



Post Vaccination Immune Response Potentiation against Blue Tongue Vaccination with Stresomix in Deccani lambs and Sheep

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Authors' contributions

This work was carried out in collaboration between CRIDA and Ayurvet Limited. Authors SM, MJS, KR had designed the study and provided the necessary samples of Stresomix for designed study. Author DBVR had performed the clinical trial. Author Adarsh did the literature search, compiled and analysed the data. All authors had read and approved the final manuscript.

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Short Research Article

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ABSTRACT

Aim: The aim of the study was to determine the immunopotentiatory effect of Stresomix, a polyherbal anti stress, immunomodulatory formulation against blue tongue vaccination. The hypothesis was that antistress, adaptogenic and immunomodulatory properties of Stresomix constituent herbs viz. *Magnifera indica*, *Withania somnifera* and *Phyllanthus emblica* would enhance the immune response in deccani lambs and sheep.

Study Design: Total 12 lambs and 12 adult deccani sheep were selected for the study. Vaccination was done with inactivated pentavalent Blue tongue vaccine at 1ml per animal subcutaneously.

Place and Duration of Study: The experiment was conducted in Central Research Institute for Dry Land Agriculture, Santoshnagar, Hyderabad, India in Deccani breed of sheep.

Methodology: The parameters viz. antibody titre and serum biochemical parameters were studied statistically.

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Results: In deccani lambs, increase in the antibody titre against blue tongue (BT) in Stresomix supplemented group II (89.08) was significantly ($P<0.01$) higher as compared to lambs in untreated group I (69.88). Similarly, In adult deccani sheep, significant ($P<0.01$) increase in antibody titre was obtained in Stresomix supplemented group II (84.57) in comparison of untreated control group I (57.88)

Conclusion: The antibody titre determination and serum biochemical analysis revealed that the Stresomix did not change the biochemical profile so it is safe to use Stresomix for improving post vaccination immune response in sheep

Keywords: Immuno potentiator; poly herbal; antibody titre; serum biochemical profile.

1. INTRODUCTION

Small ruminants such as goats and sheep are important sources of financial security for farmers [1]. Sheep have significant role in economy. According to the 1972 census, the country had 40 m sheep, which contributed approximately \$175 m (Rs 1400 m) per year to the national economy, based on a rough estimate of production of 34.3 m kg of wool, 101 m kg of mutton, and 14.6 m skins [2]. According to the live stock census of 2003 the country second in respect of goat and third in respect of sheep population in the world [3]. In India, sheeps are primarily maintained on natural pasture lands / waste lands with *in situ* grazing and often exposed to various stress like nutrition, physiological and environmental stress [4]. Stress evokes harmful responses that interferes with the general health, productivity and result in alteration in the process of homeostasis, metabolism and immunosuppression [5]. Variation in feed intake, protein deficiency, starvation, shortage of feeding space, vaccination and various other managemental operations may lead to stress which ultimately cause immunosuppression [6,7]. Stress cause of reduction in performance and increase susceptibility to disease [8]. Therefore it is mandatory to minimize the stress and restore the immunity in livestock for optimum production by adopting proper managemental practice and or supplementation of immunomodulators. Hence, an attempt was made to study the efficacy of herbal immunomodulators and antistressor-Stresomix (M/S Ayurved Limited, India) in potentiating immune response in Deccani lambs and sheep vaccinated with inactivated multivalent blue tongue virus.

2. MATERIALS AND METHODS

The experiment was conducted in Central Research Institute for Dry Land Agriculture, Santoshnagar, Hyderabad, India in Deccani

breed of sheeps. A total of 12 lambs (142 ± 8.1 days old) with mean body weight of 14.8 ± 0.23 kg and 12 adult sheeps (408 ± 13.7 days old) with mean body weight of 28.3 ± 0.41 kg were selected for the experiments. The animals were drenched against all parasites and after thorough examination for good health allowed to acclimatize to the conditions for a period of 7 days prior to commencement of experimentation. Animals were supplemented with 150 and 250g of concentrate mixture (CP: 18 and TDN: 70%) per day per animal, respectively. In addition, mineral bricks were provided in the pens.

2.1 Experiment I

Lambs were divided into group I: control group ($n=6$) without any treatment and group II ($n=6$) lambs were supplemented with Stresomix @ 1 kg/tonne of concentrate mixture for 5 days pre and 5 days post vaccination.

2.2 Experiment II

Similarly, the adult sheeps were divided into two groups group I: control group ($n=6$) without any treatment and group II ($n=6$) sheeps were supplemented with Stresomix @ 1 kg/tonne of concentrate mixture for 5 days pre and 5 days post vaccination.

