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Using an Effective Microorganism Supplementation in Layers

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ABSTRACT

An experiment was conducted to study the effects of supplementation of EM (effective microorganism) in feed on laying performance and egg quality. A 2×3 Factorial in Completely Randomized Design with 4 replications, using the total numbers of 288 layers was utilized . In one factor, supplementation and non - supplementation of EM were applied. In the other factor, supplementation of calcium at levels of 3, 3.5 and 4% were used. Results of the study, over the 3 periods, 28 days per period revealed that there were no significant effects of supplementation of EM on daily feed intake, body weight gain, mortality, egg mass, egg weight, albumen weight, yolk weight, egg shell weight, yolk color and haugh unit ($P>0.05$). But egg production ($P<0.05$), feed per 1 dozen egg and specific gravity were highly significant difference ($P<0.01$).

Key words : layer, effective microorganism, calcium, specific gravity

INTRODUCTION

Several reports in the literature have been found pertaining to the influence of microorganism on animals for highly efficiency in animal production. Probiotic is used for feed supplementation. Males and Johnson (1990) defied the term "Probiotic" to be used for life encouragment by microorganisms. They are living cells and by products from microbial fermentation. The types of probiotics range from pure culture such as *Lactobacillus acidophillus* or mixture fermentation such as a mixed culture of organisms of fungi and bacteria or fungi and yeasts or other combinations in which the components are quite unrelated. (Hesseltine, 1991)

EM (effective microorganism) is the mixed-cell culture which compose of photosynthetic bacteria, actinomyces, yeast, Lactobacillus and fungi (Higha,1993). Chantsavang *et al.* (1993) reported the effects of EM supplemented in drinking water and feed of Japanese quails that there was no significant effect of EM on growth, feed efficiency and mortality rate of growing quails and laying period (4-12 wks) but there was significant effect in egg quality trait and high content of crude protein in manure. While research with Lactobacillus cultures has focused primarily on disease processes. Tortuero (1973) found that a Lactobacillus probiotic and zinc bacitracin had similar effects in stimulating weight gain and feed efficiency of broiler chicks. Chapman (1988) reported that the probiotic caused a distinct change in microbial flora of the ceaca and small intestine in

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that by nine days of age, enterococci has essentially disappeared. According to the similar results of enhanced gain and (or) efficiency of broilers in response to probiotic culture was reported by Crawford (1979) and Dilworth and Day (1978).

Yeast culture is considered to use for enhance feed utilization. Martin (1995) reported that using of Lacto-Sacc (Alltech) 1 kg/t in broiler decreased 6.4% female mortality and 23.5% male mortality. Egg production (per hen day) in the period was improved from 59.9 % to 63 %. Layer should get optimum calcium at level 3.6 g/hen/day or 3.5% in feed. This experiment was conducted to determine the effects of Effective Microorganisms supplementation in layer feed which would have any beneficial effects on productive performance.

MATERIALS AND METHODS

The experiment was conducted in during 3 periods, each lasting 28 days with a total of 288 Isa Brown Layers, approximately 70 weeks of age. A 2 x 3 factorial in Completely Randomized Design with 4 replecations (twelve individually caged hens per replicate) was used.

In one factor; supplementation and non supplementation of 1% EM were applied. In the other factor, supplementation of calcium at the levels of 3, 3.5 and 4% were used. All birds were fed with the diets (Table 1) and water *ad libitum* throughout the entire study. Daily feed intake, feed per 1 dozen egg, mortality, body weight gain, egg production were determined. Egg mass, specific gravity, albu-

Table 1 Composition of diets for layers.

Ingredient	Treatment 1,2 (%)	Treatment 3,4 (%)	Treatment 5,6 (%)
Yellow corn	54.17	55.43	56.79
Solv. extracted rice bran	11.05	7.63	4.00
Soybean meal	20.98	21.83	22.73
Fish meal (58%)	5.00	5.00	5.00
Oystershell	6.50	7.77	9.05
Dicalcium phosphate (p/18)	0.55	0.59	0.68
Salt	0.25	0.25	0.25
Vegetable oil	1.00	1.00	1.00
Vitamin premix	0.50	0.50	0.50
Total	**100**	**100**	**100**
Calculated analysis			
Crude Protein	18.00	18.00	18.00
ME(kcal/kg.)	2800.34	2800.04	2800.46
Calcium	3.00	3.50	4.00
Available phosphorus	0.38	0.37	0.37
Lysine	0.97	0.97	0.98
Methionine+Cystine	0.62	0.61	0.61
Tryptophan	0.21	0.21	0.21
Threonine	0.69	0.70	0.70

men weight, yolk weight, yolk color, haugh unit, egg shell weight, egg shell thickness were collected from a 3-day egg sample taken from each replication at the end of each 28-day period. Natural light was supplemented with artificial light in the morning and afternoon to provide a 16-hr photopenod. The treatments were as follow :

Treatment 1 3% of calcium level in feed and 1% of EM supplementation

Treatment 2 3% of calcium level in feed

Treatment 3 3.5% of calcium level in feed and 1% of EM supplementation

Treatment 4 3.5% of calcium level in feed

Treatment 5 4% of calcium level in feed and 1% of EM supplementation

Treatment 6 4% of calcium level in feed

Data was subjected to an analysis of variance through the Statistic Analysis System procedures (SAS,1988).

