Haematological Studies during the Use of Herbal Polysaccharides in Commercial Poultry

MUHAMMAD ZAFAR¹, AFTAB AHMAD ANJUM², MUHAMMAD FIAZ QAMAR³, MUHAMMAD IMRAN NAJEEB⁴ AND AZHAR MAQBOOL⁵

¹,²,⁴,⁵ Faculty of Veterinary Science, UVAS, Lahore
³Department of Zoology, Govt. College University, Lahore

ABSTRACT

Haematological studies help the poultry consultants to understand the pathological conditions associated with different infections in different age groups. In the current study, comparison of different haematological values i.e.; Hemoglobin Concentration (Hb), Packed Cell Volume (PCV), Total Leukocyte Count (TLC), Differential Leukocytes Counts (DLC) was made between the birds treated with Livol (a Herbal Polysaccharides) and untreated birds. Treatment-related changes in feed intake, general body condition and anaemia were also observed amongst the various groups. The addition of Livol (Herbal Polysaccharides) to feed diminished the adverse effects of different vaccines and antibody titres against Newcastle disease. There was comparatively higher weight gain in Livol-treated birds. These findings suggested that Livol can effectively correct the circulatory and immune system in broiler chicks.

KEY WORDS: Haematological studies, Herbal Polysaccharides, Commercial Poultry.

INTRODUCTION

The modulation of immune responses of animals may be either immunostimulatory or immunosuppressive. Immunostimulation of a bird may lead to increase antibody production, enhance graft rejection versus host reaction, increase phagacytosis by macrophages and/or inhibit tumor growth (Spallolhz et al., 1973). Intermediate vaccines were used successfully with hot vaccines being used on heavily contaminated sites. The rationale behind this successful approach was that the hotter vaccines would be able to produce higher levels of maternal antibodies. Moreover, vaccination protocols have to be strictly adhered to so that vaccination is effective without causing adverse effects on growth or immune system function (Skinner, 2000). The half-life of maternal antibodies to IBDV is between 3 and 5 days (Skeeles et al., 1979). Such maternal antibodies protect the chick from early immunosuppressive infections, protecting them for 1 to 3 weeks, but by boosting the immunity in breeder flocks with oil-adjuvant vaccines, passive immunity may be extended to 4 or 5 weeks (Lutticken, 1981). Hence, the present study was carried out to evaluate the effect of panchagavya and andrographis paniculata on haematological, serum biochemical parameters and immune status of broilers.

Stress is responsible for suboptimal growth and production performances in commercial poultry. When a flock is exposed to any atmospheric upset, certain body changes are brought about that result in a situation where the body of the birds is unable to perform their normal functions, Qamar et al., (2010). The
objectives of the present study were to evaluate the effect of Herbal Polysaccharides (Livol) on the haematological parameters which determine the health status and degree of tissue damage caused by the disease and their correction by the use of Livol.

MATERIALS AND METHODS

Experimental Broiler Chicks
A total of 150 one day-old-chicks were reared in the experimental poultry shed for 42 days, Department of Microbiology University of Veterinary Sciences Lahore, under optimal managemental conditions. The experimental birds were randomly divided into three equal groups; 50 birds each (A, B & C) and were vaccinated against Newcastle Disease Vaccine (NDV) Lasota on days 6 by eye droppings and day 21 (through drinking water).

Group (A): They were kept as untreated control and were further subdivided into two groups having 25 birds each i.e. Group A1: - Not challenged.
Group A2: - Challenged with virulent ND virus $10^4$ EID$_{50}$, 0.1 ml/chick.

Group (B): Birds in this group were fed with herbal Polysaccharides with the dose rate of 1ml/litter in drinking water throughout the experiment till day 42$^{nd}$. This group was further subdivided into two groups having 25 birds each i.e. Group B1: - Not challenged. Group B2: - Challenged against Virulent ND virus $10^4$ EID$_{50}$, 0.1 ml/chick.

Group (C): Birds in this group were fed with 2ml/litter concentrations of herbal Polysaccharides in drinking water throughout the experiment. This group was further subdivided into two groups having 25 birds each i.e. Group C1: - Not challenged. Group C2: - Challenged against Virulent ND virus$10^4$ EID$_{50}$, 0.1 ml/chick.

Blood/Serum Collection
Ten birds were randomly selected for blood collection from each group. Blood sample were collected from each group on day 1, 7, 14, 21, 28, 35 and 42 of age. The blood was collected from each bird separately and was allowed to clot at room temperature in order to separate the serum. The serum was then piped out and stored at -20c until further processing. All the blood samples were collected from brachial vein and were processed for haematology, (Benjamin, 1981).

