

Evaluation of Immunodulatory effect of Stresroak Premix in Broiler Chick

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Abstract

The present study was aimed to evaluate the immunomodulatory efficacy of polyherbal formulation Stresroak along with effect on performance in broiler chicken. Four hundred and fifty healthy days old chicks were randomly divided into three groups (each group consisting of 150 chicks). Group A served as a negative control while group B served as positive control supplemented with levamisole, a known immunomodulator @ 15 mg/kg body weight through water for four consecutive days from third day onwards. Group C birds supplemented with Stresroak were administered @ 1 kg /tone of feed for consecutively for 11 days i.e. 5 days before and 5 days after vaccination. Parameters under study were performance traits viz, body weight gain, feed consumption, FCR, blood samples were collected at weekly interval for evaluation of various haematological, biochemical immunological and histopathological examination parameters. Results revealed that the antibody titre, total proteins and globulins were increased significantly in the birds receiving Stresroak as compared to untreated control group. Performance parameters were improved non-significantly as compared to untreated control (Group A). Histopathologically varying degrees of lympho-proliferative changes noted which reveals increase number of lymphocytes. It was concluded that Stresroak exhibits hematonic, hepato-protective and Immunomodulator properties

Key words: Immunomodulator, Broiler, Polyherbal, Hematinic, Hepato-protective.

Introduction

Irrational use of antibiotics as growth promoter and as therapeutic agent or immunomodulator in livestock and poultry is current issue. International institutions and organizations related to public health showing deep concern to reduce the use of antibiotics in animals and poultry. This absurd use of antibiotics is not only developing an increased resistance to antibiotics but also presence of residue in animal products is matter of attention for public health importance. An International Study Group on Antimicrobial Strategies (ISGNAS) has also mentioned the increased microbial resistance to antibiotics is a serious problem. Day to day managerial practices imposes stress on broiler chick which leads to decreased performance and also reflects on immunity of chicks. Different managerial stress predisposes chicks to immunosuppression and exposes to infections. *Withania Somnifera*, *Ocimum sanctum* herbs is well known for its immunomodulatory property as rational alternative of antibiotics for immunopotentialiation and increasing the growth and performance. Polyherbal formulation Stresroak (M/s Ayurved Ltd, Baddi, India) is a scientifically proven to be

adaptogenic, immunomodulatory, free radical scavenging and antioxidant rejuvenating actions (Shukla and Srivastava, 1999). The constituent herbs of polyherbal formulation Stresroak which are *Phyllanthus emblica*, *Withania Somnifera*, *Magnifera indica*, *Ocimum sanctum* and many more are scientifically proved for their antistressor, immunomodulator, adaptogenic and performance enhancing property (Oyagbemi et al. 2008 and Manoharan, 2004).

Materials and Methods

Present study was conducted at the Department of Pharmacology & Toxicology, Bombay Veterinary College, Mumbai (MS) India. Chicks were procured from Kanakeshwara Hatcheries, Aurangabad and vaccinated against ND (LaSota strain) and IBD (Georgia strain) on 6th and 14th day respectively. Four hundred and fifty healthy days old chicks were randomly divided into three groups (each group consisting of 150 chicks). Group A served as a negative control while group B served as a positive control receiving levamisole, a known immunomodulator @ 15 mg/kg body weight through water for four consecutive days from third day onwards. Group C birds were

Table-1. Performance parameters in different group of chickens in experiment

Groups	Average Body Weight (g) (FCR)	Feed consumption (g)	Feed Conversion Ratio
A	1242.20	2618.71	1.9
B	1339.65	2794.27	1.86
C	1273.18	2726.28	1.9

Table-2. Antibody titer of the birds at different time interval

Groups	Day1	Day 7	Day 14	Day 21	Day 28
A	4.66±0.71	4.00±0.89	5.33±0.84	29.33±7.63	18.67±2.67
B	4.66±0.71	5.33±0.84	13.33±1.69	74.67±17.84	42.67±9.83
C	4.66±0.71	4.67±0.67	6.67±0.84	45.33±8.68	29.33±7.63

supplemented with Stresroak were administered @ 1 kg/tonne of feed for consecutively for 11 days i.e. 5 days before and 5 days after vaccination. Parameters evaluated were average weekly body weight gain, daily feed consumption Feed conversion ratio (FCR) and mortality. Blood samples were collected at weekly interval for evaluation of various haematological, biochemical and immunological parameters viz. HI titre, phagocytic index, leukocytic migration inhibition test (LMIT). At the end of study i.e. on day 35th six birds from each group were sacrificed for histopathology and organs viz. bursa, thymus and spleen were collected for the evaluation of organ to body weight ratios. For haemagglutination test and estimation of total proteins and albumin blood was collected on day 1st, 7th 14th, 21st and 28th. Total leukocyte count (TLC) and Differential leukocyte count (DLC) was estimated as per the method suggested by Natt and Herric (1952). Total serum proteins and serum albumin were estimated by Biuret method and BCG method respectively. To detect antibody titer against NDV Haemagglutination Inhibition (HI) Test (Allan and Gough, 1974) was adopted.

