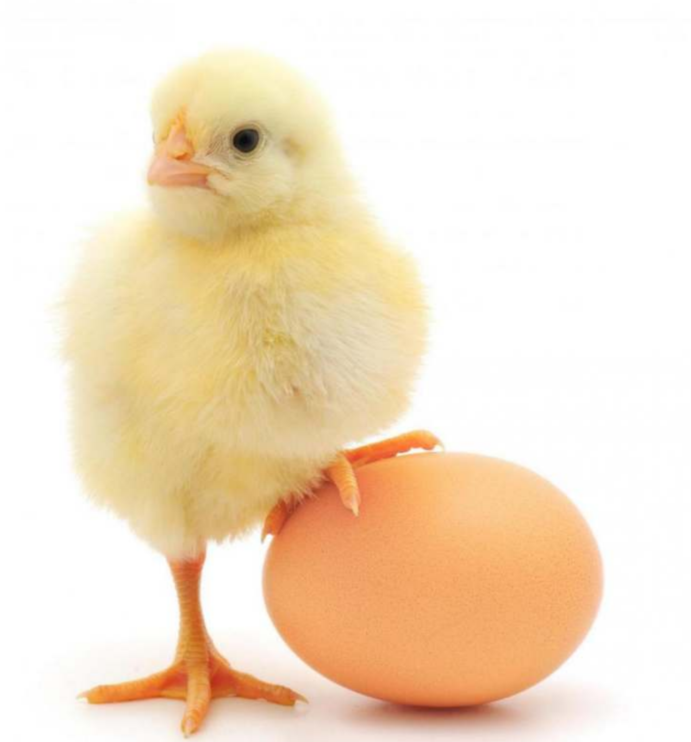
ISSN 1682-8356
ansinet.org/ijps



INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 6 (1): 52-54, 2007
ISSN 1682-8356

Effect of Probiotic Thepax® and *Saccharomyces cerevisiae* Supplementation on Performance and Egg Quality of Laying Hens

M. Yousefi* and K. Karkoodi
Department of Animal Science, Faculty of Agriculture, Islamic Azad University,
Saveh Branch, P.O. Box: 39187-366, Saveh, Iran

Abstract: An experiment was conducted to evaluate the effects of different levels of probiotic Thepax® (0.05, 0.1 and 0.15 %) and yeast (*Saccharomyces cerevisiae*) (0.05, 0.1 and 0.15 %) on performance and egg quality of laying hens. Two hundred and ten 63 wk of age Hy-line W-36 hens were used. The birds were assigned seven treatment groups in a randomized complete block design, with three replicates each with ten hens. The hens performance and egg parameters were evaluated on the three 28-d periods. The results of body weight changes, feed intake, feed conversion ratio, egg production, egg weight, shell percent and albumin weight did not indicate any treatment effect (P>0.05). Shell weight, shell thickness, yolk weight and yolk cholesterol were significantly (P=0.05) different among treatment groups. Yolk cholesterol was lower for 3, 5, 6 and 7th treatments compared to the control. The use of probiotic and *Saccharomyces cerevisiae* were not affected by production. But, egg quality did improved from 63 to 75 weeks of age.

Key words: Probiotic, yeast, production, egg quality, layer

Introduction

The microbial populations in the gastrointestinal tracts of poultry play a key role in normal digestive processes and in maintaining animal health. Disease- and stress-induced changes in the physicochemical environment in the gastrointestinal tract, or simple changes in feed management practices can significantly influence the microbial populations and their effects on animal performance and health. In the last 5 decades, increased knowledge of the factors that influence the activities of micro-organisms in the alimentary tract has helped to define the critical role of these symbiotic organisms (Tannock, 2005). In Greek probiotic means “for life” (Gibson and Fuller, 2000) and can be defined as a live microbial feed supplements, which beneficially affects the host animal by improving its intestinal balance (Fuller, 1989). Subtherapeutic use of antibiotics in poultry feeds has become undesirable because of the residuals in meat products and development of antibiotic-resistant bacterial populations in humans. In Europe, use of antibiotics as growth-promoting agents for poultry has been banned. Therefore, probiotic use has gained widespread interest since Tortuero’s (1973) first attempt at using living bacteria to replace antibiotics in poultry. Although there have been some conflicting studies, probiotics have been shown to improve weight gain and feed conversion ratio and to reduce mortality (Jin *et al*., 1997). The mechanism of action of probiotics in not yet known and is open for research, although there are several hypothesis (Ahmad, 2006). The objective of this study was to evaluate the effects of different levels of probiotic and yeast on performance and egg quality of laying hens.

