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COMPARATIVE PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL
ACTIVITY OF ETHANOLIC AND WATER FLOWER EXTRACTS OF HIBISCUS
ROSASINENSIS LINN. (HIBISCUS RED)

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ABSTRACT

Hibiscus rosasinensis Linn. is one of the important medicinal as well as ornamental plant. Hibiscus rosasinensis is the national flower of Malaysia, called Bunga Raya in Malay (Verma, 2016; Pekamwaret al., 2013). The phytochemical screening of ethanolic and water extracts of this plant species are known to contain - Flavonoids, glycosides, terpenoids, phenolic compound, carbohydrates, proteins, tannins, gum and mucilage. Alkaloids, saponins, fixed oil and fats were totally absent. Anthoquinone and phytosterols present in ethanolic flower extract but absent in water extract. The presence of flavonoids, glycosides, phytosterols, terpenoids, phenolic compound and tannins are mainly contributed in medicinal utility of the plant.

Keywords- *Hibiscus rosa- sinensis*Linn., *phytochemical*, *extract.antibacterial*, *axillary solitary*, *complanate*.

I. INTRODUCTION

Hibiscus rosa- sinensis Linn. (Malvaceae) is one of the important medicinal as well as ornamental plant. Hibiscus rosasinensis is the national flower of Malaysia, called Bunga Raya in Malay (Verma, 2016; Pekamwaret al., 2013). Vernacular name of Hibiscus rosasinensisLinn.isJapa, Gurhal, Jusum, Beng etc. It is an evergreen woody glabrous showy shrub with about 1.5-2.5 m height. Leaves are coarsely toothed above and entire below ovate, bright green and 3 nerved at the base. The flowers are axillary solitary,complanate and variously coloured red, pink, yellow and white (Kaushik et al., 1999) (Fig No. 01).



Fig No. 01 - Hibiscus red

II. MATERIAL AND METHOD

For present investigation the plant material of Hibiscus rosasinensis Linn. (flower) were collected from D.A.V.V. campus Indore. The collected plant material was identified with the help of Flora of British India (Hooker J.D., 1875).

To obtain ethanolic extract 100 gms of shade dried plant material was extract with 500 ml of ethanol (95%) in “ Soxhlet Extraction apparatus”. Finally the prepared plant was macerated with water for 24 hrs. to obtain aqueous extract. The extract was concentrated by distilling off the solvent (Kokate, 1994; Kokate et al.,2000).

Each extract sample was tested for antimicrobial activity against human pathogenic bacteria by “Cup Borer Method” (Kavanagh, 1963; Cheesbrough, 1993).

The cultures of bacteria have been obtained from Microbial Type Culture Collection and Gene Bank Chandigarh. The name and culture number of bacteria are as follows: **-Gram positive Bacteria-** Staphylococcus aureus ATCC 9144, Bacillus subtilis ATCC 6633. **Gram negative Bacteria-** Escherichia coli MTCC 739, Salmonella typhi ATCC 10749, Pseudomonas aeruginosa ATCC 25668, Klebsiella pneumoniae ATCC 33495.

III. OBSERVATIONS AND DISCUSSION

Phytochemical screening of ethanolic and water extracts of flower shows the presence of Flavonoids, glycosides, terpenoids, phenolic compound, carbohydrates, proteins, tannins, gum and mucilage. Alkaloids, saponins, fixed oil and fats were totally absent. Anthraquinone and phytosterols present in ethanolic flower extract but absent in water extract (Table No. 01).

Table No.- 01 Preliminary phytochemical screening of flower extracts (ethanolic and water) of *Hibiscus rosasinensis* Linn. (*Hibiscus red*)

S No.	Plant constituentstest / Reagents	Results	
		Ethanolic extract	Water extract
1	Alkaloids		
	(i) Mayer’s reagent	-	-
	(ii) Wagner’s reagent	-	-
	(iii) Hager’s reagent	-	-
2	Carbohydrates		
	(i) Molisch s test	+	+
	(ii) Benedict s reagent	+	+
	(iii) Fehling solution	+	+
3.	Glycosides		
	(i) Keller kiliani test	+	+
4.	Phytosterols		
	(i) Liebermann's test	+	-
5.	Terpenoids		
	(i) Salkowski test	+	+
6.	Fixed oils and Fats		
	(i)Spot test	-	-
7.	Saponins		
	(i) Foam test	-	-
8.	Phenolic Compounds		
	(i) Ferric chloride solution	+	+
9.	Tannins		
	(i) Lead acetate solution	+	+
10	Proteins		
	(i)Xanthoproteic test	+	+
	(ii) Biuret test	+	+
11.	Amino acids		
	(i) Ninhydrin reagent	+	+
12.	Flavonoids		
	(i) Con. HCl + Magnesium ribbon	+	+

