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GC-MS STUDY OF *IXORA PAVETTA* VAHL.

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ABSTRACT

Ixora pavetta Vahl. is a small tree, traditionally used for the treatment of diarrhoea, dysentery, urinary disorders, leucorrhoea, veneral diseases and sedative. The flowers of the plant were extracted with ethanol by cold percolation method. The presence of the compounds in the extract was analyzed by GC-MS technique. The parameters of mass spectral analysis viz. retention time and characteristics of peak using NIST library were considered for the detection of compounds, The compounds viz. 3-Butyn-2-ol, 3-Butyn-1-ol, Amyl nitrite, 2Octyn-1-ol, 1, 9-Decadiyne and Butyl glyoxylate were identified from the study. With reference to the phytochemical and ethanobotanical databases, the Pharmacological activity of the compounds which identified were found out and compared with its traditional uses. Sedative property is one of the traditional uses of *Ixora pavetta* was found to be due to the presence of Amyl nitrite in the extract.

INTRODUCTION: *Ixora pavetta* is a small tree or evergreen shrub belongs to the family Rubiaceae found in deciduous slopes and hills. The leaves of the plant are elliptic-oblong to oblanceolate, entire margin, obtuse-acute apex. The flowers are white, calyx truncate & four toothed, corolla tubular, lobes four, obtuse, satmens four, anthers basally tailed, and drupes didymous. Traditionally the plant is used for the treatment of diarrhoea, dysentery, urinary disorders, leucorrhoea, veneral diseases and sedative [1, 2].

The object of the present study was to detect the causative matters for its traditional uses by GC-MS analysis, phytochemical and ethno botanical databases. Gas chromatography Mass spectroscopy (GC-MS) technique is one of the excellent methods to detect the presence of compounds in the crude extracts. The parameters viz. retention time, base peak area, characteristics of peak using National Institute of Standards &Technology (NIST) Library were considered for the detection of compounds in GC-MS analysis. Phytochemical and ethnobotanical databases provide the information regarding the pharmacological activity of the compounds. The flowers of the plant are aimed to extract with alcohol by cold percolation method and detect the presence of compounds with the help of GC-MS analysis. Also planned to find out the pharmacological activities of the compounds which is identified and compare with its traditional uses.

MATERIALS AND METHODS:

Flowers: Attractive, white colored, agreeable and aromatic odorous flowers of *Ixora pavetta* were collected from Nagercoil, Tamil Nadu, during February 2010. The collected flowers were authenticated by Research officer, V. Chellathurai, Department of Botany, Tirunelveli, Tamil Nadu.

Preparation of the extract: The authenticated flowers were dried under shade by spreading as a thin layer and ground to coarse powder. The powdered material was extracted by cold percolation method using ethyl alcohol as solvent. The percolation was carried by conical metal percolator. Glass wool moistened with alcohol and was placed at the bottom of the percolator. Alcohol moistened powder was added into the percolator and packed uniformly in order to facilitate free flow of menstrum through the drug. A piece of filter paper was placed on the packed drug.

Washed sand was added on the filter paper. A sufficient quantity of alcohol was added to saturate the material. The percolator was closed to prevent evaporation of alcohol. After 24 hours of maceration the outlet was opened and collected the percolates [3, 4]. The percolation was continued till the drug was completely exhausted. The combined percolates were dried under vacuum dryer .The extract obtained was reddish brown in color, hard and brittle in nature. It yields about 7.2 % w/w of ethanol extractive value.

GC-MS Study: Ethanolic extract of flowers of *Ixora pavetta* was analyzed for the presence of different compounds by Gas chromatography-Mass spectroscopy (GC-MS) technique. It was carried out in GC Clarus 500 Perkin Elmer equipment with Turbo mass 5.2 Software. The column was packed with 5% Dimethyl and 95% Dimethyl poly siloxane. The sample of extract was dissolved in ethanol and 2µl of the same was injected for the determination. It was run for about 36 minutes and detection was carried by Mass detector Turbo mass gold-perkin Elmer. The method followed in the instrumentation of GC-MS analysis is mentioned in **Table 1**.

