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RESEARCH ARTICLE

Liquid chromatography-mass spectrometry (LCMS) based profile of bioactive compounds in ethanol extract of Polyathia cerasoides stem bark.

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Abstract

The bioactive compounds from plant sources play an essential role in the treatment of various human diseases. Isolation and identification of new bioactive compounds from plants may leads to development of new drugs. The present study was conducted to identify the various bioactive compounds from ethanolic extract of *Polyalthia cerasoides* stem bark by using Liquid chromatography-mass spectrometry. Some alkaloids, flavonoids, steroids, terpenes and polyphenols are identified with the help of computer assisted evaluation of the resulting data. Some of these identified compounds reported to have great pharmacological activities such as anti-inflammatory activity, potent antioxidant properties, rheumatic pain relief, anti-diabetic and anti-neoplastic activity. This type study may useful for exploration of novel compounds present in plant sources.

INTRODUCTION

Medicinal plants are the chief source for development of new drugs due to the presence of various bioactive compounds with significant pharmacological activities. Generally identification and isolation of these bioactive compounds from plant sources was done by using traditional methods. But there are some drawbacks from traditional methods. The traditional methods primarily target the major components this might be lead to lose the minor components during separation process and sometimes bioactive components may be deactivated (Song et al., 2005). Liquid chromatography- mass spectrometry (LC/MS) has been widely used to analyze complex mixtures like biological samples. This method is effective for identifying various bioactive compounds (Spacil et al., 2010).

Polyalthia is a large genus of shrubs and trees found in tropic and sub-tropic regions. It includes nearly 120 species. It belongs to the family of Annonaceae. *Polyalthia cerasoides* (Roxb) Bedd. is one of the species, it's basionym is *Uvaria cerasoides* (Roxb). It is commonly known as guttidudduga and deciduous tree grows up to 10 m height and is distributed in India, China, Burma and Thailand. It has been proved used for treatment of various diseases like cancer and diabetes (Naidu et al., 2015). The stembark of *P.cerasoides* has potential antioxidant properties due to the presence of polyphenolic compounds (Ravikumar et al., 2008) and it also used in pain assistance and kidney disfunctions (Smitinand 1980). Different bioactive compounds have been isolated from the plant sources for example digoxin, digitoxin, quercetin, morphine, taxol etc. (Ghani, 1998) which have different useful pharmacological properties. Hence the aim of the study was to identify the various bioactive compounds from Polyalthia cerasoides stem bark.

Materials and methods

Plant material

P. cerasoides stem bark was collected from herbal garden in Dravidian university and surrounding areas of Kuppam, A.P., India. The stem bark was shade dried and pulverized in mechanical grinder. The powder (stem bark) was stored in airtight container and it is used for the extraction process.

Preparation of extract

The dried powder was placed in a soxhlet extractor using ethanol at a temperature range of 55 – 60ºC. Then the collected solvent was poured in a glass plate and it was dried in rotary evaporator then the extract was used for further exploration studies.

Characterization of bioactive compounds from ethanol extract by LCMS

To characterize the bioactive compounds present in ethanol extract, LC column reverse phase c-18 was used with speed 10 avp. The mobile phase was water and methanol (50:50). Both positive and negative mode of ionization was done by using electronic spray ionization. The injection volume was 10 µl with flow rate 2 ml/min. Phenomenex RP 18 column with dimensions 25 cm x2.5 mm and column temperature was maintained 250^0C throughout the experiment. Ionized mother and daughter ions were detected by LC detector at 254 nm. M/z range was 50-1000 for both negative and positive. The Soft ware and library used in the detection of compounds were CLASS V P INTEGRATED and METWIN 2.0.