Materials and Methods

Two hundred and ten Hy-Line W-36 hens were used in this experiment, which were 63 weeks of age, and continued for three 28-d periods. Ten hens were grouped house and shared a common feed trough between them, forming one experimental unit. There were 3 experimental units for each of the 7 treatment groups. Diets were formulated to meet the nutrient requirements for poultry (NRC, 1994) (Table. 1). The Diets were: 0, 0.05, 0.1 and 0.15% probiotic Thepax® and 0.05, 0.1 and 0.15% yeast (*Saccharomyces cerevisiae*).

Egg production was recorded daily and expressed weekly as eggs produced per hen per day. On the 2 d of experiment, eggs were collected to measure egg weight, shell percent, shell thickness, yolk weight and albumin weight. Yolk cholesterol was extracted by the method of Folch *et al*. (1956) as modified by Washburn and Nix (1974) from three eggs of each replicate. Body weights were determined by weighting birds individually, at the start, and the end of experiment. Feed intake was determined at the end of each week.

Statistical analyses was performed by the statistical package SPSS (2003) for windows, version 12.0. Multiple comparisons of the data were done by using the Duncan test after one-way analysis of variance (one-way ANOVA).

Results and Discussion

Body weight changes, feed consumption, feed conversion ratio, egg production, egg mass and egg weight data are shown in Table 2. Body weight changes were not significantly different among treatment groups

Table 1: Composition of experimental basal diets

Ingredients (%)		Ingredients (%)	
Yellow corn	36.28	Multi enzyme[3]	0.05
Wheat	40	Vit E	0.1
Soybean meal	5.11	Vit D_3	0.1
Rapeseed meal	2	Calculated analysis	
Meat meal	5	Metabolizable Energy (Kcal/Kg)	2750
Bone meal	2.25	Crude Protein (%)	13.75
Alfalfa meal	1.75	Crude Fiber (%)	3.11
Limeston	6.45	Methionine (%)	0.3
Vitamin premix[1]	0.25	Methionine+Cysteine	0.54
Mineral premix[2]	0.25	Lysine (%)	0.61
Salt	0.25	Calcium (%)	3.22
DL-Methionine	0.09	Available Phosphorus (%)	0.3
L-Lysine Hcl	0.07		

[1]Vitamin premix provided per kilogram of diet: vitamin A, 10000 IU; vitamin D_3, 2500 IU; vitamin E, 10 IU; vitamin B_1, 2.2 mg; vitamin B_2, 4 mg; pantothenic acid, 8 mg; vitamin B_6, 2 mg; niacin, 30 mg; vitamin B_{12}, 0.015 mg; folic acid, 0.5 mg; biotin, 0.15 mg; choline chloride, 200 mg. [2]Mineral premix provided per kilogram of diet: manganese, 80 mg; copper, 10 mg; iodine, 0.8 mg; cobalt, 0.25mg; selenium, 0.3 mg; zinc, 80 mg; iron, 80 mg. [3]Nutrex.

