Effect of SafMannan on Local Iraqi Laying Hens Performance

Yasser J. Jameel[1], Mohannad M. Alrekabi[2], and Nihad A. Ali[3]

[1]Public Health Department, College of Veterinary Medicine, University of Kerbala, Karbala, Iraq,
[2]Agricultural and Biological Research Office, Ministry of Science and Technology, Iraq,
[3]College of Agriculture, AL-Qasim Green University, Babylon, Iraq

Abstract

Phase one laying hens diet were included of two levels of yeast cell wall (YCW) called SafMannan from Phlio-USA company. A total of 81 Iraqi laying hens 14 weeks' old were distributed into three treatments. Each treatment has 27 hens were distributed into 27 individual cages (one hen per cage). First group hens were fed on basal diet without supplement (CON). Chicks in second and third group were fed on 250 ppm (Saf 250) and 500 ppm (Saf 500) SafMannan respectively. Body weight were weighted weekly from 14-34 weeks; while, egg weight was numbered weekly from 20-34 weeks. Results revealed that body weight were enhanced significantly ($p \leq 0.05$) in (Saf 250) and (Saf 500) respectively as compared with the control group (CON). The highest egg weight was found in the group was received (Saf 250). Egg weight were increase significantly ($p \leq 0.05$) in groups were received SafMannan (Saf 250) and (Saf 500) respectively as compared with the (CON). In conclusion, adding of SafMannan as a prebiotic in the poultry hens diet at 250 ppm were enhanced the egg weight and body weight of local Iraqi laying hens.

Keywords: *Iraqi local hens, Prebiotic, SafMannan, Yeast cell wall, Egg weight.*

Introduction

Prebiotic is used in feeding of poultry and act as a one of the antibiotic growth promoters like other alternative growth promoter (herbs, organic acids, probiotic, and synbiotic[1,2,3,4]. Prebiotic is defined as a non-digestible food was affected the host by stimulating growth of selective intestinal bacteria which act to enhancing of host health[5,6]. One of prebiotic products is SafMannan. SafMannan is a source of B-glucan and Mannan-Oligosaccharide (MOS) derived from (YCW)[7]. Prebiotic act to enhance gut health have been studied by[8,9,10,11,12,13,14,15,16]. Microbiota of intestine help the host by fermenting of non or poorly digestible carbohydrate. This fermentation act to produce short chain fatty acid[17]. Lower pH of short chain fatty acid propionate, acetate, and butyrate increase mucin secretion by epithelial globlet cell lead to induce inflammatory reactions[18]. Also, when probiotic adhering with pathogenica bacteria which has type 1-fimbriae lead to decrease the ability of this bacteria t adhere with the digestive mucosa[19]. [13]have been studied the effect of YCW SafMannan 250 ppm and 500 ppm on Lohmman laying hens. They showed that supplemented laying diet with 250 ppm SafMannan led to enhance egg weight; whereas, shell quality was improved by adding 500 ppm of SafMannan to laying hens[13]. [20]were reported that hens fed basal diet supplemented with (YCW) led to improve FCR. Also, they found that egg weight, yolk percentage, yolk index and shell percentage were increased significantly. [21]was studied the effect of YCW on laying hens. He found that supplemented basal diet with YSW-MOS during hot season led to enhance of egg production and lowered of cracked and broken eggs and the mortality at age 54 weeks old significantly.

Corresponding author:
Yasser J. Jameel.
Email: yasser.alasadi@uokerbala.edu.iq
Assistant Professor, Ph.D.
Head of Department of Public Health,
College of Veterinary Medicine, University of Kerbala
PO Box 45, Karbala, Iraq Phone: +964 780 1507874
E-Mail: yasser.alasadi@uokerbala.edu.iq

On the other hand, many results were obtained from recently studied on the effect of prebiotic SafMannan 250 ppm on the enhancement of broiler performance[11,12,14].

The objective of this study was to evaluate the effect of yeast cell wall SafMannan from Phlio. USA with 250 ppm and 500 ppm on Iraqi local laying hens performance from the first egg to peak egg production.