Results

Figure – 1: LCMS spectrum (negative mode of ionization peaks) of *P. cerasoides* ethanol extract

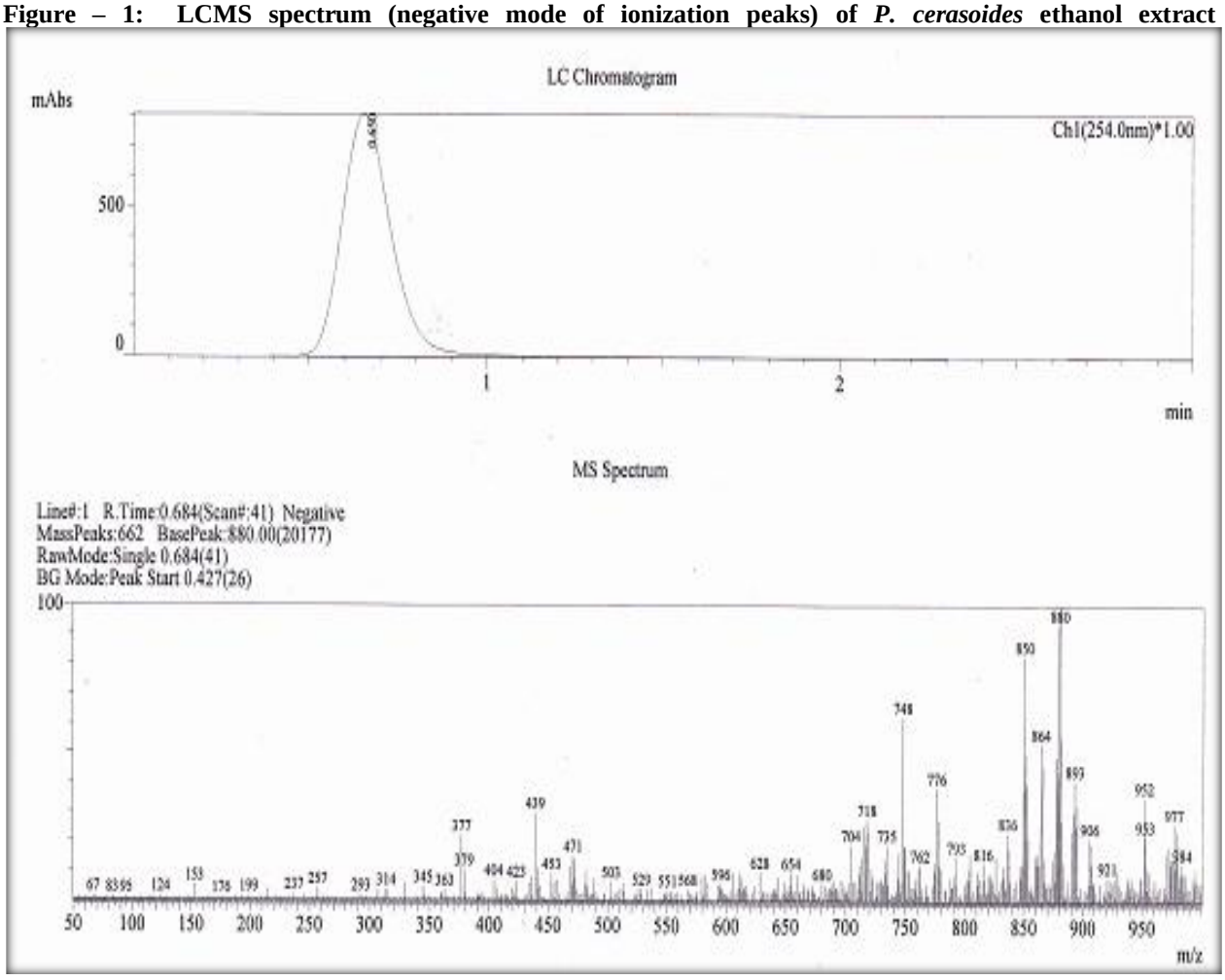

Figure – 2: LCMS spectrum (positive mode of ionization peaks) of *P. cerasoides* ethanol extract.

