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## Leaves of *Ocimum Sanctum* [LOS]: A Potent Antidiabetic Herbal Medicine

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### **Abstract:**

*Lamiaceae* member *Ocimum sanctum* [Tulasi] a medicinal herb has made important contribution to the health of human being from ancient times to modern days due to its unique medicinal properties. Each part of Tulasi is used for curing many diseases [ayurveda]. The present research work deals with leaves of *Ocimum sanctum* [LOS]: a potent antidiabetic herbal medicine. The selected herbal medicine Leaves of *Ocimum sanctum*[LOS] are used as oral medicine 5 weeks regularly on diabetes mellitus individuals to observe the blood sugar levels. Blood sugar levels are estimated calorimetrically by O-TULUEDIN method from serum samples of diabetes mellitus individuals before and every week [7-days; 14-day; 21-day;28-day; and 35-day] of LOS herbal medicine treatment. High blood sugar levels are observed before LOS herbal medicine treatment. Gradual decline is observed in blood sugar levels in relation to LOS herbal medicine treatment. Blood sugar levels are controlled and reached nearer to the normal at 35-day period.

**Key words:** [1]. Leaves of *Ocimum sanctum* [LOS]; [2]. Antidiabetic herbal medicine; [3]. Diabetes mellitus individuals; [4]. LOS 5 week treatment; [5]. Blood sugar levels; [6]. Colorimetric determination by O-Toluedin method

### **1. Introduction**

Plants are excellent source of various herbal medicines useful in the treatment for various human diseases. Medicinal plants are the back bone of Traditional medicine [Farnsworth NR, 1994]. Medicinal plants have been extensively reported for their various applications in treatment of a variety of ailments [Prajapati et al., 2003] . In India, Therapeutic potentials of some herbs in the “Rigveda” seems to be the earliest record of the use of Plants as medicines [ Alankar et al., 2008 and Mazid et al., 2012]. The medicinal heritage of India is claimed to use raw drugs pertaining to some 7500 medicinal plant species [Pushpangadan, 1995]. Different parts of *Ocimum sanctum* [Tulasi; Holy Basil] especially leaves and seeds possess Therapeutic potentials [ Kirtikar and Basu, 1993; Nadkarni and Nadkarni, 1976 and Pullaiah, 2006]. Medicinal use of *Ocimum sanctum*: common cold and cough, fever, respiratory disorders, bronchitis, antidiabetic, antiasthmatic, antituberculosis and antidote for scorpion sting, dog snake and insect bites [ Nadkarni and Nadkarni, 1976; Ayurvedic pharmacopoeia of India part I, Vol-II, 2001; Prakash and Gupta, 2005 and sen, 1993]. Diabetes mellitus is one of the major physiological disorders affecting many people on the globe. Diabetes mellitus today is recognized as an epidemic disease in most countries that are undergoing socioeconomic transitions [ Duyff, Roberta, 2002]. Before the discovery of insulin in the early 1920s and the later development of oral hypoglycemic agents the major form of treatment of diabetes mellitus involved the use of plant therapies and dietary manipulation [Baily and Day, 1989]. Traditional plant based remedies are still the first choice in developing countries because of their easy availability and minimum or no side effects [Kameswara et al., 1999]. Hence the present investigation was carried out to assess the effect of leaves of *Ocimum sanctum* [LOS] on diabetes mellitus.

### **2. Materials and Methods**

*Ocimum sanctum* Linn; is known as Tulasi the most sacred plant in India. *Ocimum santum* [Eng: Holy Basil] belongs to Labiatae / lamiaceae family also known as “ The mother medicine of Nature” and “ The queen of herbs” is an erect, bushy, strongly aromatic herb. Leaves are opposite, margins toothed, and strongly scented. Fresh leave of *Ocimum sanctum* [LOS] were used to study its effect on diabetes mellitus of selected individuals A, B and C. Fresh leaves of *O. sanctum* [LOS] are considered as herbal medicine to treat diabetes mellitus. The selected herbal medicine fresh leaves of *Ocimum sanctum* [LOS] are used as oral medicine 5-weeks regularly on diabetes mellitus individuals A, B and C to observe their blood sugar levels before LOS treatment and during the 5-week period treatment.

Selected individuals of diabetes mellitus: Diabetes mellitus was checked by collecting urine samples of individual A, B and C and analyzing the urine samples by Benedicts qualitative test. In addition to Benedicts test blood sugar levels are also estimated

Calorimetrically by O-Toluedin method. In such a way 3 individuals of diabetes mellitus were selected as diabetic individuals namely A, B and C.