Table 2: Treatment effects on performance

Parameters	Dietary levels (%)							
	Control		Probiotic			Yeast		
	0	0.05	0.1	0.15	0.05	0.1	0.15	SEM
Body weight changes (g)	71.28	21.75	12.02	83.25	74.38	75.7	20.35	14.78
Feed consumption (g/hen/d)	106.25	108.11	108.11	109.61	108.37	108.23	108.32	1.02
Feed conversion ratio (g/g)	2.4	2.59	2.57	2.79	2.64	2.62	2.55	0.03
Egg production (HD) (%)	75.35	68.86	69.19	67.42	66.47	68.92	73.44	1.19
Egg mass (g/hen/d)	46.08	42.37	42.2	41.01	40.79	41.49	43.7	2.16
Egg weight (g)	63.05	63.22	62.96	62.51	63.49	61.84	61.17	0.27

Table 3: Treatment effects on egg quality

Parameters	Dietary levels (%)							
	Control		Probiotic			Yeast		
	0	0.05	0.1	0.15	0.05	0.1	0.15	SEM
Egg weight (g)	64.99	64.68	65.75	67.41	67.66	65.09	69.12	0.54
Shell weight (g)	6.12^{ab}	5.88^{a}	6.37^{b}	6.18^{ab}	6.37^{b}	6.33^{b}	6.28^{b}	0.05
Shell percent (%)	9.4	9.2	9.9	9.48	9.93	9.81	9.45	0.08
Shell thickness (mm)	0.33^{ab}	0.32^{a}	0.342^{bc}	0.352^{c}	0.355^{c}	0.347^{bc}	0.33^{ab}	0.003
Albumin weight (g)	41.19	40.06	39.69	40.58	40.5	40.4	41.73	0.26
Yolk weight (g)	17.85^{ab}	17.93^{ab}	18.36^{b}	18.57^{b}	17.34^{a}	17.87^{ab}	18.49^{b}	0.12
Yolk cholesterol (mg/g)	10.63^{b}	10.03^{ab}	9.5^{a}	9.85^{ab}	9.13^{a}	9.36^{a}	9.06^{a}	0.15

[a-c]Means within a row with no common superscript different significantly (p=0.05)

(P>0.05). This is in support with result obtained by Kurtoglu *et al.* (2004). Feed consumption and feed conversion ratio were not affected by the dietary probiotic and yeast supplementation. This is in support with results obtained by Mutus *et al.* (2006). Inclusion of probiotic and yeast had no difference significant in egg production, egg mass and egg weight (P>0.05). The reason of variable effect of biological additives may be confounded by variations in gut flora and environmental conditions (Mahdavi *et al.*, 2005). In research conducted with laying hens under different climatic and geographical locations, Miles *et al.* (1981) showed that feeding live *Lactobacillus acidophilus* culture resulted significant increase in egg production at on location, a numerical improvement at the second and no difference at the third location. Addition of probiotic and yeast had significant effect (P=0.05) on shell weight, shell thickness, yolk weight and yolk cholesterol (Table 3). Egg weight, shell percent and albumin weight were not significantly different among treatment groups (P>0.05). Shell thickness was higher for 4^{th} and 5^{th} treatments compared to the control. This result agreement with the previous report that shell thickness was significantly higher by *Saccharomyces cerevisiae* (Yousefi *et al.*, 2004). Shell weight was higher for 5, 6 and 7^{th} treatments compared to the other treatments. Thayer and Jackson (1975) and Thayer *et al.* (1978) found that yeast culture increased organic phosphorus utilization in turkey. The increased mineralization of eggs by the SDY might be responsible for the high shell weight observed in SDY - fed pullets. Yolk weight was higher for all treatment groups (except treatment 4) compared to the control. The improvement observed in internal egg quality (Yolk weight and Haugh unit) could be due to the supply of yeast phytase coupled with the supply of some essential micro- nutrients as reported by Thayer *et al.* (1978) that yeast phytase is capable of increasing bio-availability of certain minerals such as Ca, Cu, Zn, Fe, Mn and even gross energy of the feed in agreement with Scott *et al.* (1982) and Erdman (1989). Yolk cholesterol was lower for 3, 5, 6 and 7th treatments compared to the control (Kurtoglu *et al.*, 2004; Mahdavi *et al.*, 2005). The results showed that the use of probiotic Thepax® and *Saccharomyces cerevisiae* were not affected by production. But, egg quality did improved from 63 to 67 weeks of age.

