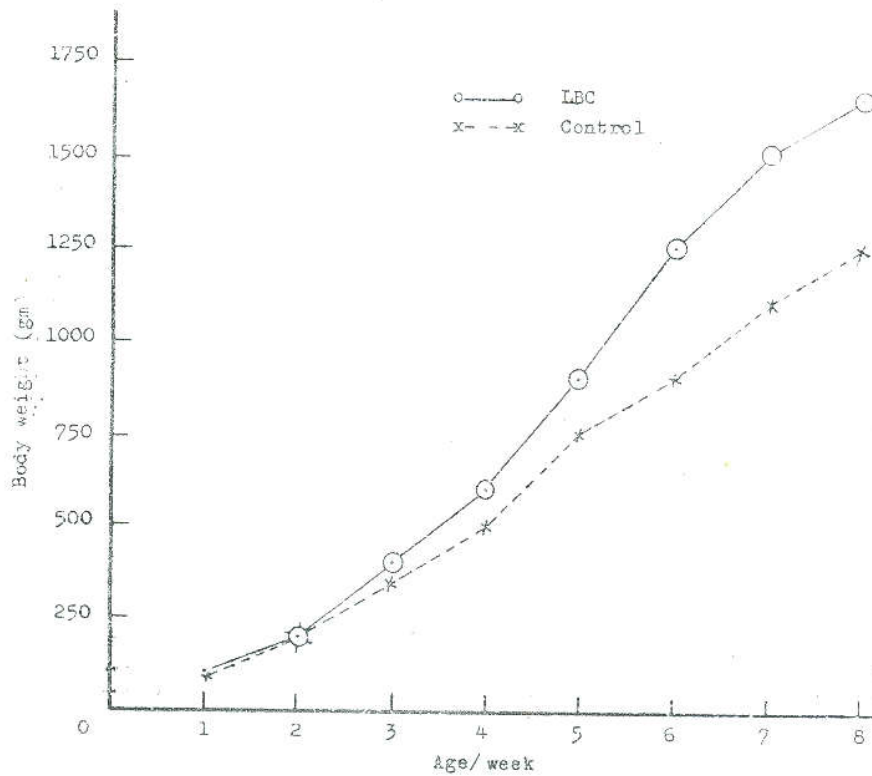


Fig. 1 . Growth rate in both control group and LBC supplemented group.

Economical evaluation of this study is presented in Table 3. From this Table, it is obviously shown that mortality rate was decreased as a result of LBC supplementation.

TABLE 3. Economical evaluation of LBC supplementation on broiler performance.

	Control group	LBC group
Initial No. of birds	5500	5000
Mortality %	10	5
Final No. of birds	4950	4750
Final live body weight/bird (kg)	1.25	1.65
Final yield/group (kg)	6187.5	7837.5
Increase % to control		(26.7%)
Total consumed diet* (kg)	26210	27621
Feed conversion during the experiment	4.2	3.5
Total feed cost (LE)	6421	6787
Cost of each 1 kg live weight (LE)	1.04	0.86
Decrement% to control		(17.3%)
Total LBC (kg) used		14
Total cost of LBC (LE)		70
Final cost (LE) of 1 kg	1.04	70.87
Live weight		(16.3%)

Price of 1 ton starter ration = LE.

Final yield (kg) was increased by 26.7% in LBC supplemented birds more than the control. This observation had led to improve feed conversion from 4.2 in the control to 3.5 in the supplemented birds.

These results had led to decrease the cost of each 1 kg live weight in supplemented chicks by 17.3% less than the control.

Finally it can be conclude that LBC supplementation leads to economical improvement in broiler performance.

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بعض الدراسات على التأثيرات المفيدة لاضافة مركز اللاكتوباسلس على انتاجية كتاكيث اللحم

حاتم حسين و محمد عبد المنعم العشرى
هيئة الطاقة الذرية وكلية الزراعة - جامعة عين شمس
القاهرة - مصر.

كان الاهتمام في هذه الدراسة منصبا على الدور المفيد لاضافة مركز اللاكتوباسلس على انتاجية كتاكيث اللحم. ولقد تم في هذه الدراسة قياس الوزن الحي ، معدل الزيادة اليومية والاكل المستهلك /طننر/ يوم ، ومعدل التحويل.

وقد اوضحت الدراسة ما يلي:

- ١- الكتاكيث التي اضيف الي عليقتها مركز اللاكتوباسلس كانت أعلى معنويا في الوزن الحي من مجموعة المقارنه (على مستوى معنويه ١.٠ر).
- ٢ - معدل الزيادة اليوميه في الوزن كان أعلى في المعامله عن الكونترول.
- ٣ - على الرغم من أن الكتاكيث المقذاه على اللاكتوباسلس استهلكت غذاء أقل من المقارنه الا أن معدل التحويل الغذائي فيها كان أعلى من مجموعه المقارنه.
- ٤ - إضافة مركز اللاكتوباسلس أدى الى نقص نسبة الاصابة بالاسهال.
- ٥ - نسبة النفوق كانت في الكتاكيث المعامله ٥٪ بينما كانت في مجموعة المقارنه ١٠٪.
- ٦ - وكمحصلة لزيادة الوزن الحي ونقص النفوق وزيادة الكفاءة التحويلية ونقص استهلاك الغذاء فقد أدى استخدام مركز اللاكتوباسلس كاضافة لعلائق كتاكيث النعم الى زيادة الموصول النهائي بنسبة ٢٦٨٪ وتقليل تكلفة إنتاج كل ١ كجم من اللحم الابيض بنسبة ١٦٩٪.