Blood sugar level before LOS treatment: Blood sugar levels are estimated calorimetrically by O-Toluedin method from serum samples of diabetes mellitus individuals A, B and C before Los treatment.

LOS Treatment: To A, B and C diabetes mellitus individuals a handful fresh leaves of Ocimum sanctum[LOS] are orally given [admistered] morning, afternoon and night regularly 5-weeks. Blood sugar levels are estimated calorimetrically by O-Toluedin method from serum samples of treated diabetes mellitus individuals A, B and C for every week at 7-day., 14-day., 21-day., 28-day and 35-day during the period of LOS treatment.

### 3. Tables and Figures

S. No	Individuals of Diabetes mellitus	0-day period Blood Sugar levels [mg%] before LOS treatment
1	A	250
2	B	200
3	C	230

Table 1

[1]. Diabetes Mellitus Individuals A, B and C Blood Sugar Levels [mg%] are estimated calorimetrically by O-Toluedin method before Los treatment.

[2]. 0-day period is known as the value of blood Sugar level [mg %] before LOS treatment of A, B and C diabetes mellitus.

S. No	Treated diabetes mellitus individuals	5-week period of LOS treatment	Morning	Afternoon	Night
1	A	√	√	√	√
2	B	√	√	√	√
3	C	√	√	√	√

Table 2

[1]. LOS treatment.. a handful fresh leaves of Ocimum sanctum are orally given to A, B and C diabetes mellitus individuals Morning, Afternoon and Night regularly 5-weeks.

[2]. A, B and C diabetes mellitus individuals are treated with L O S treatment 5-weeks regularly.

S. No	Treated diabetes mellitus individuals	0-Day period blood sugar level[mg%]	7-Day period blood sugar level[mg%]	14-Day period blood sugar level[mg%]	21-Day period blood sugar level[mg%]	28-day period blood sugar level[mg%]	35-day period blood sugar level[mg%]
1	A	250	240	225	200	160	110
2	B	200	195	185	165	130	80
3	C	230	220	205	180	140	90

Table 3

[1]. A, B and C diabetes mellitus individuals Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period .

[2]. 0-day period is known as the value of blood sugar levels [mg%] before LOS treatment of A, B and C diabetes mellitus individuals.

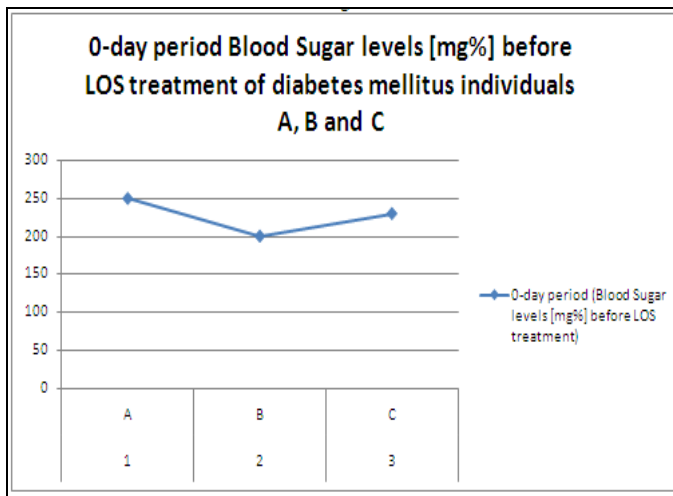


Figure 1

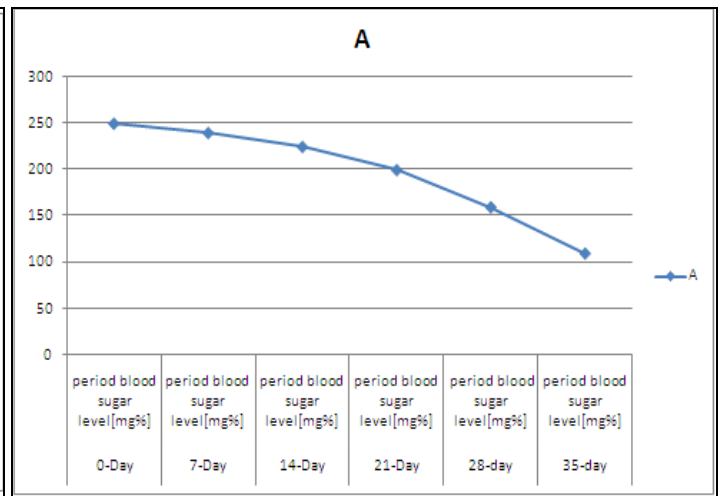


Figure 2

- Diabetes mellitus individual Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period.

