

Effect of *Asparagus racemosus*, *Sida cordifolia* and Levamisole on immunological parameters in experimentally induced immunosuppressed broilers.

Tekade S. H., S. G. Mode and S. P. Waghmare

Department of Veterinary Medicine,
Post Graduate Institute of Veterinary and Animal Sciences, Akola

Abstract

In birds treated with Cyclophosphamide @ 150 mg/kg body weight I/V on 21st day of age produced marked immunosuppression. Administration of *A. racemosus*, *Sida cordifolia* in combination with Levamisole was the more effective in producing immunomodulatory effect in immunosuppressed birds.

Keywords: Broiler, Immunosuppression, *Asparagus racemosus*, *Sida cordifolia*, Levamisole

Introduction

In recent years frequent outbreaks of poultry diseases have caused significant economic losses, resulting in set back to poultry production. There are several causes including poor quality of inputs such as stocks, feeds and drugs, other contributory factors viz., management lapses and medication. The end result is the disturbance in birds natural immunity. There are certain medicinal plants, which have immunomodulatory effect. Indigenous plant like *Asparagus racemosus* playing a role of immunomodulation (Seena *et al.*, 1993) as well as medicinal plant like *Sida cordifolia* have immune enhancing properties (Dixit *et al.*, 1978), similarly Levamisole is a well known immunomodulatory drug which enhance cellular and humoral immune response. However, information about effect of plant likes *Asparagus racemosus*, *Sida cordifolia* and Levamisole in relation to immunological change in immunosuppressed birds is not adequately available. Therefore, present study was undertaken.

Materials and Methods

All birds were randomly divided into seven groups, each group consisting 20 birds. Birds from all group except birds of first group untreated normal healthy control (T1) were immunosuppressed by administering Cyclophosphamide @ 150 mg/kg body weight intravenously on 21st day of age. First group (T1) was untreated normal healthy control. Second group (T2) was kept as immunosuppressed untreated control. Group third (T3) was treated with Levamisole 2.5 mg/kg body weight orally in feed daily for two weeks starting from 28th day of age. All birds of group T4 and T5 were treated orally with *A.*

racemosus and *S. cordifolia* alone, respectively @ 2 gm/kg in feed daily for two weeks starting at 28th day of age. Combination of *A. racemosus*+*S. cordifolia* was given in T6 group while *A. racemosus* +*S. cordifolia* and Levamisole to birds to T7 group were given each plant powder @ 2 gm/kg in feed and Levamisole 2.5 mg/kg body weight orally in feed daily for two weeks starting from 28th day of age. Birds of all groups were subjected to immunological study one day before immunosuppression at 21st day of age and after treatment at 28th and 42nd day of age. Approximately 2 ml blood was collected in sterile glass vial. Serum was separated and stored under refrigeration at 20°C until used for estimation of HI (Haemagglutination Inhibition test) for measurement of humoral immune response (Allan, 1974) and for measurement of cellular immune response evaluated skin hypersensitivity test as per method of Valsala *et al.* (1981). Statistical analysis was done as per the method of Snedecor and Cochran (1994).

Results and Discussion

As per Table-1, the birds of all experimental group including normal were vaccinated by lasota vaccine on 5th day of their age and the immune responses at 21st day of age revealed HI titre in the range of 16±3.57 to 65.33±21.10 with overall average 28.90±6.87, these changes indicated that immune system of birds was estimated by given vaccine, resulting into antibody production. Pretreatment levels of HI titre was significantly reduced after one week and again significantly increased after two weeks, during post treatment periods in normal birds. While in untreated group

Table 1. Mean values of HI titre in seven group of birds before treatment, after immunosuppression and after treatment.

