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PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF MALVA SYLVESTRIS

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ABSTRACT

Assortment of medicinal plants which are conventionally used for thousands of years, are present in a assemblage of herbal provision of the Indian traditional health care system (Ayurveda) named Rasayana which was projected for their appealing antioxidant activities. Along with the medicinal plants used in Ayurvedic Rasayana for their restorative action, medicinal plants have been scrupulously investigated. The developing countries predominantly rely on the conventional medicines. The long-established medicine involves the use of dissimilar plant extracts or the bioactive constituents. This nature of study provides the healthiness relevance at reasonable cost. The hit such as ethnomedicine actively represents one of the unsurpassed avenues in penetrating new profitable plants for medicine. In observance with this view in mind that the current investigation is carried out in *Malva sylvestris*, known as common mallow, which is native to Europe, North Africa and Asia. In the Mediterranean region, this genus has a elongated history and used as food, and outstanding to its therapeutic significance, several parts of this plant have been engaged in conventional as well as ethnoveterinary medicines. The Antioxidant evaluation of *Malva sylvestris*, was carried out using the free radical scavenging activity of the 1, 1-diphenyl-2-picrylhydrazyl radical (DPPH), total phenolics content and reducing power assay on the methanolic extract. Qualitative phytochemical investigation of this plant confirms the presence of various phytochemicals like saponins, alkaloids and flavonoids. The results suggest that the phytochemical properties of this plant were used for curing various ailments and possess potential antioxidant properties.

Keywords: Antioxidants, Free radicals, DPPH, *Malva sylvestris*, Phytochemical Screening.

INTRODUCTION

The conventional drug all over the world is currently revalue by an widespread activity of study on dissimilar plant species and their remedial principles. Investigational evidence suggests that free radicals as well as reactive oxygen species be able to involved in a high numeral of diseases[1,2]. As plant life produce a lot of antioxidants to manage the oxidative stress caused by sunbeams along with oxygen, they can correspond to a resource of new-fangled compounds with antioxidant activity. The Indian traditional health care system, Ayurveda is the oldest medical organization in the world and is being rejuvenated in its inclusive form beneath the name of Maharishi Ayurveda[3]. One of the scientific specialty of Ayurveda is Rasayana. Rasayana is not merely a drug rehabilitation but is a particular procedure accomplished in the form of rejuvenating recipe, dietary regimen promoting

high-quality habit. The function of rasayana is two-fold: avoidance of disease along with counteraction of aging processes which result from optimization of homeostasis. The denotation of the word Rasayana fundamentally refers to nutrition and its gaining, association, circulation and perfusion in the body tissues[4].

World Plant Biodiversity is the prevalent resource of herbal remedy also still concerning 60-80% World Population rely on plant based medicines which are being used in view of the fact that the ages as long-established health care systems. It is nowadays clear, that the medicinal ethics of these plants lie in the bioactive phytochemical constituents that manufacture definite physiological belongings on human body. Although the conventional Indian system of medicine has a elongated history of use, they are deficient in enough documentation, predominantly in light modern methodical knowledge[5.] These innate compounds formed the pedestal of modern drugs as we use these days[6,7,8].

'Phyto' is the Greek phrase for plant. There are readily available several families of phytochemicals and they assist the human body in a diversity of ways. Phytochemicals might defend human from an assortment of diseases. Phytochemicals are non-nutritive plant chemicals to facilitate defensive or disease anticipatory properties. Phytochemicals are fundamentally alienated into two groups i.e. primary in addition to secondary metabolites; according to their functions in plant metabolism. Primary metabolites encompass common sugars, amino acids, proteins and chlorophyll even as Secondary metabolites encompass of alkaloids, flavonoids, tannins and saponins and terpenoids[9,10]. Accordingly, the current study intended to reflect on 2,2-Diphenyl-1-picryl-hydraxyl radical (DPPH) which will be used to resolve their free radical scavenging behavior and phytochemical screening of the frequently used medicinal plant i.e. *Malva sylvestris*.

Malva sylvestris is a species of the Mallow genus, Malva which belongs to the family of Malvaceae in addition to is recognized as common mallow[11,12,13]. It originates from southern Europe along with Asia although has widen all above the world as a common weed. The dehydrated or fresh flowers moreover leaves of high mallow are used as food and medicine. It have been worn as food and medicine in Europe ever since the time of ancient Greece and Rome. Conventional herbal medicine continues to observe the plant as a valuable anti-inflammatory mediator for the respiratory tract, the skin, and the gastrointestinal tract[14]. *Malva sylvestris* is an herbaceous plant used in phototherapy and broadly dispersed in Italy[15], the leaves are used as emollient, laxative as well as cough medicine[16].