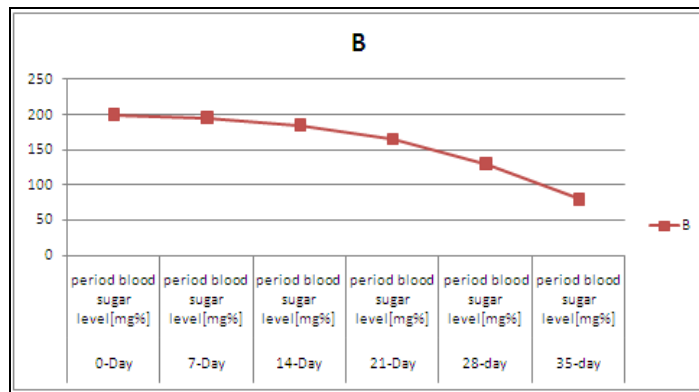


Figure 3

- Diabetes mellitus individual Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period.

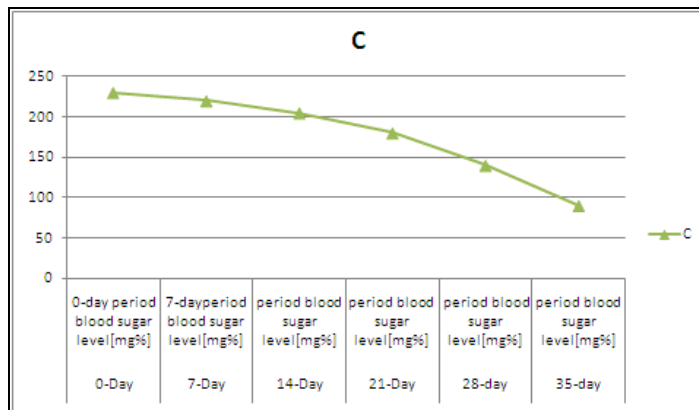


Figure 4

- Diabetes mellitus individual Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period.

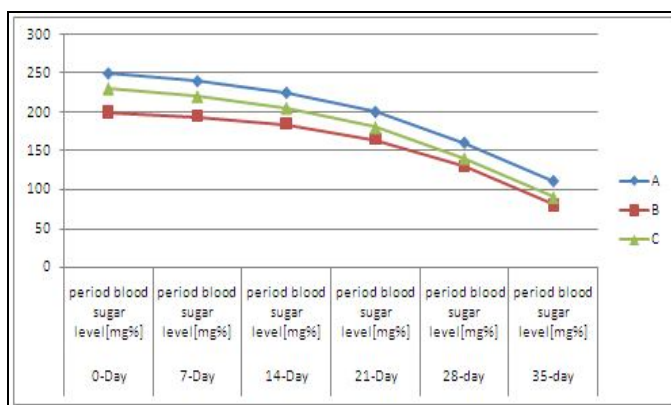


Figure 5

- A, B and C diabetes mellitus individuals Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period.

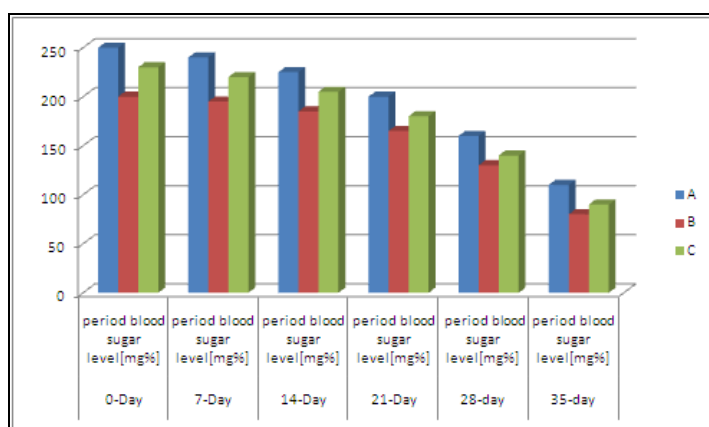


Figure 6

- A, B and C diabetes mellitus individuals Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period.

