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## Comparative Effect of *Cucurbita Maxima* Seed with Immunomodulators on Biochemical Parameters in Rabbits

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### ABSTRACT

*Cucurbita maxima* seed was tested for its immuno modulatory effects by comparing it with a proprietary immuno stimulant levamisole HCL using dexamethasone induced immuno suppression model in rabbits in terms of assessing biochemical parameters. Total protein, globulin were found to be higher in *Cucurbita maxima* treated groups when given alone and with dexamethasone and its response was higher than levamisole in immuno suppressed animals. The study suggests that *Cucurbita maxima* possesses potential to act as an immuno modulator.

**Keywords:** *Cucurbita maxima* , Levamisole Hcl, Dexamethasone, Rabbits

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### INTRODUCTION

Modulation of immune responses to alleviate the diseases has been of interest for many years. A number of plant products are being investigated for immuno modulatory activity (Upadhyay, 1997). *Cucurbita maxima* is a botanical name of pumpkin. The seed of *cucurbita maxima* contains necessary fatty acids, vitamin A and C, Calcium and Zinc (Ravi Shankar et al., 2012). *Cucurbita maxima* has been tried successfully for its antimalarial and anthelmintic properties. The study was undertaken to find out the comparative effect of *Cucurbita maxima* seed with proprietary immuno modulators on biochemical parameters in rabbits.

### MATERIALS AND METHODS

Thirty six male Newzealand White rabbits with the bodyweight of 1000-1500g were divided into six groups (I,II,III,IV,V,VI) of six animal in each. Group I was the control. Group II was dexamethasone sodium (Immunosuppressive) treated. Group III was levamisole hydrochloride (Immuno stimulant) treated. Group IV was *Cucurbita maxima* (shade dried powder preparation) treated. Group V was levamisole and dexamethasone treated and Group VI was dexamethasone and *Cucurbita maxima* treated group. The rationale behind the use of *Cucurbita maxima* with dexamethasone was to study the influence of *Cucurbita maxima* seed on dexamethasone induced immunosuppression status of the animals. For comparison, dexamethasone was given with levamisole (Group IV) as the latter is known to restore corticosteroid induced depletion of lymphocytes. Levamisole Hcl was given at 2.5 mg/kg subcutaneously thrice a week, dexamethasone sodium was given at the rate of 2mg/kg intra muscularly for seven days and *Cucurbita maxima* was given @ 1000 mg/kg PO for 10 days.

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**Table. 1:** Effect Of Immuno Modulators On Total Serum Protein Levels (Mean  $\pm$  SE) In Rabbits (G/Dl).

Groups		Day				Groups Means
		0	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>th</sup>	
Control	I	5.47 $\pm$ 0.10	5.57 $\pm$ 0.07	0.97 $\pm$ 0.05	6.01 $\pm$ 0.04	5.76 <sup>a</sup> $\pm$ 0.07
Dexamethasone	II	5.75 $\pm$ 0.03	5.89 $\pm$ 0.01	5.29 $\pm$ 0.19	4.97 $\pm$ 0.14	5.47 <sup>f</sup> $\pm$ 0.09
Levamisole Hcl	III	5.90 $\pm$ 0.02	6.19 $\pm$ 0.06	6.24 $\pm$ 0.03	6.29 $\pm$ 0.02	6.26 <sup>e</sup> $\pm$ 0.03
Cucurbita Maxima	IV	5.92 $\pm$ 0.02	6.17 $\pm$ 0.02	6.20 $\pm$ 0.03	6.25 $\pm$ 0.03	6.13 <sup>c</sup> $\pm$ 0.02
Dexamethasone + Levamisole	V	6.10 $\pm$ 0.05	6.53 $\pm$ 0.03	6.71 $\pm$ 0.02	6.75 $\pm$ 0.02	6.53 <sup>b</sup> $\pm$ 0.03
Dexamethasone + Cucurbita Maxima	VI	5.99 $\pm$ 0.03	7.06 $\pm$ 0.11	7.83 $\pm$ 0.09	8.05 $\pm$ 0.07	7.23 <sup>a</sup> $\pm$ 0.08

Over All Mean Value Bearing Superscripts Between Rows (a,b,c,d,e,) Differ Significantly (P  $\leq$  0.01).

