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Phytochemical Screening of Mimosa pudicaaerial part and evaluation of itspotent antiulcereffect in terms of phenolic and flavonoid components

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Abstract

Free radical's toxic by-products of natural metabolism of a cell, are responsible for causing a wide number of health problems. Search for plant based dietary supplements or drugs are always in great demand. This is due to characteristic flavonoids and phenolicswith antioxidant, anti-lipoxygenase, anticancer etc. clinical activities. In the study presented, aerial parts hydro-alcoholic extracts of Mimosa pudica were used for in-vitro analysis of having antioxidant activity. Three separate assay methods were used to evaluate the antioxidant activity i.e. against DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical, total flavonoid and phenolic content were investigated. This was done by formulatingmethanolic extract (70/30 ethanol to water) of Mimosa pudicaand ascorbic acid as standard. % scavenging activity and IC50 value were measured for extract prepared at various concentrations. The results IC_{50}values was 46.58 µg/mlfor DPPHradicals. Subsequently,total phenolic and flavonoids content wereobtained in three different extracts. Namely, chloroform extract (CEMP), methanolic extract (MEMP), and diethyl ether extract (DEMP). The total phenolic content (TPC) for extracts i.e. CEMP, MEMP, and DEMP were 8.49 ± 1.05 mg, 15.74 ± 1.21 mg, and 11.64 ± 1.21 mg of GAE/100 gm, respectively. The total flavonoids content (TFC)for extracts namely CEMP, MEMP, and DEMP obtained was10.85 ± 0.11 mg, 14.41 ± 0.03 mg, and 9.98 ± 0.48 mg of QE/100 g, respectively.Occurrence,in the hydro-alcoholic extract, of a greater % of phyto-constituents of Mimosa pudica,put forward that it may holdmedicinal antioxidant properties. Overall, presented research work offers noteworthydonations and improvementsin thearena of phytomedicines, fostering innovation.

Key words: *Mimosa pudica*, phenolic, *In-vitro*, Antioxidant, DPPH radical, IC_{50}

Introduction

It is well known that antioxidants are nothing but molecules that restrict oxidative process resulting in generation of so called free radicals (one with lone unpaired electron) that trigger chain of reactions causing damage to normal cells(Aryal, S. *et al.*,2019;Jafri, S. A. A.*et al.*, 2022).Subsequent series of cell damage instigatedby free radicals is called"oxidative stress"which is associated to the cause of quite a lot of diseases for instance that of heart, CNS, bronchitis, arthritis, cancer, and added inflammatory conditions etc. These processes as it advances (with time), causefurther complications by releasing more free ions (Fe or Cu), synthesising enzymes producing molecules with unpaired electrons, or disruption of redox processes, etc. In normal condition body has number of endogenous enzymes acting as antioxidant, eg.Catalase, glutathione peroxidase, superoxide dismutase etc., capable of neutralizing free radicals and deactivating the enzymes responsible, therebypreservingideal cellular functions(Kurutas, 2016). Nevertheless, thesevisceral antioxidant agents may prove incapable under augmented oxidative stressesseeking the need for dietary antioxidants.

The trepidation of diseases deadly and without known reasons has increased risksfor mankind worldwide including those from the side effects of the conventional synthetically derived medicines including antioxidants (eg. Butylated hydroxyl-anisole/ toluene),has seta trendwith upsurge in interest for theuse of naturalingeniousmedicinal and nutritionalplants as alteration for therapeutic includingantioxidants(Edo, G. I. *et al*, 2023;Uzombah, T. A. 2022). It has been well established that plants medicinal potential is credited to the secondary metabolites being therefor instance phenolics, flavonoids, alkaloids, terpenoids, vitamins, tannins etc. In this category there are many plants reported,most having antioxidant compoundsi.e. polyphenolic compounds e.g. phenolics and flavonoids grouped differently based on structural characters. They are all identified as naturally occurring in plants,scavenging free radical or active oxygen as well. These polyphenols of medicinal importance are plants' secondary metabolites with at least one hydroxyl group on its aromatic ring acting as an easydonor of electron enabling it to directly initiate and progress its antioxidant action(Tungmunnithum, D. et. al., 2018;Afolabi, O. B. *et al.*, 2023).

