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QUALITATIVE ESTIMATION OF PHYTOCHEMICALS IN DIFFERENT *OCIMUM* SPECIES OF CHHATTISGARH

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Key words: *Tulsi, Phytochemical extraction, Phytochemical estimation.*

Abstract – Medicinal plants and herbs have been proved to be of great importance to the health of the individuals and communities. The potential for developing antibacterial from higher plants appears rewarding as it will result to the development of a phytomedicine to act against microbes. Phytochemical screening of Tulsi plant (*Ocimum sp*.) was studied in the present investigation. Phytochemical analysis of methanol and aqueous extracts of *O. tenuiflorum, O. gratissum* and *O. sanctum* demonstrated the presence of phytoconstituents like Tannins, Alkaloids, Saponins, Glycosides, Terpenoids, Flavonoids, Phenols, Carbohydrates, Steroids, and Anthraquinones. Presence of such phyto constituents will increase interest with the mankind to develop anti-microbial drugs using different species of *Oscimum* for varied microbes.

INTRODUCTION

Medicinal plants form the major part of the raw materials used by the Ayurvedic practitioners. Tulsi itself is originated from Sanskrit language which means "matchless one". This is considered as popular basil and is placed at the top of herbs because it is excessively used to its economic, nutritional and medicinal properties. Volatile oil such as monoterpenes, sesquiterpenes, and aromatic constituents had been reported in the fixed oil obtained from the leaves of the plant. For this, a scientific investigation of the medicinal plants embodying proper identification of all plants and correlating them properly to the drugs described in Ayurvedic literature is absolutely necessary. This can be possible only by the study of pharmacognosy. It is one of the holiest and sacred herbs grown in India and Hindus worship this plant. There are many chemical constituent present in *ocimum sanctum* such as, oleanolic acid, rosmarinic acid, ursolic acid eugenol, linalool, carvacrol, β elemene, β caryophyllene, germacrene. *ocimum sanctum* is considered to have diuretic, stimulant property (Falagas *et al*., 2007). Volatile oil, fixed oil also obtained from the leaves of medicinal herbs (Sharma *et al*., 2001). Monoterpene are obtained from the the volatile oils such as, camphene, myrcene, sabinene, in which some mono terpene produced oxygen such as linalool, borneol (Sethi *et al*., 2004). This plant is known to possess antiseptic, analgesic, anti-inflammatory, antimicrobial, antistress, Immunomodulatory, hypoglycemic, hypotensive and antioxidant properties. In view of this background, we performed the extraction and preliminary phytochemical analysis of the aqueous extract of three different *Ocimum* species found in different agro-climatic zones of Chhattisgarh.

MATERIALS AND METHOD

All three species of *Ocimum* were collected from different agro-climatic zones of Chhattisgarh. After selection of all the species viz. of *O. tenuiflorum*, *O. gratissum* and *O. sanctum* they were brought to the laboratory and dried under shade for future experiments. Collection of the leaves were done in the month of March 2020. For phytochemical qualitative estimation different methods were used for all the phytoconstituents.

1. Alkaloids: 6 ml of aqueous extract was mixed with 6 ml of 1% hydrochloric acid in steam bath. Then it was filtered and 1 ml of Mayer's reagent was added.
2. Saponins: 0.5 g of the powdered extract was dissolved in 5 ml of distill water. The mixture was shaken vigorously. Formation of stable persistent froth was observed to see presence of

saponins. Further addition of 6 drops of olive oil forms emulsion.

