Studies on *Leptadenia reticulata;* Effect on the Egg Yield in Hens*

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ABSTRACT

Studies on *Leptadenia reticulata* and principles isolated therefrom for its effect, on egg production of culled laying hens of various age groups in different dose ranges have been reported. *Leptadenia reticulata* and the stigmasterol isolated therefrom produced significant increase in the egg production in culled hens.

INTRODUCTION

LEPTADEN tablet (Alarsin) containing *Leptadenia reticulata* and *Breynia patens* in equal amounts of 134 mg each, was reported to have a tendency to enhance the egg laying in culled hens (Natrajan 1968). The laying hens have a considerable economic importance. The layers are culled at about 50-week of production as the egg yield decline. At this stage any agent which would improve the egg yield will be welcomed; and hence the present work was taken up to screen the effects of *Leptadenia reticulata* and principles isolated therefrom on the egg yield in culled hens.

METHODS

Drug:

Leptadenia reticulata (*Lr*) plant was collected, from the college premises, dried in shade, mannually pulverised and stored.

Stigmasterol (SS) was isolated from *Lr* (by the short-cut-method set up by the author), typed, characterized and stored. The plant material was extracted in petrolium ether, and the extract was evaporated on water bath. The residue was treated with ethanol in small lots. The solid fraction was termed fraction A. Material picked up in alcohol was allowed to stand overnight, the separated bulky solid was termed fraction B. The supernatant solvent was concentrated to obtain a soft mass, which was termed fraction C. Fraction C was only positive to Liberman and Burchad test for sterols; as such fraction C (*FC*) contained non-saponifiable principles of *Lr*.

The crude *Lr* powder, in the doses of 100, 200, 300 and 900 mg/bird/day and SS and FC isolated from *Lr* equivalent to minimal effective dose of *Lr* were used in the following experiments.

Poultry Feed:

All the birds were maintained on standard Layer Mash prepared by Cen-

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Experiment 1

Administration of Lr to Arbour Acre Brown (AAB) hens.

Ninty AAB hens about 50-week old were randomised in three equal groups. Each group was divided into 3 replicates of 10 birds each. Each replicate was maintained in a seperate pen.

Lr was administered in mash as mentioned earlier. *Lr* was evenly mixed at the rate of 100 mg/bird/day for group 1 and 300 mg/bird/day for group 2. The Group 3 served as control and received plain Layer Mash. The feed hoppers were filled with 10 kg of feed and left overs were weighed every 7th day in morning, and again refilled. The treatments were given for 30 days and egg yield was recorded at 5.00 p.m. daily during the treatment period and post treatment period of 15 days.

Experiment 2

Administration of Lr to White Leghorn (WLH) hens.

Two hundred and eightyfour WLH Kembre strain hens about 68-week old were randomly alloted to two groups of 142 hens in each. One group served as control and the other was given *Lr* in the dose of 300 mg/bird/day.

The calculated dose was evenly mixed in 200 kg of Layer Mash every time and the feed hoppers were filled. The treatment was given for 30 days and the left overs were weighed on the last day and the actual dose consumed was calculated, controls received plain Layer Mash. Egg yield of the groups were recorded at 5.00 p.m. daily during the treatment period of 30 days and the post treatment period of 15 days.

Experiment 3

Administration of stigmasterol (SS) and Fraction C (FC) isolated from Lr to WLH hens.

Fortyeight WLH Kembere strain hens about 68-week old were randomised in three groups of 16 birds each. Each group was subdivided into replicates of four and each replicate was housed in separate cage. Standard Layer Mash was fed to all the birds during the experiment.

In the previous experiment of the 300 mg/bird/day of *Lr* mixed in the feed, the daily consumption was 210 mg/bird/day and since this dose produced an increase in egg yield, the doses of SS and FC equivalent to those contained in 210 mg of *Lr* was calculated, on the bases of 0.04 per cent contents of SS in *Lr*. The dose of SS was 0.084 mg/bird/day and that of FC were dissolved in pea-nut oil.

