PHYTOCHEMCIAL ANALYSIS AND ANTI LIPID PEROXIDATIVE EFFECT OF *Jasminum sambac* (L.) Ait OLEACEAE

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Summary

Jasminum sambac Linn (family: Oleaceae) is commonly known as “mogra”. The Plant is considered as cool and sweet; it is used as remedy in case of insanity, weakness of sight and affections of mouth. *J.sambac* flowers contain major phytoconstituents as glycosides, saponins, flavonoids and terpenoids. In this study, the phytochemical screening and anti-lipid peroxidation effect of *J.sambac* was evaluated using the standard antioxidants BHT, Vitamin C, Vitamin E and Rutin. The preliminary study shows the presence of alkaloids, flavonoids, terpenoids, carbohydrates, proteins, phenols, tannins, saponins and phytosterols. The methanolic extract of the *J.sambac* flowers shows anti-lipid peroxidative effect which is similar to that of all standards. Results of this study suggests that the methanolic extract of *J.sambac* can be used as therapeutic agents to treat against various diseases caused by free radicals and other chemical agents.

Key words : *J.Sambac*, anti-Lipid peroxidation, BHT,Vitamin C, Vitamin E, Rutin.

Introduction

Free radicals have been claimed to play a key role, affecting human health by causing severe diseases, such as cancer and cardiovascular diseases by cell degeneration. These free radicals can be generated during normal body function, and can be acquired from the environment[1] . In recent years attention has been directed in utilizing natural antioxidants substantially[2],[3]. The medicinal value of plants have assumed a more important dimension in the past few decades owing largely to the discovery that extracts from plants contain not only minerals and primary metabolites but also a diverse array of secondary metabolites with antioxidant potential[4].

Natural products such as herbs, fruits and vegetables become popular in recent years due to public awareness and increasing interest among consumers and scientific community [5]. Natural products which contain antioxidant properties such as phenolics include flavonoids and phenolic acids [6], carotenoids, terpenoids and vitamins[7]. Epidemiological evidence has provided that the constituents in natural products show many biological and pharmacological activities, including antioxidative, anti-inflammatory, anticancer and antiviral effects[8].

Jasminum sambac. Linn (Oleaceae) is commonly known as Jasmine. It is a well known glabrous twining shrub widely grown in gardens throughout India. The flower is acrid and bitter taste. It is useful in treating diseases of the mouth and teeth, especially for toothache[9]. The *J. sambac* flowers and leaves are largely used in folk medicine to prevent and treat breast cancer. Flowers of *J. sambac* are useful to women when brewed as a tonic as it aids in preventing breast cancer and stopping uterine bleeding[10]. It is widely used in the Ayurveda, as an antiulcerative, anti cancer, antileprotic, skin diseases and wound healing.

Materials and Methods

Collection of plant material

Jasminum sambac flowers were collected from Coimbatore district, Tamilnadu, India during the month of December, 2009. The plant was authenticated by Dr.G.V.S.Moorthy, Joint Director, Botanical survey of India, Tamilnadu Agricultural University, Coimbatore, India where a voucher specimen (No.BSI/SRC/5/23/09-10/Tech-972).

Preparation of the extract

The flowers were collected, shade dried and powdered. About 30g of the powdered material were extracted with 300ml of methanol in a water shaker for 72h. Repeatedly extraction was done with the same solvent till clear colorless solvent is obtained. Obtained extract was evaporated to dryness by using a rotary vacuum evaporator at 40-50^{o}C. A light yellow semisolid material was obtained and stored at 0-4^{o}C. The yield of the extract material was about 15.14%. The extract was then subjected to qualitative analysis of flower and lipid peroxidation inhibitory assay.

Phytochemical analysis

Preliminary phytochemical screening of the methanolic extract of *J.sambac* was estimated according to the method[11].

Determination of lipid peroxidation

Lipid peroxidation inhibitory capacity was assayed in rat liver homogenate according to the method[12].