Since ages human kind has employed number of plant products in crude as well refined form in diet, cosmetic and therapeutics for being safer with lesser price. Owing to which WHO and other regulatory units have published standardised techniques for using plant/ plant products in medicine(Rakib M. et.al., 2018;Ali, M. Y. et. al., 2021).Also multi-targeting with one-drug concept has got replaced by single drug with one specific targeting to avoid unwanted side effects. In addition to the unpleasant effect of conventional allopathic, greater part of global population relies on herbal medicine as first chosen therapy owing to their reference from sacred books(Allegra, S. *et al.*, 2023;Chaughule, R. S. & Barve, R. S., 2023).In view of this, present study unveils the polyphenolics phytochemicals present in different *Mimosa pudica* extract stressing its in-vitro antioxidant properties.Mimosa pudica L. (Family-Fabaceae/ Leguminosae; Sub-family - Caesalpinioideae) is an uninhabited species of plant well known and component in South Asian medicine including Indian and central American folk medicine system, for their severalproperties(Kholiya Sushma*et al.*, 2023). According to the Ayurveda recommendations mimosa and its parts are prescribed in conditions related to hyperglycemic, diarrhea, convulsion etc., traditionally.

Lajwanti or Chuimui, Mimosa pudica L. (Family Mimosaceae) is distributed in South Asia, Central America, East Asia,Tanzania, and many parts of the pacific island(Joseph et al., 2013). Traditionally, the roots and leaves of Mimosa pudicaplant were used by the tribes for the treatment of fever, migraine and other headache types, dysentery, sleep disorder, piles, CNS disorderand many other ailments(Merlin & Narasimhan, 2009). Additionally, this plant was used in the form of BitterTonic, as Astringent and Acrid substance. Also it hasvulnerary Cooling effect, along with Diuretic,Febrifuge, Emetic and Alexipharmic. In the system of traditional healthcare like Ayurveda,naturopathy, this plant has been used in the management of stomach related issues like diarrhoea,dysentery,constipation, in skin diseases like alopecia, leprosy etc., in various sleep and blood disorders and ininfections ofurogenital tact. Many pharmaceutical value of this plant has been reported likeanti-hepatotoxic, anti-diabetic, anti-asthmatic,sedative activity, and wound healing properties which may attributed to itsantioxidant potential(Sivarajan & Balachandran, 1994).Chemical analysis of this plant showed the existence of many Phytoconstituents like flavonoids, alkaloids, glycosides,amino acid,terpenoids,sterols, fatty acids etc. (Ahmad et al., 2012; Tamilarasi T & Ananthi T, 2012). M. pudica root is reported to have antidote property against any poison. It is bitter and pungent in taste.When ingested it exhibits cooling and astringent effect. In cases of tooth ache, the root is chewed or the owner can gargle the stem with water, while diarrhoea and urinary tract infection is treated with this stem(Joseph et al., 2013). Rita Maneju Sunday et al. (2020) also proved the antidiabetic and antioxidants effects in Wistar rats of M. pudica ethanolic seeds extract. Jagetia et al. (2020) on the similar line examined the M. pudica's chloroform, aqueous and ethanol extract for its anticancer properties in lymphoma cells.

Thus number of ethno medicinal uses of *Mimosa pudica* suggest that the plant can protectcells and thus optimal

functioning from damage due to oxidative stresses. These effects i.e. antioxidant, are related to its components ability to act as scavenger from radicals, donors of hydrogen, electron, decomposer of peroxides, peroxy-nitrites, singlet charged oxygen, etc(Nkwocha et al., 2023).Till date though antioxidant models for Mimosa pudica extract has been described, but these are very few in number and lack in one or the other aspect. Given this, present study accounts determining antioxidant property with total polyphenols using in-vitro models for Mimosa pudica extract. This will assist researchers by supplementing with base work information and enhance literature pool about medicinal plants' properties for future advancements.