Gelatin capsules were filled with 0.3 ml of relevant doses of treatments in which relevant doses of SS and FC were dissolved. One set of capsules contained only 0.3 ml of plain pea-nut oil for the treatment of controls. Each bird received the treatment capsule orally once daily at fixed time for 15 days. The eggs were collected daily at 5.00 p.m. The daily egg yield was recorded for 10 days in the pre-treatment period, for 15 days

TABLE—I

Effects of *Leptadenia reticulata* (crude), and Stigmasterol and Fraction C isolated therefrom on egg yield in hens.

Observation	*Expt. 1 (30)*			*Expt. 2 (142)*		*Expt. 3 (16)*			*Expt. 4 (16)*		
	C	*J1*	*J2*	*C*	*J3*	*C*	*SS*	*FC*	*C*	*J4*	*J5*
Egg yield in P1	—	—	—	—	—	48	51*	60*	97	85*	88*
Variation in Egg yield in P1Vs.C	—	—	—	—	—	—	+3x	+12x	—	-12x	-9x
% Variation in Egg yield in P1Vs. C	—	—	—	—	—	—	+6.2	+25	—	-12.3	-9.2
Mean egg yield/day in P1	—	—	—	—	—	3.0	3.19	3.75	6.4	5.6	5.8
Egg yield in P2	259	221	298	1818	1887	79	108	83	88	69	104
Variation in Egg yield in P2 Vs. C	—	-38	+39x	—	+69x	—	+29*	+6	—	-19	+16't'
% Variation in Egg yield in P2 Vs. C	—	41.7	+15.0	—	+3.79	—	+39.1	+2.2	—	-21.5	+18.1
Mean egg yield/day in P2	8.63	7.36	9.93	60.03	62.9	5.29	7.06	5.73	5.8	4.6	6.9
Egg yield in P3	*95*	*109*	*134*	*771*	*857*	*83*	*97*	*85*	*95*	*61*	*100*
Variation in egg yield in P3Vs. C	—	+14	+39x	—	+86x	—	+9x	-3	—	-34	+5x
% Variation in egg yield in P3 Vs. C	—	+14.7	+41.0	—	+11.1	—	+10.2	-3.3	—	-35.7	+5.2
Mean egg yield/day in P3	6.33	7.26	8.93	51.4	57.1	5.8	6.4	5.6	6.3	4.0	6.2

Lr. Leptadenia reticulata. Figures in parenthesis indicate the number of hens per group, in that experiment.
J1—Treatment for 30 days @ dose of 66 mg/bird/day of *Lr.*
J2—Treatment for 30 days @ dose of 211 mg/bird/day of *Lr.*
J3—Treatment for 30 days @ dose of 216 mg/bird/day of *Lr.*
J4—Treatment for 15 days @ dose of 153 mg/bird/day of *Lr.*
J5—Treatment for 15 days @ dose of 992 mg/bird/day of *Lr.*
SS— Treatment for 15 days @ dose of 0.084 mg/bird/day of stigmasterol isolated from *Lr.*
FC— Treatment for 15 days @ dose of 3 mg/bird/day of Fraction C isolated from *Lr.*
*— Significant where—$P < 0.05$, 't' test where t value is 2.35 & $P < 0.05$.
X— Not significant.

during the treatment period and for 15 days of the post—treatment period.

Experiment 4

Administration of Lr to WLH laying hens.

Fortyeight hens on whom the effect of SS and FC (Expt. 3) was studied were employed 15 days after the stoppage of the treatment. The birds were now 72-week old. The treatments were given 30 days after the stoppage of previous treatment. The control group was given 900 mg/bird/day of *Lr*, the group that had received FC was given 200 mg/bird/day of *Lr*, and the group that received SS served as control.

Lr, was given in the same manner as discussed in experiments 1 and 2; and the actual dose consumed was calculated at the close of the experiment, after weighing the left overs. The daily egg yield was recorded at 5.00 p.m. during the treatment period for 15 days and during the post treatment period for 15 days.

