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Pharmacognostical and Phytochemical Investigation of Tulsi Plants Available in Western Bareilly Region

Tripathi Devika and Verma Shashi

Department of Pharmacy, Shri Ram Murti Smarak College of Engineering and Technology, Bareilly, India

Abstract: The various species of Ocimum (Lamiaceae) i.e. *Ocimum basilicum* Linn. and *Ocimum sanctum* are widely distributed in western part of Bareilly. The present study deals with pharmacognostical examination include the morphological, microscopical characters and physical constants of leaves of various Ocimum species including determination of loss on drying, ash values and extractive values. The preliminary phytochemical screening of various leaf extracts was also carried out and it is revealed the presence of various phytoconstituents like carbohydrates, flavonoids, protein and amino acids, tannins, phytosterols and saponins. The results of the standardization may throw immense light on the botanical identity of various species of Ocimum which may furnish a basis of judging the authenticity of the plant and also to differentiate the drug from its allied species and detect adulterants.

Key words: *Ocimum sanctum* · *Ocimum basilicum*

INTRODUCTION

Ocimum sanctum Linn. (Holy basil in English) is a 30-75 cm high erect herb which is grown practically in every part of India. Leaves are 2.5-5 cm. long and 1.6-3.2 cm broad, elliptical, oblong obtuse. Flowers are in racemes 15-20 cm. long in close whorls. Odour and taste are aromatic and sharp. *Ocimum basilicum* Linn. (Sweet basil in English) is an aromatic plant, nearly glabrous branching herb, 60-90 cm in height with hairy stems, branches green; opposite green leaves simple, opposite, ovate, acute, entire, base cuneate, glabrous on both surfaces and are strongly scented; flowers white or pale purple in simple or much branched racemes; fruits ellipsoid nutlets, black and pitted [1-4].

MATERIALS AND METHODS

Collection and Authentication of Plant Material: The leaves of Ocimum species (*O. Sanctum* linn. and *O. basilicum* Linn.) were collected from the local area of western Bareilly (India) in the month of January 2014. The plant material were identified and authenticated by the Department of Pharmacognosy. The Herbarium specimen (No. 170) of plant was deposited and it has been identified from Shri Ram Murti Smarak College of Engineering and Technology, Bareilly. The collected leaves were shade dried under normal environmental condition, powdered, stored in a closed container for further use.

Chemicals: All the solvents and chemicals used were purchased from Merck chemical (LR grade), India.

Macroscopic Examination: The various leaves of Ocimum species was studied individually for its morphological characters such as colour, odor, taste, shape, size, etc [4, 5, 6].

Determination of Physical Constants

Ash Values: The ash values are useful to determine the quality and purity of the crude drug. Ash contains inorganic radicals like phosphate, carbonates and silicates of sodium, potassium, magnesium, calcium, etc. Such variable are then removed by treating with acid. Different ash values like total ash, water soluble ash, acid insoluble ash and sulphated ash were determined as per standard procedure mentioned in WHO Library [4, 6, 7].

Extractive Values: Extractive values are useful for evaluation of crude drugs. It gives an idea about the nature of the chemical constituents present in the crude

Corresponding Author: Tripathi Devika, Department of Pharmacy, Shri Ram Murti Smarak College of Engineering and Technology, Bareilly, India. Tel: +91-8853179519.

drug. Different extractive values like water soluble extractive and alcohol soluble extractive value were determined as per standard procedure mentioned in WHO Library [4,7, 6].

Foreign Organic Matter and Moisture Content: Foreign organic matter was determined from the weight of the drug taken and moisture content was determined by loss on drying method in terms of percent w/w as per standard procedure mentioned in WHO Library [4, 7, 6].

Reaction of Powdered Drug with Different Reagents: Powdered drug was treated with different reagents and colored shown by that treatment is noted down [4, 8].

Fluorescence Analysis: luorescence characteristic of powdered drug with different reagent were observed under day light and U.V. light after drug treatment with different reagents [4, 8].

Preliminary Phytochemical Screening: Freshly prepared various extracts of leaves were tested for the presence of phytochemical constituents by using reported methods [1, 5, 4, 6, 9].

RESULTS AND DISCUSSION

Macroscopic Evaluation

***Ocimum basilicum* Linn:** An erect, aromatic, nearly glabrous branching herb, 50-80 cm in height with hairy stems, branches green or purplish; opposite green or purple leaves simple, opposite, ovate, acute, entire or toothed, base cuneate, glabrous on both surfaces and that are strongly scented; flowers white or pale purple in simple or much branched racemes often thyrsoid; fruits ellipsoid nut lets, black and pitted.

