Research article

The effect of some additives on histological changes of broiler chicks

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Abstract

This study was conducted to investigate the effects of feed additives on weight and histological changes in the small intestine. A total of (350) broiler chicks one –day old (Ross 380) – unsexed were randomly divided into (7) equal dietary treatment groups, as follows: Treatment (T1): Basal diet without any addition (control group), Treatment (T2): Basal diet + Garlic 4cc/10L, Treatment (T3): Basal diet + Saccharomyces cerevisiae 2.5gm/10L, Treatment (T4): Basal diet + Spire 2.5cc/10 L, Treatment (T5): Basal diet + B. glucan 8gm/10 kg, Treatment (T6): Basal diet + Levamisole 1gm/kg, Treatment (T6): Basal diet + Levamisole 1gm/kg, Treatment (T7): Basal diet + Neomycin 0.5 gm/L. These additions were presented on the first day of the arrival for 5 days, and on the day of first vaccination for 5 days and at the end of the experiment for 5 days also. These chicks vaccinated with NDV on the day one of age by injection in the neck and re-vaccinated at day 10 of age with Lassota, Body weight was weekly determined the results as following: Chicks feed a diet with (T7) showed improvement in villus height and in the (T3, T4).

Keywords: Chick, villi, levamisole, broiler, vaccine

Introduction

The Poultry production is considered focus sight of scientists because this part is very important, and it is motives the scientists and the companies for found new way and manner for the evolution of the breeds in order to reflect on its productions of white meat, it is important to nutrition values. For improve its content of the proteins and lack content of the fat, to be more healthy, more acceptable by human consumption of red meat, healthy aspects more and low cost of white meat if compared with red meat. The human population growth continues and it will associate with increasing demand for the poultry meat and its products (1). Therefore should search and find new way and methods for increasing the production and facing the problems and the

challenge like high prices and hot conditions in the summer season, all that have negative affections on the production of broiler chicken in Iraq (2), which these results will produce several problems such as: Effecting on the production and producing characteristics like (the weight, the mortality), that will result bad economic situation and the high cost of the production (3). This conditions are effect on carcass characteristic, and effect on public health through using antibiotics produce new breed and strains (bacteria and viruses) this pheromone called Drug resistance (4), addition to accumulation the antibiotics in chicken meat and the transmitted the human that will causes diseases appearance and problems such as allergic diseases(5). All

these problems make the scientists and the companies found new methods for help improvement of immune and production characteristics of broiler chicks, Feed promoter is one of them (6), garlic and yeasts using as diets additive have positive effecting on the broiler chicks (7) and positive effecting will increase if add yeasts and feed promoter (8). In addition, it will increase in immune status and make the body resist the diseases more activity, also the yeasts will improve status of lining of intestine membranes and increase long of villus (9). That attributed to role of used yeasts on production and secretion important enzymes, and it works as increase ready of nutritional elements (10), also Beta-glucans use as immune regulator and growth stimulator that give us same positive results of live yeasts in improvement balance the microorganism in the intestine, the immune and increase the production (11). Either probiotic using has positively effected on the host by increasing the production of broiler chicks (5). In addition, it has maintenance on the gut flora by two methods antagonism and competitive exclusion (12). Also, it works to increase digestive factor (13). Moreover, it has stimulation humeral and cellular immunity (14). In addition, the antibiotics on the diet of broiler chicks will increase consumed diets and the production because the antibiotic will stimuli the growth by competing for other nutritional elements during absorption process (15). The aim of present study knows affecting some additive on some production characteristics such as the weight and histological changes in the intestine of broiler chicks.

Material and Methods

Ethical approval

The Animal Ethical Committee of Veterinary Medicine College, University of Al-Qadisiyah, Iraq, has approved the present study under permission No: 409

1- Distribution of experimental birds:

The study was done in specific room for broiler chicks in Noria station that follow to College of veterinary medicine, University of Al-Qadisiyah, dimension of hall (10×60) meter, and provided by all demands from 14-11-2013 for 19-12-2013, it was supported by Ross bird (N= 350) (not -sexing), it divided at one day old randomly for seven groups, fifty birds for each group, the treatment or groups as follow:

- 1- Treatment (1): administrated basal diet empty from any additive elements (control group).
- 2- Treatment (2): administrated basal diet + garlic liquid (4 cc/ 10 liters).
- 3- Treatment (3): administrated basal diet + yeast called *accharomyces cerevisiae* (2.5 gram /10 liters).
- 4-Treatment (4): administrated basal diet+ probiotics (stpire) 2.5 CC/10 litter.
- 5-Treatment (5): administrated basal diet+ B. glucan 8 gram/ 10 Kg.
- 6-Treatment (6): administrated basal diet + levamisole (1) gram/ liter.
- 7-Treatment (7): administrated basal diet+ antibiotic Neomycin (0.5) gram/ liter.

2- Used material in the study:

The commercial yeast used in this study, it made in turkey, the probiotics (stpire) ®, it consist from (cellulasy pectinase, xylause, bacillus cereus beta-glucan). Either the levamisole was Iran powder; B. glucan is prepared early, the birds feeding on starter diet and finisher diet as follow table (1):

Table (1): included the diet structure and chemical composition.

