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## Effect of Probiotic (*Aspergillus niger*) and Prebiotic (*Taraxacum officinale*) on Blood Picture and Biochemical Properties of Broiler Chicks

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**Abstract:** One hundred and fifty one day-old mixed sexes broiler (Arbor-Acres) were divided into three groups of 50 birds each and randomly assigned to three treatment diets. Group 1 controlled with no added probiotic and prebiotic added, groups 2 and 3 with 10 g (*An*)/kg diet and 10 g (*To*)/kg diet were added, respectively. The results indicate that group 3 had better value in PCV compared with groups 1 and 2. However, groups 2 and 3 showed better values in their Hb and RBC compared with group 1. But no significant differences in WBC. In the mean time they showed significantly higher ( $p < 0.05$ ) in group 1 compared with the other two groups. The results showed no significant differences in total protein, Albumin and Globulin, but the differences in Cholesterol and glucose of the control group compared with groups 2 and 3 were highly significant ( $p < 0.05$ ).

**Key words:** Prebiotic, probiotic, antibacterial, gastrointestinal tract

### INTRODUCTION

The probiotic is a product that contains a dynamic vital microorganisms with enough number to have an ability to change a number of flora (formation of colonies) inside the host which alters hygienic imported trails in the host (Schrezenmire and Vrese, 2001). The aim of many studies involving direct fed microbials has been to exclude the colonization of pathogens in the gastrointestinal tract of poultry and may be define a culture of a single bacteria strain, or mixture of different strains that can be fed to an animal to improve some aspect of its health (Griggs and Jacob, 2005).

La Ragione *et al.* (2001), showed that oral inoculation of *Bacillus subtilis* spores could reduce intestinal colonization of *Escherichia coli* 078: K80 in chickens. These results were observed only when the challenge occurred 24 h after oral inoculation of *B. subtilis*. They did not observe any inhibition of *E. coli* 078: K80 challenge when it occurred 5 after the spores were introduced may be due to the observation that a number of spores present in the intestine gradually declined over time and may have only been present in high enough levels to be protective in initial day or so following in oculation.

*Salmonella* and *Compylobacter* are the commonest 2 bacterial causes of food born, illness and a few studies have shown that probiotics may be able to reduce the amount of these bacteria that are carried by chickens.

While, the prebiotics are non digestible carbohydrates many of these carbohydrates are short chains of monosaccharide called oligosaccharides. Some oligosaccharides are thought to enhance the growth of beneficial organisms in the gut and others are thought to function as competitive attachment sites for pathogenic bacteria, two of most commonly studied

prebiotic oligosaccharides are fructooligosaccharides (FOS) and mannanoligosaccharides (MOS). FOS can be found naturally in some cereal crops and onions (Bailey *et al.*, 1991).

MOS is obtain from the cell wall of yeast *Saccharomyces cerevisiae* (Griggs and Jacob, 2005; Bailey *et al.*, 1991) and may define the prebiotic as a part of feed constitution of which ability in digestion has an improved the stimulate selection (stimulate 1 or few number useful organism in the flora) (Gibson and Roberfroid, 1995). These material are polysaccharide mon starch with a long chain and have no ability for digestion in the digestive tract of birds because of lack of an enzyme for digestion. But in digested form useful bacteria which are present in the digestive system, such as *Bifidobacteria* and *Lactobacillus* which contain digestive enzyme and could be useful as a source of carbohydrate as a result of reproduction and increase of number and hence is composition with organism such as *E. coli* and *Salmonella*. Therefore, Dandelion could be used as a main source of inulin. And (*Taraxacum officinale*) could be used as a source of prebiotic and *Aspergillus niger* as a source of probiotic resistant of antimicrobial in the gastro of digestive tract.

This study was conducted to investigate the effect dietary supplementation of adding Probiotic which prepared in the laboratory and Prebiotic available in Iraq market on blood Picture and biochemical properties on broiler chicks.

### MATERIALS AND METHODS

One hundred and fifty one day- old mixed sexes broiler (Arbor-Acres) were divided into 3 groups of 50 birds each randomly assigned to 3 treatment diets. The Experiment was carried out in 24 days. Each Treatment

Table 1: Composition of experimental diets in different periods of the experiment

Ingredient (%)	Starter	Grower
	1-3 weeks	3-7 weeks
Yellow corn	58.00	46.20
Soybean meal	38.00	31.80
*Premix	3.00	3.00
Oil	0.50	0.50
Salt	0.30	0.30
Methionine	0.10	0.10
Lysine	0.10	0.10
Total	100.00	100.00
Composition		
ME (Kcal/ kg)	2850.00	2900.00
Crude Protein (%)	22.00	20.06
Calcium (%)	0.13	0.23
Avail Phos. (%)	0.17	0.16
Methionine + Cystine	0.80	0.75
Lysine	1.22	1.15