3. Cardiac Glycosides: 2.5 g of powdered sample was added to 2.5 ml of distill water to this 1 ml glacial acetic acid containing few drops of ferric chloride was added. Then 0.5 ml of concentrated sulphuric acid was added, presence of brown ring at the interface indicates the presence of deoxy sugar. A violet ring below the brown ring was observed, while a greenish ring also appear above the brown ring confirms the presence of cardiac glycoside.
4. Flavonoids: 5 ml dilute ammonia was added to 5 ml extract, 5 ml concentrated sulphuric acid give formation of yellow colour solution shows positive result.
5. Phenol: 2 ml of extract dissolved in 4 ml of distilled water and few drops of 10% ferric chloride was added to give blue or green colour which indicates presence of phenol.
6. Tanins: 0.5 g of the extract dissolved in 10 ml of distilled water and few drops of 1% ferric chloride solution was added to give brownish green or blue-black precipitate which confirms the presence of tanins.
7. Terpenoids: 0.5 g extract dissolved in 2 ml of Chloroform followed by 3 ml concentrated Sulphuric acid was added to give reddish brown colour in interface indicates the presence of terpenoids.
8. Anthraquinone: 2.5 g extract dissolved in 5 ml of concentrated. Sulphuric acid and filtered. The filtrate was dissolved in 2.5 ml of chloroform. Then the chloroma form layer was pippeted out into a tube. To this 0.5 ml of 10% distill ammonia was added, which give formation of pink red or violet colour, hence shows the presence of anthraquinone.

RESULTS AND DISCUSSION

The use of medicinal plants plays a vital role covering the health needsin developing countries, and these plants may offer a new source of antibacterial agents with significant activity against infective bacteria.

The phytochemical screening of *Ocimum sanctum* with Petroleum Ether, Methanol, ester, formaldehyde and chloroform extract showed the presence of secondary metabolites such as Tannins, Alkaloids, Saponins, Glycosides, Terpenoids, Flavonoids, Phenols, Carbohydrates, Steroids, and

Table 1. Phytochemical analysis of *Ocimum sanctum*

Phytoconstituents	*Ocimum sanctum*				
	Ester	Petroleum ether	Methanol	Chloroform	Formaldehyde
Tannins	+	-	+	+	+
Alkaloids	-	-	+	+	+
Terpenoids	+	-	+	+	-
Glycosides	-	-	+	-	-+
Saponins	-	+	+	+	-
Flavonoids	-	+	+	+	+
Phenols	+	-	+	-	-
Carbohydrates	+	+	-	-	-
Steroids	+	-	+	+	+
Anthraquinones	-	-	-	-	-

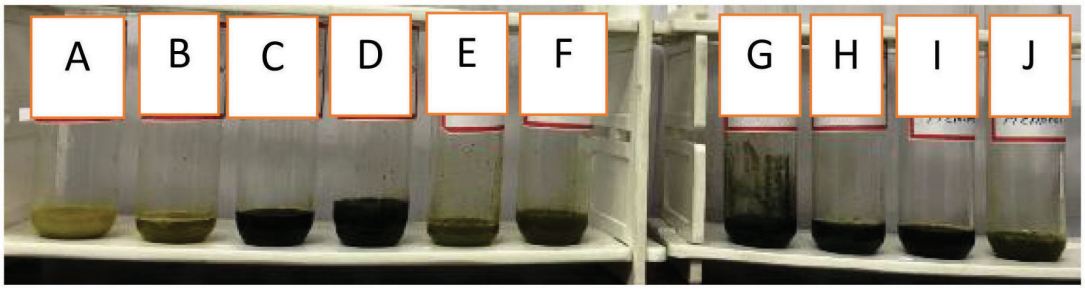

Fig. 1. Phytochemical test of Methanol extract of *Ocimum sanctum* (a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j) Anthraquinones

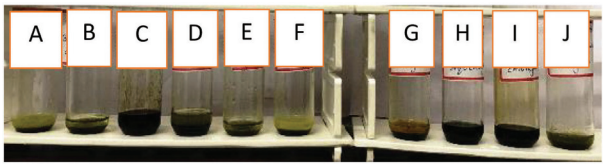

Fig. 2. Phytochemical test of chloroform extract of *Ocimum sanctum* (a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

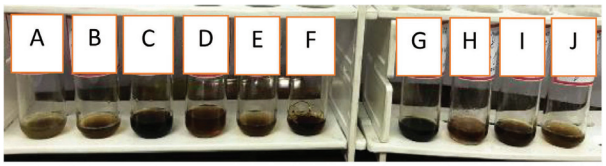

Fig. 3. Phytochemical test of extract ester of *Ocimum sanctum* (a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavanoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