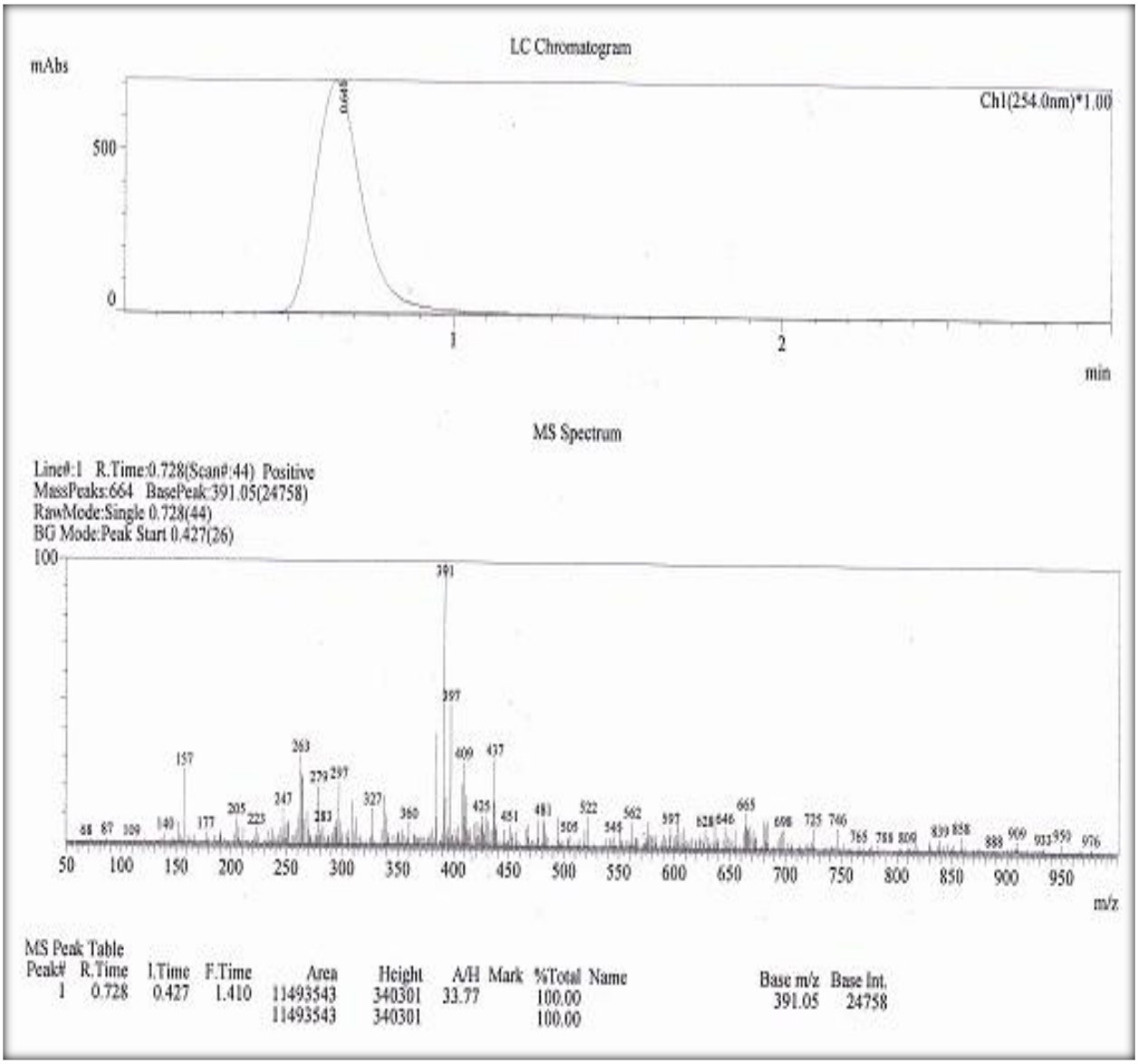

Table – 1: Different bio active compounds and their molecular mass present in ethanol extract of *P. cerasoides.*

