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The Effect of different Levels of Probiotic and Limestone on Relative Weight of the Internal Organs, Digestive PH and Body Weight in Laying Hens

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ABSTRACT

The experiment was to study the effect of different levels of probiotics (Bioplus - 2 B) and calcium carbonate on relative weight of the internal organs, , digestive pH and body weight in laying hens. This experiment was performed with 144 pieces of chicken strains HY - LINE (W 36) at the age of 58 to 68 weeks for 6 treatments 6 replicates (each replicate with 4 pieces of chicken) in the form of randomized complete block design with factorial treatment arrangement 3 x 2 consists of three physical form calcium carbonate(flour, granulated and a mixture of both) and two levels of probiotics (0, 0.04 percent) for 11 weeks (one week adaptation period).The interaction between probiotics and calcium carbonate and also the main effect of calcium carbonate had no significant effect on the digestive PH (P> 0/05).but the main effect of probiotic caused the significant of reduction in PH these parts especially the crop and gizzard(P< 0/05) but had no effect on ceca PH(P> 0/05). The relative weight of the digestive system including liver weight, ovarian weight , oviduct weight and body weight were not affected with main effect of calcium carbonate and probiotic and also interactions between the two (P> 0/05).The results showed that probiotics can reduce digestive PH and lead to reduced populations of pathogenic microorganisms and ultimately increase the solubility and absorption of some nutrients such as calcium and magnesium and have positive or negative effect on some internal organs of the chicken body means that cause increase or decrease in these organs.

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INTRODUCTION

Because of concerns about antibiotic resistance, as well as banning the use of antibiotics as growth promoter, today using appropriate alternatives such as probiotics has become a common in poultry nutrition [9]. In a different study, the use of probiotics in reducing mortality [18] and improving the performance [14] is associated to microbial balance in the digestive system, synthesis of vitamins B, stimulation and secretion of digestive enzymes [22]. In terms of microbiology, chicken gastrointestinal are classified based on the difference between PH, and the reduction of oxidized leachate and flow rate in different parts such as crop, gizzard and intestine blind [7]. PH is important factor that causing difference between the gastrointestinal areas microbial population because microorganisms live in certain PH. Gastrointestinal pH values selectively makes deploy live and certain microbial population in bird [13]. A few hours after eating, PH of crop reduced due to microbial production of lactic acid that species of crop bacteria is effective particularly Lactobacillus. Lactobacilli [23] attached to the surface epithelium of crop and this ability to connect directly related to the breed of chicken [12] that are able to control the population of microbial E.coli of crop. Probiotics used in these experiments contained two viable spores, including Bacillus Subtilis and Bacillus Lechni Formys which contains $3.2 * 10^9$ cfu / gr of bacteria that are resistant to adverse environmental conditions [6].

MATERIALS AND METHODS

In this test have been selected 144 strains of laying hens HY – Line(W36) in age of 58 weeks. The test has been run in a randomized complete block design with 3 ×2 factorial arrangement with three forms of calcium carbonate and two level of probiotic with 6 treatments and 6 replicates and 4 hens in each replicate. Birds had free access to food and water and basal diet that adjusted based on the needs of birds in sight age on the corn -

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soybean meal by WUFFDA software .lighting Program was for 16 hours of light and 8 hours of light off and the experiment lasted 11 weeks, one week was adaptation period. Treatments were used: 1 – powdery calcium carbonate with probiotic 2 - calcium carbonate granules with Probiotic 3 - calcium carbonate mixed with probiotic 4 – powdery calcium carbonate without probiotic 5 - calcium carbonate granules without probiotic 6 - mixture calcium carbonate without probiotic to study the sight traits of test from every replication a chicken cervical destruction randomly, then by PH meter, PH crop, gizzard and intestines ceca were measured the body weight and the weight of internal organs such as the liver, ovaries, and oviduct was measured with a digital scale with an accuracy of 0.01 g, separately Analysis has been done by statistical software SAS with GLM procedure and average comparison was performed with Duncan's test at 5% level.