#### 4. Results and Discussion

- 0-Day period is known as the value of blood sugar levels [mg%] before LOS treatment of A, B and C diabetes mellitus individuals. The estimated 0-day period blood sugar levels [mg%] of A,B and C diabetes individuals are 250mg%, 200mg% and 230mg% respectively[ Table 1 and Fig.1].
- LOS treatment :- A handful fresh leaves of Ocimum sanctum are orally given to A, B and C diabetes mellitus individuals Morning, Afternoon and Night regularly 5-weeks. A, B and C diabetes mellitus individuals are treated with L O S treatment 5-weeks regularly. [Table 2]
- A, B and C diabetes mellitus individuals Blood sugar levels [mg%] are estimated by O-Toluedin method before LOS treatment and during 5-week period of LOS treatment at 7-day; 14-day; 21-day; 28-day; 35-day period .
- 0-day period is known as the value of blood sugar levels [mg%] before LOS treatment of A, B and C diabetes mellitus individuals. [Table 3, Fig-5, 6]
- During 5- week treatment of LOS, blood sugar levels [mg%] are gradually declines at every week [7-day, 14-day, 21-day, 28-day and 35-day] in case of treated A, B and C diabetes mellitus individuals [Table 3, Fig -2, Fig-3, Fig-4, Fig-5 and Fig-6].
- Blood sugar levels [mg%] initially decreased during the 7-day period of LOS treatment in case of treated diabetes mellitus individuals A B, and C 240mg%, 195mg% and 220mg% respectively [Table 3, Fig-2, Fig-3, Fig-4].
- A gradual decline of blood sugar levels [mg%] was observed at 14-day, 21-day, 28-day and 35-day periods in case of treated diabetes mellitus individuals A, B and C [Table -3, Fig-2, Fig-3, Fig-4, Fig-5 and Fig-6].
- The Blood sugar levels [mg%] reached nearer to the normal at 35-day period in case of treated diabetes mellitus individuals 110mg%, 80mg% and 90mg% respectively [Table 3, Fig 2,3,4,5 and 6].

Glucose (Blood Sugar) is the currency of energy for physiological and biochemical activities. Normal range of blood sugar level is 80-120mg%. The word diabetes mellitus consists of two words diabetes and mellitus. Diabetes word derived from Greek which means "excessive discharge of urine", and word mellitus derived from Latin means "Mellite" (i.e. Sweetened taste), hence diabetes mellitus means "sweet urine". Diabetes mellitus is a growing public health problem in both developed and developing countries. Over a few decades with decreasing opportunities for physical exercise, irregular sleeping patterns and a predominantly sedentary life style have led to the emergence of life style disorder diabetes mellitus. In the present research work a gradual significant decline of blood sugar levels was observed when A, B and C diabetes mellitus individuals treated with LOS treatment for 5-week period regularly [Table -3, Fig 2, 3 and 4]. At the same time blood sugar levels [mg%] reached nearer to the normal at 35-day period in case of treated A, B and C diabetes mellitus individuals with L O S treatment [Table 3, Fig 2,3,4,5 and 6]. The parameter namely blood sugar levels reached nearer to the normal at 35-day period is a good and positive result of LOS a potent anti-diabetic herbal drug for the remedy of treatment reveals that Leaves of *Ocimum sanctum* [LOS] has anti-diabetic potency and antihyperglycemic action.

## 5. Conclusion

Complication of diabetes mellitus can be controlled by oral hypoglycemic drugs / insulin treatment. These clinical uses of the current drugs are accompanied by side effects. In this context, traditional herbal medicines have been recommended for treatment of diabetes mellitus. Therefore, the search for new anti-diabetic agents with more effectiveness and no side effects. In this scenario the current work focused on "Leaves of *Ocimum sanctum* [LOS]: a potent antidiabetic herbal medicine". In the present investigation an attempt has been made to determine quantitatively the effect of LOS on blood sugar levels of diabetes mellitus individuals A, B and C and its positive result shows that LOS is confirmed as a potent oral antidiabetic herbal medicine with special features of LOS are 1. Easily availability, 2. No side effect, 3. Treatment is very simple, 4. Benign method and 5. No financial commitment. Finally recommendation of findings is (1). LOS has antihyperglycemic action. (2).LOS: a potent antidiabetic herbal medicine, and (3). LOS: a substitute for oral hypoglycemic drugs.

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