RESEARCH ARTICLE

GC-MS analysis of aromatic compounds from leaves of *Colebrookea oppositifolia* Smith.

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ABSTRACT

Plants synthesize substances that are useful for the maintenance of health in humans and other animals. The Lamiaceae (Labiatae) is one of the diverse and widespread plant families in terms of ethnomedicine and its medicinal value is based on the volatile oils concentration. The Lamiaceae is one of the largest families among the dicotyledons, many species belonging to the family being highly aromatic, due to the presence of external glandular structures that produce volatile oil. This oil is important in pesticide, pharmaceutical, flavouring, perfumery, fragrance and cosmetic industries. *Colebrookea oppositifoli*a Smith belonging to the family Lamiaceae is commonly known as Indian Squirrel Tail (English),Binda (Hindi). The plant grows wild on hills & plains throughout India.The plant material is generally used to cure the diseases like epilepsy, fever, headache, and urinary problems.The present paper deals with the important aromatic phyto-constituents obtained from *Colebrookea oppositifolia* identified as Phytol, n-Hexadecanoic acid, 9,12,15 Octadecatrienoic acid, 2-Dodecen-1-ny,succinic anhydride, Octanoic acid tridec-2eny ester.

Keywords: Lamiaceae, GC-MS analysis , aromatic phyto-constituents, *Colebrookea oppositifoli*a.

INTRODUCTION

The family is represented by 236 genera and 6,900 to 7,200 species, out of which about 400 species are reported from India. The members of this family are well known as aromatic species, as they contain large quantities of the essential oils (Kremer *et al.,* 2012). *Colebrookea oppositifolia* Smith belonging to this family is commonly known as Indian Squirrel Tail (English), Binda (Hindi), Pansara (Bengali), Bosiki (Oriya),Dhusure (Nepali), Jolidi (Telegu) (Madhavan *et al.,* 2011).The plant grows wild on hills and plains throughout India mainly accupying subtropical Himalaya, Madhya Pradesh and Deccan Peninsula. Also it is found in Burma, Bhutan, China, Nepal, Myanmar and Thailand (Rana *et al.,*2009).*Colebrookea oppositifolia* Smith is a branched shrub, growing upto 1-3 m tall. There are many pale branches which are hairy when young. Oppositely arranged light

green leaves are crowded at branch ends, leaf blade, base broadly rounded margin crenulate-serrulate, apex long acuminate, adaxially rugulose and pubesent, abaxially densely-tomentose (Koche *et al.,*2010). The leaves are oblong, lancelike, finely serrated light colored stems are stout. Numerous tiny white flowers occur in panicles of upright spikes.It possess hepatoprotective, cardioprotective and anti-inflammatory activity (Singh *et al.,*1983). The essential oil of *Colebrookea oppositifolia* possesses fungitoxic property (Venkateshappa *et al.,*2013). plant material is generally used to cure the diseases like epilepsy, fever, headache, and urinary problems (Gupta *et al.,* 2001).

MATERIALS AND METHODS

Collection of plant material:

Colebrookea oppositifolia is a perennial shrub grows in rocky soil, flowering start at beginning of summer in month of February, colour of flower is white at maturity it become cremy. fruit small in size and pale black in colour. Collection plant material was carried out from forest locality Chikhaldara in month of February. Frequent visits were made throughout the season to know the phenological event and collect the plant parts.

Extraction Method

Preliminary phytochemical analysis

5 gm of air dried leaves powder was extracted by continuous soxhlet apparatus with petroleum ether, acetone, benzene and water according to their increasing polarity of solvent. Then the extracts obtained were filtered and evaporated. After dilution of extracts they were analysed for presence of essential oil. Preliminary phytochemical studies were conducted on all extract.

Mass Spectroscopy (HRGC-Gas Chromatography MS) analysis.

For GC-MS analysis acetone extract was used .The GC-MS analysis of leaves extract isolated from *Colebrookea oppositifolia* was carried out using gas chromatography – high resolution mass spectrophotometer. 2 µl of sample employed for GC – MS Analysis. analysis was carried out using AlegentHp 7880 with coloum 25m. Helium gas was used as carrier gas at constant flow rate and estimation of aromatic phyto-constituents done with the help of NIST online libray

RESULTS AND DISCUSSION

Preliminary chemical examination of *Colebrookea oppositifolia* Smith revealed the presence of essential oil in leaves. It was found that water and acetone is best solvent for extraction of *Colebrookea oppositifolia* It showed presence of essential oil and Alkaloids. Sudand Red III show presence of essential oil in leaves.

