ejpmr, 2017,4(9), 470-473

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

QUALITATIVE DETERMINATION OF SECONDARY METABOLITES OF *TRIDAX PROCUMBENS* LINN LEAVES

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Article Received on 26/06/2017 **Article Revised on 16/07/2017** **Article Accepted on 06/08/2017**

ABSTRACT

The present study was aimed to investigate Secondary Metabolites in leaves of *Tridax procumbens* Linn. Initially dried powder of *Tridax procumbens* L. was extracted successively in water, methanol, ethanol, chloroform and ethyl acetate. Different extracts were investigated for the determination of secondary metabolites like flavonoids, tannins, carbohydrates, saponins, alkaloids, glycosides, Phytosterol, proteins, amino acids, coumarins, Anthocyanin, Diterpenes, phenols and steroids. This study might be useful to provide the information in regard to its identification parameters.

KEYWORDS: *Tridax procumbens*, Leaves, Secondary Metabolites, Solvents.

INTRODUCTION

Fig.1. *Tridax procumbens* L. plant.

Medicinal plants are source of new and important natural drugs. From ancient years in ayurveda medicinal plants have more importance, for treatment of various diseases. Some plants are rich source of various drugs.[1] India is a country rich in indigenous herbal resources which grow on their and varied topography and under changing agro climatic conditions permitting the growth of almost 20,000 plant species, of which about 2,500 are of medicinal value.[2]

Tridax procumbens is a species of flowering plant belonging to family asteraceae. It is best known as widespread weed and pest plant. It is native to the tropical Americas but it has been introduced to tropical, subtropical and mild temperate regions worldwide. It is listed as a noxious weed in the United States and has a pest status. The extracts of *Tridax procumbens* have been reported to have various pharmacological effects, anti-inflammatory[3], antimicrobial[4], anti-hyperglycemic[5], anti-diabetic[6], hypoglycemic[7], antioxidant[8] and antifungal.[9]

Tridax procumbens Linn is a common grass found in the tropics. Traditionally, it is used for the treatment of bronchial catarrh, dysentery, malaria, diarrhea, high blood pressure and to check haemorrhage from cuts, bruises and wounds and to prevent falling of hair.[10]

Dhanabalan et.al (2008) was reported presence of Eight phytochemicals as Alkaloids, Tannin, Saponin, Steroid, Phlobatannin, Terpenoids, Flavonoids and Cardiac glycosides form the Methanolic extract of leaves of *T. procumbens* Linn.[11] Rajaram S. Sawant and Ashvin G. Godghate (2013) was reported sixteen phytochemical from the leaves of *Tridax procumbens* Linn.[12] Ayyappa Das et.al (2009) was calculated Eight secondary metabolites from the Aqueous and Methanolic leaf extract of Tridax procumbens Linn.[13]

In this work the systematic study of qualitative determination of secondary metabolites in leaves of *tridax procumbens* linn. is done.

MATERIAL AND METHOD

***Plant material*:** The fresh leaves of *Tridax procumbens* L. were collected in November at Ravalgaon village, Tal- Malegaon, District -Nashik (MS), India. The plant of *Tridax procumbens* was identified by department of botany, M.S.G.College Malegaon. Collected plant material was air-dried under shade at room temperature, ground with an electric grinder into uniform fine powder and used for the further investigations.

Method of extraction

Preparation and Extraction of Plant material: The plant materials (leaves of *Tridax procumbens*) were air-dried at room temperature for 2 weeks and grinded to a uniform powder. The different solvent (water, methanol, ethanol, chloroform, Ethyl acetate) extracts was prepared by soaking 20 g of powdered plant materials in 100 ml of different solvent at room temperature for 2 days. Extract was filtered after 2 days, with Whatmann filter paper No. 42. The extract was concentrated using a rotary evaporator with the water bath set at 35°C.

Phytochemical analysis: The various solvent extracts was freshly prepared and divided into different test tubes and various chemical constituents were analyzed according to methods described by Atul Kale.[1]

QUALITATIVE ANALYSIS OF SECONDARY METABOLITES

Table 1. Qualitative determination tests of secondary metabolites for plant extract.[1]