Material and Methods

Birds and husbandry:

Iraqi Local laying hens at 14 weeks' old were removed to research farm laying hens house in the Agricultural Research Department, Ministry of Science and Technology, Baghdad, Iraq.

Eighty-one hens were randomly distributed to three groups (27 hens per each). Twenty-seven individual cages were used (one hens per cage). Basal diet was used to feed the hens in the control group (CON.). Hens in the second and third groups were fed on basal diet with 250 ppm and 500 ppm prebiotic (SafMannan) respectively.

All birds were weighted weekly from (14-34 weeks); whereas, egg weight were also weighted weekly from (20-34 weeks) by using digital scale.

Feed as mash and water were provided ad libitum. Table 1. were show the feed composition according to NRC requirement for laying hens[22].

Table 1. Ingredients and nutrients composition of layer diets.

Ingredients %	Control diet	Saf 250	Saf 500
Yellow corn	50.8	50.8	50.8
Wheat bran	7.5	7.5	7.5
Soy bean meal 47%	27	27	27
Vegetable oil	3	3	3
Limestone	8.5	8.5	8.5
Dicalcium Phosphate	0.6	0.6	0.6
Vitamin/Mineral premix	2.5	2.5	2.5
Prebiotic Saf	0	0.025	0.05
Diatomaceous earth	0.05	0.025	0
Total	100	100	100
ME	2800	2800	2800
Cp%	17.5	17.5	17.5
Calcium %	4.03	4.03	4.03
Phosphorus	0.48	0.45	0.45

[1]Di calcium Phosphor 16/21p.

[2]Wafi premix contained the following: crude protein 8.9 %, iron 2000 mg; copper 400 mg; zinc 2400 mg; manganese 3200 mg; iodine 80 mg; selenium 10 mg; folic acid 40 mg; biotin 120 mg; pantothenic acid160 mg; niacin 1600 mg; vitamin A 480000 IU; vitamin D3180000 IU; vitamin E 2000 IU; vitamin K3100 gm; vitamin B1 120 gm; vitamin B2 280 gm; vitamin B6 160 gm; vitamin B12 1400 gm

[2]Safmannan® from (Phileo Lesaffre Company for Animal Care.

Statistical Analysis

All data were analyzed as a one-way ANOVA by using general linear model procedure of SPSS[23]. All means were compared by using Duncan's multiple range test[22] at levels $p \leq 0.05$.

Results and Discussions

Body weight at laying hens of three treatments from 14-34 weeks were shown in table (2). Body weight of hens was significantly $p \leq 0.05$ higher in hens fed basal diet with (Saf 250 ppm) and (Saf 500 ppm) SafMannan respectively as compared with control of all weeks.

Egg weight of laying hens was also shown in table (3) of three treatments from 20-34 weeks. Egg weight was higher significantly $p \leq 0.05$ of hens fed (Saf 250 ppm) and (Saf 500 ppm) respectively SafMannan with basal diet as compared with the CON.

Table 2. laying hens body weight of three treatments from 20-34 weeks. (Mean±SE).

Treatments	T1	T2	T2
Weeks			
14	934.40±26.07 B	1057.5±48.25 A	1013.13±16.46A B
16	1042.48±26.09 C	1244.1±32.31 A	1146.78±18.36 B
18	1124.66±25.18 C	1363.57±31.78 A	1258.65±18.91 B
20	1193.51±25.63 C	1458.32±31.22 A	1339.34±17.81 B
22	1229.40±29.41 C	1499.1±19.88 A	1361.13±16.11 B
24	1254.88±0.31 C	1510.78±30.82 A	1370.74±17.19 B
26	1270.92±29.66 C	1538.14±33.44 A	1382.78±17..49 B
28	1282.03±29.49 C	1560.32±10.4 A	1397.65±17.82 B
30	1321.96±31.52 C	1585.07±36.74 A	1416.56±16.80 B
32	1335.85±32.58 C	1623.39±37.13 A	1455.21±16.73 B
34	1366.96±27.98 C	1661.42±37.29 A	1492.69±15.83 B

Means with the same letters within the same column are not significantly different ($p \leq 0.05$).

