

## CHEMICAL STUDY OF FATTY ACIDS IN MIMUSOPS ELENGISEEDS BY GC-MS AND COMPARISON OF ITS ANTIBACTERIAL ACTIVITY WITH TRIMETHOPRIM

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### ABSTRACT

The aim of this study was to analyze the chemical and phytochemical composition of Mimusops elengi seeds. The individual constituents were identified by GC-MS method. In the analysis 11 components were identified which include-Pentadecanoic acid 14-methyl- methyl ester, Hexadecanoic acid ethyl ester, 10-Octadecenoic acid methyl ester, (E)-9-Octadecenoic acid ethyl ester, Methyl 9-eicosenoate, Methyl 19-methyl-eicosanoate, Hexadecanoic acid 3-[(trimethylsilyl)oxy]propyl ester, Docosanoic acid ethyl ester, Hexadecanoic acid 3-[(trimethylsilyl)oxy]propyl ester, Docosanoic acid ethyl ester, Hydrocinnamic acid o-[(1,2,3,4-tetrahydro-2-naphthyl)methyl]-, Ethyl 14-methyl-hexadecanoate, 9-Octadecenoic acid (Z)- 2-hydroxy-1-(hydroxymethyl)ethyl ester. The phytochemical analysis of ethyl acetate extract shows presence of alkaloids,

glycosides, tannins, saponins, & flavonoids. Quantitative analysis of magnesium, calcium, iron, copper shows presence of these minerals in the sample. The antimicrobial activity of M. Elengi seed extract when compared with Synthetic drug Trimethoprim shows that it exhibits good antibacterial properties and can be used for therapeutic purpose in future.

**KEYWORDS:** Mimusops Elengi Linn., Ethyl acetate seed extract, antimicrobial property, composition Trimethoprim, UV spectrophotometry, GC-MS.

### INTRODUCTION

The limited lifetime of antimicrobials has led to the requirement of continuous research for new alternatives. In this context M. elengi seeds are found to be very useful due to its

phytochemical composition. The plant *M. Elengi* belongs to the family of Sapotacea. It is also known as Bakul (Hindi and Bengali), Spanish cherry, west Indian medlar or bullet wood.<sup>[1]</sup> The plant is regarded as one of the best medicinal plant since every part of it is used to cure a no of human diseases. The therapeutic uses included cardiogenic, alexipharmic, stomachic, anthelmintic etc.<sup>[2]</sup> One of the most useful application of plant seed is antibacterial property.<sup>[3]</sup> The seeds shows potent antioxidant and metal ion chelating capacity because of which it has been reported to be effective in inflammation, arteriosclerosis, bleeding, allergy and swellings.<sup>[4]</sup> These pharmacological activities of seeds are due to its phytochemical composition present in seeds. This composition can be identified by number of methods. GC-MS is one of the method used to analyse the volatile composition, present in crude extract of plant seeds.<sup>[5]</sup>

Thus the main aim of our study was to analyse the fatty acid composition present in *Mimusops elengi* linn seeds by employing GC-MS method and the determination of its antibacterial activity in comparison to trimethoprim.

## **MATERIALS AND METHODS**

### **Collection of samples**

The seeds of *Mimusops Elengi* were collected from medicinal garden udaygiri near Vidisha (M.P).

### **Preparation of samples**

Cover of seeds were removed and kernel were air dried under shade for 48 hours. The seeds were then grounded using blender. The powder of seeds then placed in air tight glass jar for the determination of further analysis.<sup>[6]</sup>

### **Extraction of material**

The extraction of seeds was carried out by using a soxhlet apparatus at 60°C. In the process 200 gms powder of seed were taken in 1 litre of ethyl acetate and was kept for 48 hour. At the end of extraction, ethyl acetate was concentrated by evaporator below 70°C. The extract were collected and then stored for further studies.<sup>[7]</sup>

### **Physiochemical analysis**

The moisture, ash and crude fiber content was determined by (AOAC 1990) method.<sup>[8]</sup> The acid soluble and insoluble was determined as per IP 2010.<sup>[9]</sup> The mineral calcium and

magnesium was determined by complexometric titration using EDTA whereas iron by colorimetric analysis and copper was determined by Iodometric titration.<sup>[10]</sup>

### Phytochemical identification

The phytochemical identification of extract was done according to the method given in Bharat Gami et al 2010 which are mentioned in table 1.<sup>[11]</sup>

**Table: 1 Method of phytochemical identification.**

Sr.no	Name of phytochemical test	Method
1	Alkaloids	Dragenroff's test
2	Glycosides	Molish test
3	Tannins	Feric chloride test
4	Flavonoids	Alkaline reagent test
5	Terpenoids	Salkovaski test
6	Saponins	Foam test
7	Fats and oils	Stain test

### GC MS Analysis

GC-MS analysis of the Sample is done according to the method General\_1\_HP5\_80\_DEG.M.<sup>[12]</sup>

### Assay of trimethoprim

The assay determination of trimethoprim was performed as per parameters given as per Indian pharmacopeia 1996.<sup>[13]</sup>

### Antibacterial activity

The fractions of methanolic extract were individually tested against *bacteria*. Using Nutrient agar medium as culturing media for strain. Antibacterial activity was revealed by growth inhibition in the test strain, observed in solid medium.<sup>[14]</sup> In the present study we used Agar diffusion disc-variant method described by Cleidson Valgaset al. 2007.

