INFLUENCE OF SPROUTED GREEN GRAM, SELENIUM AND VITAMIN-E AND THEIR COMBINATIONS ON REPRODUCTIVE PERFORMANCE OF WHITE LEGHORN MALES

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ABSTRACT

An experiment was conducted to study the influence of sprouted green gram, selenium and vitamin E and their combinations on reproductive performance like semen quality and fertility for a period of five weeks with forty two adult White Leghorn cocks and seventy White Leghorn hens which were divided into seven treatment groups containing six cocks and ten hens for each treatment. The treatment groups consisted of control ($T_1$), sprouted grains 50g/kg ($T_2$), selenium 0.5mg/kg ($T_3$), vitamin E 500mg/kg ($T_4$), sprouted grains 50g/kg + selenium 0.5mg/kg ($T_5$), sprouted grains 50g/kg + vitamin E 500mg/kg ($T_6$) and sprouted grains 50g/kg + selenium 0.5mg/kg + vitamin E 500mg/kg ($T_7$). Significant ($P<0.05$) difference was observed between treatment groups. The overall sperm motility of treatment and control groups did not differ significantly. The sperm concentration was significantly ($P<0.05$) higher in all treatment groups compared to control. Inclusion of sprouted green gram, selenium and vitamin E had significantly reduced the overall dead ($P<0.01$) and abnormal ($P<0.05$) sperms when compared to the control group.

Key words: Sprouted green gram, Selenium, Vitamin E, White Leghorn males

INTRODUCTION

Poultry is one of the fastest growing segments of the agricultural sector in India. India is the third largest egg producing country (Watt Executive Guide, 2010) in the world. Commercial layers 310 to 320 eggs in a year. The quality of chicks depends on both male and female parents.

Many efforts have been put to improve the fertility rate by monitoring the diet of the female breeder chickens, but very often the quality of the semen is neglected which is also equally important for higher fertility rate. An increase in semen quality will reduce the cost of production of day-old chicks. Semen quality can be improved by manipulating nutrient requirements in male diet, especially with vitamins and minerals (Gallo et al., 2003).
MATERIALS AND METHODS

Forty two adult White Leghorn cocks and seventy White Leghorn females at the age of thirty weeks were purchased and divided into seven treatment groups containing six males and ten female birds for each treatment. The treatment groups consisted of control (T_1), sprouted grains 50g/kg (T_2), selenium 0.5mg/kg (T_3), vitamin E 500mg/kg (T_4), sprouted grains 50g/kg + selenium 0.5mg/kg (T_5), sprouted grains 50g/kg + vitamin E 500mg/kg (T_6) and sprouted grains 50g/kg + selenium 0.5mg/kg + vitamin E 500mg/kg (T_7). All the birds were maintained in individual cages. Different treatment (T_1 to T_7) feeds were fed ad-libitum for a five weeks period. Uniform management practices were followed for all treatment groups. The experimental diet was formulated according to the standards prescribed in Bureau of Indian Standards (BIS, 1992).

The diets were subjected to proximate analysis as per AOAC, (1995). Data on body weight, feed consumption, semen quality and fertility were recorded every week and mortality was recorded at occurrence. Data on the cost of feed ingredients were also collected.

**Semen collection** : Male birds were caged individually and handled (trained) before start of experiment in order to stimulate erectile and ejaculatory responses using abdominal massage method. The feathers around the cloaca of each male were clipped in order to minimize contamination of semen during collection.

The birds were maintained on the experimental diets for seven weeks and semen quality was studied from third to seventh week. Each adult male was gently picked up by one person holding the legs and another collecting the semen discharge after gentle massaging the lumbar region of the bird 3-4 times with the hand. Special care was taken to minimize contamination by faeces and watery fluids from the cloacal region.

**Semen characteristics** : Immediately after semen collection, the quality characteristics like semen volume, sperm motility, sperm concentration, live and dead sperms, and abnormal sperms were recorded. Pooled semen from each treatment groups was inseminated into females to find out the fertility percentage.

**Artificial insemination** : Semen was collected from six males of same treatment group and pooled. Immediately after semen collection it was inseminated into laying hens. The insemination was performed weekly twice for five weeks period.

**Fertility percentage** : Eggs were collected after third day of first insemination from each treatment group, labelled and stored in the egg holding room at the hatchery. After fumigation, the eggs were set and incubated for four days in the hatchery and incubated eggs were break opened to confirm fertility which was identified with the presence of blood ring (Biswas et al., 2009). Fertility was determined as the ratio of number of fertile eggs to the number of total eggs set.

**Statistical analysis** : The data collected on various parameters were subjected to statistical analysis as per the methods suggested by Snedecor and Cochran (1989). Angular transformation was applied to percentage data wherever needed.