*SD Standard deviation

Table 3. Egg weight of three treatments from 20-34 weeks. (Mean±SE).

Treatments	Egg Weight		
Weeks	T1	T2	T2
20	32.33±0.48B	36.39±0.7A	35.25±0.5A
21	32.95±0.69B	36.56±0.77A	36.08±0.37A
22	35.51±0.53B	37.21±0.71A	36.78±0.36AB
23	36.25±0.65B	38.17±0.67A	39.14±0.33A
24	37.05±0.55B	38.78±0.64A	39.55±0.14A
25	37.10±0.46B	40.57±0.61A	39.53±0.46A
26	37.92±0.42B	41.85±0.66A	40.66±0.46B
27	38.75±0.44C	42.88±0.50A	41.15±0.53B
28	39.37±0.40C	43.21±0.55A	41.74±0.45B
29	40.27±0.42C	43.90±0.58A	42.41±0.46B
30	40.12±0.54C	45.26±0.44A	42.98±0.47B
31	40.85±0.51C	46.47±0.65A	43.40±0.52B
32	41.41±0.39C	47.60±0.69A	44.26±0.56B
33	41.67±0.65C	48.69±0.47A	45.25±0.63B
34	42.03±0.49C	49.91±0.61A	45.52±0.55B

Means with the same letters within the same column are not significantly different ($p \leq 0.05$).

*SD Standard deviation

The enhancement of the body weight and egg weight may be the prebiotic act to enhance gut health have been studied by[8,9,11,12,13,14,15]. The fermentation of non or poorly digestible carbohydrate act to produce (propionate, acetate, and butyrate) which act to increase mucin secretion[18]. Also, [13]showed that supplemented laying diet with 250 ppm SafMannan led to enhance egg weight; whereas, shell quality was improved by adding 500 ppm of SafMannan to laying hens. [21]was studied the effect of YCW on laying hens and found that supplemented basal diet with YSW-MOS during hot season led to enhance of egg production and lowered of cracked and broken eggs and the mortality at age 54 weeks old significantly.

Conclusion

Adding of SafMannan as a prebiotic in the poultry hens diet at 250 ppm were enhanced the egg weight and body weight of local Iraqi laying hens as compared with the hen were fed diet without SafMannan.

Conflict of Interest: This research is a personal non-profit work and there is no conflict of interest.

Source of Funding: m None.

Ethical Clearance: Ethical clearance was obtained from the Faculty Scientific Committee (College of Veterinary Medicine, University of Kerbala, Karbala, Iraq) to study the effect of SafMannan on local Iraqi laying hens performance**.**

References

1 Al-Kassie GA, Mohammed MF, Hamood MF, Jameel YJ. The effect of anise and rosemary on the microbial balance in gastro intestinal tract for broiler chicks. International Journal of Poultry Science. 2008b;7(6):610-2.

2 Alshukri AY, Ali NA, Abbas RJ, Alkassar AM, Jameel YJ. Effect of Dietary Supplementation with Differing Levels of Moringa oleifera Leaf Meal on the Productivity and Carcass Characteristics of Broiler Chickens. International Journal of Poultry Science, 17. 2018. 536-542.

3 Ali NA, AL-Sherify SM, Alshojiry AK, Jameel Y. Effect of Adding Different Concentrations of the Mint oil Mentha spicata L. to the Ration on Some Blood Traits of Broiler Chicks Ross 308. Journal of Global Pharmacy Technology. 2018; 10(01):60-64.

4 Ali NA, Jameel Y, Abbas RJ. Effects of Dietary Prebiotics (SafMannan) and Local Iraqi Prebiotic on Some Blood Biochemical Parameters of Broiler Chickens. Pakistan Journal of Nutrition. 2019;18(1):80-5.

5 Gibson GR, Roberfroid MB. Dietary modulation of the human colonic microbiota: introducing the concept of prebiotics. The Journal of nutrition. 1995 Jun 1;125(6):1401-12.

