



Research Article
**International Journal of Pharmacy and
Natural Medicines**

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Post inoculation cell mediated immune response of herbal extracts in chicken

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Received: 26 October 2013, Accepted: 27 December 2013, Published Online: 15 June 2014

Abstract

The present study was carried out to examine the cell mediated immune response in thin sections of skin of broiler chicks fed with *Withania somnifera* and *Asparagus racemosus* root extract mixed with their feed which showed marked infiltration of mononuclear cells in the dermis of bird's skin when observed microscopically after histopathological staining by Haematoxylin and Eosin method.

Keywords: *Withania somnifera*, *Asparagus racemosus*, infiltration, mononuclear cells, skin

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Manuscript ID: IJPNM1919



PAPER-QR CODE

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1. Introduction

Feeding of broiler chicks with stem extracts of *Withania somnifera* and *Asparagus racemosus* root extract enhances the cell mediated immune response in the birds characterized grossly by erythema, vascularization, vesication, edema and induration and sloughing of skin. Histopathologically, it has been characterized by mononuclear cell infiltration and perivascular lymphocyte cuffing in the present study.

2. Materials and Method

Thin skin sections of 3-5 µm thickness were processed and stained by Hematoxylin and Eosin method as per the procedure described by Culling¹ with slight modifications. Selected tissues were taken and washed with formalin

(10%). Then the tissues were kept in automatic tissue processor in ascending order strength of alcohol (70%, 80%, 90%, 95%, absolute alcohol No. 1 and No. 2) for one hour in each. Then the tissues were passed in Xylene No. 1 and Xylene No. 2 each for one hour. They were then placed in xylol and paraffin mixture (equal parts) for one hour, then in paraffin No. 1 and No. 2 each for one hour. Then the tissues were blocked in paraffin. Sections were cut at 5–6 micron thickness. Glass slides were smeared in egg albumen and cut sections were mounted on the smeared glass slides over the hot water bath at 80°C. The mounted slides were air-dried and then put in Xylene No. 1 and No. 2 to remove the paraffin. The slides were passed twice through descending grades of alcohol (absolute alcohol No. 1 and No. 2, alcohol 95%, 90%, 60%, 70%) for 2 min to remove xylene. Then the slides were washed under running tap water for 2 min to remove the alcohol. The slides were put in haematoxylin solution for about 15 min and then washed in running tap water. To remove excess of haematoxylin, the sections were given dips once or twice in acid-alcohol and then were washed thoroughly. After washing, the slides were dipped in eosin solution for about 30 sec. Then the slides were passed through 95% alcohol, absolute alcohol, absolute alcohol No. 1 and No. 2 and finally the sections were mounted over cover slip with DPX and examined under microscope.

3. Results and Discussion

Histopathological examination of skin sections of broiler chicks inoculated with *Withania somnifera* and *Asparagus racemosus* root extract revealed varying degrees of mononuclear cell infiltration accompanied with edema, congestion in superficial and deep layers of dermis. No significant microscopic alteration as observed in epidermal layer of skin. Gross changes revealed erythema, induration followed by vesication, thickening and covering of skin with scales. The observations in the present study correlate with the reports by Kumari² and Sadekar et al.³ who studied the cell mediated immune enhancement by extracts of *Withania somnifera* and *Asparagus racemosus* with its competence measured grossly as increase in mean skin thickness with gross visible changes on it and histopathologically by mononuclear cell infiltration and perivascular cuffing.

Kumari et al.⁴ showed the use of *W. somnifera* and *A. racemosus* dried root powder in a specific dose during the scheduled period showed significant positive effects on both humoral and cell mediated immune responses of the birds. The bursectomized and thymectomized birds showed a decline in the antibody titer. The variation in skin thickness was significantly more among the herbal treated. Herbal formulation containing extracts of *W. somnifera* and *A. racemosus* may be therefore recommended for use as positive immunomodulator in normal and immunocompromised broiler chicks. The present study also indicated the determinative roles of herbal feed additives in obtaining higher cell mediated immune responses providing better protection level against infections.

4. Conclusion

In the present study the gross and histopathological examinations of skin revealed the cell mediated immune response enhancement in broiler birds inoculated with *Withania somnifera* and *Asparagus racemosus* root extract.

5. Acknowledgements

The authors are grateful to the Hon'ble Vice-Chancellor, Birsa Agricultural University and the Dean, College of Veterinary Science & Animal Husbandry, Ranchi, India for providing the necessary facilities for carrying out this research work.

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