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Effect of *Ocimum Sanctum* (Tulsi) on Serum Calcium and Serum Inorganic Phosphate Activities of Male Albino Rat

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ABSTRACT

The aim of research study was undertaken to investigate the effect of different schedules of oral administration of tulsi(*Ocimum sanctum*)leaf on serum calcium and serum phosphate activities of male albino rats. *Ocimum sanctum (*1g/kg body weight*)* administration for 60 days in male albino rats on biochemical parameters weighing, between 100-150g obtained from the disease free stock of the animal house were used for the experiment of rats. The experiment was divided in control group and experimental group. Experimental rats were administered aqueous dose of *Ocimum sanctum*, and control rats received vehicle. Serum parameters were recorded in male albino rats. Significant changes were observed in serum calcium and serum inorganic phosphate activities ($P<0.05$) by days 60 of the *Ocimum sanctum* administration.

Keywords: *Ocimum sanctum*(Tulsi) **,**Serum Calcium, Serum Inorganic Phosphate, MaleAlbino Rats.

I. INTRODUCTION

Ocimum sanctum is a holy plant and important symbol of Hindu religious tradition (Siva *et al*.,2016).*Ocimum sanctum* is a grassy and annual plant(Poonam *et al*., 2011).*Ocimum sanctum* has been used for thousands of years in ayurveda for its divers healing properties. It is mentioned in Charaka Samhita, an ancient ayurvedic text (NIIR,2004).The leaves of this plant are oval with sharp tip. It is a native of Iran, Afghanistan and ,India(Mann *et al*.,2000; Volak and Jiri, 1997; Zargari,1990; Mirheinder,1990).*Ocimum sanctum* has been used traditionally as medicinal herbs in the treatment of headaches, coughs, diarrhea, constipation, water, worms and kidney malfunctions (Sikmon *et al*.,1990). Minerals are present in *Ocimum sanctum* and play a significant role in the biological metabolism (Shute,1964)).The phytochemicals found in the Tulsi plant parts which are natural bioactive compounds are divided into primary and secondary constituents. The secondary metabolites which include, organic substances like alkaloids, terpenoids and phenolic compounds (Krishnaiah,2007)) are known to be responsible for the therapeutic potential of the Tulsi plant(Joshi *et al*.,2009). The phytochemicals also work as nutrients and fibres to activate the defence system against disease (Prabhakaran *et al.,* 2011). Minerals and inorganic elements are essential for normal growth and reproduction (Gilleespie,1987).The concentration of minerals in the animal body is 2 to 5% depending on the species , and the skeleton system contains the largest amount of minerals (Gilleespie,1987). Calcium (Ca) is the most abundant mineral in the body followed by phosphorus (P) (Kellems and Church,1998). Between 96 and 99% of the total Ca in the body and between 60 to 80 % of total P in the body stored in bone tissue (Crenshaw,2001). Bone ash and contains 36 to 39 % Ca and 17 to 19 % P (Crenshaw,2001), and minerals also present in soft tissue such as blood, body fluids and some secretions, and they are involved in many biochemical reactions in the body (Gllespie,1987;Kellems and Church,1998).

II. METHODS AND MATERIALS

A total no of 60 adult male albino rats weighing between 100-150g were utilized for the present experiment. Rats were obtained from the disease free stock from the animal house. Rats were acclimatized to the laboratory conditions for one week, after acclimatization animals were grouped and housed in standard polypropylene rat cages. Rats were divided in

two groups control (group I, 30 rats) and experimental (group II, 30 rats). They were kept in the laboratory condition with temperature 30±2^{0}C and relative humidity 44-56 % with light and dark cycles 10 and 14 h; respectively, during the experiments. Animals were provided standard rodent pellet diet and water ad libitum. The leaves of *Ocimum sanctum* were taken and triturated in a mortar with a pestle and made into a fine paste. This was suspended in 1 ml water and was administered daily with a dose of 1g/kg body weight/day, orally to each of the experimental group of animals with the help of oral feeding tube. Similarly, each control rat received 1 ml water as a vehicle. Body weights were measured and recorded at the beginning and before the sacrifice.

5 rats from control group and 5 rats from experimental group were not provided food and water 24 hours prior to sacrifice of the animals. Blood samples were collected by cardiac puncture technique into the plane samples tubes for biochemical parameters. Serum calcium and serum inorganic phosphate levels was estimated by calcium O.C.P.C method and Gomorris method of the control and experimental rats were estimated by digital machine AU480 Beckman Coulter (U.S.).The data so obtained were evaluated for statistical significance using Student't' test.

Table : Serum Calcium and Serum Inorganic Phosphate values of certain biochemical analysis of rats.