Results

Phytochemical analysis

In qualitative analysis, methanolic extract of *Jasminum sambac* showed the presence of secondary metabolites such as terpenoids, alkaloids, carbohydrates, phenols, flavonoids, phytosterols, glycosides, proteins, steroids, tannins and saponins but gums and mucilages are absence in phytochemical screening which are depicted in table 1.

Table 1. Phytochemical analysis methanolic extract of Jasminum sambac

Secondary metabolites	Observation
Alkaloids	+
Flavonoids	+
Terpenoids	+
Carbohydrates	+
Proteins	+
Phenols	+
Tannins	+
Saponins	+
Glycosides	+
Steroids	-
Phytosterols	+
Gums and Mucilages	-

Effect of lipid peroxidation

Figure 1 shows the inhibitory effect of the extract on lipid peroxidation. The maximum inhibition of the methanolic extract shows 70.21% at 2.5mg/ml which was compared with the standard antioxidants BHT (87.89%), Vit-C (73.28%), Vit-E (76.45%) and rutin (70.27%).

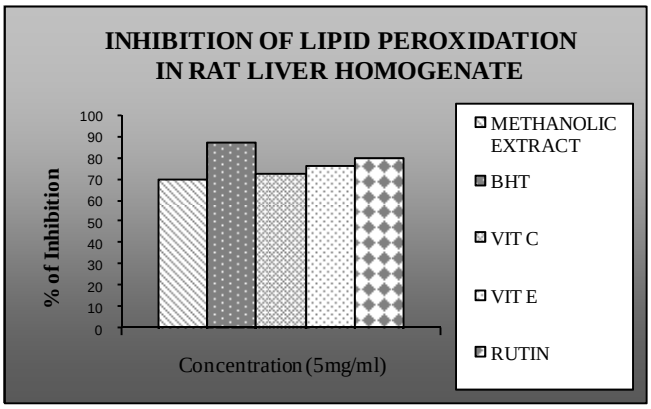

Figure 1 shows that the Inhibition of LPO by methanolic extract of Jasminum sambac in rat liver homogenate.

Discussion

Phytochemical screening was carried out to identify major biologically active phytoconstituents[13]. Plants are potent biochemical factories and have been components of phytomedicine since times immemorial. Plant based natural constituents can be derived from any part of plant like bark, leaves, flowers, roots, fruits, seeds, etc i.e. any part of the plant may contain active components. The beneficial medicinal effects of plant materials typically result from the combinations of secondary products present in the plant. The medicinal actions of plants are unique to particular plant species or groups are consistent with this concept as the combination of secondary products in a particular plant is taxonomically distinct[14].

The phytochemicals present in *J.sambac* are essential in many medicinal plants responsible for the antioxidant property either by scavenging free radicals or by preventing their formation[15]. The above results suggest the medicinal property of the flower might be due to the presence of these bioactive components present in *J.sambac*.

The lipid peroxidation has been broadly defined as the oxidative deterioration of polyunsaturated lipids[16]. Determination of lipid peroxidation content was carried out indirectly by means of derivatizing MDA with TBA at high temperature and acidic condition. The hydroxyl radical is highly reactive and can damage biological molecules. When it reacts with polyunsaturated fatty acid moieties of cell membrane phospholipids, lipid hydro-peroxides is produced[17].

In this investigation the lipid peroxidation of rat liver homogenate was triggered by Fe (II)-ascorbate and the end products of the process were measured in terms of thiobarbituric acid-reactive substances (TBARS) formed.

The ability of the extract to inhibit lipid peroxidation was evident from the present investigation and it might be due to the chelation of Fe^{2+} or trapping of free radical or chain breaking nature of the extract. Similar result was observed in *in vitro* scavenging assay of *Azima tetracantha*. Lann leaf extracts[18].

Conclusion

Hence the present work was executed to evaluate the phytochemical analysis and anti-lipid peroxidative effect of *Jasminum sambac*. Thus the flower possesses potent pytochemical constituents which might be used as to cure various diseases. So the various active compounds should be isolated from this flower, which might be used as therapeutic agents.