The GC-MS analysis supports the same and shows the presence of important aromatic phytoconstituents. The percentage of various compounds was calculated by the use of gas chromatogram and mass spectrum. Leaves of *Colebrookea oppositifolia* contain Phytol

Table 1: Preliminary chemical examination of *Colebrookea oppositifolia*

TEST	SOLVENT			
	PETROLEUM ETHER	ACETONE	BENZENE	WATER
1) Alkaloids				
a)Mayer's reagent test	-	++	++	+++
b)Wagner's reagent test	++	++	-	++
2) flavonoids				
a) Alkaline reagent test	-	-	-	++
b) Lead acetate test	++	++	++	++
3) Tannins				
a) Iodine test	-	++	-	++
b) Ferric chloride test	++	+	-	++
4) Essential oil				
a) Sudan red-III test	+++	+++	+++	+++
b) Tincture alkana test	+	++	-	+++

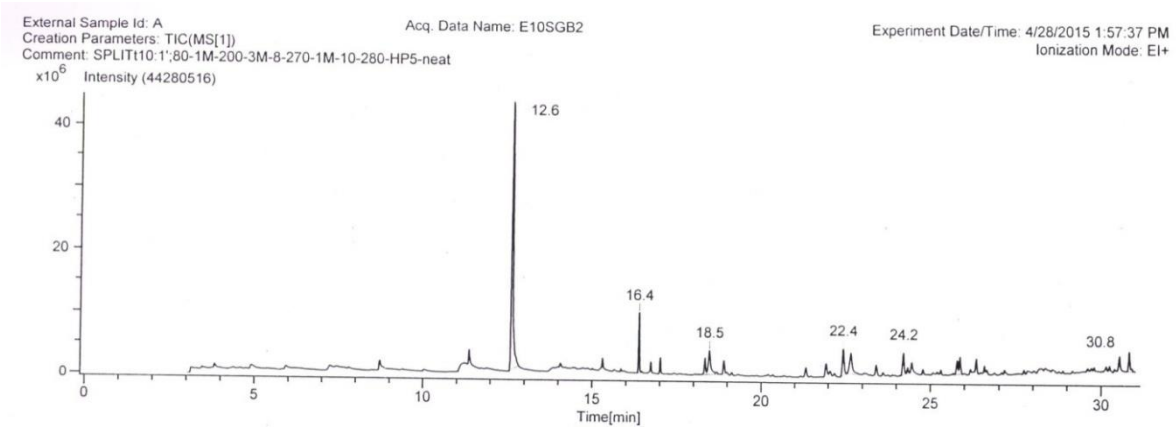
Table 1: Continued..

TEST	SOLVENT			
	PETROLEUM ETHER	ACETONE	BENZENE	WATER
5) Phenol				
a) Gelatine test	-	++	++	++
b) Nitric acid test	++	-	-	+++
6) Terpenoids				
a) Salkowki's test	-	++	-	++
7) Cardiac glycosides	-	+++	++	-
a) Keller Kelliani's test	+	+	++	+
8) Quinones				
a) HCL test	++	-	-	-
9)Anthraquinones	-	++	++	-
a)H2 SO4 test	-	++	-	+
10) coumarine				
a) Alcoholic NaOH test	-	++	-	++