Vaccination was done with inactivated pentavalent Blue tongue vaccine @1ml per animal subcutaneously. At day 28 post vaccination serum samples were collected from individual animals and antibody titers in serum samples were assessed with competitive enzyme linked immuno sorbent assay according to Jochim protocol [9]. The antibody titres in serum samples less than 50 are considered as seronegative and more than 50 as seropositive. Serum samples were further analyzed for metabolites like albumin, blood urea nitrogen (BUN) and creatinine and also transaminase (SGOT and SGPT) using Qualigens Diagnostic kits.

2.3 Statistical Analysis

All the results were analyzed statistically by using student's 't' test as per Snedecor and Cochran [10].

3. RESULTS AND DISCUSSION

3.1 Antibody Titre in Deccani Lambs

At day 0 there was no significant difference in the antibody titre of the lambs in both the untreated and treated group. Significant increase in the antibody titre was observed at day 28 post vaccination in both the groups, but the antibody titre against blue tongue (BT) of Stresomix supplemented group II (89.08) was significantly ($P<0.01$) more as compared to lambs in untreated group I (69.88) (Table 1). An antibody titre is a measurement of how much antibody an organism has produced that recognizes a particular epitope. In lambs Stresomix supplementation had significantly ($P<0.01$) boost the antibody titre. The increase in antibody titre on Stresomix supplementation was because of its constituent herbs viz. *Magnifera indica* [11], *Ocimum sanctum* [12,13], *Withania somnifera* [14] and *Phyllanthus emblica* [15] possess antistress and immuno modulatory activities.

3.2 Antibody Titre in Deccani Adult Sheep

Similar result with significant ($P<0.01$) increase in antibody titre was obtained in case of adult sheeps (84.57) of group II supplemented with Stresomix in comparison of untreated control group I (57.88) (Table 2). Significant increase ($P<0.01$) in antibody titre in Stresomix supplemented sheep was because of its constituent herbs viz *Withania somnifera*, *Ocimum sanctum* and *Phyllanthus emblica* that possess antidepressant [16], antioxidant [17] and adaptogenic [18] activities. Due to synergism, polyherbal formulation confers some added benefits not available in single herbal formulation [19].

3.3 Serum Biochemical Parameters

The biochemical indices monitored in the blood and liver are useful 'markers' for assessment of disease and to a reasonable extent the toxicity of the drug [20,21]. On Stresomix supplementation no significant change in serum biochemical parameters was observed (Table 3). In both the groups serum biochemical parameters varied non significantly. This shows that the Stresomix was safe during usage.

Table 1. Competitive Elisa antibody titre in deccani lambs vaccinated with inactivated multivalent blue tongue vaccine

Control			Stresomix		
Lamb no.	0 day titre	28 th day titre	Lamb no.	0 day titre	28 th day titre
1	3.2	69.1	1	2.2	88.6
2	2.8	69.4	2	2.9	84.3
3	3.1	71.2	3	3.1	92.1
4	2.8	70.6	4	2.3	90.3
5	3.6	68.2	5	3.8	89.7
6	2.9	70.8	6	2.9	89.5
Mean	3.07	69.88^a	Mean	2.87	89.08^b
S.E	0.13	0.47	S.E	0.24	1.07

a, b: Means with different superscripts in column differ significantly at $P<0.01$

Table 2. Competitive Elisa antibody titre in deccani adult sheep vaccinated with inactivated multivalent blue tongue vaccine

Control			Stresomix		
Lamb no.	0 day titre	28 th day titre	Lamb no.	0 day titre	28 th day titre
1	22.8	58.1	1	13.7	56.6
2	13.6	52.1	2	17.9	95.0
3	16.8	65.4	3	21.0	89.5
4	17.2	58.2	4	0.17	99.7
5	9.6	55.3	5	17.4	86.8
6	11.2	58.2	6	18.9	79.8
Mean	15.20	57.88^a	Mean	14.85	84.57^b
S.E	1.95	1.80	S.E	3.09	6.25

a, b: Means with different superscripts in column differ significantly at $P<0.01$

Table 3. Blood biochemical and liver function profiles in deccani sheep fed with or without herbal immunomodulators products

Parameter	Control	Stresomix
Blood biochemical profiles		
Serum albumen (g/dl)	3.46	3.50
Blood urea nitrogen (mg/dl)	12.68	12.71
Creatinine (mg/dl)	1.36	1.38
Liver function tests		
SGOT (IU/dl)	43.22	43.26
SGPT (IU/dl)	8.02	8.02

4. CONCLUSION

Stresomix efficiently potentiate the post vaccination antibody titre in sheep vaccinated with inactivated Blue tongue vaccine which means Stresomix, the polyherbal product can be recommended for its usage to improve post vaccination immune response in sheep.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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