Materials and Methods

Mimosa pudica Collection

The aerial parts i.e. leaf of *Mimosa pudica* weregathered for the present work.The plant parts were compiled from Sanjivani Nursery & GardenerBhopal, MP., India. These were collected in the December month.After cleaning, these parts were shade dried, and then coarsely powdered for further study.

Physicochemical &Pharmacognostical Analysis of Mimosa pudica Leaves:

Analysis of Organoleptic properties

Organoleptic properties include study of various sensorial properties like colour, odour, taste, and texture. For recording this the collected leaveswere dried. They were then powdered and the sensorial perceivable parameters were analysed.

Physico-Chemical Analysis

Concisely for any plant derived agent to be useful for therapeutic purpose, purity as well the quality of the substance is needed. Several outcome of assessment of crude form of these drugs in terms of physics and chemistry helps to stabilize criteria for these and help in properly identifying them. Also, it assists in studying change effects in view of biological and chemical influence on the drug, changes in the processes of treatment during the manufacture or storage or other additional components which can be needed to add in formulation procedure etc. It has been recognized that a large number of phyto pharmaceutical specifications are given in the Indian pharmacopoeia to carry out qualitative as well as quantitative analysis to establish the quality and safety of therapeutic plant, part of plant or extracts for therapeutic use. These values of physico-chemical validation include estimation of parameters like the different types of ash values; drying losses; extractive values. In the given work, various parameters of the plant part have been indicated by following the standard procedures under pharmacopoeial and WHO norms(of Health, 1976).

Extract preparation

In the process of extract preparation, cleaned, shade dried, coarsely powdered 250 gm of drug was first defatted using petroleum ether. This is because it has been reported that defatting process adds to the antioxidant property. Further then, three different solvents were used to extract the phytochemicals from the leaves. These are methanolic (in 70: 30 ratio), chloroform and diethyl ether solvents. Soxhlet'sextraction process was used to extract the desired components. The resulting extracts were then used for the phytochemical screening and determination of antioxidant activityin-vitro.

Phytochemical Screening of extracts of Mimosa pudica

All the three extracts prepared were tested for phytochemical screening qualitatively for the presence of various secondary metabolites like carbohydrates,glycosides, sterol, saponin,flavonoids,alkaloids, triterpenoids etc. For this different, chemical reagents were used. Consequently, the investigation uncovered alkaloids,glycosides, steroids, polyphenolic constituents especially flavonoids, naringin,quercetin etc., including gums, and mucilage.

Thin Layer Chromatography

Further then all the extracts of Mimosa pudica were used to perform thin layer chromatographic studies. This determined the probable different compoundpresent, quantitatively.

Preparation of the plates:

For TLC, precoated plates of TLC from Merk(Germany) was used. It isprepared using silica gel G as an adsorbent. Further the prepared plats are activated in an oven for half an hourkeeping the temperature at 110°C. All the test samples (1mg/ml of all extracts in respective solvents) were then applied on to the plates, in the form of bands with the help of Linomat IV applicator.

Development of solvent system

Ethyl acetate: Methanol: Water (75.5:13.5:10) and Toluene: ethyl acetate (93:7)solvent systems were tried. This were supposed to give highest isolation of the components over the plate. For development, the plates were kept dipped in the respective solvent in a beaker in undisturbed condition for around 24hrs. After development got completed with the mobile phase having travelled sufficient distances over the plates, these were air-dried.Numbers of spots that appeared were recorded. Rf value which is the retention factor for each spot were calculated using equation given under.

$$R_f = \frac{\text{Distance traveled by solute}}{\text{Distance traveled by solvent}}$$

In present work, we visualized the different spots by spraying different known standard phytochemical detecting reagents. This gave the information of the variousplant chemicals present in three different extracts considered in the study. LikeFerric chloride reagent was used to check for flavonoids, Dragendorff's reagent for alkaloids etc.