RESULTS AND DISCUSSION: The presence of six compounds in the ethanolic extract of flowers of *Ixora pavetta* by GC-MS analysis has shown in **Table 2** and **Fig. 1**. Mass spectroscopy analysis using National Institute of Standards and Technology (NIST) Library and retention time programme confirmed the presence of these six compounds. The result showed that 3-Butyn-2-ol, 3-Butyn-1-ol, Amyl nitrite, 2-Octyn-1-ol, 1, 9-Decadiyne and Butyl glyoxylate were present in the extract. The pharmacological activities of the identified compounds were shown in **Table 3**.

TABLE 1: METHOD OF INSTRUMENTATION (GC-MS)

Device used	Specifications
Gas chromatography Programme	
Equipment	GC Clarus 500 Perkin Elmer
Detector	Mass detector Turbo mass gold-Perkin Elmer
Software	Turbomass 5.2
Column	Elite (5% Diphenyl/95% Dimethyl polysiloxane) 30 x 0.25mm x 0.25µm df
Carrier gas	1ml/minute, Split: 10:1
Sample injected	2µl
Injection Temperature	250°C
Total GC Running time	36 minutes
Mass spectroscopy Programme	
Library used	NIST Version-Year 2005
Inlet line temperature	200° C
Source temperature	200° C
Electron energy	70 Ev
Mass scan (m/z)	45-450
Solvent Delay	0-2 min

TABLE 2: GC-MS ANALYSIS OF ETHANOLIC EXTRACT OF *IXORA PAVETTA*

Retention Time	Peak Area	Molecular Weight	Molecular Formula	Name of the Compound Identified
3.10	3.88	70	C_4H_6O	3-Butyn-2-ol
4.73	9.87	70	C_4H_6O	3-Butyn-1-ol
10.15	10.11	117	$C_5H_{11}NO_2$	Amyl nitrite
15.97	13.98	126	$C_8H_{14}O$	2Octyn-1-ol
16.62	5.41	134	$C_{10}H_{14}$	1,9-Decadiyne
35.09	0.47	130	$C_6H_{10}O_3$	Butyl glyoxylate

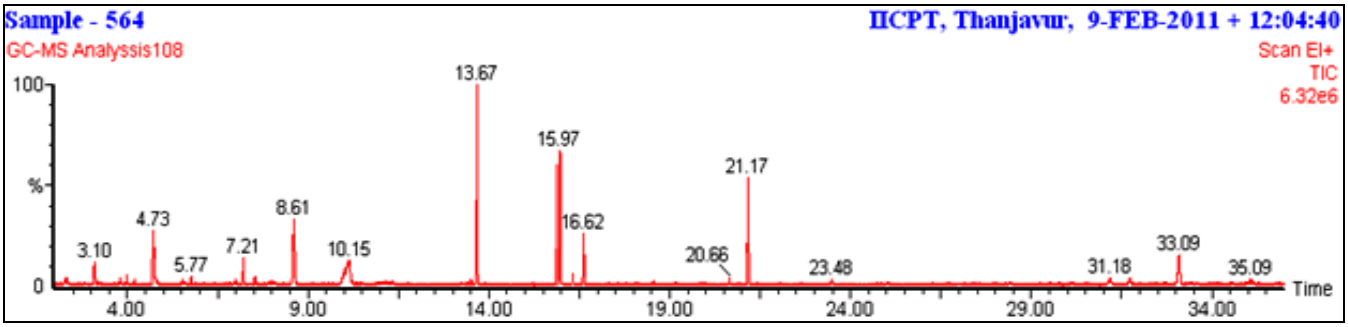

FIG. 1: GC-MS ANALYSIS OF ETHANOLIC EXTRACT OF FLOWERS OF *IXORA PAVETTA*

TABLE 3: THE COMPOUNDS IDENTIFIED FROM THE EXTRACT AND ITS ACTIVITIES

Name of the compound	Nature of the Compound	Activities of the compound
3-Butyn-2-ol	Alcoholic	Antimicrobial
3-Butyn-1-ol	Alcoholic	Antimicrobial
Amyl nitrite	Nitrite	Angina pectoris, cyanide poisoning, Sedative
2Octyn-1-ol	Alcoholic	Antimicrobial
1,9-Decadiyne	Alkene	Not found
Butyl glyoxylate	Oxylate	Not found

CONCLUSION: *Ixora pavetta* plant is traditionally used for diarrhoea, dysentery, urinary disorders, leucorrhoea, veneral diseases and sedative. The compounds identified by the GC-MS study from the same plant also have the similar properties. From this study, we have concluded that the causative matter for its traditional properties has been confirmed by the scientific approach.

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