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GC-MS Analysis of *Grewia Flavescens* Juss Whole Plant

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ABSTRACT

To investigate the phytoconstituents of ethanolic extract of *Grewia flavescens* juss whole plant using GC-MS. GC-MS analysis of *Grewia flavescens* juss whole plant was performed by using Agilent 6890 GC with 59739N MSD and GC-MS equipped with Elite-I fused with silica capillary column (Cpsil 8cb:30mm×25mm×0.25mm). The result of GC-MS analysis confirmed the presence of 12 compounds. The most prevailing compounds are Ethanamine, N,N-dimethyl, Acetic acid, Ethane,1,1-diethoxy-, Pyridine, Diethyl phthalate, Ethyl. alpha-d-glucopyranoside, 4-((1e)-3-hydroxy-1-propenyl)-2-methoxyphenol, n-hexadecanoic acid, hexadecanoic acid ethyl ester, Desaspidinol, Phytol, and Octadecanoic acid. The presence of phytoconstituents reveals the presence of medicinal value.

Keywords: *Grewia flavescens* juss whole plant, Ethanolic Extract, GC-MS analysis.

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INTRODUCTION

The present global scenario is changing their face towards use of herbal medicine due to lesser side effects. Folk medicinal system has deep rooted history among rural population in India. This unique system of knowledge has evolved from harmonious living of aboriginal people with nature. The majority of people on earth still depend on traditional medicine for every day health care ¹⁻³.

Grewia flavescens popularly known as “donkeys berry”, is a shrub or small tree, often seen in groups along the edges of roads, river banks and dry rivers, growing in large uniform groups. The plant parts are being used in Indian folk medicine. The leaves were reported to be useful in ulcerated tongue, colic pain, wounds, cholera and dysentery. *Grewia flavescens* a multi-stemmed shrub or small tree, up to 5 m high. Its bark is dark grey-brown belongs to Tiliaceae family. The plant is used traditionally as Anthelmentic, CNS depressant, anti-inflammatory, antimalarial. Nearly 40 species of this genus are found in India, some of which are well known for their medicinal value ^{4,5}. Hence the present study is to identify the phytochemical constituents present in *Grewia flavescens* juss whole plant by GC-MS analysis.

MATERIALS AND METHOD

The crude *Grewia flavescens* juss whole plant was collected from Sri Venkateswara University, Tirupati, Andhra Pradesh, India, in the month of January, 2016. The plant was authenticated by plant taxonomist Dr. K. Madhava chetty, Assistant professor, Department of botany, Sri venkateswara University, Tirupati, A.P, India. The *Grewia flavescens* juss whole plants were cut into proper Size and washed 3 times with drinking water then dried in shade with proper care. The dried plant materials were blended in to coarse powder and passed through sieve 60.

Preparation of sample extract:

The coarse powder 500gm was subjected to maceration and transferred to stopper flask, and treated with pure ethanol until the powder is fully immersed at room temperature. The flask was shaken every hour for the first six hours and then it was kept aside and again shaken after 24 hours from time to time to ensure better extraction. This process was repeated for 7 days, followed by exhaustive maceration for 5 days by using solvent ethanol. The solvent was decanted and filtered with filter paper and recovered with help of rotary vacuum evaporator. The extract was dried under desiccator and stored in an air tight container ⁶. The final extract was then subjected to GC-MS analysis.

GC-MS analysis:

GC-MS analysis of sample were performed by using Agilent 6890 GC with 59739N MSD and GC-MS equipped with Elite -I, fused with silica capillary column (cpsil 8cb :30 mm x 25mm x 0.25 mm) composed of 100% Dimethyl polysiloxane. For GC-MS detection an electron ionization system with ionizing energy of 70 ev was used. Hydrogen (99.99%) was used as the carrier gas at a flow rate of 1.5 ml and an injection volume of 2 micro liters. It was employed with split ratio of 10:1, Initial injection temp at 40⁰ c to final 280⁰ c. Ion source temp 230⁰ c. The oven temp was programmed from 110⁰ c (isothermal for 2 minute) with a rate of 10⁰ c per min to 300⁰ c. And a scan interval 0.5 sec and fragments from 20-200 Dalton. Total GC running time was 36 minutes. The relative average peak area and retention time, molecular formula with that of molecular weight were obtained. The interpretation on mass spectrum GC-MS was conducted by using the data base of national institute standard and technology (NIST), having 62,000 patterns. The spectrum of unknown component was compared with spectrum of known component stored in NIST library. The name, molecular weight and structure of the components of the sample material were identified⁷.