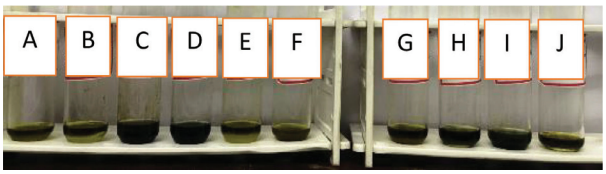

Fig. 4. Phytochemical test of petroleum ether extract of *Ocimum sanctum* (a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g) Anthraquinones, (h) Steroids, (i) Carbohydrate, (j)Phenols

Anthraquinones (Table 1).

The phytochemical screening of *Ocimum gratissum* with Petroleum Ether, Methanol, ester, formaldehyde and chloroform extract showed the

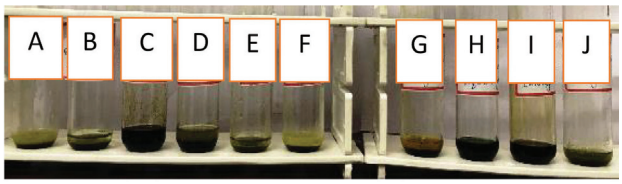

Fig. 5. Phytochemical test of formaldehyde extract of *Ocimum sanctum* (a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g) Anthraquinones, (h) Steroids, (i) Carbohydrate, (j)Phenols

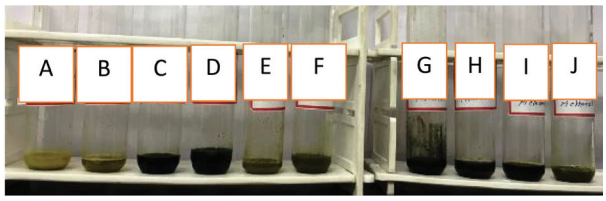

Fig. 6. Phytochemical test of Methanol extract of *Ocimumgratissum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

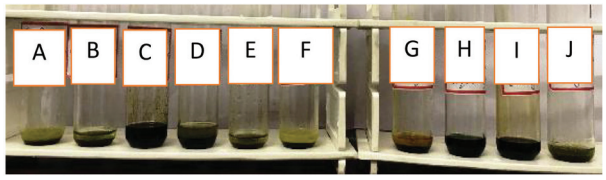

Fig. 7. Phytochemical test of chloroform extract of *Ocimumgratissum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

presence of secondary metabolites such as Tannins, Alkaloids, Saponins, Glycosides, Terpenoids, Flavonoids, Phenols, Carbohydrates, Steroids, and Anthraquinones (Table 1).

Table 2. Phytochemical analysis of *Ocimum gratissum*

Phytoconstituents	*Ocimum gratissum*				
	Ester	Petroleum ether	Methanol	Chloroform	Formaldehyde
Tannins	+	-	+	+	+
Alkaloids	-	-	-	-	-
Terpenoids	+	+	+	-	+
Glycosides	+	-	-	-	-
Saponins	-	+	+	+	-
Flavonoids	+	+	+	+	+
Phenols	+	+	+	-	-
Carbohydrates	+	+	+	+	-
Steroids	+	+	+	+	+
Anthraquinones	-	-	-	-	-

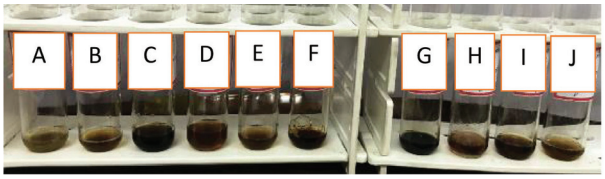

Fig. 8. Phytochemical test of extract ester of *Ocimumgratissum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavanoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

