# PRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF TWO LOCAL STRAINS OF CHICKENS AT EARLY PERIOD OF LAYING AS AFFECTED BY ENZYME SUPPLEMENTATION UNDER SUMMER CONDITIONS OF EGYPT

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***Abstract***

A total of 360 pullets at 22 weeks of age, from two local strains (Mandarah and Dokki-4) 180 birds each, were used to study the effect of dietary phytase supplementation on productive and physiological performance of two local strains of chickens during early period of laying under summer conditions. The experiment continued for 12 weeks from 22 up to 34 weeks of age.

The birds were randomly distributed into six treatments, each of two replicates (fifteen of each strain).The experimental treatments were two levels of nonphytate phosphorus (NPP) 0.45% (control) and low-NPP (0.25%), and three levels of microbial phytase (0 ,500 and 1000 u/ kg of diet). The experimental treatments were as follows:

1- 0.45% NPP- control diet.
2- low NPP- diet (0.25%).
3- 0.45% NPP- control diet supplemented with microbial phytase at a level of 500 /kg.
4- low NPP-diet (0.25%) supplemented with microbial phytase at a level of 500 U/kg.
5- 0.45% NPP- control diet supplemented with microbial phytase at a level of 1000 U/kg.
6- low NPP- diet (0.25%) supplemented with microbial phytase at a level of 1000 U/kg.

Studied criteria were: performance of egg production, egg quality, plasma Ca, P, cholesterol , total protein, albumin and globulin, and liver parameters (LDL, HDL and total lipids). The obtained results showed that:

- Hens fed 0.45%-NPP-diets supplemented with phytase (500 or 1000 u/kg of diet) gave higher final body weight , body weight gain and significantly improved feed conversion as compared with the hens fed 0.45% or 0.25%-NPP-diets without phytase supplementation.
- Hens fed 0.45%-NPP-diets supplemented with phytase (500 or 1000 u/kg of diet), showed an increase in egg number and egg weight and improvement in some egg quality parameters in Mandarah strain compared to Dokki-4 strain. However, hens fed 0.45%-NPP-diets performed better than those fed 0.25%-NPP-diets for egg production and feed conversion.
- Results showed that hens fed 0.45%-NPP-diets supplemented with phytase (500 or 1000 u/kg of diet), had better ($P<0.05$) total secondary and IgG anti-SRBC's than those fed the 0.25%-NPP-diet with or without phytase.
- Hens of the two strains, fed 0.45%-NPP-diets supplemented with phytase (500 or 1000 U/kg of diet), showed an increase in

plasma calcium, albumin, total protein , globulin , but there was a decrease in plasma phosphorus, cholesterol , liver total lipids, LDL and HDL as compared with other groups.

- Hens of the two strains, fed 0.45%-NPP-diets supplemented with phytase (1000 or 500u/kg of diet), showed an increase in relative weights of some immune internal organs such as spleen , thymus gland, ovary, oviduct organs and oviduct length, while it decreased the abdominal fat weight.

In conclusion, Mandarah and Dokki-4 laying hens fed the 0.25%-NPP- diets, whether supplemented or not with phytase, performed less efficiently for egg production and feed conversion than those fed the 0.45%-NPPdiets supplemented with phytase. Additionally, it would appear that Mandarah laying hens had better performance than Dokki-4 laying hens.

## INTRODUCTION

High environmental temperature during summer season in Egypt caused highly detrimental effect on broiler production. Feed consumption, growth rate, mortality and other economic traits governing the prosperity of the industry are adversely affected by high ambient temperature. Other consequence of high environmental temperature, is its effects on the development of a specific immune response in the chicken. In addition, Said (2006) concluded that chicks fed medium protein diet supplemented with phytase resulted in the heaviest live body weight and body weight gain values at 3 weeks of age.

Phytate is a naturally occurring organic compound in plants. It can complex with several minerals such as Ca, Mg, Zn, Fe, K and Cu, as well as with amino acids (Ravindran *et al.,* 1998). This form of phosphorus is largely unavailable to poultry because of inadequate amounts of endogenous phytase secreted by the gastrointestinal tracts of poultry to hydrolyze phytate and release the phytate-bound P., diets are usually supplemented with an inorganic source of P. This supplementation is, not only expensive, but also with excessive dietary supply. P. excretion is concomitantly increased, leading to a potential P. pollution in soil and ground water.

In areas of concentrated animal production, the excretion of excess P. in the manure has posed an environmental concern (Ravindran *et al.,* 1998). As a result of economic and environmental concerns, there is a renewed interest in using phytase to reduce the need for inorganic P. supplements and to improve utilization of P. present in feedstuffs. Supplementation of poultry diets with microbial phytase may increase P. availability and enhance their performance. An improved performance has been observed due to supplementation of diets with microbial phytase in laying hens (Um and Paik, 1999).

Keshavarz (2003) reported that, a level of supplementary phytase (300 units phytase/kg diet) was more effective than a lower level (150 units) in restoring the