
**ISSN:** 2456-2912
VET 2023; 8(1): 87-89

www.veterinarypaper.com
Received: 12-10-2022
Accepted: 17-11-2022

**Gabriel Moyano**
Technical Veterinary Manager, Laboratories Maymo, Spain

**Roopa Reddy**
Country Manager, Natural Remedies Private Limited, Veerasandra Industrial Area, Electronic City, Hosur Road, Bangalore, Karnataka, India

**Marimuthu Saravanakumar**
R&D Centre, Natural Remedies Private Limited, Veerasandra Industrial Area, Electronic City, Hosur Road, Bangalore, Karnataka, India

**Prashanth D'Souza**
R&D Centre, Natural Remedies Private Limited, Veerasandra Industrial Area, Electronic City, Hosur Road, Bangalore, Karnataka, India

**Corresponding Author:**
**Marimuthu Saravanakumar**
R&D Centre, Natural Remedies Private Limited, Veerasandra Industrial Area, Electronic City, Hosur Road, Bangalore, Karnataka, India

# Evaluation of phytogenic feed additive on egg production performance in Hy-Line commercial brown layers

**Gabriel Moyano, Roopa Reddy, Marimuthu Saravanakumar and Prashanth D'Souza**

**DOI:** https://doi.org/10.22271/veterinary.2023.v8.i1b.473

**Abstract**
The current study was carried out to evaluate the effect of phytogenic feed additive (PFA) on egg production performance in Hy-Line brown layer birds. A flock size of 14190 birds was selected in commercial poultry farm which was maintained with standard management practices at Spain. The baseline data (T1) was recorded for 20 days, thereafter, birds were fed with PFA (500 g/ton) (T2) supplemented feed for 11 days. The parameters *viz.* number of eggs, hen day egg production (HDEP) and egg size were recorded. Results revealed that PFA supplementation improved the production parameters *viz.* no. of eggs/day (204 eggs/day) and HDEP (3%) when compared to baseline. Additionally, the gap between standard HDEP and actual HDEP was reduced (-11.75 Vs. -15.80) in Hy-Line brown layer birds. Also, PFA supplementation augmented the medium sized egg production as compared to baseline (4223 Vs. 3700; Diff. +523). In conclusion, PFA can be used to improve the egg production performance and egg quality traits in Hy-Line commercial layer birds.

**Keywords:** Phytogenic feed additive, Hy-Line brown layers, HDEP, Egg quality

## 1. Introduction
There is a resurgence to augment poultry production to meet the increasing demand for animal protein due to the increase in global human population [1]. However, modern poultry industry has been facing a wide variety of stressors *viz.* environmental, nutritional, and internal stressors which leads to diminished reproductive production performance and adversely impact the health status of poultry birds as well [2]. The types of environmental stressors are (i) heat stress [3], (ii) cold stress [4], (iii) feed restriction [5], and many more. Specifically, heat stress is a main pressing issue in present day poultry rearing, as its negative impact on egg production is very much perceived [6]. Previous studies revealed that stress, in various forms and in various species, would modulate the circulating prolactin and gonadotropins in turkey poults [7], laying hens [8], and turkey hens [9, 10]. These changes in reproductive hormone secretion due to heat stress would negatively impact the reproduction performances.
Adaptogens are defined as metabolic regulators which increase the ability of an organism to adapt to environmental stressors and to avoid damage from such stressors [11, 12]. Our previous works on Phytogenic Feed Additive (PFA), Phytocee™, in rodent and avian models demonstrated that it possesses an antistress, adaptogenic and antioxidant properties [13-16]. With these viewpoints. Present study was undertaken to evaluate the effect of PFA on egg production performance parameters in Hy-Line brown commercial layer birds.

## 2. Materials and Methods
### 2.1 PFA
Phytocee™ is a proprietary PFA developed by Natural Remedies Private Limited, Bengaluru, India, containing mainly dried powder of *W. somnifera stems*, fruits of *E. officinalis* and whole plant of *O. sanctum*.