RESULTS AND DISCUSSION

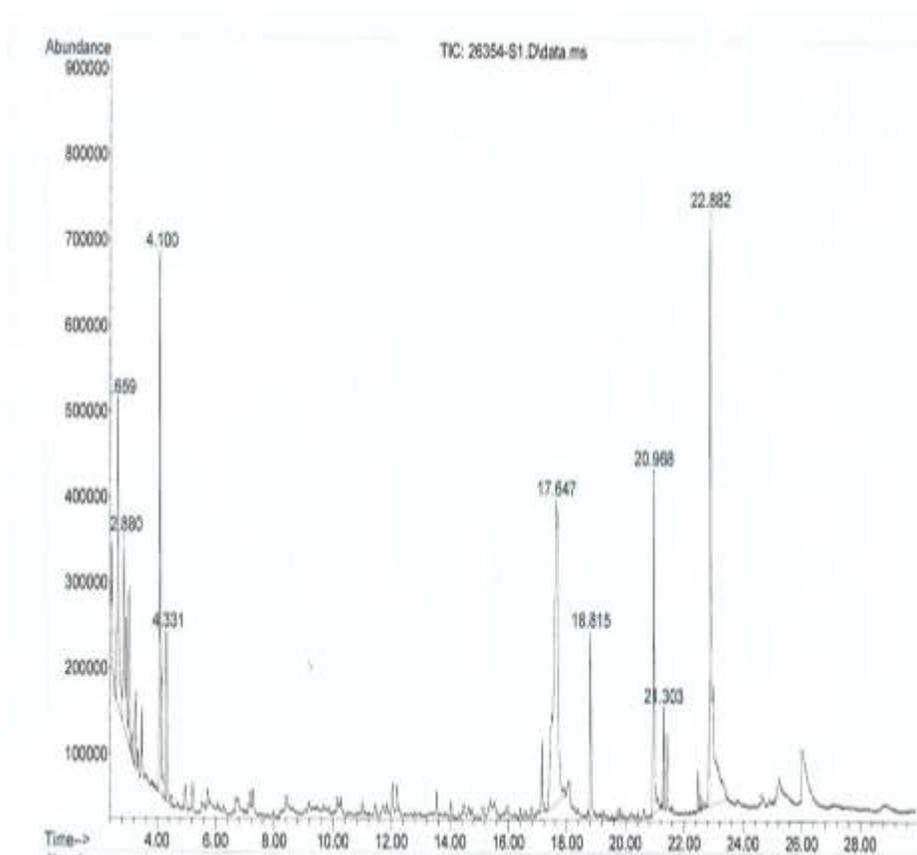


Figure 1: GC-MS chromatogram of the ethanolic extract of *Grewia flavescens* juss whole plants.

