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Short Communication

Effect of *Saccharomyces cerevisiae* and Bioplus 2B on Performance of Laying Hens

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ABSTRACT

The effect of dietary probiotic Biosaf SC 47 (SC) containing a minimum of 5×10^{10} colony forming units (cfu) gr^{-1} *Saccharomyces cerevisiae* (strain NCYC sc 47) and Boiplus 2B (BP) containing a minimum of 3.2×10^{9} (cfu) gr^{-1} *Bacillus subtilis* (CH201) and *Bacillus lichenioformis* (CH200) on body weight, daily feed consumption, egg production, egg weight, egg mass and feed conversion was determined. In 10 weeks experimental period, hens (46 to 55 weeks of age) were allocated to three dietary treatments being control, SC and BP. Treatment SCBP0 had no probiotic (control), while those for treatments SC, BP included 200, 300, 400 gr t^{-1} of *S. cerevisiae* and 400, 800, 1200 gr t^{-1} Bioplus 2B, respectively. Using different probiotics caused significant increase ($p<0.05$) in feed conversion and significant decrease in egg weight, but it had no significant effect on the other parameters.

Key Words: Probiotics; Laying hens; *Saccharomyces cerevisiae*; *Bacillus licheniformis*; *B. subtilis*; Performance

INTRODUCTION

Probiotic is a generic term and products can contain yeast cells, bacterial cultures or both that stimulate microorganism capable of modifying the gastrointestinal environment to favor health status and improve feed conversion (Dierck, 1989). Probitic inclusion in feeds benefit the host animal by changing the gut microflora, producing antibiotics, synthesizing lactic acid with consequent reduction intestinal mucosa, preventing toxicosis and stimulating immune responses in the gut (Cheeke, 1999). Haddadin *et al.* (1996) reported that egg size, egg production and egg qualities were improved by the addition of probiotic. Inclusion of Bioplus (BP) in laying hens caused no significant decrease in feed consumption, egg production and egg weight (Mahdavi *et al.*, 2005). Goodling *et al.* (1987) reported, when laying hens fed dried, non-viable *Lactobacillus* fermentation did not show any improvement in performance compared poultry fed *Lactobacillus*. The purpose of this study was to examine the outcome of probiotics *Saccharomyces cerevisiae* and Bioplus 2B on laying hens performance parameters.

MATERIALS AND METHODS

Probiotics. The two probiotics used in this study were obtained from commercial processors. The first probiotic Biosaf SC 47 (SC) containing a minimum of 5×10^{10} colony forming units (cfu) gr^{-1} *Saccharomyces cerevisiae* (strain NCYC sc 47) was obtained from the company of Société Industrielle LESAFFRE (France). Whilst the second probioic Bioplus 2B (BP) containing minimum of 3.2×10^{9} (cfu) gr^{-1} *Bacillus subtilis* (CH201) and *Bacillus lichenioformis* (CH200) was obtained from Hansen A/S (denmark).

Laying hens. One hundered and twenty laying hens(46 to 55 weeks of age) from a commercial strain (Hy-line W36, Hy-line company, Urmia, Iran) were randomly allocated to three dietary treatments (control, SC, BP) in a completely randomized design. All birds used in the experiment were cared for according to applicable recommendations of U.S National Research Council (NRC, 1996). Hens of each treatment were divided into four subgroups (replicates) of 4 birds each and accommodated to 4 floor pens/treatment.

At the beginning of the experiment, hens of all treatments had similar body weight (BW, 1373±28 g), egg production (0.86±0.02 eggs/hen/day) and egg weight (52.34±2.82 g). All 30 pens were identical and were equipped with similar through for diets and water. During 10 weeks experiment period from 46 to 55 weeks of age all hens all treatments received the same basal diet (Table I), according to nutrient requirement of laying hens as given by National Research Council value (NRC, 1994).

Treatment SCBP0 was not supplemented with any probiotic (control) but treatments SC and BP at the levels of 200, 300, 400 g t^{-1} S. *cerevisiae* and 400, 800, 1200 g t^{-1} Bioplus 2B incorporated, respectively. During the experimental period, conventional management procedures were employed, natural and artificial light was provided for 17 h per day, ambient temperature was controlled and birds

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Table I. The ingredients and chemical composition[1] of basal diet (as fed basis)

Ingredients	Amount
Yellow corn	59.233%
Soybean meal	16.8%
Fish meal	2.00%
Oyster shell	7.47%
Wheat	5.82%
Wheat bran	6.02%
Dicalcium phosphate	1.24%
Oil	0.5%
Salt	0.38%
Mineral premix[2]	0.25%
Vitamin premix[3]	0.25%
DL-Methionine	0.037%
Total[4]	100%
ME	2.7 kcal g^{-1}
Protein	15.5%
Calcium	3.25%
Available phosphate	0.40%
Sodium	0.18%
Arginine	0.92%
Lysine	0.76%
Threonine	0.57%
Tryptophan	0.19%
Met+cys	0.58%

