



*International Journal Of*  
**Recent Scientific  
Research**

ISSN: 0976-3031

Volume: 7(1) January -2016

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THE OFFICIAL PUBLICATION OF  
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)  
<http://www.recentscientific.com/> [recentscientific@gmail.com](mailto:recentscientific@gmail.com)



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

*International Journal of Recent Scientific Research*  
Vol. 7, Issue, 1, pp. 8447-8450, January, 2016

**International Journal  
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## RESEARCH ARTICLE

# EFFICACY OF SUPPLEMENTATION OF HERBAL LIVER TONIC ON THE PERFORMANCE OF COMMERCIAL LAYERS

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### ARTICLE INFO

#### Article History:

Received 16<sup>th</sup> October, 2015  
Received in revised form 24<sup>th</sup>  
November, 2015  
Accepted 23<sup>rd</sup> December, 2015  
Published online  
28<sup>th</sup> January, 2016

#### Key words:

Herbal growth promoter, mean egg  
production, Growth, Layers

### ABSTRACT

40 one day old commercial layer chicks of BV 300 strain were randomly divided into two treatment groups with two replicates of 10 chicks each and reared under deep litter system of housing. Group T<sub>1</sub> was positive control fed with the basal diet without any natural or synthetic source of antibiotics. Group T<sub>2</sub> was test group fed with the basal diet supplemented with herbal liver tonic, Superliv @ 500g/ton of feed for a period of 0 to 38 weeks (supplied by M/S Ayurved Ltd., Baddi, India). Superliv supplemented birds showed higher body weight throughout the experimental period as compared to unsupplemented control group. Hen housed egg production (HHEP) was also found to be higher in Superliv supplemented birds (75.02) as compared to control group (70.80). Feed efficiency per dozen eggs produced was also found to be better in Superliv supplemented group (1.51) birds as compared to control group birds (1.65). From the results of the study it can be concluded that Superliv may be added to layers diet to elicit growth performance and egg production performance in commercial layers.

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## INTRODUCTION

The liver performs a number of metabolic functions in the body. Nutrients from digested feed is picked up in the digestive tract and transported to the liver for distribution to body tissues. Liver play an important role in the formation of yellow yolk material which is deposited inside the inner membrane containing the genetic material of the hen. Since this organ receives almost all the substance absorbed from the small intestine, it always needs to be maintained in the state of 'rocket engine' (Dhawale, 2007). The production of low quality feed has created variety of problems for the poultry industry resulting in poor performance and lower returns (Pervez *et al.*, 2011). In many animal production systems, approximately 2/3rd of improvements in livestock productivity can be attributed to improved nutrition. Hepatoprotection by conventional and synthetic drugs used in treatment of liver diseases are inadequate and sometimes can have serious side effects (Guntupalli, 2006). In the absence of reliable liver protecting drugs in modern medicine, there are number of medicinal preparations in Ayurveda recommended for the treatment of liver disorders (Chaterjee, 2000). Inclusions of

such herbal preparations in poultry ration have been shown to give beneficial effects in terms of growth and performance. Keeping this in view, the present investigation was undertaken to study the efficacy of herbal liver tonic product Superliv (supplied by M/S Ayurved Ltd., Baddi) on overall growth, performance, feed efficiency, and egg production performance in commercial layers.

## MATERIALS AND METHODS

The present study was undertaken during June, 2014 to March, 2015 at Poultry Research Center, Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola. 40 one day old commercial layer chicks of BV 300 strain were randomly divided into two treatment groups with two replicates of 10 chicks each and reared under deep litter system of housing. Group-I was positive control fed with the basal diet without any natural or synthetic source of antibiotics. Group- II was test group fed with the basal diet supplemented with polyherbal liver formula for poultry growth and production, Superliv @ 500g/ton of feed for a period of 0 to 38 weeks (supplied by M/S Ayurved Ltd., Baddi, India). The

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average maximum and minimum temperature during the experimental period was recorded to be 27.96 to 37.33°C and 9.63 - 26.52°C, respectively and average relative humidity was recorded to be 42.97 - 77.82%.