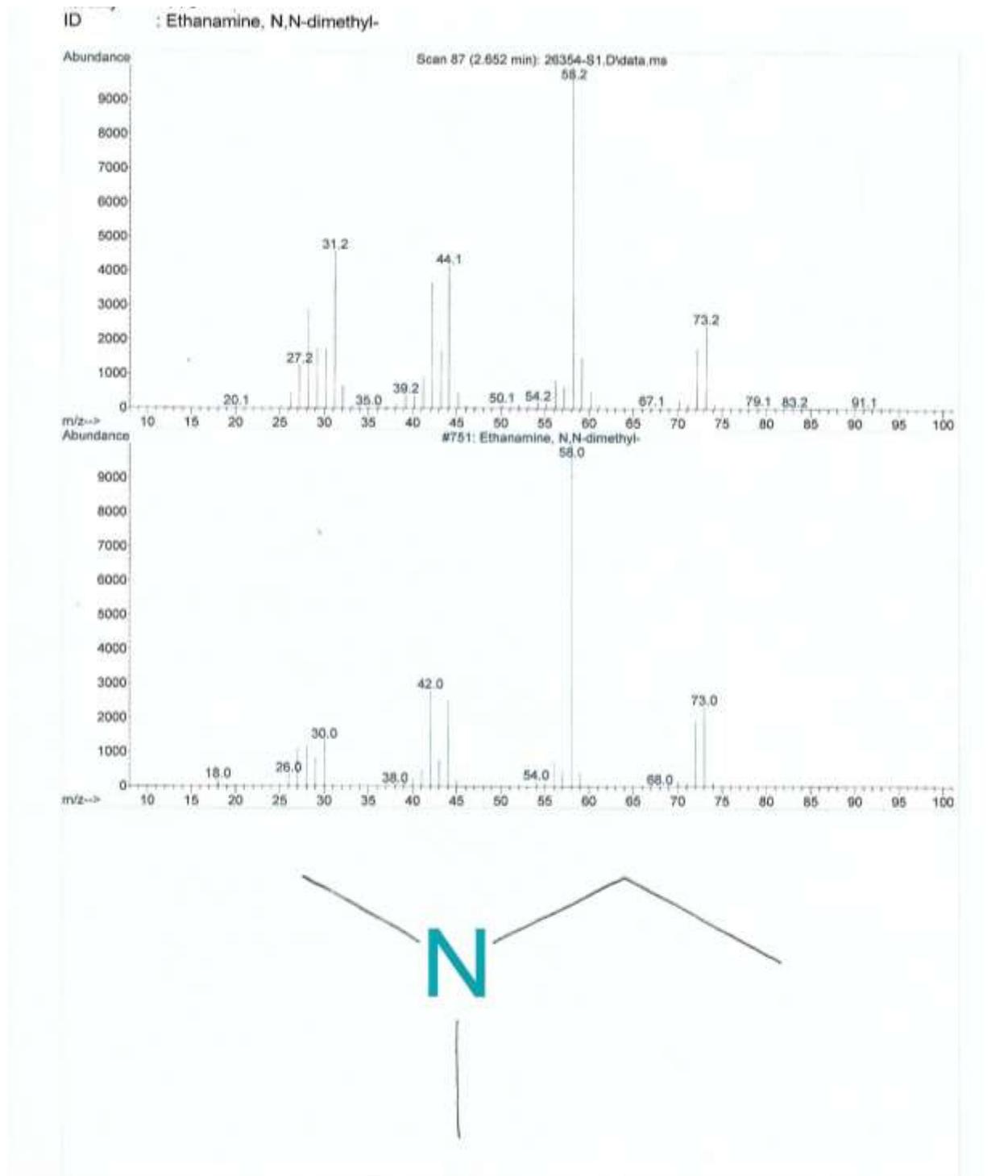


Figure 2: Mass spectrum of Ethanamine, N,N-dimethyl

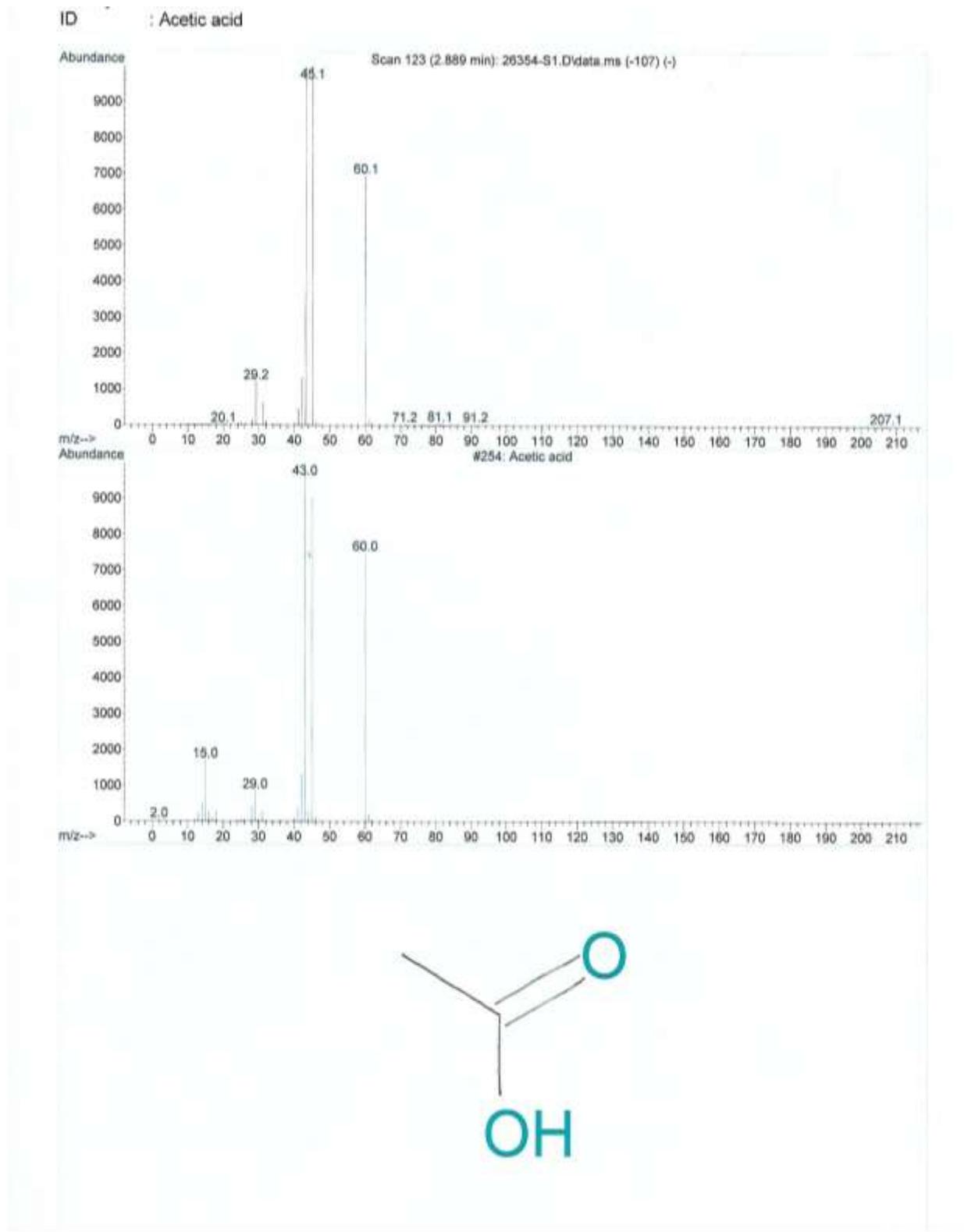