### 2.2 General Layer Birds Husbandry Practices
The standard Hy-Line brown layer bird management practices were followed during the experiment. The experimental birds were reared in the cage system and provided with the potable drinking water *ad libitum* throughout the study period. The birds were fed with mash diet as per the breeder manual instructions. Recommended standard Hy-Line layer bird's vaccination schedule was followed.

### 2.3 Study Design
The study was conducted at commercial poultry farm, Spain. A flock size of 14190 Hy-Line brown layer birds were enrolled and the study design was as described in Table 1.

**Table 1:** Study design

| Group | Treatment | Duration of Treatment | Number of birds/groups |
|---|---|---|---|
| T1 - Baseline | Standard commercial feed | 20 days | 14190 |
| T2 – PFA | Standard commercial feed + PFA (500 g/ton) | 11 days | 14190 |

### 2.4 Assessment Parameters
Number of eggs, hen day egg production (HDEP) and egg size of baseline and post-supplementation with PFA were recorded daily.

### 2.5 Statistical Analysis
Data were expressed as mean (average value per day).

## 3. Results
The egg production performance parameters *viz.* no. of eggs/day and HDEP were found to be improved following supplementation of PFA at 500 g/ton. The number of eggs/day and HDEP was improved by 204 eggs/day and 3% respectively in PFA supplemented period (T2) as compared to baseline (T1) (Table 1). The difference between standard HDEP production of Hy-Line brow layer birds and actual HDEP in T1 and T2 was -15.80 and -11.75. These findings implied that PFA supplementation reduced the gap between standard and actual egg production percentage (Table 2 and Figure 1).

**Table 2:** Effect of PFA on egg production parameters of Hy-Line brown commercial layer birds

| Group | No. of Eggs/Day | Actual HDEP % | Difference | | Standard HDEP % | Difference |
|---|---|---|---|---|---|---|
| | | | No. of Eggs/Day | HDEP (%) | | |
| T1 - Baseline | 10771 | 77 | - | - | 92.80 | -15.80 |
| T2 – PFA (500 g/ton) | 10975 | 80 | +204 | +3 | 91.75 | -11.75 |

Values are expressed as mean (average value/day)

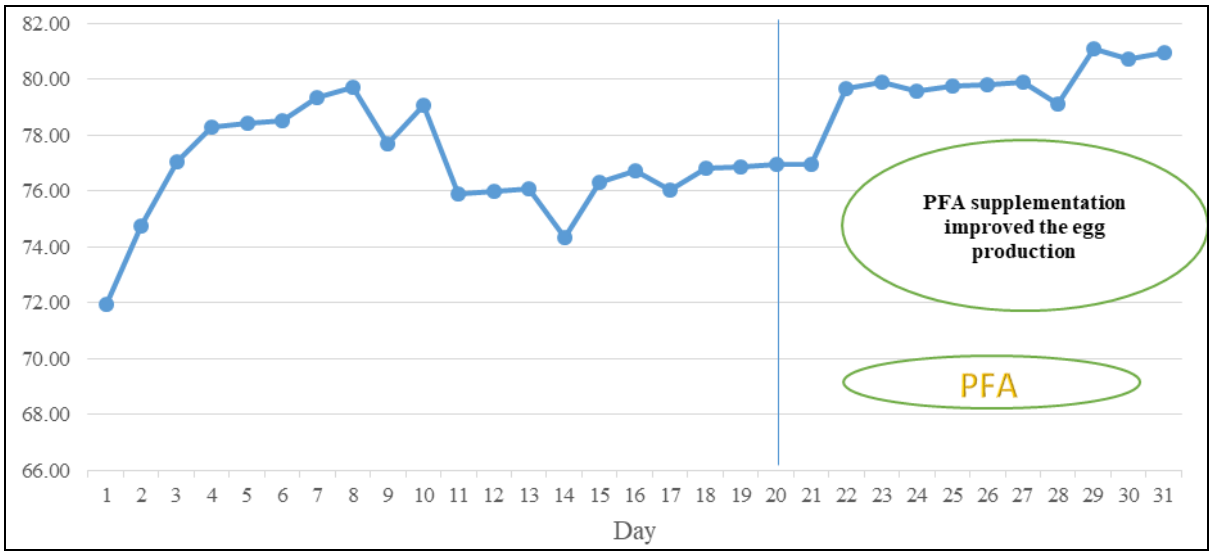


**Fig 1:** Effect of PFA on egg production parameters of Hy-Line brown commercial layer birds

The results of effect of PFA on egg size of layer birds was as represented in Table 3. Results revealed that PFA supplementation at 500 g/ton ($T_2$) improved the medium sized eggs production as compared to baseline group (T1) [4223 Vs. 3700; Diff. +523].