Antioxidant activity analysisof Mimosa pudica extracts

Inhibitory effect overDPPH radical

DPPH or 2,2-diphenyl-1-picrylhydrazyl in abbreviation is one of the famous free radicals, but is relatively stable in nature and helps in study of different in-vitro antioxidant activities of both plant origin and synthetic compounds. DPPH which develops purple coloured free radicals in methanolic medium under standard conditions, on reacting with any chemical of anti-oxidative property changes the colour to yellow. In this reaction process, the mixture is left to settle for approximately 30min in temperature controlled condition. Quantitative measurement of the changes in colour occurs at the wavelength of 517nm making it possible to have a complete colour change from purple to yellow.

Thus, the method described by Guchu et al. was used with insignificant changes in this study to estimate the DPPH scavenging effect(Guchu et al., 2020). For this assay, samples of the extract in different concentrations, which is 50, 100, 150, 200 and 250 µg/ml was prepared. Methanol solvent was used in the preparation of all extract samples whether crude or the subsequent fractions. A ascorbic acid as a standard solution of equal concentration to test solution was also made. Subsequently in an extremely cleaned test tube, 1 millilitre test sample was combined with 0. 5 millilitre, 0. 3 mM methanolic DPPH, solution and immediately stirred until the solution became homogenised. After preparation, solutions were allowed to stand in a dark room maintaining temp, slightly lower to that of room, for nearly 15 minutes.

The solution as control was made as follows; 1 ml methanol + 2.5 ml of DPPH mixed.The sample absorbance was taken at 517 nm with using spectrophotometer, and the formula under used for calculating the percentage of inhibitory activity(Adebiyi et al., 2017; Guchu et al., 2020):

$$\%\text{Radical inhibiting activity} = \frac{C - S}{C} \times 100$$

C - Amount of absorbance by the control solution

S - Amount of absorbance by the extract/standard solution

The IC_{50} value of the extract and the standard solutions werecomputed. Three replicates for all experiments

were done and the mean values were calculated of the results.

Total phenolic content (TPC)determination in extract

Total phenolic content (TPC) simply means the total amount of the various phenolic compounds that may be found in any extract sample. There are the secondary metabolites that play the many benefits according to the therapeutic aspect that is associated with antioxidant activity. FCT or Folin-Ciocalteu test is the standard widely used method to quantify TPC. The test employs reagent of Folin-Ciocalteu. This reagent gets reduced in the presence of phenolics and forms molyb-denum-tungsten blue coloured complex. The vividness of the colour is determined spectrophotometrically with 725 nm to 765 nm range; intensity is directly related to the phenolic compound content. The absorbance of the sample extract is then compared with the calibration curve prepared from reference standard solutions of Gallic acid, for estimating TPC of sample as Gallic acid equivalent / gm or ml.

In this method, 2 millilitre extract is thoroughly amalgamated to 1 millilitre of Folin Ciocalteu reagent of the concentration 1:10v/v. This mixture was allowed to stand for 7 min,when Folin Ciocalteu reagent which is the one of reagents forms blue coloured complex in the presence of phenolic extract chemicals.Further then, to the resultingsolution, 1ml of sodium carbonate solution (7. 5 g/l) were added and left in a dark place for 2 hrs. At 760 nm, the absorption values were then obtained with the help of spectrophotometer. TPC was estimated from gallic acid calibration curve of 10-50 µg/ml and the results were presented as GAE of extract (mg/gm). All the experiments were carried out three times and the means of the results obtained were used in analysis(Shahinuzzaman et al., 2020).

Total flavonoid content (TFC) determination in extract

As in TPC the total flavonoid content (TFC) refers to the overall amount of all identified flavonoids in a definite extract sample. These are also the secondary metabolites with number of reported health benefits because of their anti-inflammatory, anti-oxidative, and antibacterial activities. These can be quantified by determining different chemical reactions, or by the help of HPLC or spectrophotometer. The aluminium chloride solution based spectrophotometric method is the most popular one in which the absorbance is measured at a wavelength of about 415 to 425 nm .The results are compared with the calibration curve prepared with quercetin as standard.