Figure 3: Mass spectrum of Acetic acid

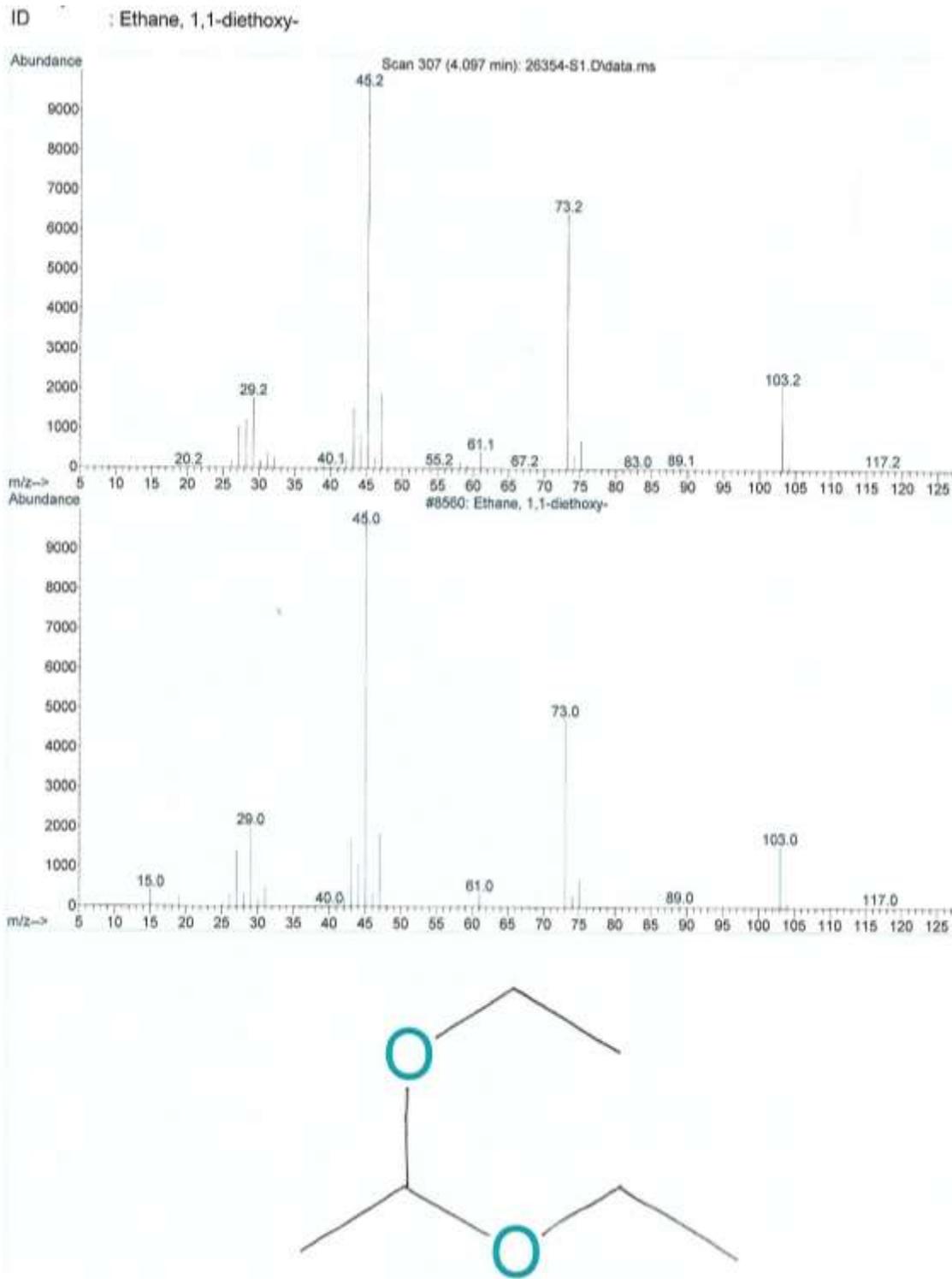


Figure 4: Mass spectrum of Ethane,1,1-diethoxy-

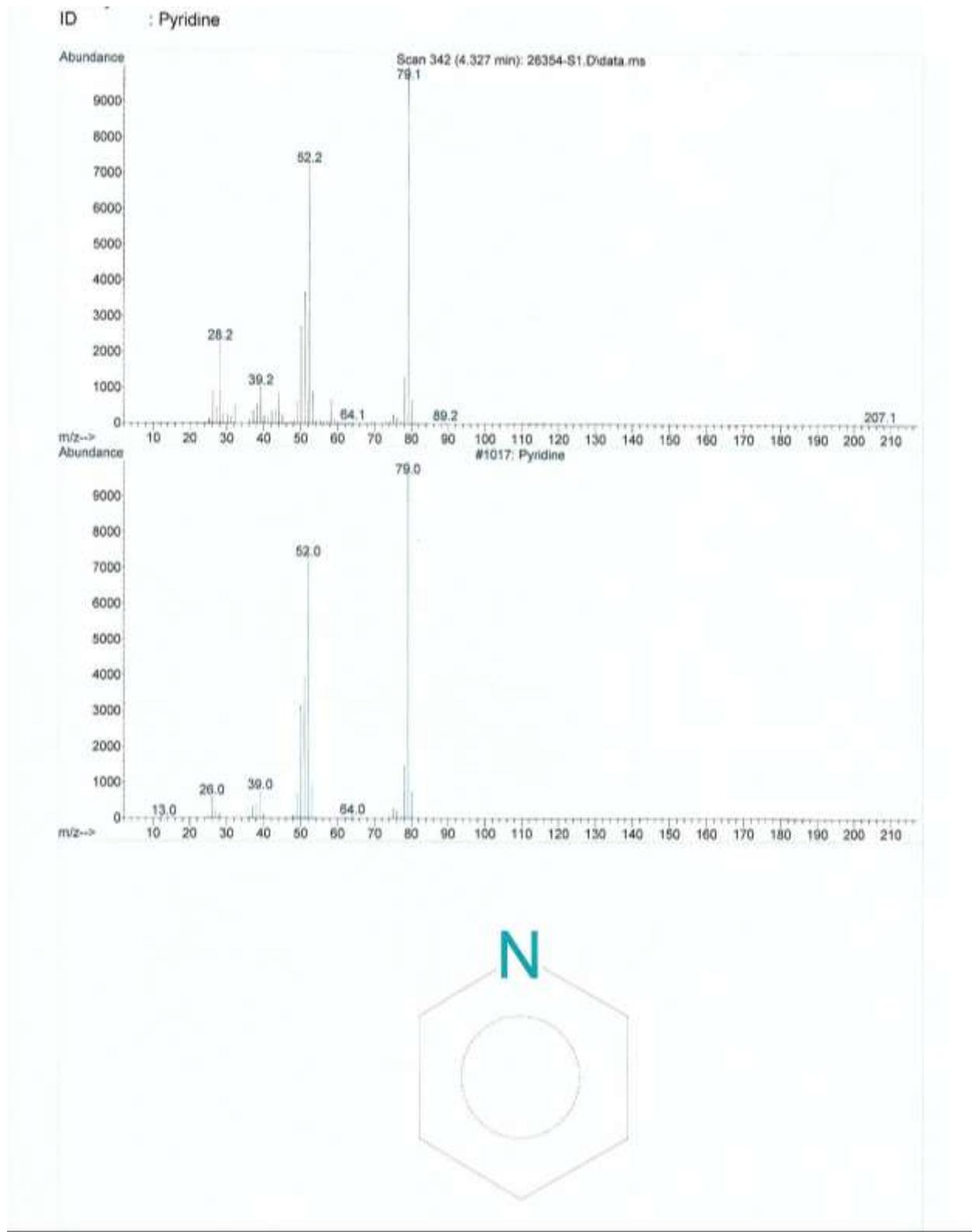