**Table. 2:** Effect Of Immuno Modulators On Serum Albumin Levels (Mean  $\pm$  SE) in Rabbits (G/Dl).

Groups		Day				Groups Means
		0	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>th</sup>	
Control	I	4.07 $\pm$ 0.01	4.11 $\pm$ 0.01	4.20 $\pm$ 0.00	4.32 $\pm$ 0.00	4.17 <sup>d</sup> $\pm$ 0.01
Dexamethasone	II	4.15 $\pm$ 0.03	4.18 $\pm$ 0.01	4.05 $\pm$ 0.02	3.96 $\pm$ 0.03	4.08 <sup>b</sup> $\pm$ 0.02
Levamisole	III	3.91 $\pm$ 0.01	3.82 $\pm$ 0.00	3.81 $\pm$ 0.01	3.70 $\pm$ 0.01	3.81 <sup>d</sup> $\pm$ 0.01
Cucurbita Maxima	IV	3.85 $\pm$ 0.02	3.83 $\pm$ 0.02	3.81 $\pm$ 0.02	3.79 $\pm$ 0.02	3.82 <sup>d</sup> $\pm$ 0.02
Dexamethasone + Levamisole	V	3.99 $\pm$ 0.02	3.95 $\pm$ 0.02	3.97 $\pm$ 0.02	3.94 $\pm$ 0.02	3.96 <sup>c</sup> $\pm$ 0.02
Dexamethasone + Cucurbita Maxima	VI	3.72 $\pm$ 0.02	3.61 $\pm$ 0.02	3.54 $\pm$ 0.02	3.48 $\pm$ 0.02	3.59 <sup>e</sup> $\pm$ 0.02

Over All Mean Value Bearing Superscripts Between Rows (a,b,c,d,e) Differ Significantly (P $\leq$  0.01).

**Table.3:** Effect of Immuno Modulators on Serum Globulin Levels (Mean  $\pm$  SE) In Rabbits (G/Dl).

Groups		Day				Groups Means
		0	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>th</sup>	
Control	I	1.41 $\pm$ 0.10	1.46 $\pm$ 0.07	1.77 $\pm$ 0.05	1.69 $\pm$ 0.04	1.58 <sup>d</sup> $\pm$ 0.06
Dexamethasone	II	1.60 $\pm$ 0.02	1.70 $\pm$ 0.02	1.24 $\pm$ 0.18	1.02 $\pm$ 0.13	1.39 <sup>e</sup> $\pm$ 0.09
Levamisole	III	1.99 $\pm$ 0.01	2.37 $\pm$ 0.06	2.44 $\pm$ 0.04	2.59 $\pm$ 0.03	2.35 <sup>c</sup> $\pm$ 0.03
Cucurbita Maxima	IV	2.08 $\pm$ 0.03	2.33 $\pm$ 0.04	2.39 $\pm$ 0.04	2.46 $\pm$ 0.04	2.31 <sup>c</sup> $\pm$ 0.04
Dexamethasone + Levamisole	V	2.12 $\pm$ 0.04	2.58 $\pm$ 0.03	2.74 $\pm$ 0.04	2.82 $\pm$ 0.03	2.57 <sup>b</sup> $\pm$ 0.03
Dexamethasone + Cucurbita Maxima	VI	2.26 $\pm$ 0.03	3.45 $\pm$ 0.11	4.30 $\pm$ 0.10	4.57 $\pm$ 0.07	3.65 <sup>a</sup> $\pm$ 0.08

Over all mean value bearing superscripts between rows (a,b,c,d,e) differ significantly (P $\leq$  0.01).

The study was carried out after getting approval from Institutional Animal Ethical Committee. Blood samples were collected from the ear vein on day 0, 7, 14 and 21 and the serum separated was used for the estimation of total serum protein, albumin and globulin level by modified Biuret and Dumas method (Varley et al., 1980). Data collected were analysed statistically (Snedecor and Cochran 1994).