**Table 1** Nutrient composition (%) of experimental diets.

| Sr. No. | Nutrients        | Chick starter | Grower | Layer |
|---------|------------------|---------------|--------|-------|
| 1       | Crude protein    | 20.00         | 16.00  | 18.00 |
| 2       | ME Kcal/kg       | 2800          | 2500   | 2600  |
| 3       | Crude fiber      | 7.00          | 9.00   | 9.00  |
| 4       | Calcium          | 1.00          | 1.00   | 3.00  |
| 5       | Total Phosphorus | 0.70          | 0.65   | 0.65  |
| 6       | Lysine           | 1.00          | 0.70   | 0.70  |
| 7       | Methionine       | 0.40          | 0.35   | 0.35  |
| 8       | Salt             | 0.50          | 0.50   | 0.50  |

**Table 2** Ingredient composition (%) of experimental diets

| Sr. No. | Ingredients         | Chick mash (0-8 weeks) | Grower mash (9-19 weeks) | Layer mash (20-35 weeks) |
|---------|---------------------|------------------------|--------------------------|--------------------------|
| 1.      | Maize               | 57.00                  | 48.00                    | 54.00                    |
| 2.      | Soybean meal        | 30.00                  | 18.00                    | 26.00                    |
| 3.      | De-oiled rice bran  | 11.00                  | 30.00                    | 10.00                    |
| 4.      | Dicalcium phosphate | 1.90                   | 1.60                     | 1.70                     |
| 5.      | Lime Stone          | 1.30                   | 2.00                     | 7.50                     |
| 6.      | DL- Methionine      | 0.10                   | 0.10                     | .010                     |
| 7.      | L- Lysine           | 0.20                   | 0.00                     | 0.00                     |
| 8.      | Common Salt         | 0.44                   | 0.30                     | 0.40                     |
| 9.      | Vitamin Premix      | 0.10                   | 0.10                     | 0.10                     |
| 10.     | Trace Mineral       | 0.15                   | 0.10                     | 0.10                     |

### Statistical analysis

Observations were summarized in tabular form for each individual group. The data were analyzed following standard procedure (Snedecor and Cochran, 1994).

## RESULTS AND DISCUSSION GROWTH AND PERFORMANCE PARAMETERS

### Weekly body weight (g/b)

Superliv supplemented birds showed non significantly high live body weight during entire experimental period as compared to control group (Table 3).

**Table 3** Effect of supplementation of Superliv on weekly body weight (g/b) of layer chicks

| Age (weeks) | Weekly body weight (g/b) |          |        |
|-------------|--------------------------|----------|--------|
|             | Control                  | Superliv | SEM    |
| 0           | 31.95                    | 32.15    | 0.286  |
| 1           | 62.55                    | 65.30    | 0.405  |
| 2           | 92.20                    | 95.80    | 0.422  |
| 3           | 131.25                   | 139.00   | 2.137  |
| 4           | 177.80                   | 204.75   | 3.516  |
| 5           | 248.05                   | 271.15   | 4.639  |
| 6           | 347.60                   | 361.35   | 5.668  |
| 7           | 423.50                   | 435.60   | 7.423  |
| 8           | 510.60                   | 520.15   | 6.989  |
| 9           | 613.10                   | 617.60   | 7.134  |
| 10          | 694.90                   | 711.85   | 7.482  |
| 11          | 752.65                   | 788.05   | 7.871  |
| 12          | 813.50                   | 843.35   | 7.808  |
| 13          | 874.40                   | 909.50   | 8.744  |
| 14          | 936.45                   | 971.95   | 16.616 |
| 15          | 1008.60                  | 1027.60  | 16.243 |
| 16          | 1063.75                  | 1075.75  | 9.823  |
| 17          | 1108.25                  | 1119.80  | 8.388  |
| 18          | 1147.45                  | 1159.00  | 8.539  |
| 19          | 1189.25                  | 1200.65  | 6.368  |

The results of the present study are well in confirmation with those reported by Sundermanna *et al* (1996) that supplementation of herbal products improve growth rate. Narahari (1995) also reported improvement in weight gains of chicks compared to control by adding liver tonic concentrate.

Means bearing different superscript within a row differ significantly, P<0.05.

### Biochemical Parameters

#### Total serum protein (g/dl) and albumin (g/dl)

At 8<sup>th</sup> week of age total protein and albumin value were non significantly high in Superliv supplemented group (4.45 and 1.70, respectively) as compared to control group (3.50 and 1.62, respectively) (Table 4). Similarly at 18<sup>th</sup> week of age the albumin values were non significantly high in Superliv supplemented group (2.12) as compared to control group (1.85) whereas total protein concentration was found to be significantly (P<0.05) high in Superliv supplemented group (4.05) as compared to control group (3.04) (Table 4). The increase in total serum protein and albumin concentration in Superliv supplemented group may be attributed to its ingredient herb viz *Andrographis paniculata*. Mathivanan *et al.* (2012) also observed significantly higher serum total protein and albumin after *Andrographis paniculata* supplementation.