Results and Discussion

The average total body weight gain was 1242.20, 1339.65 and 1273.18 g recorded in groups A, B & C respectively, which showed highest gain in group B (positive control) receiving standard immunomodulator Levamisole hydrochloride (Table 1). The average feed consumption in A, B and C groups was 2618.71, 2794.27 and 2726.78 g respectively, which showed higher feed consumption in group B followed by Group C was higher as compared to untreated control (Group A). The cumulative FCR for groups A, B & E were 1.9, 1.86 and 1.90 respectively, (Table-1), however difference among the group was non-significant ($p < 0.05$). The mortality during the experimental period was 2.53%. At 4th week the average antibody titer of group B was highest (42.67 ± 9.83) followed by treatment group C and control indicating immunomodulator activity of levamisole and Stresroak.

Stresroak is used as antistressor, immunomodulator, adaptogenic and performance enhancer mostly in poultry management (Rajmane, 1996). According to Leena et al. (1998) Stresroak increases non-specific immune response and overall protection against infections and non-infectious diseases. The average phagocytic activity (%) per bird during the five week period was 21.83, 26.55 and 24.61 respectively for groups A, B and C (Table 2). Highest phagocytic index was recorded in group B receiving levamisole followed by treatment Group C which was statistically non-significantly ($P < 0.05$) differing from each other. Immunopotential is one of the major activity of Stresroak was confirmed various workers (Pradhan et al. 1995, Leena et al. 1998, Shukla and Srivastava, 1999, Deka et al. 2004, Manoharan et al. 2004). The average leukocyte migration inhibition index in untreated control group A was highest as compared to group B and E which showed their better capacity to improve cell mediated immunity. The herbo-mineral constituent of test formulation Stresroak are *Phyllanthus emblica*, *Withania somnifera*, *Magnifera indica*, *Ocimum sanctum* and many more scientifically proved for their antistressor, immunomodulator, (Oyagbemi et al. 2008 and Manoharan, 2004). Each of these herbs has been scientifically proven to boost immunity in poultry (Semblulingam et al. 1998, Markare et al. 2001, Prakash et al. 2002 and Rajak et al. 2004). Average total serum protein, albumin and globulin were higher in treated birds (Group C) as compared to untreated control (Group A). The average total leukocyte count (TLC) (thousand/ml) at end of experiment 14971.67 ± 1259.48 , 16479.40 ± 0519.81 and $16774.40 \pm 1114.92 \times 10^3/\text{ml}$ respectively for groups A, B and C (Table 4) which was not differing significantly ($p < 0.05$) among the groups. The average differential leukocyte count (DLC) at the end of experiment was non-significantly ($p < 0.05$) differing from each other. The difference in the average organ to body weight ratio of thymus, spleen and bursa of fabricus was found to be non-significant among groups

Table -3. Average % Phagocytosis, Phagocytic index and LMIT of different groups of chicks

Groups	A	B	C
Average % Phagocytosis	21.83 ±4.45	26.55 ±6.95	24.61±5.95
Average Phagocytic Index	3.60 ±0.32	3.86 ±0.44	3.70±0.40
Leukocyte Migration Inhibition Test (LMIT)	0.84 ±0.00	50.81 ±0.00	50.83±0.00

Table 4. Haematological parameters (TLC & DLC) of chicken in experimental groups

Groups	A	B	C
Total Leukocyte count (TLC)	14971.67±1259.48	16479.40 ±0519.81	16774.40±1114.92
Differential Leucocytes count (DLC)			
Heterophil	33.94 ±3.99	33.17 ±4.10	33.50 ±3.93
Eosinophil	2.33±0.42	2.44±0.58	2.44±0.46
Basophil	1.44 ±0.29	1.11 ±0.53	1.39±0.34
Monocyte	6.67 ±0.25	6.16 ±0.96	6.95±0.62
Lymphocyte	55.60 ±3.60	57.05 ±4.17	55.68 ±5.17

Table- 5. Serum Biochemical parameters of chicken in experimental groups

Groups	A	B	C
Total Serum Proteins (g %)	2.31 ±0.14	2.72 ±0.22	2.56±0.21
Serum Albumin (g/dl)	1.29 ±0.09	1.51 ±0.13	1.40 ±0.12
Serum Globulin (g/dl)	1.08 ±0.07	1.20 ±0.10	1.17±0.09
Serum Albumin Globulin Ratio	1.20 ±0.02	1.25±0.03	1.19 ±0.02

at the end of experiment. Histopathological examination of organs revealed that Bursa of fabricus and spleen showed varying degree of lympho-proliferative changes. Increased lymphocyte on microscopic examination in Group C was followed by other group (Fig.1 & 2).