Acknowledgments

Financial support of Islamic Azad University-Saveh Branch is gratefully acknowledged.

References

Ahmad, I., 2006. Effect of probiotics on broilers performance. Int. J. Poult. Sci., 5: 593-597.

Erdman, J.W., 1989. Phytic acid interactions with divalent cations in Foods and in Gastro intestinal tract. In: F.R. Dintizisand J.A. Laszio (ed.). Mineral absorption in monogastric gastro-intestinal tract. Plenum Press, New York. NY Pg: 161-170.

Folch, J., M. Less and G.H. Solane Stanley, 1956. A simple method for the isolation and purification of total lipid from animal tissues. J. Bio. Chem., 226: 497-509.

Fuller, R., 1989. Probiotics in man and animals. J. Appl. Bacteriol., 66: 365-378.

Gibson, G.R. and R. Fuller, 2000. Aspects of in vitro and in vivo research approaches directed toward identifying probiotics and prebiotics for human use. J. Nutr., 130: 391-395.

Jin, L.Z., Y.W. Ho, N. Abdullah and S. Jalaludin, 1997. Probiotics in poultry: Modes of action. World's Poult. Sci. J., 53: 351-368.

Kurtoglu, V., F. Kurtoglu, E. Seker, B. Coskun, T. Balevi, and E.S. Polat, 2004. Effect of probiotic supplementation on laying hen diets on yield performance and serum and egg yolk cholesterol. Br. Poult. Sci., 21: 817-823.

Mahdavi, A.H., H.R. Rahmani and J. Pourreza, 2005. Effect of probiotic supplements on egg quality and laying hen's performance. Int. J. Poult. Sci., 4: 488-492.

Miles, R.D., A.S. Arofa, R.H. Harms, C.W. Carlson, B.L. Reid, and J.S. Crawford, 1981. Effects of a living non freeze-dried *Lactobacillus acidophilus* culture on performance, egg quality, and gut microflora in commercial layers. Poult. Sci., 60: 993-1004.

Mutus, R., N. Kocabagli, M. Alp, N. Acar, M. Eren and S. Gezen, 2006. The effect of dietary probiotic supplementation on tibial bone characteristics and strength in broilers. Poult. Sci., 85: 1621-1625.

National Research Council, 1994. Nutrient Requirements of poultry. 9th rev. ed. National Academy Press, Washington, DC.

Scott, M.L., M.C. Neisheim and R.J. Young, 1982. Nutrition of the chickens 3rd edn. M.L. Scott and Associates, Ithaca, New York.

SPSS, 2003. SPSS For Windows Release 12.0, SPSS Inc.

Tannock, G.W., 2005. Probiotics and prebiotics: Scientific aspects. Caister Academic Press, Wymondham, UK, 230.

Thayer, R.H. and C.D. Jackson, 1975. Improving phytase phosphorus utilization by poultry with live yeast culture. Res. Reproduction. M.P. 1033, Oklahoma Agricultural Expt. Station, Pg:131-139.

Thayer, R.H., R.F. Burkitt, R.D. Morrison and E.E. Murray, 1978. Efficiency of utilization of dietary phosphorus by caged turkey breeder hens fed ration supplemented with live yeast culture. Anim. Sci. Res., MP-103. Oklahoma State Univ., Stillwater, Ok.

Tortuero, F., 1973. Influence of implantation of *Lactobacillus acidophilus* in chicks on the growth, feed conversion, malabsorption of fats syndrome and intestinal flora. Poult. Sci., 52: 197-203.

Washburn, K.W. and D.F. Nix, 1974. A rapid technique for extraction of yolk cholesterol. Poult. Sci., 53: 1118-1122.

Yousefi, M., M. Shivazad and I. Sohrabi-Haghdoost, 2004. The effect of dietary treatments flaxseed, yeast, soy fatty acid on fatty liver-hemorrhagic syndrome in laying hens. Poult. Sci., 83(Suppl. 1): 168 (Abstr.).