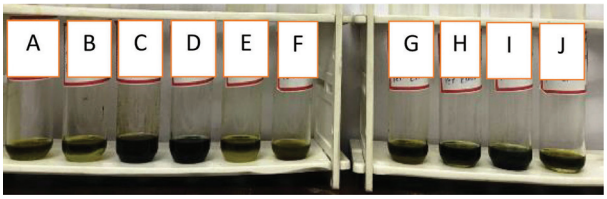

Fig. 9. Phytochemical test of petroleum ether extract of *Ocimumgratissum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g) Anthraquinones, (h) Steroids, (i) Carbohydrate, (j)Phenols

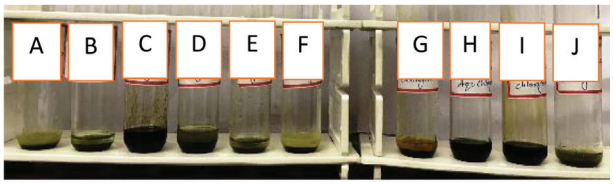

Fig. 10. Phytochemical test of formaldehyde extract of *Ocimumgratissum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g) Anthraquinones, (h) Steroids, (i) Carbohydrate, (j)Phenols

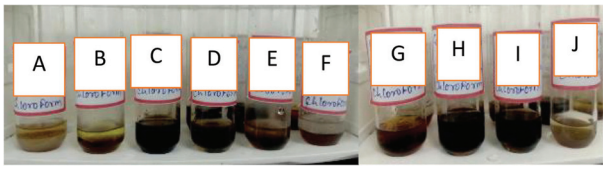

Fig. 11. Phytochemical test of Chloroform extract of *Ocimumtenuiflorum*(a) Tannins, (b)Alkaloids (c) Terpanoids, (d) Glycosides, (e) Saponins, (f) Flavanoids, (g) Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

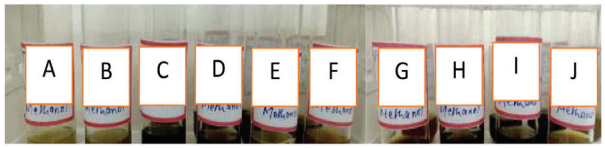

Fig. 12. Phytochemical test of Methanol extract of *Ocimumtenuiflorum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

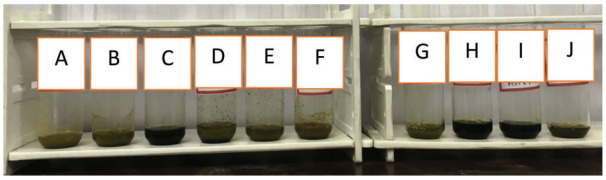

Fig. 13. Phytochemical test of Petroleum ether extract of *Ocimumtenuiflorum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j) Anthraquinones

The phytochemical screening of *Ocimumtenui florum* leaves with Petroleum ether, Methanol, ester, formaldehyde and Chloroform extract showed the presence of secondary metabolites such as Tannins, Alkaloids, Saponins, Glycosides, Terpenoids, Flavonoids, Phenols, Carbohydrates, Steroids, and Anthraquinones (Table 1).

Table 3. Phytochemical analysis of *Ocimum tenuiflorum*

Phytoconstituents	*Ocimum tenuiflorum* leaves				
	Ester	Petroleum ether	Methanol	Chloroform	Formaldehyde
Tannins	-	-	+	+	-
Alkaloids	+	-	+	-	+
Terpenoids	-	+	+	+	+
Glycosides	+	-	+	+	-
Saponins	-	-	+	-	-
Flavonoids	+	+	+	-	+
Phenols	+	-	+	-	-
Carbohydrates	-	+	+	+	+
Steroids	-	+	-	+	-
Anthraquinones	-	-	-	-	-

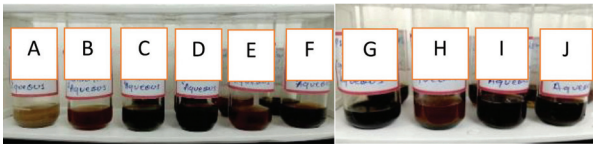

Fig. 14. Phytochemical test of ester extract of *Ocimumtenuiflorum*(a) Tannins, (b)Alkaloids (c) Terpenoids, (d) Glycosides, (e) Saponins, (f) Flavonoids, (g), Phenols, (h) Carbohydrate, (i) Steroids, (j)Anthraquinones,

Conflict of interest: There is no conflict of interest.