SL NO	COMPOUND NAME	MOLECULAR MASS
1	HUMULENE	204.36
2	LAUDANOSINE	357.45
3	RETICULINE,	329.40

4	MACULOSINE	331.33
5	RETRORSINE N-OXIDE	367.40
6	DELCOSINE	453.58
7	ERGOSINE	547.66
8	THALICARPINE	696.85
9	AZETIDINE 2-CARBOXYLIC ACID	101.11
10	ISOVALERIC ACID	102.14
11	METHYL AMINO L ALANINE	118.14
12	PHENETHYLAMINE	121.18
13	METHYL CYTOSINE	125.13
14	DEOXYQUERCETIN	286.25
15	ACETOXYVALERENIC ACID	292.38
16	METHYL LINOLENATE	292.46
17	CAFFEOYLMALIC ACID	296.23
18	ELLAGIC ACID	302.24
19	HYDROXYCYANTHIN	303.25
20	BENZOYLMETHYLECGONINE	303.36
21	EUPAFORMONIN	306.36
22	PELARGONIDIN CHLORIDE	306.70
23	INDICAXANTHIN	308.30
24	GALANGIN TRIMETHYL ETHER	312.33
25	DIHYDROXY STEARIC ACID	316.49
26	MYRICETIN	318.24
27	RUTACRIDONE EPOXIDE	323.35
28	CAFFEOYLSHIKIMIC ACID	336.35

Discussion

Plants are important source for development novel drug compounds. Secondary metabolites like alkaloids, flavonoids, terpanoids, phenolic acids, glycosides etc., exhibit several biological effects like antibacterial, anti-inflammatory, antiallergic, antibacterial, antiviral, antidiabetic, hepatoprotective and antioxidant properties (Murali Krishna et al., 2013). In our study different types of bioactive compounds were identified in ethanol extract of P. cerasoides stem bark.

LCMS characterization and chemoprofile of ethanol extract revealed the presence of nearly 28 compounds based on their molecular mass. Humulene, ergosine, hydroxycyanthin, deoxyquercetin, dihydroxy stearic acid, ellagic acid, glycosides, caffeoylshikimic acid, myricetin, eupaformonin, thalicarpine and other various compounds. Identification of active ingredients in ethanol extract with maximum activity was important to know the biologically active compounds that can act on target tissues.

The phenolic acids show a broad range of biological properties including antibacterial, ant-iinflammatory, antiallergic, hepatoprotective, antithrombotic, antiviral, anticarcinogenic and vasodilatory actions. Recent years, these compounds are used in food, cosmetic and pharmaceutical industries, as substitutes for synthetic antioxidants (Saikat Sen et al., 2010). Ellagic acid and myricetin are the poly phenolic compounds acts as antioxidants which were present in *P. cerasoides* stem bark.

The phytochemical screening of ethanol extract of *P.cerasoides* stem bark showed the presence of alkaloids, triterpenoids, tannins, phenols and saponins (Naidu et al., 2015). Humulene and eupaformonin are the terpenes it might be exhibit the anti inflammatory effects. Deoxyquercetin is a glycoside, pelargonidin chloride is a flavonoid acts as antioxidant and it scavenges the nitric oxide radicals. Thalicarpine is one of the alkaloid compounds.

In our study the compound identification was done based on the molecular mass. By using the Soft ware and library (CLASS V P INTEGRATED and METWIN 2.0) the compounds were detected. This study might be helpful for further isolation studies.

Conclusion

On the basis of the results of the present study, it was concluded that the presence of various compounds were identified successfully from *Polyalthia cerasoides* stem bark by LC-MS. More research on the isolation, purification and structure elucidation of the compounds in the *P. cerasoides* stem bark may be focused and carried out in future.

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