References

1. Allan, W.H. and R.E.Gough (1974): A standard Hi test for Newcastle Disease, vaccination and challenge. *Vet. Rec.* 95: 147-149.
2. Deka, D., Sarma D.K and G.N. Dutta, (2004): Stimulating effect of Stresroak and Levamisole in breeders vaccinated with infectious bursal disease vaccine. *Ind. Vet. J.*, 18: 821-822.
3. Garcia, D., J. Leiro, R. Delgado, M.L. Sanmartin and F.M. Ubeira (2003): *Mangifera indica* L. extract (Vimang) and mangiferin modulate mouse humor immune responses. *Phytotherapy Research*

4. Kolte, A.Y., Sadekar R.D., Bar,ase B.S. Desai, V.F. and Kolte B.R. (1999) Immunomodulating effect of dry powder of *Ocimum sanctum* and leaf gall of *Ficus racemosa* leaves in broilers naturally infected with Infectious Bursal disease virus. *Indian Veterinary Journal*, 76 (2): 84-86.
5. Leena, B., dutta, G.N. and Buragohain J. (1998): Comparative efficacy of Levamisole and Stresroak (an ayurvedia product) as immunomodulators in broiler chicks vaccinated with pigeon pox vaccine *Indian Journal of Comparative Microbiology, Immunology & Infectious Disease.* 19(1): 14-15.
6. Makare, N., S. Bodhankar and V. Raigari, (2001): Immunomodulatory activity of alcohol extract of *Mangifera indica* in mice. *J. Ethnopharmacol.*, 78:133-137.
7. Makare, Neelam, Subhash Bodhankar and Vinod Rangari (2001): Immunomodulatory activity of alcoholic extract of *Mangifera indica* in mice. *Journal of*



Fig.1 Bursa of Fabricus showing lymphoproliferative changes in birds (Group C)



Fig.2 Spleen showing lymphoproliferative changes (Group C) in birds

- Ethnopharmacology* 78(2):133—137.
8. Manoharan, S., et.al. (2004): Effect of a Poly Herbal Ingredient on Day Old Chick Quality by Feeding in Parent Flocks. *International Journal of Poultry Science* 3 (12): 773-778.
 9. Mediratta P. K., Sharma K. K. and Surender Singh (2002): Evaluation of immunomodulatory potential of *Ocimum sanctum* seed oil and its possible mechanism of action. *Journal of Ethnopharmacology* 80(1):15-20.
 10. Oyagbemi, A. A., et.al.(2008): Safety Evaluation of Prolonged Administration of Stresroak in Grower Cockerels. *International Journal of Poultry Science* 7 (6):574-578.
 11. Prakash, J., et.al.(2002): *Withania somnifera* root extract prevent DMBA induced squamous cee carcinoma of skin in Swiss albino mice. *Nutr. Cancer*, 42:91-97.
 12. Rajak, S., S.K. Banerjee., S. Sood., A.K. Dina., Y.K.Gupta., S.K. Gupta and S.K. Manlik, (2004): *Emblica officinalis* causes myocardial adaptogen and protects against oxidative stress in ischaemic reperfusion injury in rats. *Phytother Res.*, 18: 54-60.
 13. Rajmane, B.V.(1996): Effect of Stresroak in stress condition on broiler performance. *Biotechnologija Yugoslavi stocarstv* pp:215-218.
 14. Reena Mukharjee, Dash P.K. and Ram G.C. (2005): Immunotherapeutic potential of *Ocimum sanctum* (L) in bovine subclinical mastitis. *Research in Veterinary Science*, 79 (1):37-43.
 15. Sembulingam, K., Prema Sembulingam Namasivayam A. (2005): Effect of *Ocimum sanctum* Linn. on the changes in central cholinergic system induced by acute noise stress. *Journal of Ethnopharmacology* 96 (3):477-482.
 16. Shukla, P.K., Srivastava, P.K.(1999): Beneficial effect of Stresroak and Livfit Vet supplementation in post infection hydro-pericardium syndrome cases. *Indian Vet. Med. J.*, 23: 335-337.