PARAMETERS	SERUM CALCIUM (mg/dl)		SERUM INORGANIC PHOSPHATE (mg/dl)	
	CONTROL	EXPERIMENTAL	CONTROL	EXPERIMENTAL
1 DAY	9.00±0.25	9.04±0.14*	2.58±0.11	2.60±0.13*
7 DAYS	8.90 ±0.07	9.30±0.19*	2.62±0.10	2.66±0.14*
15 DAYS	8.94±0.2	9.10±0.21*	2.64±0.10	2.72±0.11*
30 DAYS	9.04±0.17	9.22±0.22*	2.68±0.14	3.04±0.08*
45 DAYS	9.36±0.27	9.50±0.17*	2.94±0.12	3.36±0.16*
60 DAYS	10.12±0.28	10.46±0.16*	3.00±0.09	3.40±0.19*

Mean ± SE,*P<0.05, N=5

III. RESULTS AND DISCUSSION

A *Ocimum sanctum* is an aromatic herb, which is widely used in folk medicines for several ailments because of its high medicinal value(Nadkarni,1976).It is found throughout the semitropical and tropical parts of India. This is used as medicinal plant in Ayurveda and Sidha system of medicine (R.Carolin *et al.*,2011).*Ocimum sanctum* contains minerals (Anbarasu *et al*., 2007). In the present study 'effect of *Ocimum sanctum* on serum calcium and serum inorganic phosphate in male albino rat' oral administration of *Ocimum sanctum* at doses of 1g/kg body weight daily for 60 days did not produce any mortality. All the experimental and control rats were normal throughout the study period. The animals did not show any changes in their behaviour. Insignificant changes were observed in their body weight. Food consumption and water intake in *Ocimum sanctum* treated experimental groups compared with control groups till 60 days of study period in rats were normal. Biochemical parameters of serum calcium and serum inorganic phosphate were significant. Activities of different biochemical parameters of the control and experimental rats have been summarized in the given table. Serum calcium mg/dl were comparatively higher (P<0.05) in experimental than the control rats. The

serum calcium mg/dl activities of control rats varied between 9.00±0.25 to 10.12±0.28 (mg/dl) where as in experimental rats these activities ranged between 9.04±0.14 to 10.46±0.16 mg/dl. Serum inorganic phosphate (mg/dl) were comparatively higher ($P<0.05$) in experimental than the control rats. The values recorded in the control 2.58±0.11 to 3.00±0.09 (mg/dl) whereas the corresponding values in experimental rats were 2.60±0.13 to 3.40±0.19 (mg/dl).

The data obtained in the experiment given in table suggests that the experimental rats more responsive than the control rats by *Ocimum sanctum* administration.

The data recorded a significant increase in serum calcium and serum inorganic phosphate content in the experimental rats group. The changes started to ameliorate when *Ocimum sanctum* treated rats.Phosphate is an integral component of plant cells which maintains blood sugar level, normal heart contraction (Linder and Manria,1991) bone growth and kidney function when consumed by human (Johns T and DuquetteM,1991) and Calcium is essential for making good of worn out cells, building of red blood cells and maintaining body mechanism (WHO,1996). Phytochemical analysis of *Ocimum sanctum* are used to assess their potential nutritive and medicinal benefits. In *Ocimum sanctum* plant, the inorganic elements are available only in trance amount which may usefully various functions. These elements are used extensively in chemotherapy and are essential in humans and animal health(Khan IZ,1996;Ogugbuaja VO *et al.*, 1997; Moses EA *et al* ., 2002).The chemical compounds and elements found in the *Ocimum sanctum* extracts have been known to exert pharmacological effects , while others are capable of protecting the active ingredients in the herb from decomposing either chemically or physiologically(Abdulrahman,2001).The treatment with cytone and polyherbal formulation the increase in calcium and phosphorus excertion could be due to defective tubular reabsorption in kidneys (Varalakshmi *et al.*,1990) while treatment with polyherbal formulation and ABP(Alcoholic Bryophyllum Pinnatum), markedly reduced levels of these ions showing the protective effect of polyherbal formulation and ABP again urolithiasis.So polyherbal included *Ocimum sanctum* with ABP have antiurolithiatic property (Sarang Jain and AmeetaArgal, 2013).Increased serum calcium and serum phosphorus in rats by treatment of *Ocimum gratissimum* (Arfa *et al.*, 2008).Sag, rosemary and thyme belong to the family Lameace, restored the decreased levels of serum Ca and P to normal value because phytoesterogenic compounds in Sag, rosemary and thyme have structural similar estrogen conformation and binding capabilities to estrogen receptors which may there for promote calcium absorption through an intestinal cells(Arjmandi *et al* .,2002) .Calcium is an essential element in bone mineralization and formation being the key component of hydroxyapatite and its use as a mono therapy for osteoporosis (Blanch and Pros,1999; Flynn, 2003).Optimizing the dietary intake of Ca is the nutritional goal to prevent osteoporotic fractures in postmenopausal woman (Deprez and Fardellone,2003) because plant derived polyphenols receive considerable attention because of their potential antioxidant and antimicrobial propertie (Moretra *et al.*, 2005).Treatment with *Ocimum sanctum* prevented the decreased in the level of membrane bound enzymes(MBEs). Administration of ethanolic extract of *Ocimum sanctum* had a normalizing action on mambranes of the cell and controlled the alteration of MBE due to noise stress in noise stress with *Ocimum sanctum* group. Animal exposed to noise stress after pretreatment with *Ocimum sanctum* showed a significant increase in the activity of Ca^{2+} ATPase, compared to noise exposed group of animals. *Ocimum sanctum* prevented the decrease in the levels of MBEs. *Ocimum sanctum* could prevent the changes by scavenging the free radical generated there are reports that support the favourable actions during stress. *Ocimum sanctum* could bring the activity to normal activity as that of the control in the stressed group indicating it can be an antidote for noise stress (Gayathri Fathima and Sheela Devi R, 2015). So *Ocimum sanctum* is beneficial for human and animal(Gayathri Fathima and Sheela Devi R,2015)

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V. REFERENCES

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