MATERIALS AND METHODS

Collection:

Authentic samples: Various market samples of *Malva sylvestris* were procured from Chunnilal Attar Ayurvedic Store, Ghat Gate, Jaipur in the month of March, 2010.

Identification:

All the samples were authenticated and were given identification number. The identification was as follows:

These samples were authenticated and submitted in Ethnomedicinal Herbarium, Centre of Excellence funded by DST, MGiaS, Jaipur (Rajasthan).

Processing of plant materials:

During the course of the study each sample was screened for its foreign matter and milled, before use.

Experimental details:

Present studies were performed on *Malva sylvestris* for the following studies-.

1. Phytochemical test of plant extract
2. Antioxidant Potentials of Methanolic extract of plant

1. PHYTOCHEMICAL SCREENING

Phytochemical screening was performed using standard procedure:

TEST FOR REDUCING SUGARS (FEHLINGS TEST)

The aqueous ethanol extract (0.5gm in 5 ml of water) was added to boiling fehling's solution (A and B) in a test tube. The solution was observed for a colour reaction.

TEST FOR TERPENOIDS (SALKOWSKI TEST)

To 0.5 gm each of the extract was added to 2ml of chloroform. Concentrated sulphuric acid (3ml) was carefully added to form a layer. Reddish brown coloration of the interface indicates the presence of terpenoids.

TEST FOR FLAVONOIDES

4ml of extract solution was treated with 1.5ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution, 5-6 drops of concentrated Hydrochloride acid was added and red colour was observed for flavonoids and orange color for flavons.

TEST FOR TANNINS

About 0.5 g of the extract was boiled in 10ml of water in a test tube and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or a blue-black coloration.

TEST FOR SAPONINS

To 0.5 g of extract was added 5 ml of distilled water in a test tube. The solution was shaken vigorously. And observed for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

TEST FOR ALKALOIDS

Alkaloids solutions produce white yellowish precipitate when a few drops of Mayer's reagents are added. Most alkaloids are precipitated from neutral or slightly acidic solution by Mayer's regent.

The alcoholic extract was heated on a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of mayer's reagent. The sample was then observed for the turbidity or yellow precipitation.

2. ANTIOXIDANT ACTIVITY

Preparation of test extracts

All the test plant sample and their adulterants were milled and refluxed in ethanol for 36 h, filtered, concentrated to dryness *in vacuo*. A portion of ethanolic extract was further successively extracted in pet. ether, benzene, chloroform, alcohol and water, concentrated and stored at minimum temperature, until used.

Preparation of DPPH

DPPH (2, 2'-diphenyl-1-picrylhydrazl, $C_{18}H_{12}N_5O_6$; Hi media) 0.8 mg was dissolved in 10 ml methanol to obtain a concentration of 0.08 mg/ml for antioxidative (qualitative and quantitative) assay.

Qualitative assay

Each successive extract (10 mg) was dissolved in 10 ml of its suitable solvent to get a concentration of 1 mg/ml and from this, 0.25µl was taken with the help of micropipette, applied on silica gel G coated plates. These circular spots were sprayed with DPPH solution, allowed to stand for 30 min. When DPPH reacts with an antioxidant compound, which can donate hydrogen, it is reduced, and the changes in colour (from deep-violet to light- yellow on white) were recorded at 517 nm on a UV spectrophotometer (Varian Cary PCB 150, Water Peltier System).

Quantitative assay

A concentration of 1 mg/ml of ethanolic extract of each test sample was prepared to obtain different concentrations (10^2µg to 10^{-3} µg/ ml). Each diluted solution (2.5 ml each) was mixed with DPPH (2.5ml). The samples were kept in the dark for 15 min at room temperature and then the decrease in absorption was measured. Absorption of blank sample containing the same amount of methanol

and DPPH solution was prepared and measured. The UV absorbance was recorded at 517 nm. The experiment was done in triplicate and the average absorption was noted for each concentration. Data were processed using EXCEL and concentration that cause 50% reduction in absorbance (RC_{50}) was calculated. The same procedure was also followed for the standards- quercetin and ascorbic acid.