REFERENCES

Borah, R. and Biswas, S.P. 2018. Tulsi (*Ocimum sanctum*), excellent source of phytochemicals. *International Journal of Environment, Agriculture and Biotechnology.* 3: 1732-1738. Link: http://bit.ly/32EZtJo

Falagas, M.E. and Bliziotis, I.A. 2007. Pan drug-resistant Gram-negative bacteria the dawn of the post antibiotic era. *Int J Antimicrobe Agent.* 29 : 630-636. Link: http://bit.ly/2GoBcO8

Gupta, S.K., Prakash, J. and Srivastava, S. 2002. Validation of traditional claim of Tulsi, *Ocimum sanctum* Linn, as a medicinal plant. *Indian J Exp Biol.* 40 : 765-773. Link: http://bit.ly/2XUMC7i

Khandelwal, K.R. 2001. Preliminary photochemical screening in Practical Pharmacognosy Techniques and Experiments. *Nirali Publication Pune*. 3 : 149-156.

Kirchner, G.J. 1973. Thin layer chromatograp is quantitative analysis. *Journal of Chromatography*. 82: 101-115. Link: http://bit.ly/2JV6wVN

Lahon, K. and Das, S. 2011. Hepatoprotective activity of *Ocimum sanctum* alcoholic leaf extract against paracetamol-induced liver damage in Albino rats. *Pharmacognosy Res*. 3 : 13-18. Link: http://bit.ly/2Z3cslL

Makkar, H., Bluemmel, M., Borowy, N. and Becker, K. 1993. Gravimetric determination of tannins and their correlations with chemical and protein precipitation methods. *J Sci Food Agric*. 61 : 161-165. Link: http://bit.ly/2SyI1S7

Pattanayak, P., Behera, P., Das, D. and Panda, S.K. 2010. *Ocimum sanctum* Linn A reservoir plant for therapeutic applications An overview. *Pharmacogn Rev.* 4 : 95-105. Link: http://bit.ly/2XXBGpl

Rao, S.A., Vijay, Y., Deepthi, T., Lakshmi, C.S. and Rani, V. 2013. Antidiabetic effect of ethanolic extract of leaves of *Ocimum sanctum* in alloxan induced diabetes in rats. *Int J Basic Clin Pharmacol*. 2 : 613-616. Link: http://bit.ly/2St5cNL

Sen, A., Mishra, S., Ghosh, A., Bhattacharjee, B. and Datta, S. 2017. Aqueous leaf extract of Tulsi (*Ocimum sanctum*) protects against high fat diet-induced injury to rat liver through antioxidant mechanisms a dose dependent study. *Journal of Pharmacy Research*. 11 : 334-351. Link: http://bit.ly/2y2WbSa

Sethi, J., Sood, S., Seth, S. and Talwar, A. 2004. Evaluation of hypoglycaemic and antioxidant effect of *Ocimum sanctum*. *Indian J Clin Biochem.* 19 : 152-155. Link: http://bit.ly/2ycMGA5

Sharma, M., Kishore, K., Gupta, S.K., Joshi, S. and Arya, D.S. 2001. Cardioprotective potential of *Ocimum sanctum* in isoproterenol induced myocardial infarction in rats. *Mol Cell Biochem.* 225 : 75-83. Link: http://bit.ly/2Z6UuyS

Uthayarasa, K., Pathmanathan, K., Jeyadevan, J.P., Jeeyaseelan, E.C. 2010. Antibacterial activity and qualitative phytochemical analysis of medicinal plant extracts obtained by sequential extraction method. *IJIB.* 10 : 76-81. Link: http://bit.ly/32CWEIV