Figure 5: Mass spectrum of Pyridine

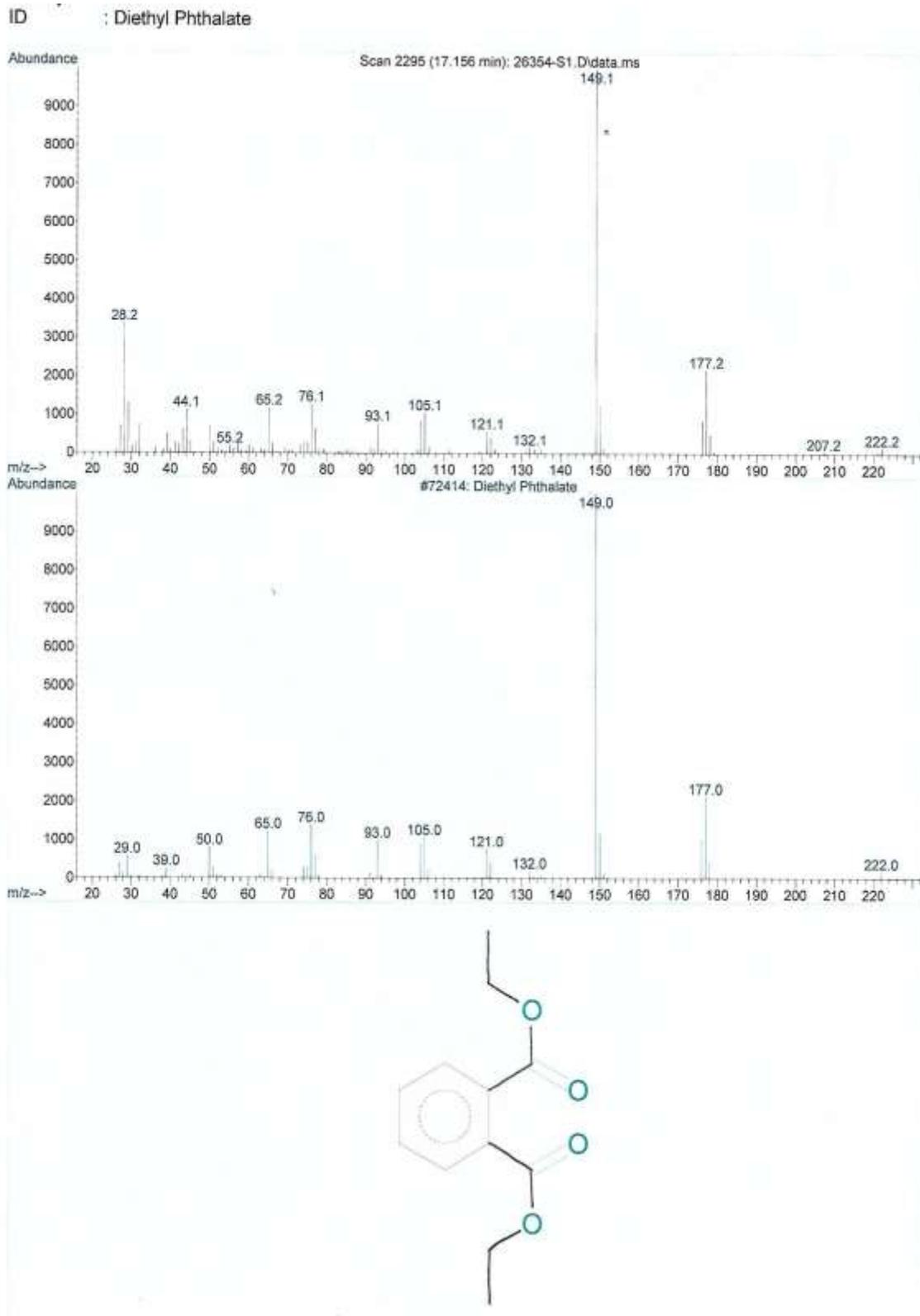


Figure 6: Mass spectrum of Diethyl phthalate

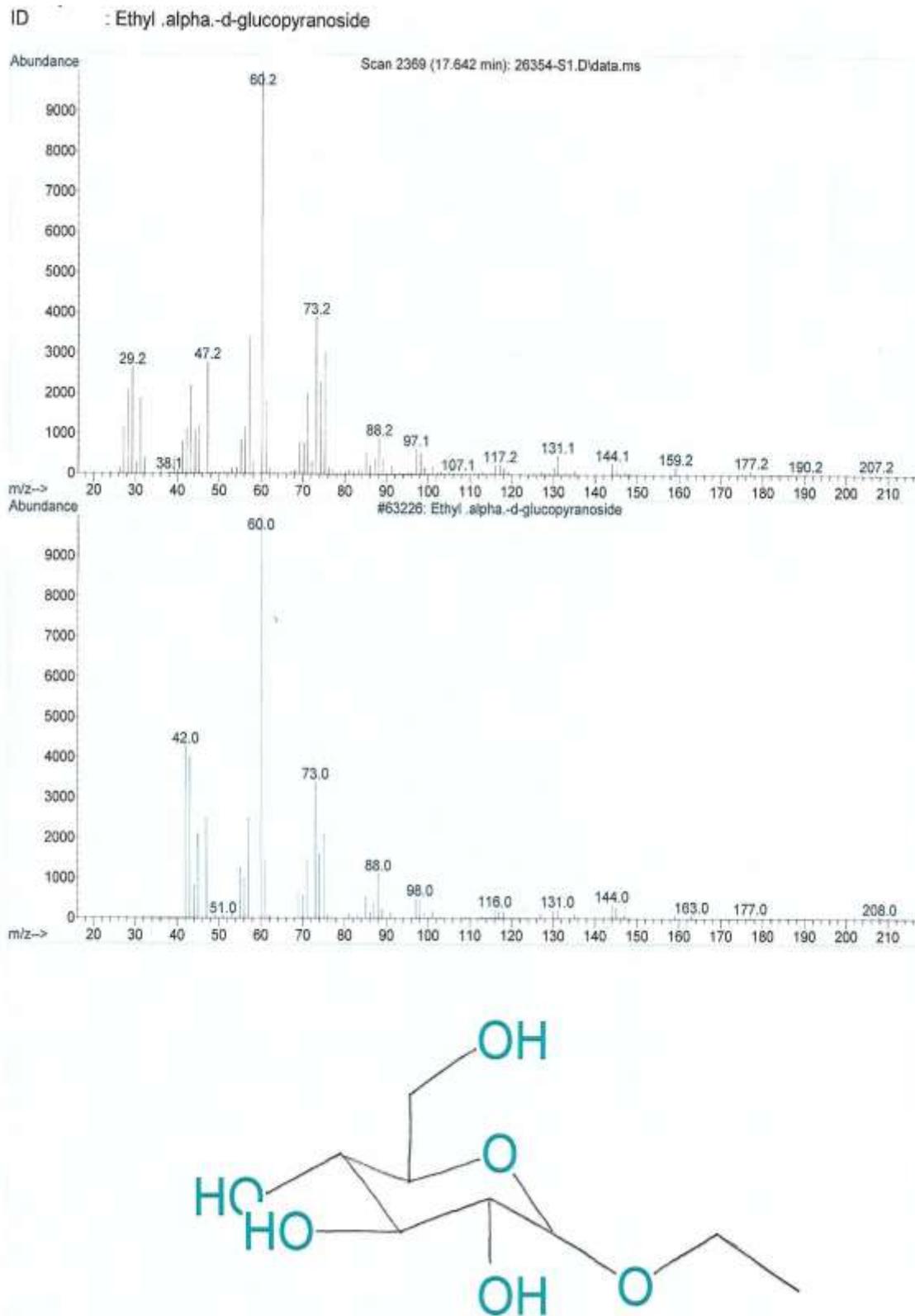