[1]Dry matter content 9000g/gr. [2]premix supplied per kg of diet: 10 mg Cu, 0.99 mg I, 50 mg Fe, 100 mg Mn, 0.08 mg Se, 100 mg Zn. [3]Premix supplied per kg of diet: 9000Iu vitamin A,1.78 mg vitamin B_1, 6.6 mg vitamin B_2, 30 mg niacin, 10mg pantothonic acid, 3 mg vitaminB_6 0.15 mg biotin, 1500 mg choline, 0.015 mg vitamin B_{12}, 2000Iu vitamin D, 18 IU vitamin E, 2 mg vitamin k_3,[4] All value were calculated from NRC value (1994)

were fed and watered *ad libitum*. Hens BW (g) were measured at the start and end of the study on a pen basis. Mortality, daily feed consumption (DFC, g), egg production (egg/hen/day), egg weight (g), egg mass (g/hen/day) and feed conversion (kg feed/kg egg mass) were recorded daily.

Statistical analysis. Egg production parameters were statistically analyzed by one-way analysis of variance with the pen of hens being the experimental unit, the comparision was among groups and non-ortogonal. The statistical analysis was made with the help of the SPSS statistical software package (SPSS, 2003).

RESULTS AND DISCUSSION

Inclusion of dietary probiotic on a range of egg production traits of laying hens are presented in Table II. Addition of probiotic had no significant effect on final body weight. It was not seen any improvement on egg production and egg weight among treatments after receiving during 10 weeks the different probiotics. Although not statistically significant a numerical difference in daily feed consumption between SC (105.8) and the other groups was apparent. Feed conversion was higher ($p<0.05$) in treatments SC, BP compared to treatment control and egg weight in treatment control was higher ($p<0.05$) than the other treatments.

Goodling *et al*. (1987) reported, when laying hens fed a dried, non-viable *lactobacillus* fermentation product at levels 0, 250, 500, 750, mg kg^{-1} from 23 through 70 weeks of age did not show any improvement in hen day egg production nor feed conversion compared with laying hens fed no *lactobacillus*. Feed conversion for hens fed a diet having no *lactobacillus* supplementation was significantly lower than the diets supplemented with *lactobacillus* at various levels 1100 and 2200 ppm for 24 weeks (Nahashon *et al.*, 1994). Miles *et al.* (1981) showed that the *lactobacillus* culture incorporation at levels 125, 375 and 625 g t^{-1} of the laying hen's diet gave equivocal results. Feeding the *lactobacillus* culture resulted in increased egg production in the first experiment, a numerical improvement in the second experiment and no difference in the third experiment. Similarly, Mahdavi *et al.* (2005) did not report any improvement on laying hens performance during the 12 weeks of experiment (28-39 weeks old) fed the probiotic Bioplus at levels up to 2000 g t^{-1} in laying hens. In contrast feeding probiotics were found to enhance egg production and egg quality (Nahashon *et al.*, 1994; Turtuero & Fernandez, 1995). The failure of probiotics culture to enhance poultry production has been attributed to the inability of probiotics to colonize or survive in gastrointestinal tract or their inability to antagonize or competitively exclude the pathogenic bacteria (Jin, 1997). Lyon (1987) suggested that the effectiveness of probiotic was related to two factors, correct number of living bacteria used and the presence of stress on the poultry.

Furthermore, it may be concluded that result of egg performance parameters that obtained in this study, related to the strain of microorganisms, the time of study, concentration and form of probiotics, which used at this study.

Our results may indicate that the dietary application of probiotics Biosaf SC 47 *Saccharomyces cerevisiae* (strain NCYC sc 47) at the levels up 300 g t^{-1} and bioplus 2B *Bacillus lichenioformis* (CH200) *Bacillus subtilis* (CH201) at the levels up to 800 g t^{-1} did not substantially effect on egg performance of laying hens (Hy-line w36) from 46 to 55 weeks age.

Table II. Effect of probiotic on production performance of laying hens

Treatment	Final body weight(g)	Daily feed consumption(g)	Egg production (egg hen^{-1} day^{-1})	Egg weight (g)	Egg mass (g hen^{-1} day^{-1})	Feed conversion (g feed g^{-1} egg mass)
control	1462	103.25	0.857	61.11[b]	52.39	1.96[a]
SC	1450.6	105.8	0.851	59.94[a]	50.77	2.12[b]
BP	1462	101.44	0.8133	59.78[a]	48.65	2.11[b]
SEM	48.21	3.5	0.315	0.625	0.991	0.025

[a-b]Means within each row with different superscripts are significantly different

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