## RESULTS

### Physiochemical analysis

The Physiochemical analysis of M. Elengi seeds shown in table no. 2 reveal that it contain moisture 5.2%, crude fibre 4.3%, ash 4.5%, water soluble ash 40%, acid insoluble ash 10%.

**Table.2: Proximate composition of samples.**

Parameters	M.Elengi
Moisture	5.2%
Crude fibre	4.3%
Ash	4.5%
Water soluble ash	40%
Acid Insoluble ash	10%

**Table.3: Mineral composition of samples (per 100 gm).**

Minerals	M.Elengi
Magnesium	57.6
Calcium	28.8
Iron	1.447

### Phytochemical results

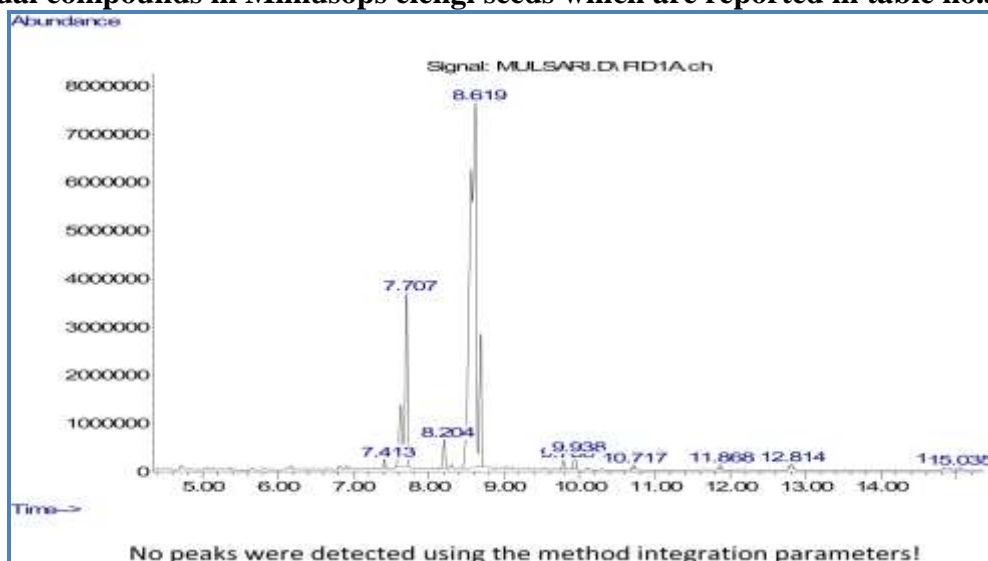
The phytochemical analysis of M. elengi seeds shown in table no. 4 reveal that it content Alkaloids, Glycosides, Tannins, flavonoids, Terpenoids, saponins, Fats and oils'.

**Table.4: Identification of phytochemicals in ethyl acetate seed extract.**

Sr.no	Name of phytochemical test	M.Elengi
1	Alkaloids	+
2	Glycosides	+
3	Tannins	+
4	Flavonoids	+
5	Terpenoids	-
6	Saponins	+
7	Fats and oils	+

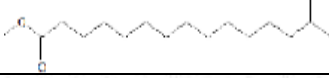


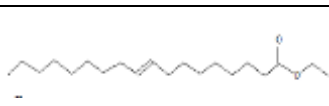


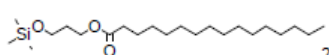

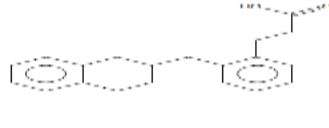

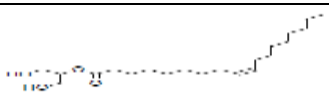
### GC-MS results

The GC-MS results are shown in figure 1. The graph represents the presence of 11 individual compounds in *Mimusops elengi* seeds which are reported in table no.5

**Figure 1: GC-MS Graph for *Mimusops elengi* seeds.**

The result shows that the seeds contain 77.423% of (E)-9-Octadecenoic acid ethyl ester followed by traces of other components.