RESULTS

Table 1: Showing Optical density of *Malva sylvestris* on different concentrations

CONCENTRATION (µg/ml)	O.D (nm)
0.001	0.808
0.01	0.669
0.1	0.298
1	0.269
10	0.251
100	0.218
1000	0.198

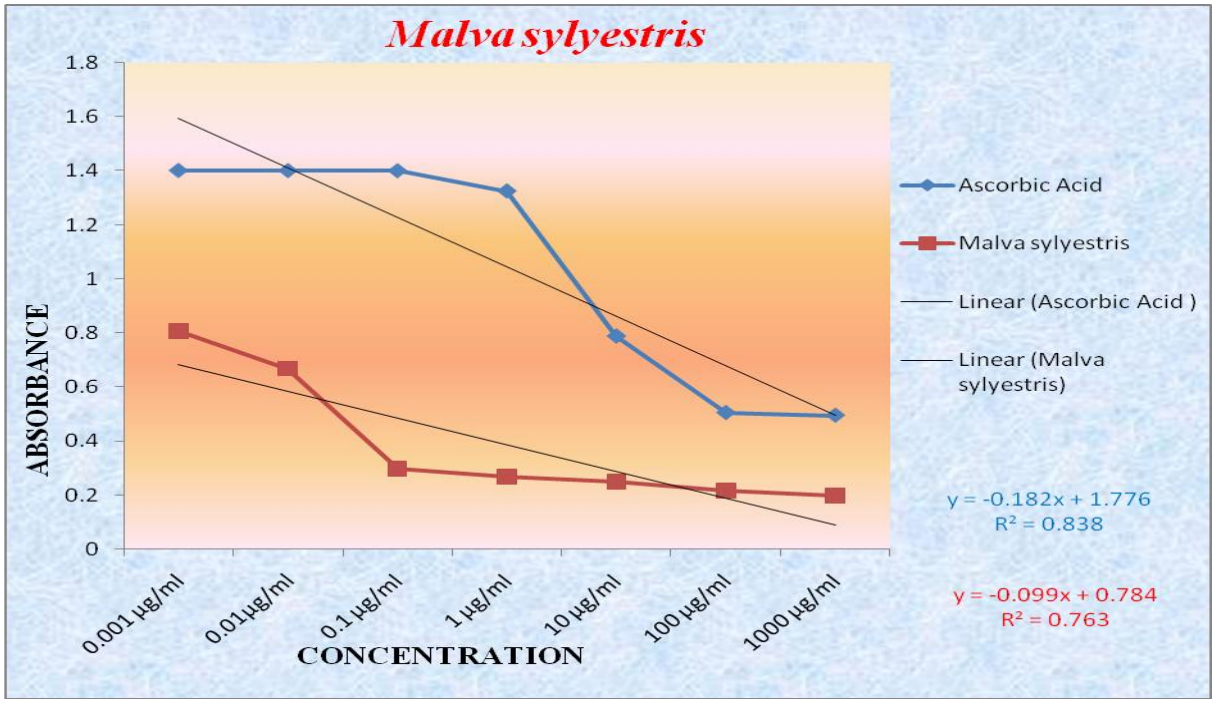

Fig 1: Graph showing Antioxidant Activity of *Malva sylvestris* at different concentration

Table 2: Showing phytochemical screening results of *Malva sylvestris*

Malva sylvestris						
TEST	**Reducing Sugar**	**Saponin**	**Tannin**	**Terpenoides**	**Flavonoides**	**Alkaloides**
	-	**+**	**-ve**	**-ve**	**+**	**+**

DISCUSSION

In the present investigation, Table 1 shows the optical density of *Malva sylvestris* at different concentrations and it was showed that the maximum optical density comes out to be 0.808 nm which is at the concentration 10^{-3} µg/ml and the smallest optical density is 0.198 nm which is at the concentration 10^{3} µg/ml where as the other shows comparable O.D at different concentrations i.e. 0.669 nm at 10^{-2} µg/ml, 0.298 nm at 10^{-1}µg/ml, 0.269 nm at 1 µg/ml, 0.251 nm at 10^{1} µg/ml, 0.218 nm at 10^{2} µg/ml.

The DPPH radical scavenging activity of *Malva sylvestris* is given in the Fig.1. In the present investigations antioxidant activity of *Malva sylvestris* showed appreciable activity against the DPPH assay method where the regression line clear cut showed the effectiveness of it as it's have potentials which are comparable to ascorbic acid. The antioxidant activity of *Malva sylvestris* in methanolic extract using DPPH assay method shows appreciable activity comparable to standard ascorbic acid. The straight line showed Y= -0.182x+1.776 & regression = 0.838 whereas, in above drug the straight line is Y= -0.099x+0.784 & regression = 0.763.