In this procedure, 0. 5 ml 2%of $AlCl_3$ solution is mixed to the 0. 5 ml of extract solution.This further is allowed to be kept for about 1 hour at temperature of 25°C. Aluminium tri-chloride reaction with a base results in to formation of a coloured species which can be identified by spectrophotometry. Subsequently, the absorbance of the samples at 420 nm became measured with the aid of spectrophotometer. TFC then was determined by comparing the samples with the standard quercetin curve (produced using concentrations of solution from 10 - 50 µg/ ml).The results expressed as equivalents of quercetin (mg QE/ gm extract). All the experiments were repeated three times and the tested values were an average of the results obtained(Sasikumar et al., 2020).

Results and Discussions

As is well known that in-vitro study of antioxidant activity cannot be relied based on single assay model results. Keeping this in mind 3 different methods were used i.e.DPPH, total phenolic and total flavonoid methods, to confirm antioxidant activity of alcoholic extract from *Mimosa pudica*. These radical scavenging assays together with spectrophotometric methods confirmed TPC and TFC in polyphenolic extract of *Mimosa pudica*medicinal plant showing light to their usage as potent antioxidant in clinical recommendations.

Pharmacognostical & Physicochemical result analysis

Organoleptic properties

Mimosa pudica leafs were observed as dry greenish brown colour powdered. This was astringent and sweet in

taste and the particle size 80-100 (mesh size) was observed. Results are compiled in table 1 under.

Table 1: Organoleptic Property

Parameters	Observation
Odour	Astringent
Colour	Green
Test	Sweet
Texture	Powder

Physico-Chemical Analysis

Mimosa pudica leaves, shade driedthen powdered, was subjected to standard proceduresof determination of various physico-chemical parameters. This included finding the variousash values (total ash, acid insoluble ash and water soluble ash), Moisture content (M.C.). Results from the study are summarized in Table 2.

Table 2. Physico-Chemical Analysis of Mimosa pudica

S.No.	Physicochemical constants	Values obtained on dry weight basis
1	Percentage of loss on drying	7.36% w/w
2	Percentage of Total ash content	4.91% w/w
3	Percentage of acid insoluble ash	0.86% w/w
4	Percentage of water soluble ash	2.42% w/w
5	Percentage of alcohol solubleextractive value	5.07% w/v
6	Percentage of water solubleextractive value	16.46% w/v

Phytochemical Screening

Phyto-chemicals screeningfor various constituents at preliminary level is generally done using different available standard reagents and tests. This indicatedthe presence of numerous essential plant derived ingredients, which can be useful form therapeutic point. Thepolyphenolics included i.e. Quinones,flavonoids, Steroids,tannins,glycosides,alkaloids etc. listed in table 3 under. Study was performed in 4 different solvent systems considered. These are methanol, Chloroform,Diethyl ether and water solvent systems.

Table 3: Phytochemical test for extract of Mimosa pudica leaf

S. No.	Phytoconstituents	Water	Methanol (ME)	Chloroform (CE)	Diethyl ether (DE)
1	Alkaloids	- ve	+ ve	+ ve	+ ve
2	Quinone	- ve	- ve	+ ve	+ ve
3	Flavonoids	- ve	+ ve	+ ve	+ ve

4	Steroid	+ ve	+ ve	+ ve	- ve
5	Phenol	+ ve	+ ve	- ve	+ ve
6	Tannins	- ve	+ ve	- ve	- ve
7	Glycosides	+ ve	+ ve	+ ve	+ ve
8	Terpenoids	+ ve	+ ve	- ve	- ve
9	Proteins	- ve	- ve	+ ve	- ve

Note: (+) positive result, (–) negative result

Thin Layer Chromatography analysis

Based on the above preliminary analysis, the methanolic extract was considered for next TLC analysis.From among the standard mentioned solvent systems, methanol showed the presence of maximum components in preliminary step above. Outcomes are summarised in table 4.

Table 4: TLC for extract of Mimosa pudica leaf

Detection Reagents	**Observation**	**Inference**
Dragendorff's reagent	Orange Red	Alkaloids
Alkaline reagent	Yellow to colourless	Flavonoids
Conc. sulphuric acid	Reddish Yellow	Steroids & Triterpenoids
Dilute Ferric chloride solution (5%)	Violet colour.	Phenols
Molisch's reagent	Brown	Glycosides

It has been reported from the phytochemical evaluations at primary stage in the presented study that extract of Mimosa pudica is rich in different phenols and flavonoid compounds, also revealed from the study by Ittiyavirah and his group(Ittiyavirah & Pullochal, 2014).