RESULTS AND DISCUSSION

The results of the live weight of chicken in laying hen showed no significant effect (P> 0.05). But adding calcium and probiotic increased index of the body weight. With respect to mechanisms of their effect on this index could be stated the bacteria that produce lactic acid can inhibited diarrhea and improved performance and digestibility. Also Causes the increasing population of sugar-degrading bacteria and decreasing degrading protein bacteria and improves protein and causes improves body weight, in result. Conflicting results have been reported in relation to the probiotic effect and calcium on body weight index. [1] were investigated on effect of calcium sources (oyster shell and limestone) on performance and egg quality in laying hens. Also, [2] were investigated on effect of different levels of calcium on performance and eggshell quality in laying hen on body weight. They reported that the use of calcium can lead to weight gain. Also, according to reports as the effect of probiotic feeding in laying hens and mother herd on production and egg quality of, [3] as the effect of probiotic and organic acids on performance and egg quality that stated there has been a significant increase in body weight .In contrast, [8] were examined effect of meat and bone meal in diets with 2, 4 and 6 percent as a source of calcium on body weight index reported there is no significant effect between treatments. Also the results of the present study Is in contrast with results [19] as the effect of calcium sources on eggshell quality and egg performance and needed calcium for egg laying hens and [4] as the effect of dietary probiotic Bacillus subtilis and inulin supplemental on performance, egg shell quality, morphology and composition of intestinal flora in the laying at hen production stage, which concluded probiotic and calcium, have no significant effect on bodyweight index. Reason of contradictions is, used species in probiotic, viability ,usage method ,usage level ,usage level and frequency of use (intermittent or continuous), age of the bird, is environmental stressors. The interaction between calcium and probiotics did not have significantly impact on PH crop, gizzard, and intestine the Blind (P> 0/05) .The main effect of calcium carbonate did not show significant effect on the PH in this part of the gastrointestinal (P> 0/05) But the main effect of probiotics in its recommended level makes significant decreases on the PH level, crop and gizzard P <0/05)But had no effect on the pH of blind gut (P> 0/05). Weight parts of the digestive system including liver, ovary and oviduct did not affect with the main and interaction effects of calcium carbonate and probiotics. (P> 0/05). There was not little change in terms of weight. Probiotics with producing short-chain fatty acids from structural carbohydrates and starch make PH reduced in different parts of the digestive system by this way limited harmful microorganisms and established helpful bacteria of digestive such as lactobacillus and bifidobacterias [11,17]. PH changing of proposed sucrose is for how the effects on probiotics that make improve in protection level and selection of digestion useful microorganisms, increase fermentation, feed intake upgrades and improve the immune response that PH reduction in the crop and gizzard is consistent with the findings [16]. This reduction in PH leads to reduction in population of pathogenic microorganisms in the digestive tract that are sensitive to lactic acid and also increase the solubility and finally absorption of some minerals such as calcium and magnesium [26]. Using sources of calcium and probiotic showed no significant effect on ceca PH (P> 0/05).These results have been contrast with reports [24]. And the difference in results can be due to probiotic strains of bird, system maintenance; dietary, digestive bacteria and nutrient composition of the diet .Adding calcium and probiotics had no significant effect on liver weight (P> 0/05). Lack of impact can be due to lack of energy and protein in such tests. The results of the measure corresponded with [21] study that stated adding calcium and probiotics do not have effect on liver weight. But the results have contrast with [20]. Results of ovarian weight in laying hens showed that there was no significant effect between treatments (P> 0/05)But [15] reported significant effect of calcium sources on ovarian weight and also [10] observed a significant increase in ovarian weight that are inconsistent with results of current research .According to the results in weight of Avydvkt did not observed significant effect between treatments (P> 0/05)the researchers observed significant increase effect on this index, which is inconsistent with the present results.

Table –Comparison of responses of hens to lime stone and probiotic (Hens at 58-68wk of ages)

Treatments	Crop PH	Gizzard PH	Cecum PH	Liver Weight	Ovary Weight	Oviduct Weight	Body Weight
Main effect of Calcium							
1- Powdery lime stone	4.275a	3.528a	6.098a	42.515a	81.30a	59.195a	1614.17a
2- Granular lime stone	4.301b	3.753a	6.018a	44.087a	91.95a	61.347a	1582.67a
3- Mixed Of lime stone (50:50)	4.416b	3.960a	6.045a	44.373a	75.79a	61.228a	1666.00a
P	0.03	0.53	0.92	0.87	0.36	0.83	0.52
SEM	0.1	0.2645	0.1414	2.756	7.705	2.837	50.518
Main effect of Probiotic							
1- Zero level	4.391a	4.137a	6.024a	43.934a	78.991a	59.734a	1599.78a
2- 0.04 level	4.271b	3.356b	6.083a	43.382a	87.039a	61.446a	1642.11a
P	0.01	0.03	0.73	0.86	0.38	0.61	0.48
SEM	0	0.2236	0.1414	2.251	6.291	2.317	41.248
Interaction effect Calcium × Probiotic							
P	0.11	0.37	0.91	0.31	0.11	0.06	0.33
SEM	0.1	0.3873	0.2236	3.9	10.896	4.811	71.444

P = P-Value **SEM=Standard error of means**

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