**Table 3:** Effect of PFA on egg size of Hy-Line brown commercial layer birds

| Group | Egg Size (Nos.) | | | |
|---|---|---|---|---|
| | Jumbo (XXL) | Extra Large (XL) | Large (L) | Medium (M) |
| T1 - Baseline | 193.80 | 1087.90 | 5630.30 | 3700.90 |
| T2 – PFA (500 g/ton) | 149.64 | 916.09 | 5452.27 | 4223.18 |
| Difference | - 44 | - 172 | - 178 | + 523 |

Values are expressed as mean (average value/day)

## 4. Discussion
To the best of our literature knowledge there are no reports available evidencing the conducive effects of medicinal herbs *viz. W. somnifera stems, E. officinalis* and *O. sanctum* neither individually nor synergistically on egg production performance and egg quality traits in Hy-line brown commercial laying birds. Hence, the present study was undertaken to evaluate the effect of PFA on egg production performance parameters and egg quality traits in Hy-Line commercial layer birds.

Our study results depicted that egg production parameters *viz*. no. of eggs/day and HDEP was improved by 204 eggs/day and 3% respectively after PFA supplementation in Hy-Line brown layer birds. Furthermore, the gap between standard HDEP production of Hy-Line brown layer birds and actual HDEP was reduced in PFA supplementation period as compared to baseline (-11.75 Vs. -15.80). Additionally, PFA supplementation augmented the medium sized egg production as compared to baseline (4223 Vs. 3700; Diff. +523). Moreover, the findings of egg production in our study are in accordance with the previous findings reported by Akdeimar *et al*., Radwan *et al*., Park *et al*., Damaziak *et al*., Abou-Elkhair *et al*., wherein addition of the different phytogenic feed additives in the layer bird's diet significantly increased the HDEP [17-21]. Typically, commencement of lay is a prolonged stress factor in young layers which might alter their hormonal system thereby compromising the immunity and making them vulnerable to any infection [22]. However, the ability of birds to cope with the stress associated with initial production process can be improved by the addition of herbal adaptogens. Hence the conducive effects of PFA on egg production performance and egg quality traits could be ascribed to the synergistic effects of phyto-actives present in the individual herbal ingredients of Phytocee™ which was evidenced from literature reports that demonstrated the antistress, adaptogenic, and antioxidant potential [13-16]. Therefore, the augmentation of egg production performance and enhancement in medium sized eggs production effects in Hy-Line layer birds in the present study following supplementation of Phytocee™ at 500 g/ton could also be attributable to anti-stress, adaptogenic and antioxidant properties of synergistic effect of individual herbal ingredients.

## 5. Conclusions

In conclusion, the results of the present study demonstrated that the supplementation of PFA at 500 g/ton improved the egg production performance as well as enhanced the egg quality traits which can be related to the synergistic beneficial effects of phytoactives present in Phytocee™. Hence, Phytocee™ can be used to improve the egg production performance and egg quality traits of Hy-Line brown commercial layer birds.