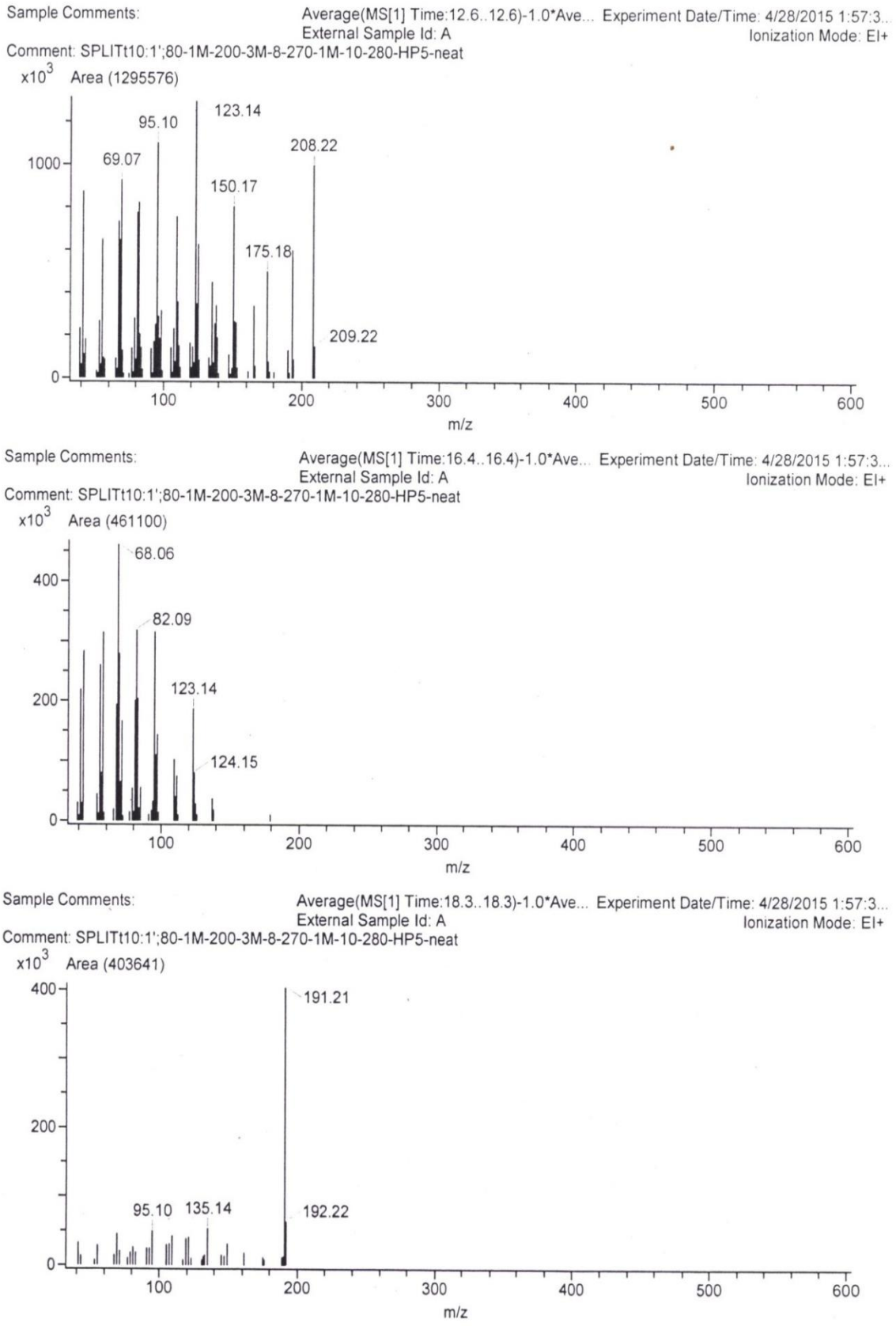
(+++ highly present,++ moderately present,+ presence,- absence of phytoconstituents.)