Figure 7: Mass spectrum of Ethyl.alpha-d-glucopyranoside

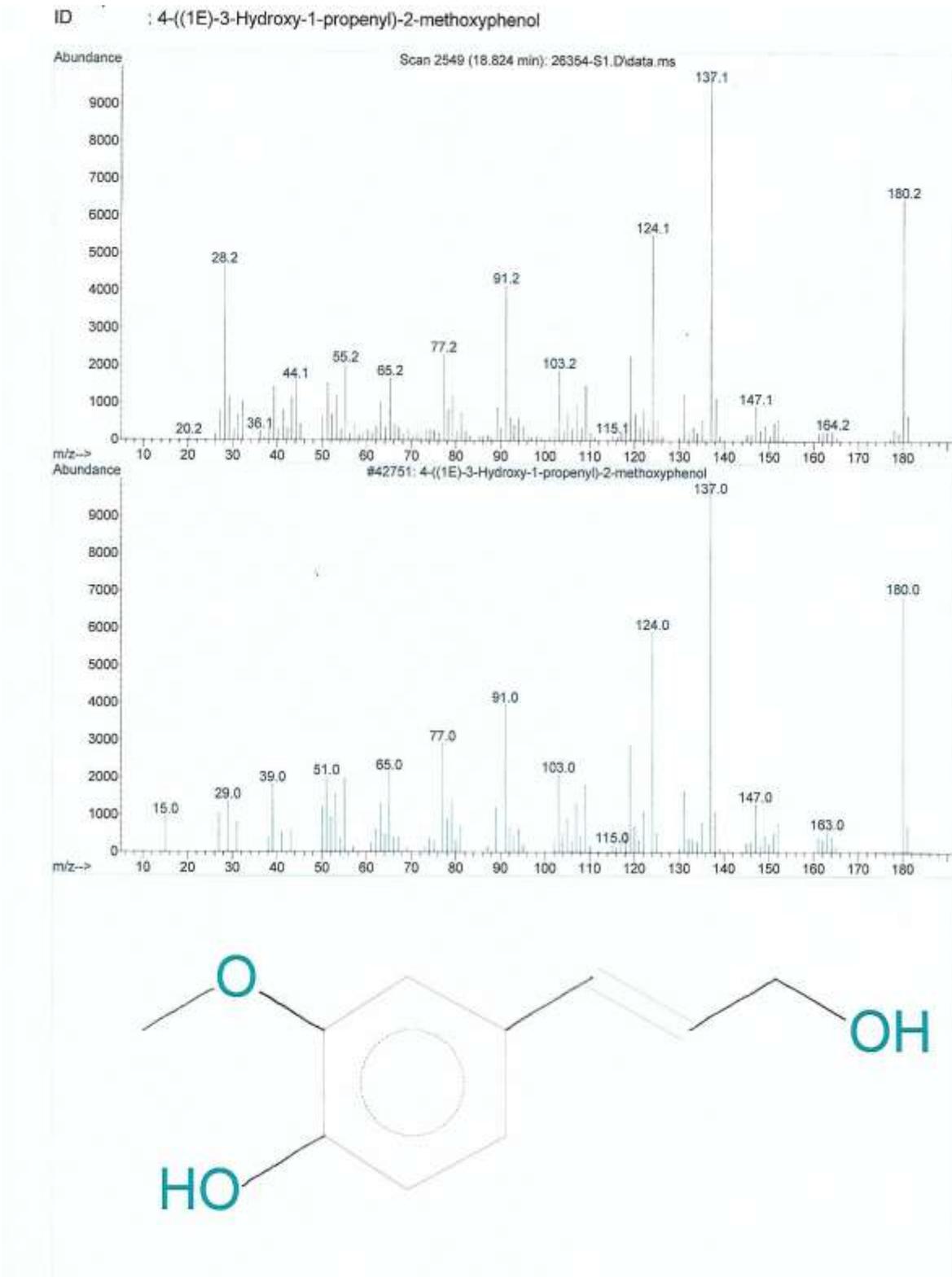


Figure 8: Mass spectrum of 