PHYTOCHEMICAL SCREENING AND ANTIOXIDANT POTENTIAL OF SELECTED SPECIES OF LAMIACEAE

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ABSTRACT: *Total phenolic and total flavonoid content and antioxidant component protect wide range of diseases caused by free radical activity. The object of present research is to evaluate phytochemical activity like total phenolic, total flavonoid content and antioxidant activity by using methanolic extract of different part of selected species of family Lamiaceae.Total phenolic content, Total flavonoid content and antioxidant potential were reported by according to standard protocols. Highest and lowest total phenolic content were present in leave extract of Mentha royleana (384.8µg/mL) Gallic acid equivalent (GAE) and aerial part of Ajuga bracteosa (178.1µg/mL) Gallic acid equivalent (GAE) respectively. Maximum value of flavonoid content was observed in aerial part extract of Ajuga bracteosa (1772.6µg/mL) Rutin equivalent (RE). Extract of whole plant of Otogetia limbata exhibited lowest value of flavonoid content (849µg/mL) Rutin equivalent (RE). Methanolic extract of leaves of Mentha royleana indicted maximum svaenging activity. Polyphenolic compounds like Rosmarinic acid, Caffeic acid etc increses reducing activity of plant species of Lamiaceae. After isolation of active antioxidant compounds these plant will be used in making various drug which are effective in reducing free radical diseases.*

, Polyphenolic Compounds,Lamiaceae.

Key words: Phytochemistry, TPC,TFC,Antioxidant activity

INTRODUCTION

Many phytoconstituents are used in control of large number of dieases, posses natural antioxidant compounds [1]. Basically, Oxidative stress reaction is inhibited by reducing the initiation of oxidation of lipid and other compounds[4]. And it has been linked with various aliament like cardiovascular disease,cancer and atheroscelosis etc.

Lamiaceae is one of the most important family of plant which consist of mixture of herb,shrub, and subshrub. It contain 252 genera and about 6700 species [5]. Most plant of lamiaceae are a great source of medicine and used as ornamental plants. Essential oils extracted from this family is important in making perfumes. Essential oils and extract are source of wide range of bio activities like antimicrobial, antioxidant and anti-inflammatory etc [6], [7] and [8]. Many plant species of lamiaceae contain polyphenolic compound which showed great antioxidant activity. In current study total phenolic, total flavonoid content and antioxidant potential was determined in selected plants of family Lamiaceae.

MATERIALS AND METHODS

Collection of Plant Materials

Selected plant species were collected and identified by Taxonomists. compare with herbarium plant material and voucher specimen were submitted in herbarium.

Preparation of Extract

Plant parts were washed and dried and grind by using electric grinder.100 g of each plant part was soaked in methanol. Each soaked plant part was filtered by using filter paper after 15 days and Rotary evaporator was used to obtained the filterate under reduce pressure (R-210, B.U.CHI,Switzerland).

Determination of TPC

TPC was determined by using the procedure of Folin-ciocalteu. [9]. 40 µL of methanolic plant extract was mixed 200 µL FC reagent and 3.14 mL of distilled water and kept it at room temperature for 8 min. Then, 600 µL of sodium carbonate was added in it and was incubated in incubator at 40C for 30 min (Fisher Scientific). The absorbance was determined at 765 nm by using spectrophotometer. (UVD-3200, Labmed Inc., USA).GAE was expressed as µg .

Determination of TFC

TFC was reported by AlCl3 method. [10]. 300µL of each methanolic extract of plant was mixed with 150µL of NaNO2 and 3.4mL of methanol Afer 5 min, 150µL of AlCl3.6H2O and I mL of NaOH was mixed with solution. UV/Visible spectrophotometer was used to measured absorbance value against blank at 506nm. RE expressed as µg .

DPPH Scavenging activity Free radical scavenging was determined according to DPPH Scavenging activity [11]. In glass vial, 2.9 mL of DPPH was mixed with 100µL of plant extract and incubated for 30 min at 517nm. Triplicate readings were taken for each plant extract.

Scavenging value was measured by using following equation.

$$\textbf{DPPH Scavenging activity}\ (\%\textbf{age}) = \frac{\textbf{Absorbance(control)} - \textbf{Absorbance(sample)}}{\textbf{Absorbance(control)}}\textbf{x100}$$

EC^{50} was also determined by using the varying concentrations. EC^{50} has ability to convert free radical to stable one.

RESULTS

Total phenolic content

Methanolic extract of leaves of *Mentha royleana*, showed maximum TPC. Intermediate TPC found in whole plant of *Micromeria biflora.* and minimum TPC was observed in whole plant of *Micromeria biflora* (Table 2).

Total flavonoid content

Maximum TFC was present in aerial part of *Ajuga bracteosa*, intermediate TFC and lowest TFC was found in leaves of *Mentha royleana* and *Ostegia limbata* respectively (Table 2).