Table 2: Aromatic phyto-constituents in leaves *Colebrookea oppositifolia.*

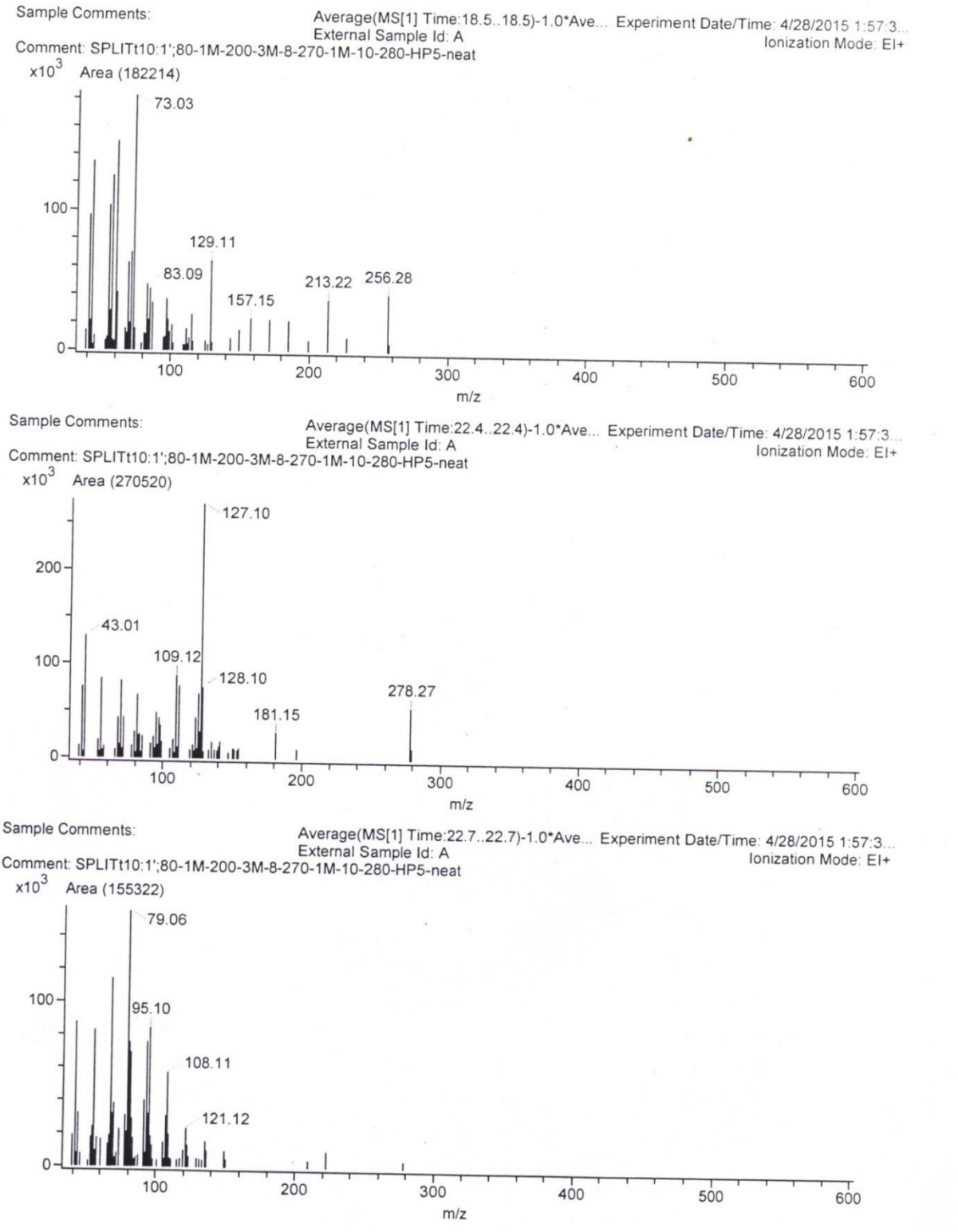
Sr. No.	R.T.	COMPOUND	PEAK AREA	M.W.	M.F.
1.	16.4	Phytol	41.28%	296.5310	$C_{20}H_{40}O$
2.	18.5	Palmitic acid	27.52%	256.4241	$C_{15}H_{30}O_2$
3.	22.4	Caprylic acid	5.1%	278.4296	$C_{21}H_{38}O_2$
4.	22.7	α-Linolenic acid	9 .9%	278.4296	$C_{18}H_{30}O_2$
5.	24.2	2-Dodecen-1-ny,succinic anhydride.	4.4%	266.3758	$C_{16}H_{26}O_3$



Chromatogram of *Colebrookea oppositifolia* leaves.



Mass spectra of *Colebrookea oppositifolia* leaves.



Mass spectra of *Colebrookea oppositifolia* leaves.

(41.28%), n-Hexadecanoic acid (27.52%), Octanoic acid tridec-2eny ester (5.1%), 9,12,15 Octadecatrienoic acid (9.9%), 2-Dodecen-1-ny,succinic anhydride(4.4%). 9,12,15 Octadecatrienoic acid also called α-Linolenic acid is an essential fatty acid so called because they are necessary for health, and they cannot be produced within the human body. They must be acquired through diet (Burr *et al.,* 1930).

Octanoic acid tridec-2eny ester also called Caprylic acid. is used commercially in the production of perfumes and also in the manufacture of dyes (Papamandjaris *et al.,* 1998). n-Hexadecanoic acid or Palmitic acid is used to produce soaps, cosmetics, and release agents (Benoit *et al.,*2009). Hydrogenation of palmitic acid yields acetyl alcohol, which is used to produce detergents and cosmetics. Sodium palmitate is permitted as a natural additive in organic products (Kingsbury *et al.,* 1961).

Conflicts of interest: The authors stated that no conflicts of interest.

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