6 Al-Kassie GA, Al-Jumaa YM, Jameel YJ. Effect of probiotic (Aspergillus niger) and prebiotic (Taraxacum officinale) on blood picture and biochemical properties of broiler chicks. International Journal of Poultry Science. 2008;7(12):1182-4.

7 Yang Y, Iji PA, Choct M. Dietary modulation of gut microflora in broiler chickens: a review of the role of six kinds of alternatives to in-feed antibiotics. World's Poultry Science Journal. 2009 Mar;65(1):97-114.

8 Tako E, Glahn RP. Intra-amniotic administration and dietary inulin affect the iron status and intestinal functionality of iron-deficient broiler chickens. Poultry science. 2012 Jun 1;91(6):1361-70.

9 Xiao R, Power RF, Mallonee D, Routt K, Spangler L, Pescatore AJ, Cantor AH, Ao T, Pierce JL, Dawson KA. Effects of yeast cell wall-derived mannan-oligosaccharides on jejunal gene expression in young broiler chickens. Poultry Science. 2012 Jul 1;91(7):1660-9.

10 Jameel YJ. Evaluation of probiotic, prebiotic and synbiotic on starter broilers performance subjected to bursa vaccine and clostridium perfringens challenge. Int. J. Adv. Biol. Res. 2017;7:373-7.

11 Jameel YJ. Effect of prebiotic plus xylanase enzymes in reduced-energy high wheat Midd diets on broilers subjected to bursa vaccine and Clostridium perfringens challenge under heat stress. Journal of Global Pharmacy Technology. 2018;10(01):53-9.

12 Abdaljaleel RA, Al-Ajeeli M, Jameel Y, Hashim MM, Bailey CA. Assessing effects of yeast cell wall supplementation on threonine requirements in broilers as measured by performance and intestinal morphology. Poultry science. 2018 Jul 1;97(7):2473-8.

13 Hashim M, Fowler J, Haq A, Bailey CA. Effects of yeast cell wall on early production laying hen performance. Journal of Applied Poultry Research. 2013 Dec 1;22(4):792-7.

14 Hashim MM, Leyva□Jimenez HE, Al□Ajeeli MN, Jameel YJ, Gaydos TA, Bailey CA. Performance of broilers fed diets supplemented with two yeast cell wall strains using two feeding strategies. Veterinary medicine and science. 2019 Aug;5(3):435-41.

15 Hussain RA, Jasim WK, Jameel YJ. Effect of Using Prebiotic (Dandelion) and Probiotic (Bacillus subtilis) on Some Physiological and Immunological Traits of Broiler Chicken. Indian Journal of Public Health Research & Development. 2019;10(3):569-73.

16 Ameer OH, Jameel YJ, Ali MA. The Effect of Fermentation of Oyster Mushrooms on Millet Grain of Healthy Japanese Quail Diets on Some Productive and Physiological Traits. Indian Journal of Public Health Research & Development. 2019;10(9):1247-51.

17 Gibson GR, Fuller R. Aspects of in vitro and in vivo research approaches directed toward identifying probiotics and prebiotics for human use. The Journal of nutrition. 2000 Feb 1;130(2):391S-5S.

18 Dibner JJ, Richards JD. Antibiotic growth promoters in agriculture: history and mode of action. Poultry science. 2005 Apr 1;84(4):634-43.

19 Jacobs CM. The effects of potential dietary prebiotics and grain particle size on the growth performance and intestinal microflora of young poultry (Doctoral dissertation, University of Illinois at Urbana-Champaign). 2011.

20 Hassan HA, Ragab MS. Single and combined effects of mannan oligosaccharide (MOS) and dietary protein on the performance and immunity response of laying hens. Egyptian Poultry Science. 2007; 27:969-87.

21 Çabuk M, Bozkurt M, Alcicek AH, Çatlı AU, Baser KH. Effect of a dietary essential oil mixture on performance of laying hens in the summer season. South African Journal of Animal Science. 2006; 36(4): 215-21.

22 National Research Council. Nutrient requirements of poultry: 1994. National Academies Press; 1994 Feb 1.

23 SPSS. IBM SPS Statistic Version 19. Armonk, NY. 2010.