Inhibitory effect of the extract on DPPH radical

Based on the assumption that hydro-alcoholic extract of *Mimosa pudica*has capability to donate hydrogen atom, free radical DPPH assay was conducted to prove this.Outcomes of the study is charted in Fig.1and table 5, showing MEMPfree radical scavenging at 5 different strengths of extract i.e. 50, 100, 150, 200, 250 µg/ml, keeping ascorbic acid(in same concentration) as standard. Both test(MEMP)and standard(ascorbic acid)extracts exhibited IC_{50} values 46.58 µg/ml and 24.81 µg/ml, respectively. Theseextract IC_{50} valueswere considerable compared to the ascorbic acid and antiradical effect was found proportional to concentration of MEMPextract. 2,2-Diphenyl-1-picrylhydrazyl (DPPH) is most commonly used in-vitro assay method for antioxidant property owing to its less cost, shorter process and affordability. Number of plant extractions have been assayed for antiradical activity using DPPH. In a study by Siddartha et. al. on *Ficus religiosa*, they reported antioxidant activity of 0.550 at 517nm absorbance with percent antioxidants being calculated as 43.415%(Baliyan et al., 2022).In DPPH assay a radical scavenger compound reduce DPPH to DPPH-H (a hydrazine from), lowering its absorbance and decolorizing it from purple to yellow hue. In another study on antioxidant activity of *Vernonia amygdalina* by Huseen et.al., where they used different leaf extracts (in H2O, MeOH and EtOH), IC50 value

obtained through DPPH assay was 111.4, 94.92 and 94.83 µg/ml(Hussen & Endalew, 2023). In another study Luhata et.al. assayed ethyl acetate extract of *Odontonema strictum* leaf using DPPH method for antioxidant action of 4 different α-pyrones and got IC50 values in range from 0.24±0.0002 µg/mL to 55.7±0.027 µg/mLagainst the standard ascorbic acid with IC50 value 1.73×10-3±0.3µg/ ml(Luhata et al., 2023). Henceforth, the discussions and resultscollected in presented data, indicates ability of extract tocontribute hydrogen ions against the free radicals of DPPH in solution. Thus, proving*Mimosa pudica*extract to have the potential to reduce DPPH radicals by converting it into equivalent hydrazine.

Table 5: Effect of Mimosa pudica methanolic extract and ascorbic acid on DPPH radicals

Concentration (µg/ml)	**DPPH Scavenging %**	
	MEMP	**Ascorbic acid**
50	48.1	63.8
100	78.6	91.3
150	95.4	115.6
200	121.7	142.7
250	139.2	172.1
IC_{50}	46.58	24.81

***Values are reported as the mean±SD from three repetitions of each experiment*

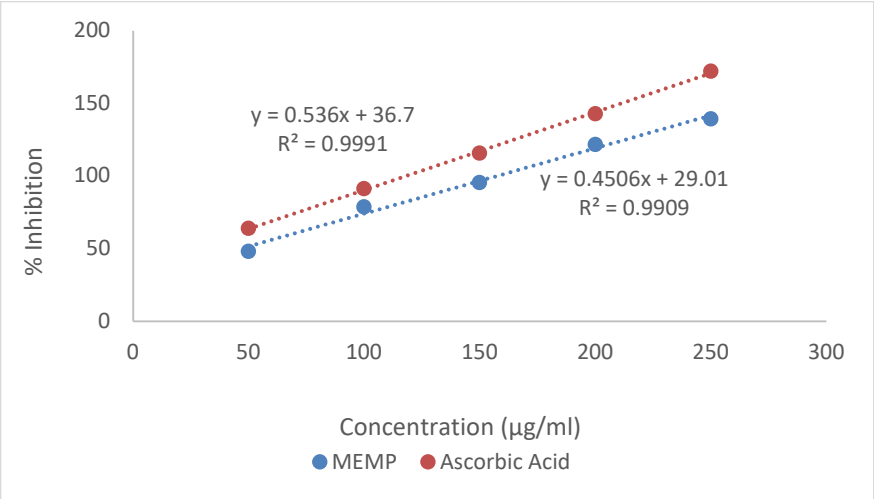

Fig 1: Graphical representation of scavenging abilities of *Mimosa pudica* on DPPH radicals

