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Preliminary phytochemical screening and micromeretic parameters of *Ocimum sanctum* L.

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ABSTRACT

Ocimum sanctum L. (Family- Lamiaceae) is an erect annual grows 0.5-1.5 meters in height .The leaves are opposite, about 2-4 cm long, margins entire or toothed, hairy on both the surfaces and are aromatic. The leaves contain eugenol, eugenal, carvacrol, methylchavicol, limatrol and caryophylline. The use of this herb has been reported in Indian Traditional Systems of Medicine and its modern applications are receiving wide spread attention day by day. It has been observed that Ocimum sanctum L. has antioxidant, antibiotic, immunomodulatory, anti-inflammatory, analgesic, antiulcer, chemopreventive and antipyretic properties. The investigation was carried out to determine the qualitative analysis of phytochemical Screening and possible chemical components Ocimum sanctum L. leaves. Preliminary phytochemical examination of different extracts of O. sanctum L. leaves shows the presence of Alkaloid, carbohydrates, Glycosides, Volatile oil, Flavanoids, Terpenoids and Tannins. Physicochemical parameters of leaves of the plant are like foreign organic matter (1.5%), total ash (9.2% w/w), acid insoluble ash (5.5% w/w) and water soluble ash (7.5% w/w) were found. Alcohol soluble extractive and aqueous extractive values were found 5.2 & 6.0 % w/w respectively. Micromeretic parameters were also determined and angle of repose (30.96), bulk density (0.24) and tapped density (0.27) were found respectively. From the ongoing studies it can be concluded that the above pharmacognostical characteristics, phytochemical parameters, Micromeretic parameters, together may be utilized for the future studies on O. sanctum L. leaves and might be useful to supplement information about its identification parameters assumed significantly in the way of acceptability of herbal drugs in present scenario lacking regulatory laws to control quality of herbal drugs.

Key words: Physicochemical, micromeretic, extractive values.

INTRODUCTION

Conventional medicine involves the use of herbal medicine, animal parts and minerals. However, herbal medicines are the most widely used of the three. Herbal medicines contain active constituent, aerial or alternative parts of plants as their petal or seeds materials or combinations thereof, whether in the crude state or as plant preparations [1]. Despite the vast scientific development in contemporary medicine, many people in world still rely on traditional curative practices and medicinal plants for their daily healthcare requirements [2]. In most of the developing countries of the world, rural and urban dwellers, literate or illiterate rely heavily on herbal preparations for the treatment of various diseases despite the availability of conventional medicine [3].

Ocimum sanctum L. is an erect annual grows 0.5-1.5 meters in height .The leaves are opposite, about 2-4 cm long, margins entire or toothed, hairy on both the surfaces and are aromatic. The flowers tiny, purple and inflorescence is

a long spike or 12-14 cm in length. The fruits are small, smooth nut lets, reddish grey in color. The leaves contain eugenol, eugenal, carvacrol, methylchavicol, limatrol and caryophylline. The seeds contain oil composed of fatty acids and sitosterol. The roots contain sitosterol and three triterpenes A, B, and C. The leaves also contain a steroid ursolic acid, n-triacontanol, eugenol (70.5), its methyl ether (4.8), nerol (6.4), caryophyllene (7.5), terpinen (0.4), decyl aldehyde (0.2), selinene (0.4), pinene (0.4), camphene (2.0) and a-pinene (3.5%). Tulsi has mild antiseptic, analgesic properties and it relieves the swellings also. The dressing with the pulp of its leaves effectively controls the infections and hastens the healing of chronic infected wounds [4] [5].

MATERIALS AND METHODS

Procurement and authentication of Crude drugs:
The *Ocimum sanctum* L. levaes were procured from the local area of Bhopal (M.P.) and authenticated from Department of Botany, Safia College Bhopal. (Specimen Voucher No. 278/bio/saf/11/c). After authentication the leaves were shade dried and ground in a mechanical grinder to obtain coarse powder for extraction

Pharmacognostic examination:
(I) Macroscopic examination: The morphological studies such as size, shape, color, odor and taste of *Ocimum sanctum* L. were carried out. (Table: 1)

(II) Microscopic examination:
Leaves of *O. sanctum* L.:
Upper epidermis shows transparent cells with thin walls and thin smooth cuticle. Lower epidermis shows a layer of small, quadrangular transparent cells with thin walls and thin smooth cuticle. Short glandular trichomes are seen. Parenchyma's with cylindrical cells are observed, Vascular bundles, collenchyma cells, Diacytic stomata are also observed. (Figure:1)

Micromeretic parameters: [6]
(i) Angle of repose: Angle of repose is the maximum angle possible between the surface of a pile of the powder and the horizontal plane.