13.	Gums and Mucilages		
	(i) Alcoholic precipitation	+	+
	(ii) Molisch's test	+	+
14	Anthraquinones		
	Borntrager's test	+	-

The observations showed that ethanolic and water flower extract of Hibiscus Red (RF) having strong antibacterial activity against (Escherichia coli, Salmonella typhi, Pseudomonas aeruginosa, Klebsiella pneumoniae, Bacillus subtilis and Staphylococcus aureus) all the tested bacteria. (Table No. 02 and Fig No. 02,03)

Table No. – 02Antimicrobial activity of ethanolic and water flower extracts of Hibiscus rosasinensis Linn.

S. NO.	Extract used	Quantity of extract in ml	Escherichia coli.	Salmonella typhi .	Pseudomonas aeruginosa.	Klebsiella pneumoniae.	Bacillus subtilis.	Staphylococcus aureus.
			Average diameter of zone of inhibition in mm					
1	Ethanolic	0.05	No zone	No zone	10	No zone	10	No zone
		0.08	10	13	12	09	14	12
		0.11	15	19	15	11	19	15
		0.14	20	25	18	14	20	20
		0.17	25	30	24	22	22	25
		r		0.986394	0.978709	0.97824	0.970725	0.968246
2	Water	0.05	No zone	No zone	No zone	No zone	No zone	No zone
		0.08	8	10	10	No zone	10	No zone
		0.11	10	12	12	12	12	No zone
		0.14	12	15	15	15	15	15
		0.17	18	20	18	19	18	20
		r		0.966736	0.961152	0.945594	0.95686	0.945594

r = correlation coefficient,
r = +1 perfect positive correlation, r = -1 perfect negative correlation

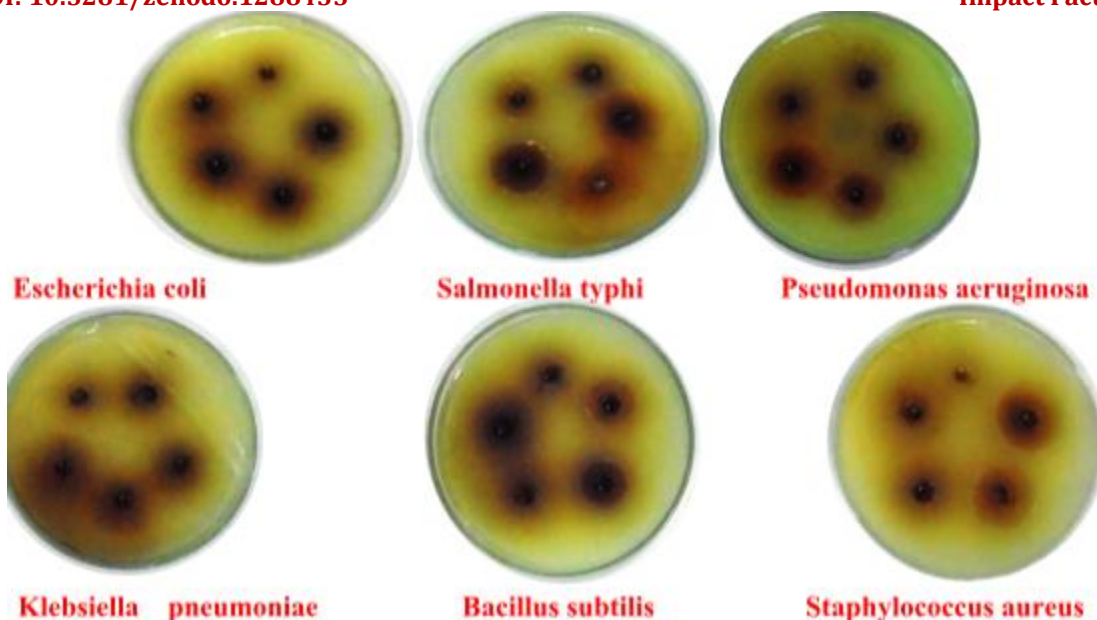


Fig. No.- 02 Antibacterial activity of ethanolic flower extract of *Hibiscus rosasinensis* Linn.