Also, the antioxidant assay evaluating DPPH activity, our results were found to be in accordance with literature reported result fromPatro et al.(Patro et al., 2016) They found an IC_{50} value of 23.74 μg/mL. Likewise, Zhang et. al.(Zhang et al., 2011)reported an $IC_{50}$of 35.36 μg/mL. Also, Mandal el. al.(Mandal et al., 2022)reported 158.95 ± 1.12 μg/mL IC_{50} value for Mimosa pudica ethyl acetate extract. Variation in case of outcomes from different groups was attributed to different climatic conditions which greatly effects different biochemical productions in plants.

Total flavonoid and phenolic content of extract

Polyphenolic along with flavonoid concentration in *Mimosa pudica*differentextract are represented in Fig. 2 (for galic acid equivalents) and Fig. 3(for quercetin equivalents). The data is compiled in table 6 & 7. The results quantitatively indicate that CEMP, MEMP, and DEMP was observed at 8.49 ± 1.05 mg, 15.74 ± 1.21 mg, and 11.64 ± 1.21 mg of GAE/100 gm of phenolic compounds and CEMP, MEMP, and DEMP was observed at 10.85 ± 0.11 mg, 14.41 ± 0.03 mg, and 9.98 ± 0.48 mg of QE/100 g, of flavonoid compounds in it.

This quantitative estimation of plant content in extract reveals its ability for antioxidant effects. The results detected for the estimation of the total phenolic composition (TPC) were also consistent with the study conducted by the group of Jimenez and Patro independently. The TCP of aqueous extract of Mimosa albida in Jimenez group was found out to be 323 mg GAE/g (Jiménez et al., 2015) while TCP in Patro group was 15. 64 ± 1.31 mg GAE/g. The TPC in Mimosa pudica leaves extract was established in accordance(Patro et al., 2016). The literature reported data exhibited variability especially by Jimenez group. It can be explained by the choice of various species of the Mimosa genus or Shifts in the methods of cultivation and collection of plant materials. Rahardiyan and his group conducted a study whereby they established 7.27% concentration of total phenol propositions to be true. The reason might be the alternate method which have used(Rahardiyan et al., 2019). In another case total flavonoid evaluation of 19.747mg QE/g data was revealed. This was by Shrestha et al, their amount of TFC found. 49.47mg QE/g was reported by Parmar et al. where they performed experiment with the help of extract of Mimosa pudica (Parmar et al., 2015; Shrestha et al., 2022).All these other studies also well correlated with the present study.

Along with other bioactivities they exhibit potent antioxidant property which is attributed to their redox potential to donate hydrogen atom acting as reducing agent. Thus in present study also we achieved *Mimosa pudica*extract with unexpectedlygreater concentration of phenolic and flavonoid components(Serafim et al., 2020).