Haematology
Blood samples were analyzed for Hemoglobin concentration (Hb), Packed Cell Volume (PCV), Total Leukocyte Count (TLC), Differential Leukocyte Count (DLC) using the methods followed by Benjamin, (1981) & Burg (1998).

Statistical Analysis
Data was analyzed by using one way analysis of variance (ANOVA) as described by Zar (1974) to show significant difference (p<0.05).
RESULTS AND DISCUSSION

Hematology
Blood samples with anticoagulant (EDTA) from all birds were collected from the brachial vein at the end of experiment. Blood samples were analyzed for the following hematological parameters, using the method followed by Benjamin, (1981). Hemoglobin Concentration, Packed Cell Volume (PCV), Total Leukocyte Count (TLC), Differential Leukocytes Counts (DLC).

Hemoglobin (Hb)
Means Hb level is presented in (figure 4). Significant (P<0.05) differences were observed in the mean Hb levels between groups treated with Livol and not treated with Livol.

The findings of the present research study are in agreement with the findings of Esonu et al., (2006), who observed significant increase in Hb level while, feeding herbal plant (Neem) to the laying hens. Our results are also in agreement with the results of Sham & Patwardhan (2003), who reported significant effect on hemoglobin and red cell count, while feeding Withania somnifera to animals.

PCV
Means PCV level is presented in (figure 4). Significant (P<0.05) differences were observed in the mean PCV levels among the treatments and non-significant (P>0.05) between the vaccinated and non-vaccinated and also among the interaction of vaccinated and non-vaccinated with groups. The findings of the present research study are parallel to the findings of Esonu et al., (2006), who observed that significant increase in PCV level while feeding herbal plant (Neem) to the laying hen. Our findings justified the result of Singh et al., (2001), who reported that Withania somnifera works through macrophage chemotaxis.

TLC
Means TLC level is presented in (figure 4). Significant (P<0.05) difference was observed in the mean TLC level among the treatments and non-significant (P>0.05) difference between the vaccinated and non-vaccinated and also among the interaction of vaccinated and non-vaccinated with groups. The findings of the present research study are parallel to the findings of Esonu et al., (2006), who observed significant increase in TLC level while feeding herbal plant (Neem) to the laying Hen. Our findings justified the result of Singh et al., (2001), who reported that Withania somnifera works through macrophage chemotaxis.

PCV, WBCs & Hemoglobin (Hb)
The groups which was offered Livol (Herbal Polysaccharide) in the feed showed higher PCV, WBC & Hemoglobin percentage compared with the rest of the groups (p<0.05). Significant (P<0.05) difference was observed on the mean PCV, WBCs & HB levels among the treatments and non-significant between the vaccinated and non-vaccinated and also among the interaction of vaccinated and non-vaccinated with groups. Additionally, this percentage was consistently present throughout the monitoring period in this group. Interestingly, PCV, WBC & Hemoglobin percentage of all other groups were almost the same. The two
binders did not differ in feed consumption as is indicated in figure 4. These results indicated that Livol (Herbal Polysaccharide) have affected the birds and resulted in higher PCV, WBCs & Hb levels. Moreover, the use of Livol (Herbal Polysaccharide) improves the immunosuppressive effects of vaccines in groups, Zafar et al., (2011) (Fig., 1).

![PACKEK CELL VOLUME](image1)

**Fig., 1:** Comparison of Means PCV, WBCs & Haemoglobin Production

A1 & A2= Vaccinated kept without Herbal Polysaccharides (control group).
B1 & B2= Vaccinated & fed with 1ml/Liter Herbal Polysaccharides.
C1 & C2= Vaccinated & fed with 2ml/Liter Herbal Polysaccharides.

![EFFECT OF HP ON WBCs](image2)

**Fig., 2:** Comparison of Means WBCs

A1 & A2= Vaccinated kept without Herbal Polysaccharides (control group).
B1 & B2= Vaccinated & fed with 1ml/Liter Herbal Polysaccharides.
C1 & C2= Vaccinated & fed with 2ml/Liter Herbal Polysaccharides.
**Fig., 3:** Comparison of Means Haemoglobin Production

A1 = Vaccinated kept without Herbal Polysaccharides (control group).
A2 = Vaccinated kept without Herbal Polysaccharides (control group).
B1 = Vaccinated & fed with 1ml/Liter Herbal Polysaccharides.
B2 = Vaccinated & fed with 1ml/Liter Herbal Polysaccharides.
C1 = Vaccinated & fed with 2ml/Liter Herbal Polysaccharides.
C2 = Vaccinated & fed with 2ml/Liter Herbal Polysaccharides

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