RESULTS AND DISCUSSION

The data is presented in Table 2 and 3. Results showed that there were no significant difference on daily feed intake, body weight gain and mortality (P>0.05) in supplementation and non-supplementation of EM in any level of calcium.

Similar report of Miles *et al.* (1981) found that there were no significant differences in feed consumption, egg production and mortality in adding a *Lactobacillus* culture to the diet of Bobwhite quail breeds. Damron *et al.* (1981) also reported that 625 mg/kg of Probios (a mixed *Lactobacillus* culture) in Turkey hens feed did not significantly affect egg production, daily feed intake, specific gravity of eggs, or body weight. Miles *et al.* (1981) remarked that the addition of the *Lactobacillus* culture at a level of 0.625 g/kg feed in Bobwhite Quail breeders had no significant influence on feed consumption, egg production, fertility, hatchability of fertile eggs and mortality.

However, it was found that there was highly significant difference (P<0.01) in feed per dozen egg by 3% calcium level consumed feed more than 3.5% and 4% calcium level respectively and there was interaction between 1st factor and 2nd factor in feed. 3.5% calcium level without EM supplementation (T4) can be fed to produce a dozen egg better than 3% calcium level and EM supplementation (T1) (P<0.01)

Moreover, 3.5 % calcium level without EM supplementation (T4) had significant difference (P<0.05) in egg production (%) therefore EM did not affect calcium utilization in feed for production.

Table 2 Effect of EM supplementation in feed at difference calcium level on layers.

Characteristics	3.0% Ca		3.5%Ca		4.0% Ca	
	EM	no EM	EM	no EM	EM	no EM
Daily feed intake (g/b)	109.775	108.133	108.954	108.133	109.778	109.939
Feed per dozen egg (kg)	1.616^{a}	1.564^{abc}	1.542^{bdc}	1.49^{d}	1.517^{dc}	1.608^{ab}
Body weight gain (g)	0.107	0.14	0.168	0.102	0.178	0.177
Hen day production (%)	82.244^{z}	83.209^{yz}	84.524^{xyz}	87.203^{x}	86.286^{xy}	83.603^{yz}
Mortality(%)	0.694	0	0.694	0	0.694	1.388

abc : Mean values on the same row with common superscripts are highly different at (P<0.01)

xyz : Mean values on the same row with common superscripts are different at (P<0.05)

Table 3 Effect of EM supplementation in feed at different calcium levels on egg quality.

Characteristics	3.0% Ca		3.5%Ca		4.0% Ca	
	EM	no EM	EM	no EM	EM	no EM
Egg mass (g)	51.089	51.737	53.302	53.461	53.763	52.168
Egg weight (g)	62.12	62.165	63.023	61.660	62.299	62.369
Egg shell weight (g)	5.613	5.580	5.715	5.634	5.795	5.722
Yolk color	7.444	7.68	7.751	7.668	7.764	7.653
Haugh unit	87.174	87.474	85.239	85.388	84.251	83.254
Specific gravity	1.086^{c}	1.085^{d}	1.087^{bc}	1.087^{bc}	1.088^{a}	1.088^{ab}

abcd : Mean values on the same row with common superscripts are highly statistical different ($P<0.01$)

Table 3 shows no significant effects ($P>0.05$) on egg mass, egg weight, albumen weight, yolk weight, egg shell weight, yolk color, haugh unit in every treatment, which was similar to the report of Boonyoung *et al.* (1995) who also found that there were no differences in egg mass, egg weight, albumen weight, yolk weight, egg shell weight, egg shell thickness, yolk color, haugh unit and specific gravity in EM supplement in drinking water of layer.

In the variation of calcium levels at 3%, 3.5% and 4% Table 3 shows specific gravity values vary to calcium levels. 3.5% calcium level had the highest specific gravity value ($P<0.01$). Although in this experiment, layers were raised during summer season, egg production did not decrease. It may be because of evaporation housing system. The temperature in house was about 27°C and good condition for raising laying. The layers fed with 3% calcium produced egg ($P<0.05$) with thinner egg shell weight ($P>0.05$).

CONCLUSION

1. There were no significant differences on daily feed intake, weight gain, mortality, egg mass, egg weight and yolk weight in layers at 3%, 3.5% and 4% calcium levels.

2. There were highly differences on feed per dozen egg and specific gravity ($P<0.01$), egg production ($p<0.05$)

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