



## Effect of Ocimum Sanctum (Tulsi) Powder on Hyperglycemic Patient

### KEYWORDS

Diabetes mellitus, Ocimum sanctum L.(Tulsi), Hypoglycaemia, PP<sub>2</sub>BS, HBA<sub>1</sub>C

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### ABSTRACT

The study was planned to investigate the effect of dry leaves powder of *Ocimum Sanctum L. (Tulsi)* on the Hyperglycaemic condition. Total 40 subjects (20 Male and 20 Female) were selected randomly from "Manan Clinic" at Sama area in Vadodara city. Dose of 1 capsule (3 gm powder) was given in early morning empty stomach and breakfast after half an hour for 45 days to each subject. The FBS, PP<sub>2</sub>BS and HBA<sub>1</sub>C were monitored at the start and on the supplementation. After 45 days of supplementation, a significant lowering of the blood glucose was observed. The result indicate that in females group for FBS there is no significant difference were seen but in male group significant difference were seen at 0.5 and 1% level. In both the group of PP<sub>2</sub>BS show significant difference at 0.5 and 1% level but in HBA<sub>1</sub>C of both groups no significant difference were observed because of short study period. Tulsi had hyperglycaemic effect it is supplement for longer period

### Introduction:

Hyperglycemia or high blood sugar is a condition in which an excessive amount of glucose circulates in the blood plasma. Diabetes Mellitus is the most common pathological condition that presents with hyperglycemia. Diabetes Mellitus is one of the most common metabolic disorders. It is one of the leading causes of morbidity worldwide. Diabetes mellitus is characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both. Diabetes mellitus usually presents with its characteristic symptoms such as thirst, polyuria, blurring of vision, weight loss and polyphagia. Sometimes its acute complications like keto-acidosis or nonketotic hyperosmolarity may be the first presentation. These complications in the absence of timely treatment may lead to death. (Shaw et al., 2010)

One such plant of interest is *Ocimum sanctum* (Lamiaceae). Known to the Ayurvedic

medical tradition as tulsi, it has been called the "Queen of Herbs" since the times of ancient civilization in India. *Ocimum sanctum* is widely used by traditional healer for the treatment of various disease especially diabetes and related complications. In last few decades several study have been carried out by Indian scientist and researchers to suggest the role of essential oil & eugenol in therapeutic potentials of *Ocimum sanctum L.* Eugenol is the major constituents of essential oil extracted from different parts of Tulsi plant. (Rajeshwari S., 1992 and Sen P., 1993). *Ocimum Sanctum* leaves help in lowering blood glucose levels and antioxidant property appears to be predominantly responsible for hypoglycemic effect (Sethi et al., 2004).

Plant based control to different diseases can serve as an alternative in the areas where there is difficulty of availability of modern treatment. In large areas of developing world, numerous plant species are used as folk medicine to Diabetes Mellitus. Many Indian medicinal plants are rec-

ommended for the treatment of Type 2 Diabetes Mellitus. *O. Sanctum*, commonly known as Tulsi, is one of the plants that have long been used in traditional herbal medicine against diabetes. (Prajapati et al., 2003). However, only few scientific attempts have been made to correlate scientific.

### Materials and Methods

**Study Population:** The patients who visited "MANAN" clinic were included in the study. A total of 40 patients (45 to 55 years of age) were selected for the study. A Randomised control trial conducted in the "MANAN" clinic, Vadodara. The study included 20 male and 20 female with Type 2 diabetic mellitus.

**Ethical Clearance:** The study was performed under the supervision of the Physicians. All the Procedure was informed to the patient in his native language. After taking their consent the subjects were enrolled and interviewed at their convenient timing to fill questionnaire which is prepared for research.

**Preparation and Feeding of Tulsi Leaf powder:** Good quality of Tulsi leaves were purchased from local market. Wash Tulsi leaves thoroughly with distilled water. Pressed leaves between folds of tissue paper and dry at a room temperature for 3-5 days. The dry leaves ground to very fine powder in a mixer, Sap green colour powder were obtained. These Sap green colour powder were weighted in 3 gm each and fill in a capsule. These capsules were packed in a dry small plastic bag and seal it. Each plastic bag contains 45 capsules. The biochemical profile like FBS, PP<sub>2</sub>bS, and HbA<sub>1</sub>C were estimated at beginning and end of the intervention study. After that t test and z test were used to test the significance of mean difference between preliminary and final value of biochemical parameters.

**Feeding of the Subjects:** In this study tulsi powder capsule were given to the selected subjects per day in empty stomach and after 30 minute they consume their breakfast. Subjects consume this capsule for 45 days but

they continued their all regular medicines that is prescribed by doctor and do not change their regular dietary pattern

**Initial Assessment:** The patients diagnosed as type 2 diabetes mellitus by physician of the clinic underwent physical examination. The physical examination consisted of assessment of the parameters like Height, weight, Body mass Index, Waist circumference, Hip circumference, blood pressure of extremities. Information related to pharmacological treatment (Oral hypoglycaemic agents, Insulin), pre-existing health or diabetic complications, smoking status as well as demographic information was also recorded at the initial assessment.

**Laboratory investigations:** Blood samples (3-5 ml) were drawn from each patient by venepuncture through plastic disposable syringes. The blood samples were collected in a clean oven dried glass bottles All Laboratory investigations were conducted at central research laboratory using the set protocol and procedures established by the hospital. For FBS and PP<sub>2</sub>BS they use GOD & POD (glucose oxidase- peroxidase) method & for HBA<sub>1</sub>C the use enzymatic assay method.