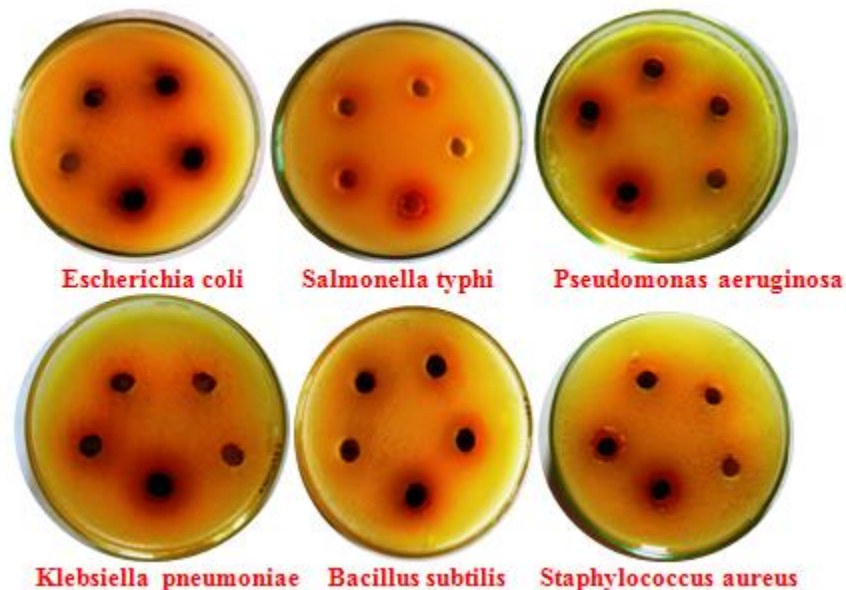


Fig. No.- 03 Antibacterial activity of water flower extract of *Hibiscus rosasinensis* Linn.

IV. CONCLUSION

The presence of flavonoids, glucosides, phytosterols, terpenoids, phenolic compounds and tannins is mainly contributed to the medicinal utility of the plant. Flavonoids are polyphenolic compound. Polyphenolic compounds shows a remarkable spectrum of biological activities including antiallergic, anti-inflammatory, antimicrobial, antioxidant, anticarcinogenic, antimutagenic and modulation of enzyme activities (Craig WJ. 1999; Middleton et al., 2000; Galati et al., 2000; Ren et al, 2003). *Hibiscus rosasinensis* Linn may be utilized in the preparation of some newer antibiotics against tested microorganism.

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REFERENCES

- [1] Cheesbrough, Monica (1993). *Medical laboratory manual for tropical countries, Vol II Microbiology. Greet Britain at the university press. Cambridge, 201.*
- [2] Craig WJ (1999). *Health-promoting properties of common herbs. Am. J. ClinNurr., 70: 491-499.*
- [3] Galati G., Ten S., Moridani MY., Chan TS and O'Brien PJ (2000). *Cancer chemoprevention and apoptosis mechanisms induced by dietary polyphenolics. Drug Metabolism and Pharmacokinetics, 17:311-349.*
- [4] Hooker, J.D., (1875). *Flora of British India, Vol I. L. Reeve and Co Ltd. The oast house, Brook. N.R. Ashford, Kent England. 344.*
- [5] Kaushik, Purshotam and Dhiman, Anil kumar., (1999). *Medicinal plant and row drugs of India. Bishen Singh Mahendra pal Singh publication, Dhehra Dun. 126-127.*
- [6] Kavanagh, F. (1963). *Analytical microbiology. Academic Press, London, 125-141.*
- [7] Kokate, C.K., (1994). *Practical pharmacognosy – Fourth Edition, Vallabhprakashan, Delhi. 107-111.*
- [8] Kokate, C.K., Purohit A.P. and Gokhale S.B., (2000). *Pharmacognosy, Eight edition, NiraliPrakasan, Pune.*
- [9] Middleton, E. Jr., Kandaaswami C and Theoharides T (2000). *The effect of plant flavonoids on mammalian cells: Implication for inflammation, heart diseases and cancer. Pharmacol Rev., 52:673-751.*
- [10] Pekamwar, S.S., Kalyankar, T.M. and Jadhav, A.C., (2013). *Hibiscus rosasinensis Linn. : A review on ornamental plant. World journal of pharmacy and pharmaceutical science, 2 (6) : 4719 – 4727.*
- [11] Ren, Wenying., Qiao, Zhenhua., Wang, Hongwei., Zhu, Lei and Zhang Li. (2003). *Flavonoids: promising anticancer agents. Medicinal research reviews, 23(4): 519-534.*
- [12] Verma, Sunita (2016). *Hibiscus rosasinensis L. (Malvaceae): A multipurpose ornamental plant. International journal of research in pharmacology and pharmacotherapeutics, 6(1):61-64.*