DPPH radical scavenging activity

Ascorbic acid was used as standard and had percentage inhibition and EC^{50} 93.35 and 230.14 respectively. Values of percentage inhibition and EC^{50} of selected plant species

were exhibited in table 3. EC^{50} of selected medicinal plant represented in graph 2. Lowest EC^{50} showed high reducing activity.

Table01:Medicinal importance of selected plants used for TPC,TFC and antioxidant activity

Sr. No	Name of Plants	Local Name	Plant part	Medicinal Uses	Place of Collection
1	*Ajuga bracteosa* Wall.ex Benth	Kori booti	Aerial part	Jundice,Sore throat infection [12].	QAU,Islamabad
2	*Mentha royleana* L.	Phari podina	Leaves	Dysentry, Ulceration13].	QAU, Islamabad
3	*Micromeria biflora* Buchi-Ham. exD.DonBent.	Chai butt	Whole plant	Infested wounds,Shoulder wounds,Joint worm[15].	Margalla, Islamabad
4	*Stachy parviflora* Benth.	Baggibuti	Aerial part	Tonic,Stimulant,Astrigent,Antispasmodic[16].	Kohat
5	*Marrubium vulgare* L.	Khar boti	Whole plant	Antispetic,Stomachache, Tonic [17],Visceral,Uterine and hepatic affection[18].,	Battagram
6	*Otostegia limbata (Benth.)Boiss*	Bui	Leaves	Throatache and mouth gum [19].	Islamabad

Table 02: TPC,TFC and antioxidant activity of selected species of Lamiaceae.

Sr. No.	Name of Plants	Gallic acid equivalent(GAE) (µg/mL)	Rutin equivalent (RE) (µg/mL)	Percentage inhibition(%)	Ec^{50} (µg/mL)
1	*Ajuga bracteosa* Wall.ex Benth	178.1±0.31	1772.6±0.83	16.577	3498.8732
2	*Mentha royleana* L.	384.8±0.43	1352.3±0.01	68.345	789.5055
3	*Micromeria biflora* Buchi-Ham. exD.DonBent.	287.4±0.06	1257.3±0.67	31.052	1743.3392
4	*Stachy parviflora* Benth.	137.4±0.21	902.3±0.27	8.872	4013.2312
5	*Marrubium vulgare* L.	179.4±0.32	960.6±0.41	22.915	2346.1003
6	*Otostegia limbata (Benth.)Boiss*	150.8±0.04	849±0.64	22.59	2229.0910

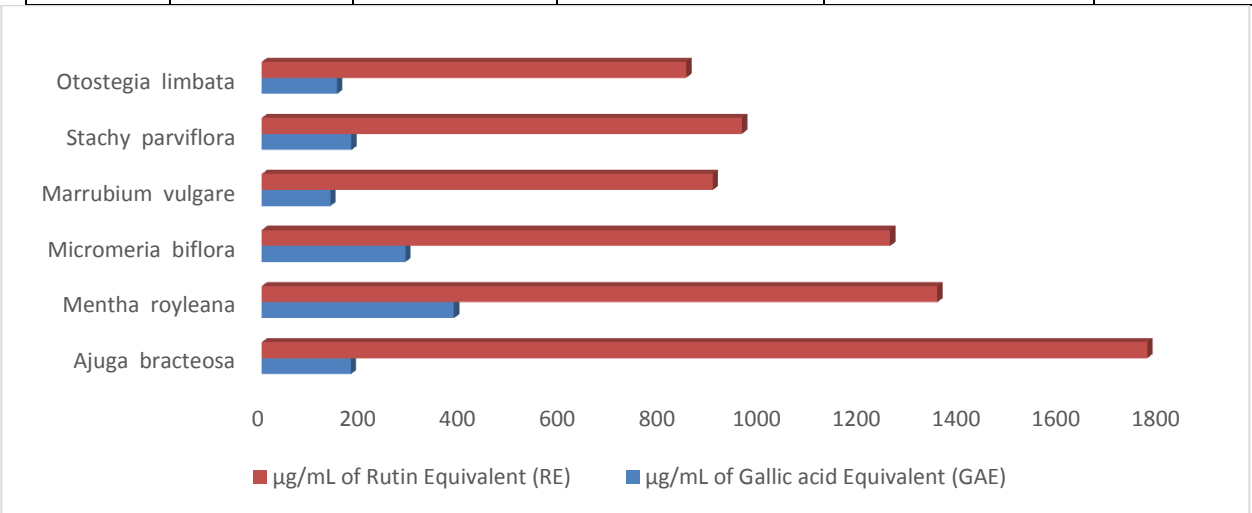

Fig. 1 Total phenolic and flavonoid content expressed as gallic acid equivalent (GAE) and rutin equivalent of selected medicinal plant of Lamiaceae