#### Phosphorus (mg/dl) and calcium (mg/dl)

At both 8<sup>th</sup> and 18<sup>th</sup> week of age in Superliv supplemented group phosphorus concentration (5.94 and 6.06, respectively) and calcium concentration (8.13 and 9.87, respectively) were found to be non significantly high as compared to phosphorus concentration (5.34 and 5.39, respectively) and calcium concentration (7.42 and 8.66, respectively) in control group (Table 4).

#### SGPT (IU/L) and SGOT (IU/L)

Liver acts as the most important organ in the body's metabolism. The activities of SGOT and SGPT are the most commonly used biomarkers of liver damage (Sturtgill and Lambart, 1997). At both 8<sup>th</sup> and 18<sup>th</sup> week of age in Superliv supplemented group SGPT (32.46 and 44.94, respectively) and SGOT (28.20 and 54.73, respectively) values were found to be low as compared to SGPT (37.65 and 46.50, respectively) and SGOT (43.85 and 58.54, respectively) values in control group (Table 4). Low SGOT and SGPT values in Superliv supplemented group may be attributed to ingredient herb of Superliv viz. *Andrographis paniculata* and *Solanum nigrum* that is scientifically well proven to reduce SGPT and SGOT levels, increase liver ATPase activity; thus having protective effect on liver. Dwivedi *et al.* (1987), Trivedi and Rawal (1998) and Bhattacharyya *et al.* (2003) also reported a similar finding that *Andrographis paniculata* feeding significantly prevented the elevation of serum SGOT and SGPT.

**Table 4** Effect of supplementation of Superliv on serum biochemical parameters in growers at 8<sup>th</sup> and 18<sup>th</sup> week of age

| Serum parameters     | At 8 <sup>th</sup> week of age |                   |       | At 18 <sup>th</sup> week of age |                   |       |
|----------------------|--------------------------------|-------------------|-------|---------------------------------|-------------------|-------|
|                      | Control                        | Superliv          | SEM   | Control                         | Superliv          | SEM   |
| Total protein (g/dl) | 3.50                           | 4.45 <sup>a</sup> | 0.127 | 3.04 <sup>a</sup>               | 4.05 <sup>b</sup> | 0.130 |
| Albumin (g/dl)       | 1.62                           | 1.70              | 0.041 | 1.85                            | 2.12              | 0.052 |
| Phosphorus (mg/dl)   | 5.34                           | 5.94              | 0.169 | 5.39                            | 6.06              | 0.226 |
| Calcium (mg/dl)      | 7.42                           | 8.13              | 0.209 | 8.66                            | 9.87              | 0.314 |
| Glucose (mg/dl)      | 157.63                         | 184.04            | 6.297 | 145.62                          | 163.73            | 4.554 |
| SGPT (IU/l)          | 37.65                          | 32.46             | 1.343 | 46.50                           | 44.94             | 0.261 |
| SGOT (IU/l)          | 43.85                          | 28.20             | 2.205 | 58.54                           | 54.73             | 1.421 |

Means bearing different superscript within a row differ significantly, P<0.05.

**Egg production parameters Hen housed egg production (hhep)**

Laying chickens require a completely balanced diet to sustain maximum egg production over time. Liver is considered to be an integral part of female reproductive system because that is where the egg yolk lipid is formed. Hen housed egg production in Superliv supplemented group birds (75.02) was significantly high (P<0.05) than the birds in control group birds (70.80) (Table 5). This increased HHEP in Superliv supplemented group may be attributed to its ingredient herb viz *Solanum nigrum* which is known to have saponins, tannins, glycosides, terpenes and sterol which are well recognized to have hepatoprotective action (Tran *et al.*, 2001).