Procedure: A glass funnel was held in place with a clamp on a ring support over a glass plate. 50 gm of powder was transferred in to the funnel. As the thumb was removed, the lab-jack was adjusted so as to lower the plate and maintain about a 6.4 mm gap between the bottom of the funnel stem and the top of the powder pile. When the powder was emptied from the funnel, the angle of the heap to the horizontal plane was measured with the protractor and calculated by following formula.(Table:2)

$$\tan \theta = h/r$$

$$\theta = \tan^{-1} h/r$$

Where,
h = height of pile, θ = angle of repose, r = radius of the base of the pile

(ii) Bulk Density: Bulk density is the mass of powder divided by its bulk volume. 50gm of powder was introduced in to the bulk density apparatus and the timer knob was set for 100 tappings. The volume occupied by the powder was noted. Further, another 50 taps continued and the process of tapping is continued until concurrent volume was achieved. This final volume was the bulk volume. Bulk density was calculated by using this equation. (Table: 2)

$$\text{Bulk density } (\rho) = \frac{\text{Mass of powder}}{\text{Bulk volume}}$$

(iii) Tapped Density: Tapped density was achieved by mechanically tapping a measuring cylinder containing a powder sample. After observing the initial volume, the cylinder was mechanically tapped, and volume readings are taken when little further volume change was observed. (Table: 2)

$$\text{Tapped density } (\rho) = \frac{\text{Mass of powder}}{\text{Tapped volume}}$$

Extraction: The leaves were cleaned and chopped in to small pieces and dried under shade. The dried plant material was powdered and passed through the coarse sieve (No 10/44). This powder was macerated using alcohol and distilled water for 7 days with occasional shaking. The extract was filtered through muslin cloth, then the filtrate was evaporated under reduced pressure and vacuum dried. The preliminary Phytochemical screening of the extract was then carried out [7].

Physical Evaluation: [7] [8]
(i) Determination of foreign matter: 10 gm of the sample was weighed and spread on a white tile uniformly without overlapping. Then the sample was inspected by means of 5x lens and the foreign organic matter was separated. After complete separation the matter was weighed and percentage w/w was determined. (Table: 3)

(ii) Determination of Ash value:
a. Determination of total ash: Total ash was determined by weighing 2 gm of the air dried crude drug in the tared platinum or silica dish and incinerated at a temperature not exceeding 450°C until free from carbon and then was cooled and weighed. (Table: 3)

$$\% \text{ Total ash value} = \frac{\text{Wt. of total ash}}{\text{Wt. of crude drug taken}} \times 100$$

b. Determination of acid insoluble ash: The ash obtained from the previous process was boiled with 25ml of 2M HCl for 5 min. .The insoluble matter was collected on ash-less filter paper and was washed with hot water, ignited, cooled in a dessicator and weighed. Percentage of acid insoluble ash was calculated with reference to the air dried drug. (Table: 3)

$$\% \text{ Acid insoluble ash value} = \frac{\text{Wt. of acid insoluble ash}}{\text{Wt. of crude drug taken}} \times 100$$

c. Determination of water soluble ash: The ash was boiled with 25ml of water for 5 min. . The insoluble matter was collected on ash-less filter paper and was washed with hot water, ignited for 15min. at a temperature not exceeding 450°C. The weight of the insoluble matter was subtracted from the weight of the ash and this represents the water soluble ash. Percentage of water soluble ash was calculated with reference to the air dried drug. (Table**:** 3)

$$\% \text{ Water soluble ash value} = \frac{\text{Wt. of Water soluble ash}}{\text{Wt. of crude drug taken}} \times 100$$

(iii) Determination of solvent extractive value:
A. Determination of water soluble extractive value: Five gm of powdered drug was macerated with 100ml of water closed flask for 24 hr and was occasionally shaked with 6hr time period and was allowed to stand for 18hr. After filtration the 25ml of the filtrate evaporated to dryness in a tarred flat bottomed shallow dish. Dried at 105°C and weighed. Percentage of water soluble extractive value was calculated with reference to the air dried drug. (Table: 4)

B. Determination of alcohol soluble extractive value: Five gm of powdered drug was macerated with 100ml of ethanol closed flask for 24 hr and was occasionally shaked with 6hr time period and was allowed to stand for 18hr. After filtration the 25ml of the filtrate evaporated to dryness in a tared flat bottomed shallow dish. Dried at 105°C and weighed. Percentage of ethanol soluble extractive value was calculated with reference to the air dried drug. (Table**:** 4)

Phytochemical Screening: [8] [9] [10]
The extracts obtained were subjected to various qualitative tests to reveal the presence or absence of common phytopharmaceuticals. (Table**:** 5)

RESULTS AND DISCUSSION

O. sanctum L. *is* used in the treatment of various disease conditions. The standardization of a crude drug is an integral part of establishing its correct identity. The present study is associated to pharmacognostical, physical constants and preliminary phytochemical screening of *Ocimum sanctum* L. leaves. Phytochemical study is also useful to isolate the pharmacologically active principles present in the drug. Preliminary phytochemical examination of different extracts of *O. sanctum* L. leaves shows the presence of Alkaloid, carbohydrates, Glycosides, Volatile oil, Flavanoids ,Terpenoids and Tannins. Physicochemical parameters of leaves of the plant are like foreign organic matter (1.5%), total ash (9.2% w/w), acid insoluble ash (5.5% w/w) and water soluble ash (7.5% w/w) were found. Alcohol soluble extractive and aqueous extractive values were found 5.2 & 6.0 % w/w respectively. Micromeretic parameters were also determined and angle of repose (30.96), bulk density (0.24) and tapped density (0.27) were found. The other parameters observed are also useful for the future identification of the plant and serves as a standard monograph for identification and evaluation of plant.