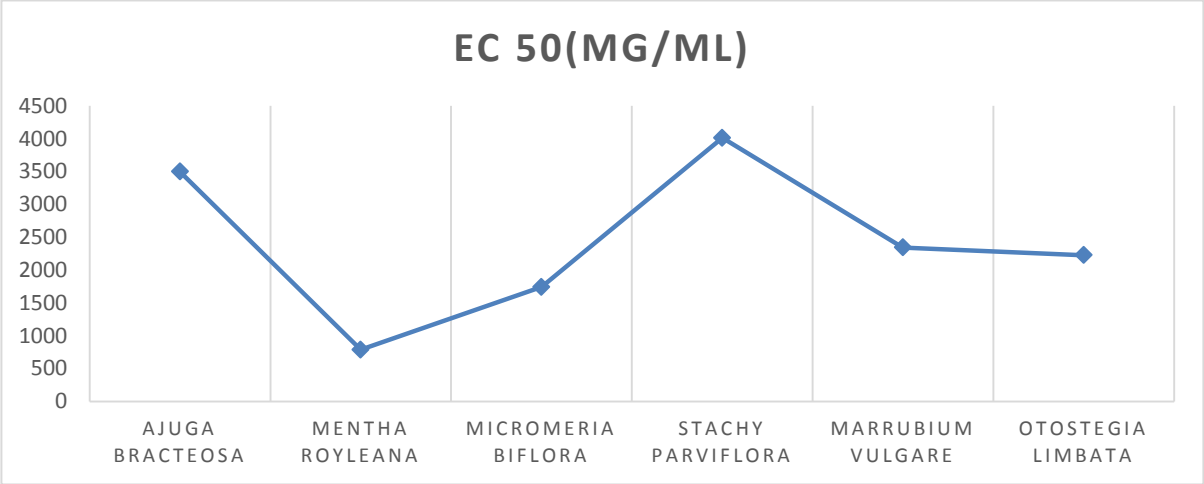

Fig.2 EC^{50} of selected medicinal plant of Lamiaceae

DISCUSSION

Secondary metabolities like phenolic and flavonoid compounds which exhibit the remarkable value of antioxidant activity.

The present research showed that highest value of TPC exhibits in leaves of Mentha royleana due to occurance of more number of phenolic ring. Lowest value of TPC is found in Marrubium vulgare due to less activity of phenolic ring. Reference [20] showed the minimum value of TPC in M. vulgare.

Flavonoids present in different parts of plant associated with carcinogensis, atherogensis [21]. Maximum flavonoid content was observed in aerial part of Ajuga bracteosa. Leaves of otostegia limbata showed lowest value of TFC.

Polyphenolic compound are important as antioxidants due to reactivity of phenolic rings [22,23] are divided into various groups. Phenolic compounds, flavonoids and phenolic acid etc are important groups of polyphenolic compounds [24]. Antioxidant activity of family Lamiaceae are due to presence of large amount polyphenolic compounds which helpful in prevention of of number of diseases like cancer by inhibition of oxidative chain reaction [25].

Leaves of Mentha royleana posses highest level of scavenging activity due to large quantity of phenolic compounds. Polyphenolic compounds like rosmarinic acid, caffeic acid M.royleana showed high scavenging activity. Oil of M. royleana exhibited maximum reducing power [27]. Previous literature indicated 75% radical scavenging activity in M. royleana [28].

In present study Good value of DPPH radical scavenging activity is observed in whole plant of *Micromeria biflora,* Oil of *M. biflora* was exhibited noticeable reducing activity [29].

Marrubium vulgare showed good value of scavenging activity die to large quantity of flavonoid compounds. Flavonoid compounds possess remarkable value of antioxidant potential due redox activity. Significant antioxidant potential was observed in M.vulgare [30]. The previous literature showed that *M. vulgare* exhibited a considerable antioxidant activity

Leaves of otostegia limbata demonstrate good reducing value According to previous literature 68.96% scavenging activity was observed in otostegia limbata [31]. Aerial part of Ajuga bracteosa exhibited good value of antioxidant activity.

Reference [26] indicted that oil of Ajuga bracteosa show considerable of antioxidant activity.

Aerial part of Stachy parviflora have less level of antioxidant potential due to small quantity of polyphenolic compounds.

CONCLUSION

Antioxidant activity of selected species of Lamiaceae is due to presence of polyphenolic compounds. It lead toward isolation and characterization of bioactive compounds which may be helpful in formation of herbal medicine and development of new nutritional and pharmaceutical agent. Revealing of biological activity like antioxidant activity of medicinal plants are important in pharmacological studies.

Due to occurance of polyphenolic compounds in lamiaceae show excellent value of antioxidant activity which helpful in development new drug which have high nutritional value and are important in pharmacological investigations.

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