Phyto constituents	Test	Observation
Flavonoids		
Lead acetate test	1ml extract + 1ml $Pb(OAc)_4$ (10%)	Yellow coloration
Alkaline reagent test	Extract + NaOH	Intense yellow coloration
Tannins		
Braymer's Test	2ml extract + 2ml H2O + 2-3 drops FeCl3	Green precipitate
Gelatin Test	Extract + 1% gelatin solution	White precipitate
Phlobatannins		
Precipitate Test	2ml extract + 2ml HCl (1%) + heat	Red precipitate
Carbohydrates		
Molisch's Test	2ml extract + 10ml H2O + 2 drops Ethanolic α-naphthol +2ml H2SO4 (conc.)	Reddish violet ring at the junction
Benedict's Test	Extract + benedict's reagent + heat	Orange red precipitate
Fehling's Test	Extracts + dil. HCl + Fehling's A&B solution + Heat	Red precipitate
Saponins		
Foam Test	5ml extract + 5ml H2O + heat	Froth appears
Alkaloids		
Mayer's Test	Extracts + few drops of mayer's reagent	Yellow coloration
Wagenr's Test	Extracts + few drops of wagner's reagent	Brown/Reddish precipitate
Dragendroff's Test	Extract + few drops of dragendroff's reagent	Red precipitate
Hagers Test	2ml extract + few drops of Hager's reagent	Yellow precipitate
Glycosides		
Legal Test	Extract + sodium nitroprusside in pyridine + NaOH	Pink to blood red coloration
Phytosterol		
Solkowski Test	Extract + $CHCl_3$ + filter + drop of conc. H_2SO_4 shake	Golden yellow coloration
Libermann Burchard's Test	Extract + $CHCl_3$ + filter + drop of acetic anhydride boil, cool + H_2SO_4	Formation of brown ring at junction
Proteins		
Xanthoproteic Test	1ml extract + 1ml HNO_3(conc.)	White precipitate
Amino acids		
Ninhydrin Test	Extract + 0.25% w/v ninhydrin reagent + boil	Blue coloration
Quinines	Extract + conc. HCl	Yellow precipitation
Oxalate	Extract + ethanoic acid glacial	Greenish black coloration
Diterpenes		
Copper acetate Test	Extract + 3-4 drops of copper acetate solution	Blue coloration

Anthocyanin

2 ml of aqueous extract is added to 2 ml of 2N HCl & NH3, the appearance of pink red turns blue violet indicates presence of Anthocyanin.

Coumarin

3 ml of 10% NaOH was added to 2 ml of aqueous extract formation of yellow colour indicates coumarins.

Phenol

Ferric Chloride test: Test extract were treated with 4 drops of Alcoholic FeCl3 solution. Formation of bluish black colour indicates the presence of Phenol.[12]

RESULT AND DISCUSSION

Table 2. Phytochemical Screening of Various Extracts of the Plant leaves of *Tridax procumbens* Linn.

Phyto constituents	Observation				
	Water	Methanol	Ethanol	Chloroform	Ethyl Acetate
Flavonoids					
i)Shinoda test	-	+	+	-	-
ii)Alkaline reagent test	-	+	+	-	-
Tannins	-	+	+	-	+
Carbohydrates					
i)Molisch's Test	+	-	+	+	+
ii)Benedict's Test	+	+	+	+	+
Saponins					
Foam Test	-	+	+	+	+
Alkaloids					
i)Mayer's Test	-	-	+	+	+
ii)Wagenr's Test	-	-	-	+	+
iii)Hagers Test	-	-	-	+	+
Glycosides					
Legal Test	-	-	+	+	+
Phytosterol	-	-	-	-	-
Proteins					
i)Biuret Test	-	-	+	-	-
ii) Lead Acetate Test	-	+	-	-	-
Amino acids					
Ninhydrin Test	+	+	+	+	-
Coumarins	+	+	+	+	-
Anthocyanin	+	-	-	+	-
Diterpenes					
Copper acetate Test	+	+	+	+	+
Phenols					
Ferric Chloride Test	-	+	-	+	-
Steroids	+	+	+	+	+

(+ = Present, - = Absent)

Present work deals with qualitative determination of secondary metabolites in leaves extract of *Tridax procumbens* Linn. Table 2 shows the results of phytochemical analysis for leaves of *Tridax procumbens* Linn.

- Aqueous extract of leaves of *Tridax procumbens* Linn shows the presence of carbohydrates, amino acids, coumarins, Anthocyanin, Diterpenes and steroids whereas Flavonoids, Tannins, Saponin, Alkaloids, Glycosides, Phytosterols, Proteins and phenols were absent.
- Methanol extract of leaves of *Tridax procumbens* Linn shows the presence of Flavonoids, Tannins, carbohydrates, Saponin, Proteins, amino acids, coumarins, Diterpenes, phenols and steroids whereas Alkaloids, Glycosides, Phytosterol and Anthocyanin were absent.
- Ethanol extract of leaves of *Tridax procumbens* Linn shows the presence of Flavonoids, Tannins, carbohydrates, Saponin, Alkaloids, Glycosides, Proteins, amino acids, coumarins, Diterpenes and steroids whereas Phytosterol, Anthocyanin and phenol were absent.
- Chloroform extract of leaves of *Tridax procumbens* Linn shows the presence of carbohydrates, Saponin, Alkaloids, Glycosides, amino acids, coumarins, Anthocyanin, Diterpenes, phenols and Steroids whereas Flavonoids, Tannins, Phytosterol and Proteins were absent.
- Ethyl Acetate extract of leaves of *Tridax procumbens* Linn shows the presence of Tannins, carbohydrates, Saponins, Alkaloids, Glycosides, Diterpenes and Steroids whereas Flavonoids, Phytosterol, Proteins, Amino acids, Coumarins, Anthocyanin and Phenols were absent.

CONCLUSION

The present study clearly indicates that the qualitative determination of secondary metabolites in leaves of *Tridax procumbens* Linn in various solvent extracts. From result we conclude that *Tridax procumbens* was rich in secondary metabolites particularly tannins and flavonoids which are responsible for antibacterial activity. Further, more investigation of the active compounds of the plant for the exact will contribute greatly to the development new pharmaceuticals. Therefore, there is huge room for research in direction of more pharmacological activities of plants.

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