Treatment	Age			Pooled average
	21st day	28th day	42nd day	
T1	65.33bB ± 8.95	37.33aB ± 8.92	53.33bB ± 17.36	51.99BCDE ± 8.11
T2	32.00bA ± 10.73	10.00aA ± 2.00	11.33aA ± 2.17	17.77A ± 7.12
T3	16.00aA ± 3.57	12.00aA ± 1.78	144.00bD ± 38.53	57.33b ± 43.34
T4	16.00aA ± 3.57	12.00aA ± 1.78	64.00bBC ± 14.31	30.66AB ± 16.7
T5	17.33aA ± 3.21	14.66aA ± 3.81	72.00bBC ± 19.26	34.66ABCD ± 18.68
T6	18.66aA ± 4.46	10.66aA ± 1.68	64.00bBC ± 14.31	31.10ABC ± 16.6
T7	37.33bA ± 6.87	16.00aA ± 3.57	213.33cE ± 26.98	88.77F ± 62.41
Pooled average	28.90a ± 6.87	16.09a ± 3.62	88.85D ± 25.5	

CD for treatment = 22.41
 CD for period = 14.67

Common superscripts within a corresponding rows and column indicated non-significant difference

post immunosuppressed and post treatment level of HI titre were significantly lower than the pretreatment level, as well as immunosuppressed values of all treated group except T7 were apparently lower than their respective pretreatment values. However, T7 group immunosuppressed value was significantly lower than its pretreatment value which indicated immunosuppression by Cyclophosphamide (Carrier *et al.*, 1979). Post treatment values of all treated groups after 42nd days of age were significantly higher than their respective pretreatment and post-immuno suppressed values and also higher than corresponding 42nd days post treatment normal group. These changes indicated higher antibody production in treated groups than normal due to more stimuli to the immune system by given treatments. However, T3 and T7 groups of birds have shown significant post treatment HI titre than the post treatment titre of normal group, these changes indicated strong stimuli to immune system due to T3 and T7 treatment which contain Levamisole. Srinivasa *et al.* (1996) reported approximately 3-fold increased in antibody titre in Levamisole treated chicks.

The mean value of prechallenge skin thickness of normal group was higher than the corresponding mean value of untreated group, T6 and T7 and apparently higher than T3, T4 and T5 groups after Cyclophosphamide treatment. These changes indicated immunosuppression in all experimental groups. These findings are in agreement with Prasad (1978). Who demonstrated histopathological

changes in Cyclophosphamide treated chicken. The mean values of post challenge skin thickness of all treated groups were significantly higher than the mean values of T1 and T3 groups were non significant, but 48 hours post challenging value of T3 was significantly higher the corresponding value of normal T1 group, indicating immunostimulatory effect of Levamisole, Lewis and Picut, (1989) also reported cell mediated immune response in Levamisole injected group might be due to increased production of T-cell precursor and passive influences on the production of cytokines.

References

- Allan, W. H. and R. E. Gough (1974): *Vet. Res.*, **95**: 120-125.
- Corrier, D. E., L. G. Adams and K. R. Pierce (1979): *Am J. Vet. Res.*, **40**(20): 1683-1689.
- Dixit, S. P., P. V. Tiwari and R. M. Gupta (1979): *J. Res. Indian Med. Yoga Homoeop.*, **13**(3): 50-66. (Abst. Med. and Aromatic Plants, **1**(5): 1979).
- Lewis, R. M. and C. A. Picut (1989): *Veterinary clinical immunology*, Lee and Febiger, Philadelphia, London.
- Seena, K., G. Kuttan and R. Kuttan (1993): *Amala Research Bulletin*, **13**(8): 41-45. (Abst. Med. and Aromatic Plants, **16**(2):170).
- Snedecor, G. W. and W. G. Cochran (1994): *Statistical method* 8th Edition, IOWA State University Press, AMES, IOW, U.S.A.
- Srinivas Rao, T. V., T. N. Jaiswal, S. C. Mishra (1996): *Indian J. Ani. Sci.*, **66**(11): 1095-1099.
- Valsala, K. V., A. Ranjan and M. Krishnan Nair (1981): *Kerala J. Vet. Sci.*, **12**(2): 332-336.

* * * * *