\*Premix: (1%) provided the following (per Kilogram of complete diets). 1400 IU Vitamin A, 3000 IU Vitamin D<sub>3</sub>, 50 mg Vitamin E, 4 mg Vitamin K, 3 mg Vitamin B<sub>6</sub>, 6 mg Vitamin B<sub>12</sub>, 60 mg Niacin, 20 mg Pantothenic acid, 0.20 mg folic acid, 150 mg Choline, 48 mg Ca, 3.18 mg P, 100 mg Mn, 50 mg Fe, 80 mg Zn, 10 mg Cu, 0.25 mg Co, 1.5 mg Iodine

group was further more sub-divided into 2 replicates. A total of 25 birds per replicate. The chicks were fed on the starter and grower diets. The ingredients and chemical compositions of the diets, presented in Table 1, were analyzed using AOAC (1990) procedure. Feed and water were provided *ad libitum* during the experiment.

A photo period of 24 h/days in 4 weeks and 16 h/days in 4-6 weeks was maintained. Birds were slaughtered by cutting the throat and jugular vein with a sharp knife near the first vertebra from each replicate (12 bird group), were picked for eviscerating to calculate the dressing percent without edible giblets (Heart, Liver and Gizzard) after recording their weight so.

Data were analyzed by using the General Linear Model Procedure of SAS Institute (2002). A means were compared by the Duncan's Multiple Range Test at 5% probability (Steel and Torrie, 1980).

## RESULTS AND DISCUSSION

Table 2 showed some trails of 6 week age birds, which indicated a better value in group 3 in PCV compared with groups 2 and 1, however, groups 3 and 2 showed better values in Hb and RBC compared with control group. These results agreed with those found by Birdane *et al.* (2004), by using (*An*) however no difference WBC. In the mean time H/L ratio showed significantly higher ( $p < 0.05$ ) in group 1 compared with other two groups. But group 2 showed significantly higher ( $p < 0.05$ ) than those in group 3. These could be due to the low stress in birds in groups 2 and 3 compared with control group. These results were found by Karoglu and Drudag (2005), who found that adding probiotic diet could be inhibited the nutritional stress or any stress which causes an

Table 2: Effect of adding *Aspergillus niger* and *Taraxacum officinale* on blood picture and biochemical properties on broiler chicks

Items	Diets		
	1 control	2 <i>A. niger</i>	3 <i>T. officinale</i>
PCV (%)	33.55±0.11 <sup>a</sup>	33.70±0.16 <sup>b</sup>	34.53±0.20 <sup>a</sup>
Hb (gm / 100 mL)	7.20±0.37 <sup>a</sup>	8.92±0.53 <sup>a</sup>	8.85±0.55 <sup>a</sup>
RBC (10 <sup>9</sup> ×Cell/mm <sup>3</sup> )	2.97±0.05 <sup>a</sup>	3.17±0.02 <sup>a</sup>	3.23±0.03 <sup>a</sup>
WBC (10 <sup>3</sup> ×Cell/mm <sup>3</sup> )	21.83±1.06 <sup>a</sup>	21.92±1.10 <sup>a</sup>	21.93±1.13 <sup>a</sup>
H/L ratio	0.31±0.00 <sup>a</sup>	0.28±0.00 <sup>b</sup>	0.26±0.00 <sup>b</sup>
<b>Biochemical properties</b>			
Protein ((gm/100mL)	5.32±0.11 <sup>a</sup>	5.68±0.33 <sup>a</sup>	5.47±0.12 <sup>a</sup>
Albumin (gm/100mL)	1.70±0.04 <sup>a</sup>	1.67±0.06 <sup>a</sup>	1.72±0.07 <sup>a</sup>
Globulin (gm/100mL)	3.62±0.10 <sup>a</sup>	4.02±0.35 <sup>a</sup>	3.75±0.07 <sup>a</sup>
Cholesterol (gm/100mL)	196.83±0.79 <sup>a</sup>	186.50±3.20 <sup>b</sup>	183.50±4.40 <sup>b</sup>
Glucose (mg/dl)	219.67±3.43 <sup>a</sup>	199.00±5.98 <sup>b</sup>	189.50±3.70 <sup>b</sup>

increases in H/L ratio, because the stress could cause an increase in the stimulation of adrenal gland to produce some hormones such as estrone which has a direct effect to analyze a lymphatic cell which causes an increase in H/L ratio (Gross and Siegel, 1983). Then H/L ratio could be used as an indicator for the health of animals and any increase of H/L ratio refers to an increase in stress case (McFarland and Curtis, 1989).