The Phytochemical screening of the plants bare a few differences in the constituent of the tested plants in table 2. The phytochemical screening of *Malva sylvestris* shows the occurrence of alkaloids, flavonoids and saponin, whereas it shows the absence of tannin, terpenoids respectively. The screening of the *Malva sylvestris* shows only a miniature amount of differences in the component of the hard-bitten plants. This drug shows the substantiation of broad-shouldered antioxidant activity equivalent or in a less important amount. The prolongation of alkaloids, flavonoids and saponin in this plant is persuasive to be painstaking for the free radical scavenging effects hardheaded.

CONCLUSION

Numerous studies have been performed to categorize antioxidant compounds with pharmacologically activity and a restricted toxicity. The Phytochemical screening and qualitative estimation of *Malva sylvestris* shows a small amount of differences in the ingredients, Where it possess a large amount of alkaloids, flavonoids and saponins. The incidence of quercetin in enormous capacity is rationally proportional to the antioxidant activity so it is manifestly shows that the occurrence of flavonoids will provide evidence of the antioxidant activity and also it promotes a drug for treatment of various infectious diseases. *Malva sylvestris* exhibit strapping antioxidant activity in added or a smaller amount. The presence of flavonoids in the plant is expected to be conscientious for the free radical scavenging effects pragmatic. The plant phenolic compound i.e. flavonoids are a chief assemblage of compounds that execute as primary antioxidants or free radical scavengers. The DPPH analysis provides in progression on the reactivity of the test compounds through stable free radical along with it gives a strapping absorption band at 517nm in visible region. Accordingly, these types of studies suggest that these plants acquire

antioxidant activities which can counteract the oxidative damage caused by infectious disease.

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REFERENCES

1. Richards, R.T., Sharma, H.M., 1991. Free radicals in health and disease. Indian Journal of Clinical Practice 2 (7), 15–26.
2. Niwa, Y., 1991. Effect of Maharishi 4 and Maharishi 5 on inflammatory mediators with special reference to their free radical scavenging effect. Indian Journal of Clinical Practice 1 (8), 23–27.
3. Glaser, J.L., 1988. Maharishi Ayurveda: an introduction to recent research. Modern Science and Vedic Science.
4. Singh, R.H., 1992. Rasayana and Vajikarana. In: Sharma, P.V. (Ed.), History of Medicine in India. Indian National Science Academy, New Delhi.
5. Shrivastava Surabhi and Leelavathi S. Preliminary Phytochemical Evaluation of Leaf Extracts of Catunaregum spinosa Thunb. International Journal of Pharmaceutical Sciences Review and Research 2010; 3 (2) : 114-118.
6. Edeoga HA, Okwu DE, and Mbaebie BO. Phytochemical constituent of some Nigerian Medicinal Plants, African Journal of Biotechnology academic journals 2005; 4:685-688.
7. Akinmo-laudn, Ibukun, EO, afor, E, Obuotor, EM and Farombi, EO Phytochemical constituents and Antioxidant Activity of Extracts from leaves of O>Gratissimum, Sci. Res. Essay 2:163-166.
8. Rout SP, Choudhary KA, Kar DM, Das L and Jain A. Plants in Traditional Medicinal System- Future Source of New Drugs, Internl. J. Pharmacy and Pharmaceurical Sci 1(1) : 1-23.
9. Parekh Jigna, Chanda V Sumitra. In vitro Antimicrobial Activity and Phytochemical Analysis of Some Indian Medicinal Plants. Turk J Biol 2007; 31: 53-58.
10. Kumar A, Ilavarasn R, Jayachandran T, Decaraman M, Aravindham P, Padmanaban N and Krishnan M RV. Phytochemical investigation on a tropical plant. Pakistan Journal of Nutrition 2009; 8(1): 83-85.
11. Chevallier, A . (1996): The Encyclopedia of Medicinal Plants . New York: DK Publishing.
12. Blumenthal, M.; Goldberg, A. and Brinckmann, J. (2000): Herbal Medicine: Expanded Commission E Monographs . Marshmallow leaf . Austin, TX: American Botanical Council; Newton, MA: Integrative Medicine Communications.
13. Milin, V. and Kustrak, D. (2003): Officinal and unofficinal polysaccharide containing drugs (Mucilagenous drugs) . Farm Glas . 59: 57-67.
14. Lust, J. (1974): The Herb Book. Toronto, Bantam Books, 262–3.
15. Guarrera, P.M. (2005) : Traditional phytotherapy in central Italy (Marche, Abruzzo, and Latium). Fitoterapia 76: 1-25.
16. Gonda, R., Tomoda, M. and Shimizu, N., 1990: Structure and anticomplementary activity of an acidic polysaccharide from the leaves of Malva sylvestris var. mauritiana. Carbohydrate Research, 198: 323- 9.