Table: 1 Morphological Parameter

S. No.	Name of the drug	Part of the plant	Size	Shape	Color	Odour	Taste
1.	*Ocimum sanctum* L.	Leaves	1.5-2 cm	Oblong, acute, serrate margin	Green	Aromatic	Slightly pungent

Table: 2 Micromeretic Parameters

S. No.	Drug	Angle of repose	Bulk density	Tap density
1.	*O. sanctum* L.	30.96	0.24	0.27

Table: 3 Physico-chemical Characteristics

S. No.	Name Of The Drug	Foreign Organic Matter (%)	Total Ash Value (% w/w)	Acid Insoluble Ash Value (% w/w)	Water Soluble Ash Value (% w/w)
1.	*O. sanctum* L.	1.5	9.2	5.5	7.5

Table: 4 Solvent Extractive Values

S. No	Name of the drug	Water soluble Extractive value (%w/w)	Alcohol soluble Extractive value (%w/w)
1.	*O. sanctum* L.	6.0	5.2

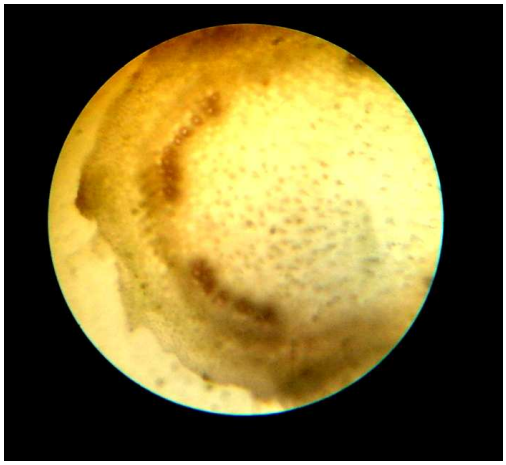

Figure: 1 T.S. of *Ocimum sanctum L.*

Table: 5 Qualitative Phytochemical Tests

S. No.	Compound	Alcoholic extract of *O. sanctum* L.	Aqueous extracts of *O. sanctum* L.
1.	Alkaloids	+	–
2.	Carbohydrates	+	–
3.	Glycosides	+	–
4.	Proteins	–	–
5.	Gums & resins	–	–
6.	Terpenoids	+	+
7.	Volatile oil	+	–
8.	Tannins	+	+
9.	Flavanoids	+	+

Where, + = *Present* – =*Absent*

CONCLUSION

For the proper identification of plant, physicochemical parameters provide useful information. From the ongoing studies it can be concluded that the above pharmacognostical characteristics, phytochemical parameters, micromeretic parameters, together may be utilized for the future studies on *O. sanctum* L. leaves and might be useful to supplement information about its identification parameters assumed significantly in the way of acceptability of herbal drugs in present scenario lacking regulatory laws to control quality of herbal drugs. This makes the plant beneficial for the future pharmacological activities.

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REFERENCES

[1] Salahdeen HM, Yemitan OK , *African Journal of Biomedical Research*, **2006**, 9,101 – 107
[2] World Health Organisation: WHO Guideline for the Assessment of herbal Medicines, WHO expert committee on specification for pharmaceutical preparation. Technical Report series No 863. Geneva, **1996.**
[3] Nwabuisi C, Prophylactic Effect of Multi-Herbal Extract "Agbo- Iba" on Malaria induced in Mice, *East Afri Med* Journal, **2002**, 79(7): 343-346.
[4] Dorenburg, Andrew Page, Karen, The New American Chef: Cooking with the Best Flavors and Techniques from Around the World, John Wiley and Sons Inc., **2003**, 103.
[5] Balch, Phyllis, Balch James, Prescription for Nutritional Healing, 3rd ed., Avery Publishing, **2000**, 94.
[6] Martin AJ, Physical Pharmacy, B. I. Waverly Pvt. Ltd. New Delhi, fourth edition, **1994**, 423-452.
[7] Kokate CK, Practical Pharmacognosy, fourth edition, Vallabh Prakashan, Delhi, **2001**, 108-111,125.
[8] Harborne JB, Phytochemical Methods, chapman and hall, Newyork, **1984**, 6.
[9] Kokate CK, Purohit AP, Gokhle SB , Textbook of Pharmacognosy, Nirali prakashan, pune, **1996**, 533-537.
[10] Wagner H, Blandt S, Zgainsky EM , Plant Drug Analysis, sprigher veralg, Heidelberg, **1996**,170-176.