The same table showed no significant differences in total protein, albumin and globulin between treatments. But the cholesterol and Glucose of the control group differed significantly compared with groups 2 and 3. These results were an agreement with those found by Yoon *et al.* (2004) and Al-Kassie and Abd-Aljaleel. (2007), who showed the same trend. In the mean time these results agreed with those found by Kim *et al.* (2003), who found broiler fed on a diet contained *A. oryzae* caused a reduction on cholesterol level of blood serum of broiler. Same results were obtained by Al-Sodini (2005) by using probiotic *Aspergillus niger*.

This could be due to the role of Glucan which is present on (*An*) line. However, Mensink (2006) found that broiler which gave juice that contained β-glucan for 5 weeks caused a reduction of 5% and Light Density Lipoprotein (LDL) with a rate of 7.7% compared with control group.

The reduction of glucose in group 2 and 3 compared with the control could be due to the additions to chick diet that had a positive effect, on birds which meant, that those additions represented a low stress factor on birds.

To the best of my knowledge there are scarce studies on the effect of probiotic and prebiotic on blood culture and biochemical properties in broiler chicks.

## REFERENCES

- Al-Kassie, G.A.M. and R.A Abd-Aljaleel, 2007. Effect of adding Galli acid Iraq probiotic on some physiological properties and intestinal microflora in Broiler chicks. Proceeding of second Veterinary, Scientific Conference. College Vet. Med. Univ. Baghdad, pp: 102-115.
- Al-Sodini, A.A.H.K., 2005. Using the *Aspergillus niger* as prebiotic in ration of broiler Ross. Strain. Thesis of M.Sc College of Agriculture, Baghdad University of Iraq.
- AOAC, 1990. Official Methods of Analysis Association of Agricultural Chemists. Virginia, D.C; USA, pp: 746-780.
- Bailey, J.S., L.C. Blankenship and N.A. Cox, 1991. Effect of fructooligosaccharide on *Salmonella* colonization of the chicken intestine. Poult. Sci., 70: 2433-2438.
- Birdane, Y. and O.R. COI, H. Basmaciology and H. Oguz, 2004. Effect of esterified glucomannan on aflatoxicosis in broiler. Serum biochemical hematological and bone parameters. 21st, World Poultry Conference Istanbul.
- Gibson, G.R. and M.B. Roberfroid, 1995. Dietary modulation of the human colonic microbiota: Introduction the concept of prebiotic. J. Nutr., 125: 1401-1412.
- Grigg's, G.R. and M.B. Jacob, 2005. Alternatives to antibiotics for Organic Poultry Production. J. Applied Poult. Res., 14: 750-756.
- Gross, W.B. and H.S. Siegel, 1983. Evaluation of heterophile/lymphocyte ratio as a measure of stress in chickens. Avian Dis., 27: 972-979.
- Karoglu, M. and H. Durdag, 2005. The influence of dietary probiotic (*Sacchromyces cerviciae*) supplementation and different slaughter age on the performance, slaughter and carcass properties of broiler. Int. J. Poult. Sci., 4:309-316.
- Kim, S.H., S.Y. Park, D.J. Yu, S.J. Lee, K.S. Ryu and D.G. Lee, 2003. Effect of feeding *Aspergillus oryzae* ferments on performance, intestinal microflora, blood serum components and environmental factors in broiler. Kor. J. Poult. Sci., 30: 151-159.
- La Ragione, R.M., G. Casla, S.M. Cutting and M.J. Woodward, 2001. *Bacillus subtilis* spores competitively exclude *Escherichia coli* O78: K80 in poultry. Vet. Microbiol., 79: 133-142.
- McFarland, J.M. and S.E. Curtis, 1989. Multiple concurrent stressors in chicks effect on plasma corticosterone and heterophils to lymphocytes ratio. Poult. Sci., 68: 522-527.
- Mensink, R., 2006. Beta glucan and cholesterol. American Journal of Clinical Nutrition.
- SAS Institute, 2002. SAS User's Guide Statistics. Version 6.12 Edn. SAS institute, Inc. Cary, NS.
- Schrezenmier, J. and M. D. Vrese, 2001. Probiotics and synbiotics approaching a definition. Am. J. Ch. Nutr., 73: 305-3645.
- Steel, R.G.D. and J.H. Torrie, 1980. Principles and Procedures of Statistics. 2nd Edn. McGraw-Hill book Co. Inc. New York.
- Yoon, C., C.S. Na, J.H. Park, S.K. Han, Y.M. Nam and J.T. Kwon, 2004. Effect of feeding multiple probiotics on performance and fecal noxious gas emission in broiler chicks. Kor. J. Poult. Sci., 3: 229-235.