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GC-MS ANALYSIS OF *BOERHAAVIA DIFFUSA* LINN LEAF EXTRACT- TRADITIONAL VALUABLE PLANT

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ABSTRACT

Phytochemical compounds and GC-MS analysis of *Boerhaavia diffusa* leaf was carried out in the present study presence of phytochemical compounds was screened by qualitative method. The results showed the presence of phytochemical compounds namely phenol, lipid, saponin, flavonoids, steroids, protein, carbohydrates, and tannin. In GC-MS analysis, 9 bioactive phytochemical compounds were identified in the ethanolic extract of *Boerhaavia diffusa*, the components were identified by comparing their relation indices and mass spectra fragmentation patterns with those stored on the MS-Computer library and also form the published literatures. Myo-Inositol 4-C-methyl-, Phytol and Vitamin E acetate were seem to be the major constituents.

INTRODUCTION

Medicinal plants are of great importance to the health of individuals and communities in general. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds. Many of the indigenous medicinal plants are used as spices and food. They also sometimes added to foods meant for pregnant women and nursing mothers for medicinal purposes [1,2,3]. In addition, the use of herbal medicine for the treatment of diseases and infections is as old as mankind. The World Health Organisation (WHO) supports the use of traditional medicine provide they are proven to be efficacious and safe [4].

Boerhaavia diffusa is a member of Nyctaginaceae family. *Boerhaavia diffusa* is a perennial creeping weed, a number of branches spread out from the node of main stem and cover most of the surrounding area. The stem is usually prostrate and woody. Leaves are simple, ovate or oblong or round in shape.

Flowers are minute, hermaphrodite, subcapitate, pedicellate. Stamens are usually two or three in number and the stigma is peltate. The fruit is achene, ovate, oblong, pubescent. Five ribbed and glandular and anthocarpous [5,6,7].

In the present study an attempt has been made to analysis the *Boerhaavia diffusa* Phyto chemical compound analysis (qualitative method) and GC-MS analysis provide information for the use in medicine

MATERIALS AND METHODS

Collection of Plant Material

Leaves of *Boerhaavia diffusa* was collected from Velusampuram, near the Karur District in Tamilnadu.

Preparation of Plant Extract

The leaves of *Boerhaavia diffusa* was shade dried at room temperature. The dried material was then homogenized to obtain coarse powder and stored in air-tight bottles for further analysis. The shade dried, powdered leaves were extracted [8] with ethanol solvent by hot extraction using soxhlet apparatus collected and stored in a vial for further analysis.

Phytochemical Screening

The leaf extract was subjected for qualitative phyto chemical analysis ^[9,10].

Gas Chromatography - Mass Spectrometry Analysis

The Gas Chromatography-Mass Spectrometry (GC-MS) analysis of the extracts was performed using a clarus 500 Perkin Elmer gas chromatography equipped with a Elite-5 capillary column [5% Phenyl and 95% methyl Polysaccharides Siloxane] and mass detector turbomass gold of the compant which was operated in E1 mode. Elite wax (Polyethylene glycol) (30mmx 0.25mm X0.25umdf) is a polar column used in the estimation)

An insert gas such as Hydrogen or Nitrogen or Helium is used as a carrier gas at a flow rate of 1ml/min, split 10:1. The components of test sample is evaporated in the injection part of the GC equipment and segregated in the coloumn by adsorption and desorption technique with suitable temperature programmes of the over controlled by software different components are eluted

from based on the boiling point of the individual components ^[11].

The GC column is heated in the oven between 110 C to 280 C. The time at which each component eluted from the GC column is termed as retention time (RT). The total GC running time is 36 min. The eluted component is detected in the mass detector. The spectrum of the known components stored in the NIST library and ascertains the name, molecular weight and structure of the components of the test material in GC-MS study.

Identification of components was based on comparison of their mass spectra with those of Wiley and NIST Libraries and as well as on comparison of their retention indices with literature ^[12,13].

Table 1: Qualitative Analysis of Phytochemical Components

Sl.No	Phytochemical Components	Ethanal extract
1	Phenol	+
2	Phlobatannins	-
3	Lipid	+
4	Saponin	+
5	Flavonoids	+
6	Terpenoids	-
7	Steroids	+
8	Protein	+
9	Carbohydrates	+
10	Tannin	+
11	Cardiacglycosides	-

“+” Referred to Presence

“-“ Referred to Absence

Table 2: Phyto compounds identified from the leaf of *Boerhaavia diffusa*

Sl.No	RT	Name of the Compound	Molecular Formula	MW	Peak Area%
1	7.92	Phenol, 4,6-di(1,1-dimethylethyl)-2-methyl-	C ₁₅ H ₂₄ O	220	0.70
2	10.08	Myo-Inositol, 4-C-methyl-	C ₇ H ₁₄ O ₆	194	41.31
3	11.60	1,14-Tetradecanediol	C ₁₄ H ₃₀ O ₂	230	14.79
4	11.88	1-pentadecyne	C ₁₅ H ₂₈	208	1.64
5	12.08	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	C ₂₀ H ₄₀ O	296	3.29
6	14.94	Phytol	C ₂₀ H ₄₀ O	296	14.55
7	24.66	2,4,6-Cycloheptatrien-1-one, 3,5-bis-trimethylsilyl-	C ₁₃ H ₂₂ OSi ₂	250	3.29

8	28.96	Vitamin E acetate	C31H52O3	472	14.08
9	32.29	Androstane-11,17-dione, 3- [(trimethylsilyl)oxy]-17- [O- (phenylmethyl)oxime], (3a,5a)-	$29^H43^{NO_3}Si$	481	6.34

RESULTS AND DISCUSSION

The present study have been carried out in leaves of *Boerhaavia diffusa* to check the presence of medicinal by active constituents. Phytochemical screening of the ethanolic extract indicated the presence of phenol, lipid, saponin, flavonoids, steroids, protein, carbohydrates and Tannin qualitatively analysed and the results are presented in Table-1.

In the GC-MS analysis, 9 bio active phytochemical compounds were identified in the ethanolic extract in this plant (Table-2). The identification of Phytochemical compounds is based on the peak area, molecular weight and molecular formula Myo-inositol, 4-c-methyl-(C7H14O6) with RT 10.08 has peak area (41.31%) followed by 1,14-Tetradecanediol C14H30O2 with RT 11.60 has peak area 14.79%. This study has revealed the presence of many secondary metabolites and bioactive compounds in the leaf of *Boerhaavia diffusa* and may be of a very important medicinal value and further plan study

include isolation and purification of active phyto compounds ^[14].

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