The composition	The starter diet % (0-2) week	The finisher diet % (2-5) week
yellow corn	50	59
Soybeans	35	26
Wheat	7.25	6.75
Concentrated protein	5	5
Vegetable oil	1	1.5
NACL	0.25	0.25
Calcium phosphate	1.5	1.5
Total	100	100

Results

Affecting on long of villi:

Table (2) and histological pictures indicate exceed the seventh treatment (antibiotics group) (856.74), yeast group (833.77) and probiotic group (833.37) if compare with control group (548.21) , while don't show any significant difference change in garlic group (760.8), B. glucan 8 gm/10 kg and Levamisole group (770), with not the process measured by micron, unite. The histological figure (1) showed duodenum tissue of broiler checks in B. glucan group, where notice exfoliative of villus lining cells in the intestine lumen with the destruction of villus ending also, degenerative of villus lining cells, either intestine glands be formed in the intestine mucosa. Figure (2) observed the destruction of villus ending with intestine glands formed in the mucosa of the intestine, Figure (3) and Figure (4) showed duodenum of broiler chicks for garlic group, where

observed there are villus become longitudinal and lining by proliferative cells and the intestine glands proliferative too. Figure (5) and (6) in the yeast group, where was observed villus longitudinal and lining by columnar cells and proliferative of goblet cells and there are small intestine glands in the intestine mucosa. Figure (7) and (8) where levamisole group showed villus have a thin ending and small intestine glands in the mucosa of the intestine, either the antibiotics group in Figure (9) and (10) showed proliferative of lining cells of villus with simple degenerative in villus ending and intestine glands in the intestine mucosa. In histological Figure (11) and (12) in the probiotic group showed medium long villus and small intestine glands, while control group figure (13) and (14) showed there are thin villus and small in the intestine mucosa.

Table (2): effecting of the additive on histological changes on the caudal part of small intestine

The treatment	M ± SE	The treatment	M ± SE
T1-control group	548.21±52.31C	T4-probiotic group	833.37±54.21ab
T2-garlic group	760.8±77.98Ac	T5-B. glucan group	758.71±68.09ac
T3-yeast group	833.77±20.24ab	T6-levamisole group	770±56.43ac
T7-Neomycin group	856.47±72.09b

Figure (1): duodenum of broiler chicks administrated by B. glucan where was observed exfoliative of the cell of the villi in the intestine lumen (black arrow) and destruction of villus ending (thin arrow), the cell of villi lining show degenerative, the intestine glands (red arrow), staining by Hand E, x 4.

Figure (2): Showed duodenum of broiler chicks were administrated by B. glucan, notice destruction of villus ending (thin arrow), the cells of villus lining showed degenerative, intestine glands in intestine mucosa (red arrow), staining by H and E X4.

Figure (3): duodenum of broiler chicks feed by garlic, notice highest villus (thin arrow), lining by proliferative cells (green arrow) and proliferative of intestine glands (red arrow) Staining by H and E, X 4.

Figure (4): duodenum of broiler chicks administrated by garlic, observed long villus and lining by proliferative cells (thin arrow) and proliferative intestinal glands (red arrow) (H&E) x 10.

Figure (5): duodenum of broiler chicks, administrated by yeast, observed highest villus (green arrow) and lining by columnar cells (black arrow) observed goblet cells proliferative and there are small intestinal glands in intestine mucosa (red arrow). &E x 10.

Figure (6): duodenum of broiler chicks, administrated by yeast, observed short proliferative villus (green arrow) also lining by columnar cells (black cells) also observed goblet cells and there are intestinal glands in intestinal mucosa (red arrow) (H&E x 10).

Figure (7): duodenum of broiler chicks administrated by Levamisole, observed the villus has thin ending (thin arrow), the intestinal glands is formed in mucosa if intestine but is small size (red arrow) (H&E x 10)

Figure (8): duodenum of broiler chicks administrated by Levamisole, observed the villus has thin ending (thin arrow), and few goblet cells (green arrow) the intestinal glands is formed in mucosa if intestine but is small size (red arrow) (H&E x 10).

Figure (9): duodenum of broiler chicks administrated by antibiotics, observed simple degenerative at the villus ending (green arrow), also the intestinal glands is formed in mucosa of intestine but is small size (red arrow) (H&E x 10).

Figure (10): duodenum of broiler chicks administrated by antibiotics, observed proliferative in the cell that lining of villus (black arrow), and there are simple degenerative in villus ending (thin arrow) and there are intestinal glands is formed in mucosa of intestine (red arrow) (H&E x 10).

Figure (11): duodenum of broiler chicks administrated by probiotics observed highest medium villus (thin arrow) and there are intestinal glands is formed in mucosa of intestine (red arrow) (H&E x 40)

Figure (12): duodenum of broiler chicks administrated by probiotics, observed highest medium villus (thin arrow), end of villus is wide and convex (green arrow) and there are intestinal glands is formed but has small size (red arrow) (H&E x 40)

Figure (13): duodenum of broiler chicks (control group) there are medium villus (the narrow), the intestinal glands is formed but small size (red arrow) (H&E x 40).

Figure (14): duodenum of broiler chicks (control group) there are thin villus (thin arrow), the intestinal glands is formed but small size (red arrow) (H&E x 40).

Discussion

Intestine histological changes:

The results of histological of seven treatment at experimental fish showed the seven treatment is exceeded (antibiotic group) if compare with another treatment with little mathematic differences. The treatment probiotic (4) group and yeast (3) group support close results. That considered more important of histological changes for increase Surface area of the intestine that will result in increased absorption that agreement with (16-19). While the changes in probiotic group will cause some the physiological changes of intestine lining and the surface

area will increase by elongation of villus because increase the intestine flora and activation the enzymes (20) also (21) exhibited it has great role in capable to produce amino acids and volatile fatty acids that result increasing of the epithelium cells and villus long, (22) also give same the result in villus long (9). While the third and sixth group showed exceed if compare with the first group (control group) that agree with (23) in the improvement of intestine efficiency also the yeast can make some changes in the intestine building, intestinal environment and increase of intestine long.

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