**Table 5** Effect of supplementation of Superliv on hen housed egg production (%) of layers.

| Age (weeks) | Weekly egg production (%) |                          |              |
|-------------|---------------------------|--------------------------|--------------|
|             | Control                   | Superliv                 | SEM          |
| 20          | 6.35                      | 8.73                     | 1.599        |
| 21          | 30.16                     | 31.75                    | 3.075        |
| 22          | 65.87                     | 75.40                    | 2.488        |
| 23          | 66.67                     | 75.40                    | 2.085        |
| 24          | 67.46                     | 75.40                    | 2.211        |
| 25          | 80.16                     | 82.54                    | 1.958        |
| 26          | 79.37                     | 84.13                    | 1.707        |
| 27          | 78.57                     | 83.33                    | 1.383        |
| 28          | 76.19                     | 82.54                    | 1.627        |
| 29          | 74.60                     | 82.54                    | 1.625        |
| 30          | 80.16                     | 83.33                    | 1.733        |
| 31          | 86.51                     | 87.30                    | 1.228        |
| 32          | 85.71                     | 92.06                    | 1.216        |
| 33          | 84.92                     | 84.92                    | 1.308        |
| 34          | 69.05                     | 70.63                    | 2.016        |
| 35          | 69.84                     | 77.78                    | 1.937        |
| 36          | 84.13                     | 84.92                    | 1.787        |
| 37          | 76.98                     | 78.57                    | 1.998        |
| 38          | 82.54                     | 84.13                    | 1.883        |
| <b>HHEP</b> | <b>70.80<sup>a</sup></b>  | <b>75.02<sup>b</sup></b> | <b>0.601</b> |

Means bearing different superscript within a row differ significantly, P<0.05.

**Feed efficiency per dozen eggs produced**

The GI tract microflora is a mixture of bacteria, fungi, and protozoa, but bacteria are the predominant microorganisms (Gabriel *et al.*, 2006). The sophisticated relationship that has evolved between the GI tract and gut microbiota allows for efficient utilization of dietary nutrients. Significantly better

(P<0.05) feed efficiency per dozen eggs produced was evident throughout the study in the group offered feed supplemented with Superliv (1.51) as compared to control group birds (1.65) (Table 6). Neupane *et al.* (2008) also reported that supplementation of basal feed herbal liver tonic, Superliv is beneficial for improving laying performance.

**Table 6** Effect of supplementation of Superliv on Feed efficiency per dozen eggs produced

| Age (weeks)        | Feed efficiency per dozen eggs produced |                         |              |
|--------------------|---|-------------------------|--------------|
|                    | Control                                 | Superliv                | SEM          |
| 21                 | 2.83                                    | 1.87                    | 0.260        |
| 22                 | 2.20                                    | 1.53                    | 0.107        |
| 23                 | 2.53 <sup>a</sup>                       | 1.49 <sup>b</sup>       | 0.113        |
| 24                 | 2.59                                    | 1.80                    | 0.164        |
| 25                 | 1.56                                    | 1.76                    | 0.080        |
| 26                 | 1.85                                    | 1.53                    | 0.085        |
| 27                 | 1.48                                    | 1.45                    | 0.027        |
| 28                 | 1.59                                    | 1.43                    | 0.037        |
| 29                 | 1.69                                    | 1.51                    | 0.049        |
| 30                 | 1.70                                    | 1.57                    | 0.056        |
| 31                 | 1.49                                    | 1.46                    | 0.023        |
| 32                 | 1.44                                    | 1.28                    | 0.024        |
| 33                 | 1.40                                    | 1.37                    | 0.024        |
| 34                 | 1.60                                    | 1.75                    | 0.089        |
| 35                 | 1.66                                    | 1.47                    | 0.083        |
| 36                 | 1.88                                    | 1.51                    | 0.107        |
| 37                 | 1.78                                    | 1.68                    | 0.113        |
| 38                 | 1.62                                    | 1.77                    | 0.089        |
| <b>20-38 weeks</b> | <b>1.65<sup>a</sup></b>                 | <b>1.51<sup>b</sup></b> | <b>0.014</b> |

Means bearing different superscript within a row differ significantly, P<0.05.

**CONCLUSION**

It may be concluded that supplementation of herbal liver tonic, Superliv used in this investigation elicited significant increase in egg production, improved feed efficiency per dozen egg production and overall performance without any harmful alteration in the biochemical parameters of commercial layer chickens.

**Acknowledgment**

The authors are thankful to Ayurved Limited, Baddi, India and Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola for providing the required facilities, guidance and support.

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**How to cite this article:**

Manwar S. Jet al., Efficacy of Supplementation of Herbal Liver Tonic on The Performance of Commercial Layersefficacy of Supplementation of Herbal Liver Tonic on The Performance of Commercial Layers. *Int J Recent Sci Res.* 7(1), pp. 8447-8450.

T.SSN 0976-3031



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