**Results**

**1.1 Effect of Ocimum Sanctum on fasting Blood Glucose Level for female experimental group:** The FBS in the female experimental group slightly change from 374.3 ± 9.7 to 372.5 ± 9.7 and it was insignificant.

**1.2 Effect of Ocimum Sanctum on fasting Blood Glucose Level for male experimental group:** The FBS in the male experimental group improve from the value of 388.67 ± 13.4 to 368.5 ± 17.9 and it was significant at <0.05, <0.01 level respectively.



Figure 1: Comparison Pre and Post FBS data of Female



Figure 2: Comparison Pre and Post FBS data of Male

**1.3 Effect of Ocimum Sanctum on Post Prandial Blood Glucose Level for female experimental group:** The PP<sub>2</sub>BS in the female experimental group improve from the value of 520.4 ± 27.1 to 556 ± 35.2 and it was significant at <0.05, <0.01 level respectively.

**1.4 Effect of Ocimum Sanctum on Post Prandial Blood Glucose Level for male experimental group:** The PP<sub>2</sub>BS in the male experimental group improve from the value of 610.3 ± 46.8 to 515.9 ± 33.3 and it was significant at <0.05, <0.01 level respectively.



Figure 3: Comparison Pre and Post PP<sub>2</sub>BS data of Female



Figure 4: Comparison Pre and Post PP<sub>2</sub>BS data of Male

**1.5 Effect of Ocimum Sanctum on Glycosylated Haemoglobin (HBA<sub>1</sub>C) for female experimental group:** The HBA<sub>1</sub>C in the female experimental group slightly change from 32.6 ± 0.29 to 38.2 ± 0.27 and it was insignificant. More changes were not seen in pre and post report of HBA<sub>1</sub>C due to limitation of study period of intervention. As it was only 45 days but HBA<sub>1</sub>C gives us 3 months average blood glucose level so not much change observed.

**1.6 Effect of Ocimum Sanctum on Glycosylated Haemoglobin (HBA<sub>1</sub>C) for male experimental group:** The HBA<sub>1</sub>C in the male experimental group slightly change from 39.03 ± 0.55 to 38.72 ± 0.79 and it was insignificant. More changes were not seen in pre and post report of HBA<sub>1</sub>C due to limitation of study period of intervention. As it was only 45 days but HBA<sub>1</sub>C gives us 3 months average blood glucose level so not much change observed.

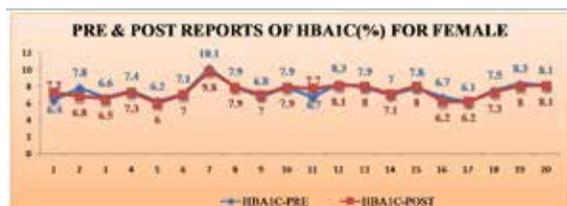


Figure 5: Comparison Pre and Post HBA<sub>1</sub>C data of Female

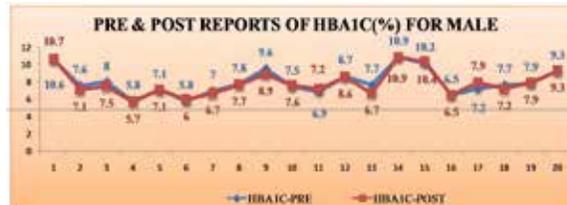


Figure 6: Comparison Pre and Post HBA<sub>1</sub>C data of Male

**Discussion**

In the traditional system of Indian medicine different parts of Tulsi have been recommended for anti diabetic, anti-hypertensive adaptogenic, antilipidemic, cardio protective and so on properties. In this study after analysing data we conclude that Ocimum sanctum L. powder capsules had significant reduction in all report but we give these capsules for longer period of time (3months). So we get better results. We can also increase quantity of taking pow-

der per day. The previous data shows that Tulsi capsules are more beneficial in male compare to female because in my study shows female's physical activity was lesser compare to male.

Similar study conducted by Somasundaram et al., 2012 for 90 days after 90 days shows that significant drop in the mean FBS level from 174.35 mg/dl to 114.50 mg/dl. In PP<sub>2</sub>BS after 90 days shows that significant drop in the mean PP<sub>2</sub>BS level from 247.31 mg/dl to 152.02 mg/dl and In HBA<sub>1</sub>C after 90 days shows that significant drop in the mean HBA<sub>1</sub>C level. Furthermore the results correlate with all the preclinical studies reported as used of aqueous and alcoholic extract of O. Sanctum in rat models showed significant decrease in the levels of blood glucose and glycosylated haemoglobin.(Narendhikaran et al., 2006) Mitra A. (2007) suggests that tulsi leaves shows significant improvement in several biochemical parameters. Thus the composite shows hypoglycemic effect as being revealed by the reduction of fasting blood sugar level from 154 ±6 to 139±8 (p=0.020). Khogare et.al (2011) also observed there was a significant fall in the levels of blood glucose when alloxan induced diabetic respondents was treated with tulasi level extract for 30 days and study reveals that tulasi has ant hyperglycemic action.

Suanarunsawat et al. (2014) study conclude that treatment of AQOS (aqueous extracts of Ocimum sanctum L.) for three weeks significantly lowered blood glucose in DM rats. Devra et al., (2012) conclude that the significant fall in fasting blood sugar and HbA<sub>1</sub>C may be attributed to the hypoglycemic effect of Tulsi. Other studies conducted that after intervention of Tulsi leaves blood sugar level were decreased. (Srinivasa P., 2014, and JMS Hannan, 2015).

It can be concluded that in metabolic syndrome, Tulsi therapy significantly reduces blood sugar. It shows the therapeutic effect of Tulsi and it may be used as an adjunct with diet and drugs in the management of metabolic syndrome.

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