Effects of Ocimum Sanctum (Tulsi) on Body Weight, Serum Cholesterol, Blood Urea, Blood Sugar and on Pancreas of Experimental Rats

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Introduction

We harbour our long heritage of traditional medicine since time to till date. Harbal medicine is one of them. Many medicinal herbs are cheap[1] and easy available in and around our green belt, long been used successfully against many ailments and many of them awaits to be focused by modern knowledge.

Ocimum sanctum, commonly known as Tulsi, a sacred herb in Hindu Religion, long been used as antitussive and antimicrobial agent. It has got also hypoglycaemic[2] and hypocholesteremic[3] effect.

Thus the present study has been designed in such way to explore its effects on body weight, serum cholesterol, blood sugar, blood urea and on pancreas of experimental rats.

Materials and Methods

The experiments were carried out on Norweigian long evans rats of either sex, 2-3 months old, weighing between 150-300 gms. They were kept in plastic cages containing 6 rats per cage and maintained under natural conditions of 12 hours light and dark schedule and were given rat pillets (purchased locally) as their food and allowed to drink ad libitum.

Ocimum sanctum leaf extract was prepared as 100% solution[3]. 100 grams of fresh leaf were homogenised with 100 ml of distilled water with the help of morter and pestle. This was filtered through muslin cloth. The solution was given to the rats by force feeding by gastric cannula in a dose 10ml per kg body weight daily for 15 days.

Twelve rats were taken and divided into group 'A' & 'B' containing 6 each. Group 'A' served as control and received distilled water in a dose 10 ml./kg body weight for 15 days.

Group 'B' was experimental and received tulsi leaf extract as described

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above. On the 16th day all the animals of both groups were sacrificed under light either anaesthesia after a fasting of 18 hours. Blood was collected by decapitation for sugar, cholesterol and urea estimation and pancreas were preserved in 10% formaline solution for histologicl studies. Body weights were recorded on the 1st and 16th day of experiment.

Oxalated blood was used for sugar and urea estimation[4]; Folin-WU method for sugar and dicotyl monoxim method[4] for urea were followed. Cholesterol was estimated by ferric chloride acetic acid solution[4]. Pancreas was preserved for two days, then removed from formalin, blotted, weighed and then processed for paraffin impregnation. Sections were cut at 6 micron thickness and stained in Gomori's chrome haematoxyline pholoxine stain. Randomly selected 10 islets from each group were studied. Occulometer and stage micrometer were used to measure diameter. Both A & B cells were counted. Student's t-test was used in analysis.

Results

The mean blood sugar, urea and serum cholesterol levels of control group were 80.82 ± 1. 2, 37.28 ± 5.1 and 90.16 ± 14.3 mg% respectively. Body weight was increased by 19.4% (table 1.) Mean pancreatic weight was 272 ± 15.79 mg; A & B cell counts were 25.3 ± 3.15 and 35.4 ± 4.43 respectively. Mean transvertical diameter was 106.38 ± 11.70 micron and mean islet volume was 6.3 X 10 (table 2.)

The mean blood sugar, urea and serum cholesterol levels of experimental group (group B) were 76.17 ± 2.42, 40.6 ± 0.94 and 54.98 ± 6.42 mg% respectively (table1). Body weight was increased by 10.8 %. Mean pancreatic weight was 278 ± 27.12 mg; mean transvertical diameter was 113.04 ± 10. 70 micron; islet volume was 7.56 X 10 ; A and B cell count was 31.8 ± 3.34 and 39 ± 3.67 per islet respectively.

There is gross failure of weight gain; 6% fall in blood sugar (not significant) ; significant fall in serum cholesterol ($p < 0.05$) and no significant changes (but a little increase in all pancreatic parameters) noted in pancreeas of group B as compared with control.

Discussion

Ocimum sanctum did not reduced body weight but has retarded gaining. It correlats with its hypocholestemic effect and talies with the resul of Giri[3] Probably Ocimum sanctun increases high density lipoprotein (HL) as it contains unsaturatd fatty acids[5].

Table 1. Effect of ocimum sanctum on normal non diabetic rats.

Groups	Mean Initial Body weight (g) ± SE	Mean Body Weight Before Sacrifice (gm) ± SE	Change in Mean Body Weight (%)	Mean Blood Glucose (mg %) ± S.E	Mean Blood Urea (mg%) ± SE	Mean Serum Cholesterol (mg %) ± S.E
Group A (Control)	185 ± 2.8 N = 6	221 ± 1.53 n = 6	+ 19.4	80.92 ± 1.2 n = 6	37.28±5.1 n = 6	90.16±14.3 n = 6
Group B (Experi Mental)	169.6 ± 4.48 n = 6	188 ± 4.76 n = 6 * * *	+ 10.8	76.17 ± 2. 42 n = 6 N.S.	40.6 ± .94 n = 6 N. S	54.98±6.42 n = 6 *

N. S. Not significant
* *Just significant (P < .05)*
* * * *Highly significant (P < .001)*
S. E Standard error
N= Number of rats in the group

Table 2. Effect of Tulsi on pancretic histology of normal non-diabetic rat.

Groups	Mean Pancreatic weight (mg ± S.E)	Mean Number of A- cells per Islet ± S E	Mean number of B-Cells per Islet ± S E	Mean transvertical Diameter (Micron + S. E.)	Mean Islet volume (Cubic micron)
A (Control)	272 ± 15.79 N = 6	25.3 ± 3.15	35.4 ± 4.43	106.38 ± 11.70	6.3 x 10
B (Tulsi treated)	278 ± 27.12 n = 6 N. S.	31.8 ± 3.34 N. S.	39 ± 3.67 N. S.	113.04 ± 10.70 N.S.	7.56 x 10

(10 Randomly selected islets of Lancerhans were studied in each group)
N = Number of rats in experiment
N. S. = Not significant (p>0.05)

Hypoglycaemic effect was not significant (6% decrease) and also not desirable in nondiabetics. Though this result differs with others[3,2] does not go against them. Because one of them used diabetic rats[3] and another experiment was acute one (that is, Ocimum sanctum was administered single time)[2]. Effects on blood urea was disappointing.

Ocimum sanctum did not stimulated insulin secretion because there was no profound hypoglycaemia and histology did not show any significant hyperplasia or hypertrophy of B cells. The number of B cells were increased apparently but cell population per unit area of islet has not increased rather decreased.

Summary

Ocimum sanctum commonly known as *Tulsi* ; a sacred herb of abiatae family, wide been used in this subcontinent as antitussive agent. It has got hypoglycaemic as well as hypocholestemic effect. In this study experimental rats were fed Ocimum sanctum leaf extract for 15 dyas, then several blood parameters (sugar, urea and cholesterol), pancreas (its histology and weight) and body weight were masured and studied and compared with normal (control). Hypocholestemic effect was significant. There was a fall in blood sugar level by 6% which was not significant statistically.

No significant changes in the pancreatic histology except that all parameters have little increasing tendency. Rate of gaining body weight was decreased in experimental group as compared with control.

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