4-((1E)-3-hydroxy-1-propenyl)-2-methoxyphenol

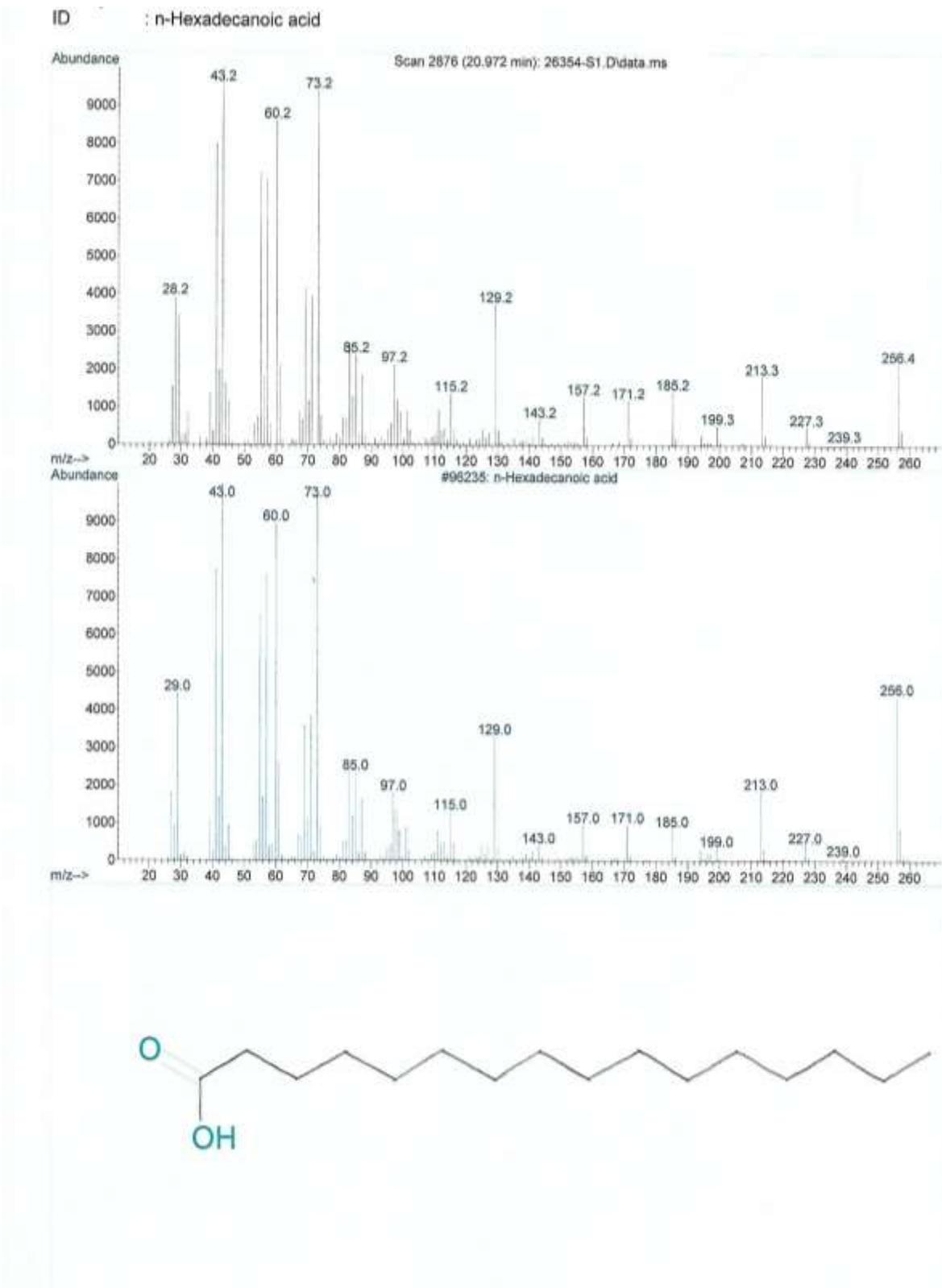


Figure 9: Mass spectrum of n-hexadecanoic acid

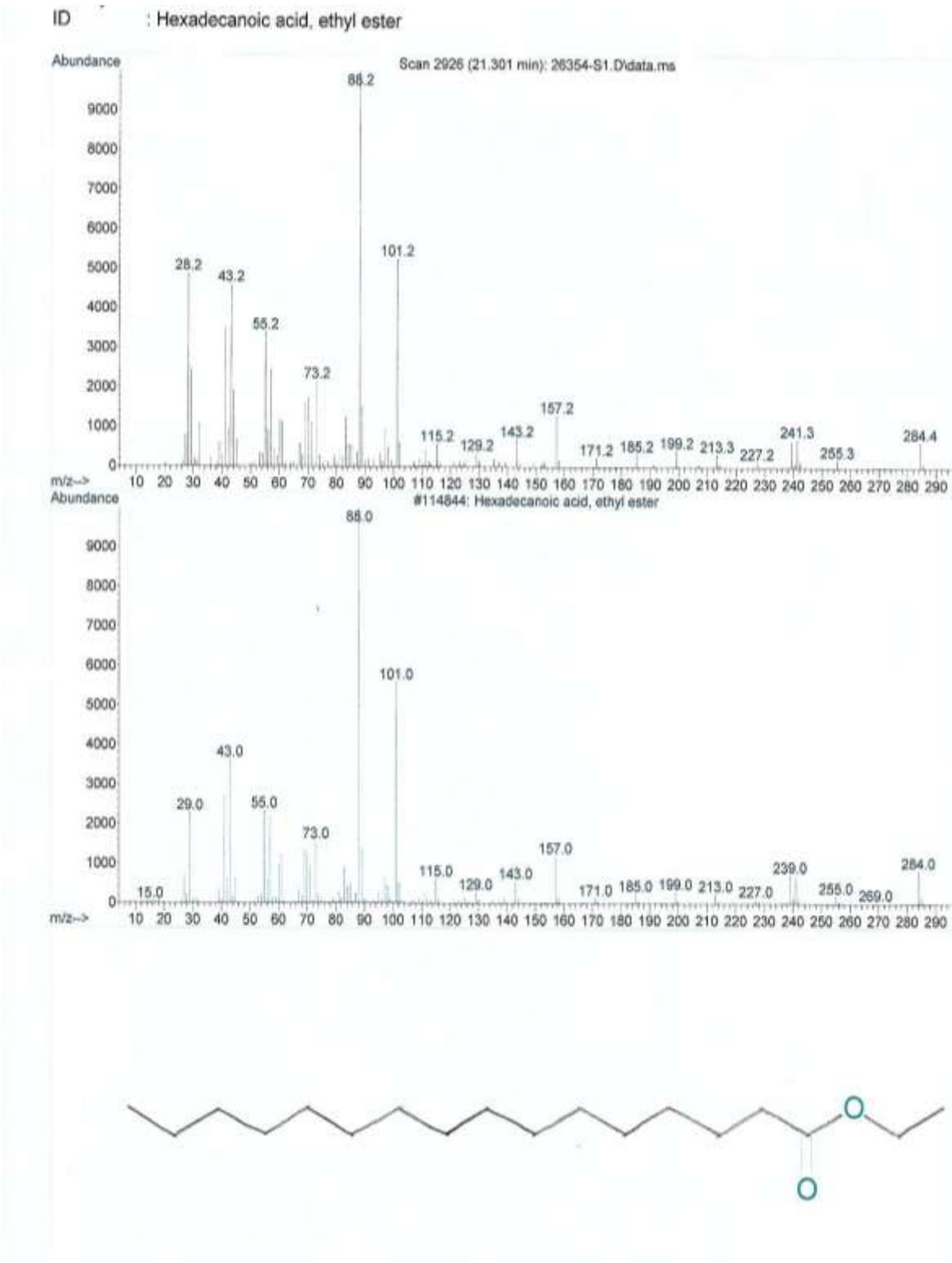