Table 6: Absorbance potential of Gallic acid at various concentration

Concentration (µg/ml)	Absorbance
10	0.151
20	0.247
30	0.342
40	0.515
50	0.581

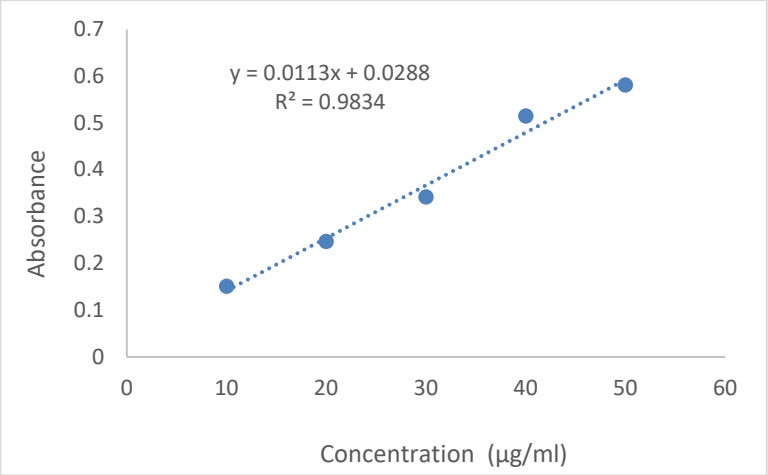

Fig 2: Gallic acid calibration curve employed for quantifying phenolic content

Table 7: Absorbance potential of quercetin at various concentration

Concentration (µg/ml)	Absorbance
10	0.187
20	0.278
30	0.415
40	0.548
50	0.631

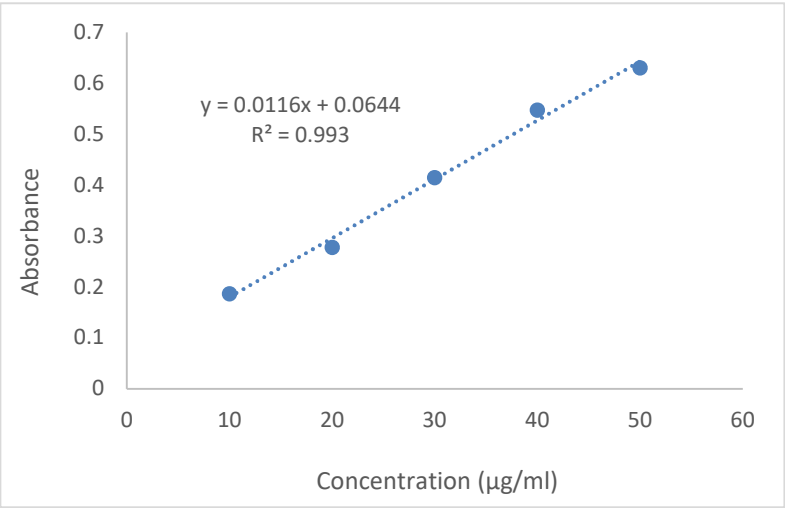

Fig 3: Quercetin calibration curve employed for quantifying flavonoid content

All the above demonstrated assays have confirmed the antioxidant potential i.e. ability to restrict free radical in one or the other way by *Mimosa pudica*plant extract. This indicates strong relationship for usage of these components as hydrogen donors in oxidised environment scavenging number of cellular enzyme processes as both primary and secondary antioxidants. Hence the finding validates usage of *Mimosa pudica*plant by locals across the globe.

Conclusion

The plant *Mimosa pudica*has been used as a medicine for centuries and is still frequently recommended today.Though prescribed for number of conditions there are scarce finding related to its antioxidant potential in aerial parts of *Mimosa pudica*taken together. For studying,*Mimosa pudica*hydro-alcoholic extract was made. Phytochemical investigation throughnumerous in-vitro models of the hydro-alcoholic extract of *Mimosa pudica*showed presence of flavonoids and other active components.The extracts were rich in polyphenols and flavonoids, which was confirmed by the antioxidant activity as it causes a considerable reduction of free radicals. Thus based on a sharp relationship between the concentration of the polyphenols present and the antioxidant efficacy, further supported by the IC50 values obtained in various in-vitro assays, *Mimosa pudica* plant possess considerable amount of antioxidant compounds, phenols and flavonoids. The present study also support hypothesis for in-vivo study and characterization of *Mimosa pudica*extract, planed as part of future assays.These different studies along with the preliminary evaluations proved various flavonoids and phenolics secondary metabolites in leaf extracts of Mimosa pudica, supporting its ability to combat the gastric injury by ulceration in different animal models. Presence of these various phenolic and flavonoid derivatives like Vitexin, Mimosine, Jasmonic acid, Orientin, Quercetin etc. in extracts of Mimosa pudica has also been previously reported in literatures.

Conflict of interest

None

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