**Table no: 5 Fatty acid composition in Mimusops elengi seeds.**

RT.	Name of compound	Formula	Structure	MW	%
7.413	Pentadecanoic acid, 14-methyl-, methyl ester	$C_{17}H_{34}O_2$		270	0.349
7.707	Hexadecanoic acid, ethyl ester	$C_{18}H_{36}O_2$		284	17.042
8.204	10-Octadecenoic acid, methyl ester	$C_{19}H_{36}O_2$		296	1.943
8.619	(E)-9-Octadecenoic acid ethyl ester Hexadecanoic acid, 3- [(trimethylsilyl)oxy]propyl ester	$C_{20}H_{38}O_2$		310	77.423
9.788	Methyl 9-eicosenoate	$C_{21}H_{40}O_2$		324	0.648
9.938	Methyl 19-methyl-eicosanoate	$C_{22}H_{44}O_2$		340	0.935
10.717	Hexadecanoic acid, 3- [(trimethylsilyl)oxy]propyl ester	$C_{22}H_{46}O_3$ Si		386	0.290
11.868	Docosanoic acid, ethyl ester	$C_{24}H_{48}O_2$		368	0.325
12.814	Hydrocinnamic acid, o-[(1,2,3,4-tetrahydro-2-naphthyl)methyl]-	$C_{20}H_{22}O_2$		294	0.256
14.879	Ethyl 14-methyl-hexadecanoate	$C_{19}H_{38}O_2$		298	0.422
15.035	9-Octadecenoic acid (Z)-, 2-hydroxy-1-(hydroxymethyl)ethyl ester	$C_{21}H_{40}O_4$		354	0.366

#### Assay of Trimethoprim:

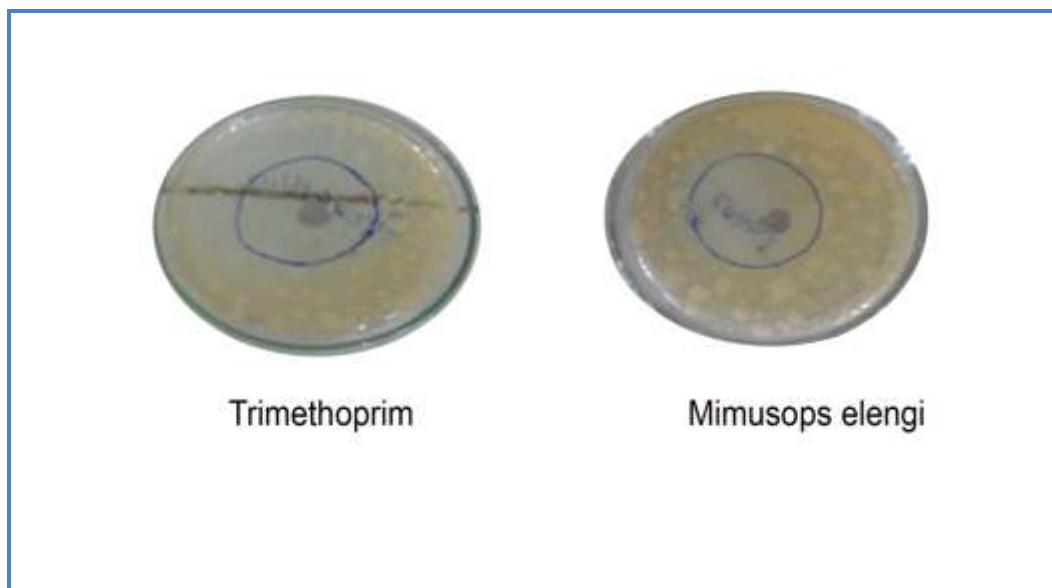
The results showed that assay purity of tablets were as per limit defined in IP.

**Table.6: Assay of tablets.**

Sr.no.	Sample name	Wavelength	Absorbance	% assay
1	Saptron	271	0.3889	95.31%
2	Co-trimoxazole	271	0.4305	105.37%
3	Antrima	271	0.3425	83.88%
4	Bectrim DS.	271	0.4031	98.19%

#### Antibacterial activity

The zone of inhibition shown in table no. 6 represents that seed shows similar antibacterial activity with trimethoprim hence can we use its antibiotic activity.



**Figure 2: Zone of inhibition.**

**Table.6: Antibacterial Activity.**

S .No.	Sample name	Zone of inhibition
1	M. elengi	16.5mm
2	Trimethoprim	17.00mm

## CONCLUSION

The extracts of *M. elengi* showed a good antibacterial activity against trimethoprim hence can be used as an alternative of available antibiotic. GC-MS analysis representing the presence of individual components in samples shows that the seeds are rich in fatty acid composition. Thus it can be concluded that seeds inspite of having rich fatty acid composition can also be used as an antibiotic.

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