RESULTS

The results of the effects on the egg yield in all the four experiments are given in Table 1. The results were analysed by applying analysis of variance. To begin with each experiment it was seen that the egg yields between the groups were not varying statistically in pre-treatment period.

Experiment 1

Of the 100 and 300 mg/bird/day doses of *Lr* employed, the actual doses consumed were 66 mg and 211 mg/bird/day of *Lr* (J2) had 15.05 per cent increase egg yield in the treatment period. The variations were highly significant but at critical difference level the variations were not significant. With the same dose the increase in the post treatment period was 41.05 per cent which was not significant.

Experiment 2

Of 300 mg/bird/day of *Lr* (J3) mixed with the feed, the actual dose consumed was 216 mg/bird/day. The birds in this experiment were 68-week old, while in experiment 1 they were 50-week old, as such the egg laying capacity decreased to some extent comparatively. The trend towards increase in the egg yield was discerend both during treatment period (3.79%) and the post treatment period (41.0%). The variations were not significant.

Experiment 3

The doses of 0.084 mg/bird/day of SS and 3 mg/bird/day of FC were consumed as the treatments were given individually by capsules orally once daily. The egg yield of all the groups was not varying statistically in pre and post treatment period, SS produced highly significant increase of 39.1 per cent in the egg yield. The expected critical difference at 5 per cent is 1.49 and the difference between means under C and SS was 1.8.

Experiment 4

Of the 200 mg/bird/day and 900 mg/bird/day doses consumed were 153 mg and 992 mg/bird/day, respectively. The egg yield variations did not differ significantly in pre and post treatment period. However 992 mg/bird/day of *Lr*

(J5) produced a highly significant increase of 18.1 per cent in egg yield in the treatment period; however the critical difference of the means under treatments C and J5 was 1.3 and the observed difference was 1.04 which was marginally bellow the significant level. On comparing the results of C and J5 with 't' test variation was found to be significant. The birds were 72-week old and were in steep phase of decline in egg yield.

DISCUSSION

The laying hens have a considerable economic importance and on the poultry farms the laying hens are culled after about 50-week of production and onwards. Such birds may be uneconomical for maintenance on the poultry farm and are sold for the table purpose. If a ready market is not available they would have to be maintained rather uneconomically till their disposal. At this stage any agent which can improve the egg yield will be welcomed.

Of 66, 153, 211, 216, 992 mg/bird/day of *Lr adiministered* for 15 to 30 days to laying hens of different age groups the dose of 211 mg/bird/day of *Lr* for 30 days in 50-week, age group produced 15 per cent increase (significant) in egg yield. As the age of the birds advanced a similar dose level of 216 mg/bird/day of *Lr* for 30 days produced only 3.7 per cent increase (not significant) in the egg yield. However, 992 mg/bird/day of *Lr* given to 72-week old birds produced 18 per cent increase (significant) in the egg yield. In all these experiments the observation for 15 days in post-treatment period were also made and a trend of sustained effect was also noticed, but was not significant.

Of 0.084 mg/bird/day of SS and 3 mg/bird/day of FC isolated from *Lr*, given for 15 days, SS treatment produced significant increase of 39 per cent in the egg yield. It is thus plausible to suggest that the stigmasterel component of the plant alone may be responsible for the increase in the egg yield. The demonstration of the effectiveness of *Letpadenia reticulata* (crude) and stigmasterol isolated therefrom, in increasing the egg yield in culled hens, seems to be the first report of its kind. The question, therefore arises: does stigmasterol content of *Leptadenia reticulata* play a role in stimulating egg production in culled hens? It would be for further experimentation to answer this question and characterise the nature of such action. Several other doses may also be required to be screened to establish optimal dosage at an average age of culling.

REFERENCE

Natrajan, T.R. 1968. Leptaden in poultry and effect in culled birds. Paper presented at the 18th Indian Veterinary Conference, Hydrabad. (AP).