RESULTS AND DISCUSSION

**Body weight of cocks** : Age wise body weight analysis revealed no significant difference in body weights of White Leghorn cocks.

throughout the experimental period due to dietary inclusion of sprouted green gram, selenium vitamin E and their combinations. This was well supported by Lagana et al. (2007), Ozkan et al. (2007), Niu et al. (2009), Arscott and parker (2011).

However, overall body weight revealed significant (P<0.05) increase in all treatment groups except T1 and T4. This was in agreement with the findings of Mehta et al. (2004), Lin et al. (2005), Maysa et al. (2009) and Vakili et al. (2010) who stated that inclusion of sprouted green gram, selenium and vitamin E in the diet of chicken significantly increased body weight.

In T2, T3, T5, T6 and T7, the body weight was significantly (P<0.05) higher when compared to control T1 and T4 at the end of the experimental period. This clearly indicates that the supplementation of sprouted green gram, selenium and vitamin E supports the growth rate of White Leghorn cocks.

**Semen volume**: Overall semen volume of White Leghorn cocks revealed significant (P<0.05) difference with lowest semen volume in T4. This was contrary to the findings of Maysa et al. (2009) who reported that semen volume was significantly higher in treatment groups when compared to control group.

**Sperm motility**: Inclusion of sprouted green gram, selenium and vitamin E in White Leghorn cocks did not have any influence on motility of spermatozoa. It was consistent with the results of Danikowski et al. (2002) and Biswaset al. (2009). But was contrary to the findings of Gallo et al. (2003), Cerolini et al. (2005), Lin et al. (2005), Ebeid, (2009) and Maysa et al. (2009) who reported that sperm motility was significantly improved when the cocks fed with sprouted green gram, selenium and vitamin E.

**Sperm concentration**: Mean sperm concentration revealed no significant difference between treatment groups. Similar finding was observed by Biswaset al. (2009) who stated that supplementation of sprouted green gram, selenium and vitamin E did not affect sperm concentration.

**Live and dead sperms**: The per cent dead sperm in control group was significantly (P<0.01) higher than other treatment groups. This was in agreement with the findings of Surai et al. (1997), Gallo et al. (2003), Lin et al. (2005), Biswaset al. (2009), Ebeid (2009) and Maysa et al. (2009).

**Abnormality of sperms**: Abnormality of sperm was significantly (P<0.05) higher in control group than sprouted green gram, selenium and vitamin E fed groups. This may be due to protection of antioxidants vitamin E and selenium in treatment groups. This was consistent with the findings of Surai et al. (1997), Danikowskiet al. (2002), Edens and Sefton (2009) and Biswas et al. (2009) who stated that the supplementation of sprouted green gram, selenium and vitamin E significantly reduced sperm abnormality.

**Fertility percentage**: The sperm fertility percentage of White Leghorn cocks did not differ significantly between treatment and control groups due to the inclusion of sprouted green gram, selenium and vitamin E. Long and Kramer (2003) also observed similar trend. This was contrary to the findings of Surai et al. (1997), Surai et al. (2001), Gallo et al. (2003), Lin et al. (2005), Hester AlettaBekker (2008), Biswas et al. (2009), Arscott and Parker (2011) who reported per cent fertility was significantly higher in groups fed diet with sprouted green gram, selenium and vitamin E when compared to control group.
### Table 1
Reproduction performance of White Leghorn cocks fed with sprouted green gram, vitamin E, selenium and their combinations for five weeks period

<table>
<thead>
<tr>
<th>Period after start of experiment</th>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$T_1$</td>
</tr>
<tr>
<td>Body weight (g)</td>
<td>1367.47$^D$ ±12.76</td>
</tr>
<tr>
<td>Semen volume (ml)*</td>
<td>0.49$^{a-b}$ ±0.02</td>
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<tr>
<td>Sperm motility (%)$^{NS}$</td>
<td>84.33 ±0.41</td>
</tr>
<tr>
<td>Sperm concentration (millions x 10$^6$)$^{NS}$</td>
<td>3776.00 ±169.75</td>
</tr>
<tr>
<td>Dead sperms (%)$^{**}$</td>
<td>2.219$^b$ ±0.480</td>
</tr>
<tr>
<td>Abnormal sperms (%)$^{*}$</td>
<td>4.983$^b$ ±0.282</td>
</tr>
<tr>
<td>Fertility (%)$^{NS}$</td>
<td>97.78 ±1.36</td>
</tr>
</tbody>
</table>

$^A-D$ Means having common superscript within a row do not differ significantly (P<0.01).

$^a-c$ Means having common superscript within a row do not differ significantly (P<0.05).

NS – Not significant

### REFERENCES


Ozkan, S., Malayoglu, H. B., Yalcin, S., Karadas, F., Kocturk, S., Cabuk,