## 6. References


1. Tona GO. Current and future improvements in livestock nutrition and feed resources. Animal Husbandry and Nutrition; c2018. p. 147-169.
2. Surai PF, Fisinin VI. Vitagenes in poultry production: Part 3. Vitagene concept development. World's Poultry Science Journal. 2016;72(4):793-804.
3. Tsiouris V, Georgopoulou I, Batzios C, Pappaioannou N, Ducatelle R, Fortomaris P, *et al*. Heat stress as a predisposing factor for necrotic enteritis in broiler chicks. Avian Pathology. 2018;47(6):616-24.
4. Zhang ZW, Lv ZH, Li JL, Li S, Xu SW, Wang XL, *et al*. Effects of cold stress on nitric oxide in duodenum of chicks. Poultry Science. 2011;90(7):1555-61.
5. Janczak AM, Torjesen P, Palme R, Bakken M. Effects of stress in hens on the behaviour of their offspring. Applied Animal Behaviour Science. 2007;107(1-2):66-77.
6. Renaudeau D, Collin A, Yahav S, De Basilio V, Gourdine JL, Collier RJ. Adaptation to hot climate and strategies to alleviate heat stress in livestock production. Animal: An international journal of animal bioscience. 2012;6(5):707.
7. Rozenboim I, Mobarky N, Heiblum R, Chaiseha Y, Kang SW, Biran I, *et al*. The role of prolactin in reproductive failure associated with heat stress in the domestic turkey. Biology of reproduction. 2004;71(4):1208-13.
8. Downing JA, Bryden WL. Determination of corticosterone concentrations in egg albumen: a non-invasive indicator of stress in laying hens. Physiology & Behavior. 2008;95(3):381-7.
9. Angelier F, Wingfield JC, Tartu S, Chastel O. Does prolactin mediate parental and life-history decisions in response to environmental conditions in birds? A review. Hormones and Behavior. 2016;77:18-29.
10. Williams TD. Hormones, life-history, and phenotypic variation: opportunities in evolutionary avian endocrinology. General and Comparative Endocrinology. 2012;176(3):286-95.
11. Panossian A, Wikman G. Evidence-based efficacy of adaptogens in fatigue, and molecular mechanisms related to their stress-protective activity. Current Clinical Pharmacology. 2009;4(3):198-219.
12. Panossian A, Wikman G. Effects of adaptogens on the central nervous system and the molecular mechanisms associated with their stress—protective activity. Pharmaceuticals. 2010;3(1):188-224.
13. Divya P, Sasikumar M, Bharathi B, Prashanth DS, Deepak M. Adaptogenic/Antistress Activity of a Polyherbal Formulation (Phytocee™): Mechanism to Combat Stress. International Journal of Innovative Science and Research Technology. 2019;4(9):433-439.
14. Chandrasekaran CV, Sundarajan K, David K, Agarwal A. In-vitro efficacy and safety of poly-herbal formulations. Toxicology *in vitro*. 2010;24(3):885-897.
15. Joseph JA, Radhakrishnan U, Mutyala S, Goudar KS, Thachappully Ayyappan UP, *et al*. Antioxidant and protective effects of Phytocee™ against carbon tetrachloride-induced oxidative stress. Journal of Natural Science, Biology and Medicine. 2015;6:183-187.
16. Selvam R, Suresh S, Saravanakumar M, Chandrasekaran CV, Prashanth DS. Alleviation of heat stress by a polyherbal formulation, Phytocee™: impact on zootechnical parameters, cloacal temperature, and stress markers. Pharmacognosy research. 2018;10(1):1-8.
17. Akdemir F, Orhan C, Sahin N, Sahin K, Hayirli A. Tomato powder in laying hen diets: effects on concentrations of yolk carotenoids and lipid peroxidation. British Poultry Science. 2012;53(5):675-80.
18. Radwan Nadia L, Hassan RA, Qota EM, Fayek HM. Effect of natural antioxidant on oxidative stability of eggs and productive and reproductive performance of laying hens. International Journal of Poultry Science. 2008;7(2):134-50.
19. Park JH, Song TH, Kim I. Egg production, egg quality, and cecal microbial populations of layers fed diets supplemented with fermented phytogenic feed additive. Turkish Journal of Veterinary and Animal Sciences. 2016;40(5):660-6.
20. Damaziak K, Riedel J, Gozdowski D, Niemiec J, Siennicka A, Rog D. Productive performance and egg quality of laying hens fed diets supplemented with garlic and onion extracts. Journal of Applied Poultry Research. 2017;26(3):337-49.
21. Abou-Elkhair R, Selim S, Hussein E. Effect of supplementing layer hen diet with phytogenic feed additives on laying performance, egg quality, egg lipid peroxidation and blood biochemical constituents. Animal nutrition. 2018;4(4):394-400.
22. Morrow C. Management as a cause of disease in poultry. In Poultry Diseases. WB Saunders; c2008. p. 536-547.