## RESULTS AND DISCUSSION

The mean values of various blood constituents in different experimental groups are presented in the table1,2 and 3. The total serum protein value was found to be significantly higher in dexamethasone + levamisole group (6.53  $\pm$  0.03 g/dl) When compared with levamisole treated group 6.26  $\pm$  0.03 g/dl) Levamisole has been reported to enhance the immunity in immuno suppressed conditions (Robertson, 1988). The overall mean total serum protein value was found to be highest in dexamethasone + Cucurbita maxima group (7.23  $\pm$  0.08 g/dl). It could be due to the presence of tocopherol in Cucurbita maxima (Rastogi and Mehrotra, 1990) and this vitamin is known to be an anti stress agent which protects the cell membrane from stressors (Chakraborty, S.B., Csaba Hancz, 2011). The serum protein values in levamisole, Cucurbita maxima treated groups were significantly high and similar among themselves (6.26 $\pm$ 0.03 g/dl . 6.13  $\pm$  0.13

g/dl). Levamisole, Cucurbita maxima treated groups showed relatively similar values of serum albumin (3.81  $\pm$  0.01 g/dl, 3.82  $\pm$  0.02 g/dl, respectively) but significantly lower than control and dexamethasone treated groups. This is in accordance with Vyas et.al. (1987) who reported that there was a descending fall in serum albumin in chicken treated with levamisole. Total serum globulin value was found to be higher in dexamethasone + Cucurbita maxima, levamisole and in Cucurbita maxima (3.65  $\pm$  0.08 g/dl, 2.35  $\pm$  0.03 g/dl, 2.31 $\pm$ 0.04 g/dl, respectively) treated groups. It was significantly lower in dexamethasone treated groups. This is in accordance with Bijwal et al., 1999, who reported that there was increase in the level of total serum protein and globulin noticed in levamisole treated groups.

## CONCLUSION

The obtained results support that Cucurbita maxima has the potential for modulating the immune system as it has improved the serum biochemical entities. Further studies are warranted for the understanding of the exact mechanisms responsible for immuno modulation.

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## REFERENCES

- Bijwal, D.L., Sadekar, R.D., Mode, S.G., Chede, S.A., Joshi, M.V. and Pund, T.G., Immunomodulatory effect of levamisole in haemorrhagic septicaemia vaccinated crossbred calves, *Ind.J. Anim. Sci.*, 1999; 69: 570-571.
- Chakraborty, S.B., Csaba Hancz., Application of phytochemicals as immuno stimulant, anti pathogenic and anti stress agents in finfish culture, *Reviews in Aquaculture*, 2011; 3: 103-119.
- Ravi Shankar, K., Kiranmayi, G.V.N., Appa Reddy, G.V., Savjanya, V.V.L., Baba Sainadh, V., Lakshmi Durga, V.G., Siva Prasad, V., Swami Naidu, P.V., Prasad, T., Preliminary phyto chemical screening and in –vitro anti bacterial activity of cucurbita seed extract, *International Journal of Research in Pharmacy and Chemistry*, 2012; 86-91.
- Rastogi and Malhotra, *Compendium of Indian medicinal Plants*, Volume II, PID, New delhi, (1990): 229.
- Robertson, E.L., *Antinematodal drugs* In : *Veterinary Pharmacology and Therapeutics*, 6<sup>th</sup> Edition, 1988; IOWA State University Press, USA
- Snedecor, G.W., Cochran, W.G., *Statistical methods* , 1994; IOWA State University Press, USA
- Upadhyay, S.N., *Immuno modulation*, Narosa Publishing House, New Delhi, 1997; pp. 149.
- Varley, H., Gowenlock, A.H. and Bell, M., *Practical Clinical Biochemistry*, 5<sup>th</sup> Edition, William Hienemann Books Ltd., London. (1980): 550.
- Vyas, G.P., Dholakia, P.M., Kathiria, L.G., Studies on immuno modulation by levamisole along with vaccination in chicks against Ranikhet disease, *Indian Vet. J.*, 1987; 64; 456-462.