***Ocimum sanctum* Linn:** Annual herb 30-75 cm high, much branched, stems and branches usually purplish. Leaves are 2.5-5 cm. long and 1.6-3.2 cm broad, elliptical, margin entire or serrate, surface pubescent on sides, minutely gland dotted, base obtuse or acute, petioles 1.3-2.5 cm. long slender, hairy. Inflorescence verticillaster, flowers in racemes 15- 20 cm. Bracts 3 mm. Corolla 4 mm long, purplish, bilabiate upper lip pubescent on the back. Seeds brownish, globose or subglobose. Odour and taste aromatic and sharp. The fruit is a caeruleus.

Fig. 1: Plant image of *Ocimum basilicum* linn

Fig. 2: Plant image of *Ocimum sanctum* linn

Determination of Physical Constant

Moisture Content of Various Ocimum Species:

Table 1: Determination Of Physical Constants: (Moisture Content, Extractive Values, Ash Values And Foreign Organic Matter)- Data Showing Moisture Content Of Various Ocimum Species- Data Showing Ash Values Of Various Ocimum Species

Drug	Moisture content (%w/w)
Ocimum basilicum	0.1
Ocimum sanctum	0.8

DATA SHOWING EXTRACTIVE VALUES OF VARIOUS OCIMUM SPECIES

Drug	Water soluble extractives (%w/w)	Alcohol soluble extractives(%w/w)	Ether soluble extractives (%w/w)
Ocimum basilicum	6.21	4.0	3.5
Ocimum sanctum	4.1	2.5	3.9

Data Showing Ash Values of Various Ocimum Species

Drug	Total ash (%w/w)	Acid insoluble ash (%w/w)	Water soluble ash (%w/w)	Sulphated ash (%w/w)
Ocimum basilicum	8.0	0.2	3.2	0.5
Ocimum sanctum	8.6	0.8	3.6	0.8

Table 2: Phytochemical Screening of Various Tulsi Extracts

Phytochemical	*O. basilicum*	*O. sanctum*
Alkaloids	+	+
Glycoside	+	+
Anthraquinone glycosides	-	-
Gums, mucilage	+	+
Proteins	+	+
Amino acids	+	+
Tannins	+	+
Phenolic compounds	+	+
Steroids	+	+
Saponins	+	+
Flavonoids	+	+

Table 3: Behavior Of The Powder Of Various Ocimum With Different Chemical Reagents

Treatment	Colour
Powder as such	Pale green
Powder + Conc. sulphuric acid	Greenish black
Powder + Conc. nitric acid	Brownish yellow
Powder + Conc. Hydrochloric acid	Pale yellow
Powder + 5% I	Brownish yellow
Powder + 5M NaOH	Yellowish green
Powder + glacial Acetic acid	Pale green
Powder + 80% H_2SO_4	Black

Table 4: Showing Fluorescence Characteristic Of Drug With Different Chemical Reagent-(G: Green, P: Pink, R: Red, Db: Dark Black, Bb: Brownish Black, Ybr: Yellowish Brown, Gbr: Greenish Brown, Dybr: Dark Yellowish Brown, Gp: Greenish Pink, Yg: Yellowish Green, Lyg: Light Yellowish Green, Yr: Yellowish Red, Py: Pinkish Yellow

		Ocimum basilicum			*Ocimum sanctum*		
S.NO.	Material	Day light	UV 254 nm	UV 366 nm	Day light	UV 254 nm	UV 366 nm
1	Powder as such	LG	GY	GY	G	G	G
2	P + Hcl (1N)	P	DB	DB	P	DB	DB
3	P + 50% KOH	DYBR	DB	DB	DYBR	DB	DB
4	P + 50% H_2So_4	YG	DB	DB	PY	DB	DB
5	P + 50% HNO_3	GP	DB	DB	P	DB	DB
6	P + Conc. HNo_3	R	DB	DB	R	DB	DB
7	P + Conc.H_2So_4	BB	DB	DB	BB	DB	DB
8	P + Iodine in water	GP	DB	DB	P	DB	DB
9	P + In NaOH (1N) in methanol	YBR	DB	DB	YG	DB	DB

CONCLUSION

The present study is related to pharmacognostical, physical constants and preliminary phytochemical screening of various species of Ocimum leaves provided useful information about its correct identity and evaluation. It helps to differentiate from the closely related other species of Ocimum. Phytochemical study is also useful to isolate the pharmacologically active principles present in the drug. 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.

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