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References

1. Stanner SA, Hughes J, Kelly CN. Review of the epidemiological evidence for the 'antioxidant hypotheses. Pub Health Nutr 2004; **7:** 407 – 422.
2. Shahidi F, Liyana-Pathirana CM, Wall DS. Antioxidant activity of white and black sesame seeds and their hull fractions. Food Chem 2006; 99: 478–483.
3. Vetrivel R, Shanmugavalli N, Greety Sunitha C, Umashankar V. Hepatoprotective effects of *Cassia tora* on CCl4 induced liver damage in albino rats. Indian J Sci Technol 2009; 2 (3): 41-44.
4. Akinmoladun AC, Ibukun EO, Akinrinlola E, Onibon TR. Chemical constituents and antioxidant activity of *Alstonia boonei*. Afr J Biotechnol 2007; 6(10): 1197-120.
5. Thaipong K, Boonprakob U, Crosby K, Cisneros-Zevallos L, Byrne DH. Comparison of ABTS, DPPH, FRAP, and ORAC assays for estimating antioxidant activity from guava fruits extracts. J Food Compos Anal 2006; 19: 669-675.
6. Klimczak I, Malecka M, Szlachta M, Gliszczynska-wiglo A. Effect of storage on the content of polyphenols, vitamin C and the antioxidant activity of orange juices. J Food Compos Anal 2007; 20: 313-322.
7. Rupasinghe VHP, Clegg S. Total antioxidant capacity, total phenolic content, mineral elements, and histamine concentrations in wines of different fruit sources. J Food Compos Anal 2007; 20: 133-137.
8. Pawlowska AM, Oleszek W, Braca A. Quali-quantitative analyses of flavonoids of *Morus nigra* L. and *Morus alba* L. (Moraceae) fruits. J Agric Food Chem 2008; 56: 3377-3380.
9. Kirtikar KR, Basu BD. Indian Medicinal Plants. Allahabad, India. 2nd Ed. 1993; 2: 1523.

10. Joshi SG. Oleaceae: Joshi SG. (Ed.), Medicinal Plants. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi, 2000: 298-300.
11. Paech D, Tracey MV. Modern methods of plant analysis, Ed.4. 1955: 373-371.
12. Ohkawa H, Ohishi N, Yagi K. Assay for lipid peroxides in animal tissue by thiobarbituric acid reaction. Anal Biochem 1979; 95: 351-358.
13. Kaur GJ, Arora DS. Antibacterial and phytochemical screening of *Anethum graveolens*, *Foeniculum vulgare* and *Trachyspermum ammi*. BMC Complement. Altern Med 2009; 9: 30.
14. Makari HK, Haraprasad N, Patil HS Ravikumar. *In vitro* Antioxidant Activity of the Hexane and Methanolic Extracts of *Cordia wallichii* and *Celastrus Paniculata*. The Internet J Aesthetic and Antiaging Med2008; 1: 1-10.
15. Patricia I, Oteiza AG, Erlejman S, Verstraeten V, Keen CL, et al. Flavonoid-membrane interactions: A protective role of flavonoids at the membrane surface. Clinl Develop Immunol 2005; 12: 23–25.
16. Raquel M, Laura B. Chromatographic and electrophoretic methods for the analysis of biomarkers of oxidative damage to macromolecules (DNA, lipids, and proteins). J Sep Sci 2007; 30: 175-191.
17. Valentao P, Fernandes E, Carvalho F, Andrade PB, Seabra RM, et al. Studies on the antioxidant activity of *Lippia citriodoru* Infusion: scavenging effect on superoxide radical, hydroxyl radical and hypochlorous acid. Pharm. Bull 2002; 25: 1324-1327.
18. Hepsibha BT, Saravana Babu SC, Premalakshmi V, Sekar T. *In vitro* studies on antioxidant and free radical scavenging activities of *Azima tetracantha.* Lann leaf extracts. Indian J Sci Technol 2010 ; 3 : 571-577.