Figure 10: Mass spectrum of hexadecanoic acid ethyl ester

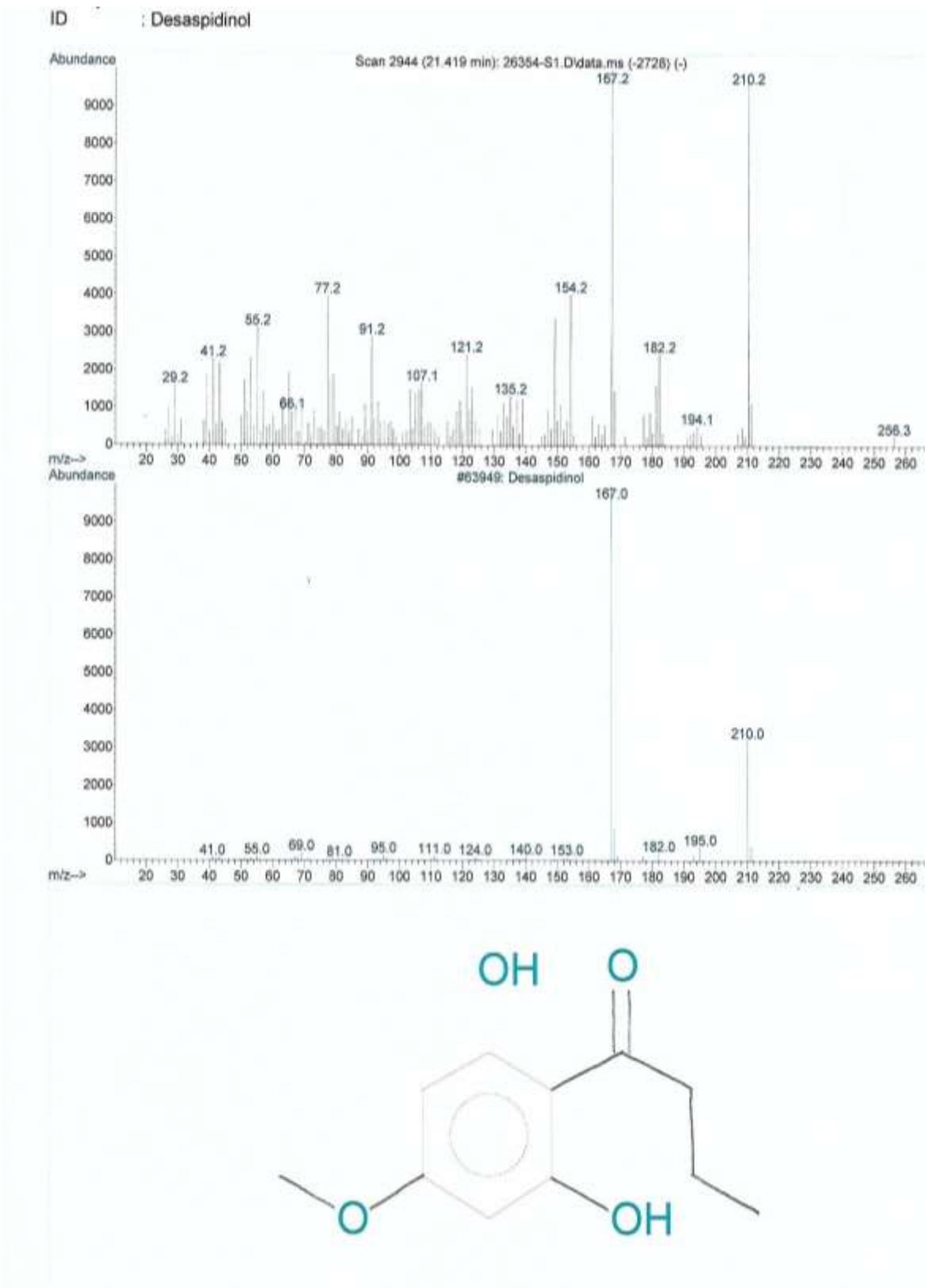


Figure 11: Mass spectrum of Desaspidinol

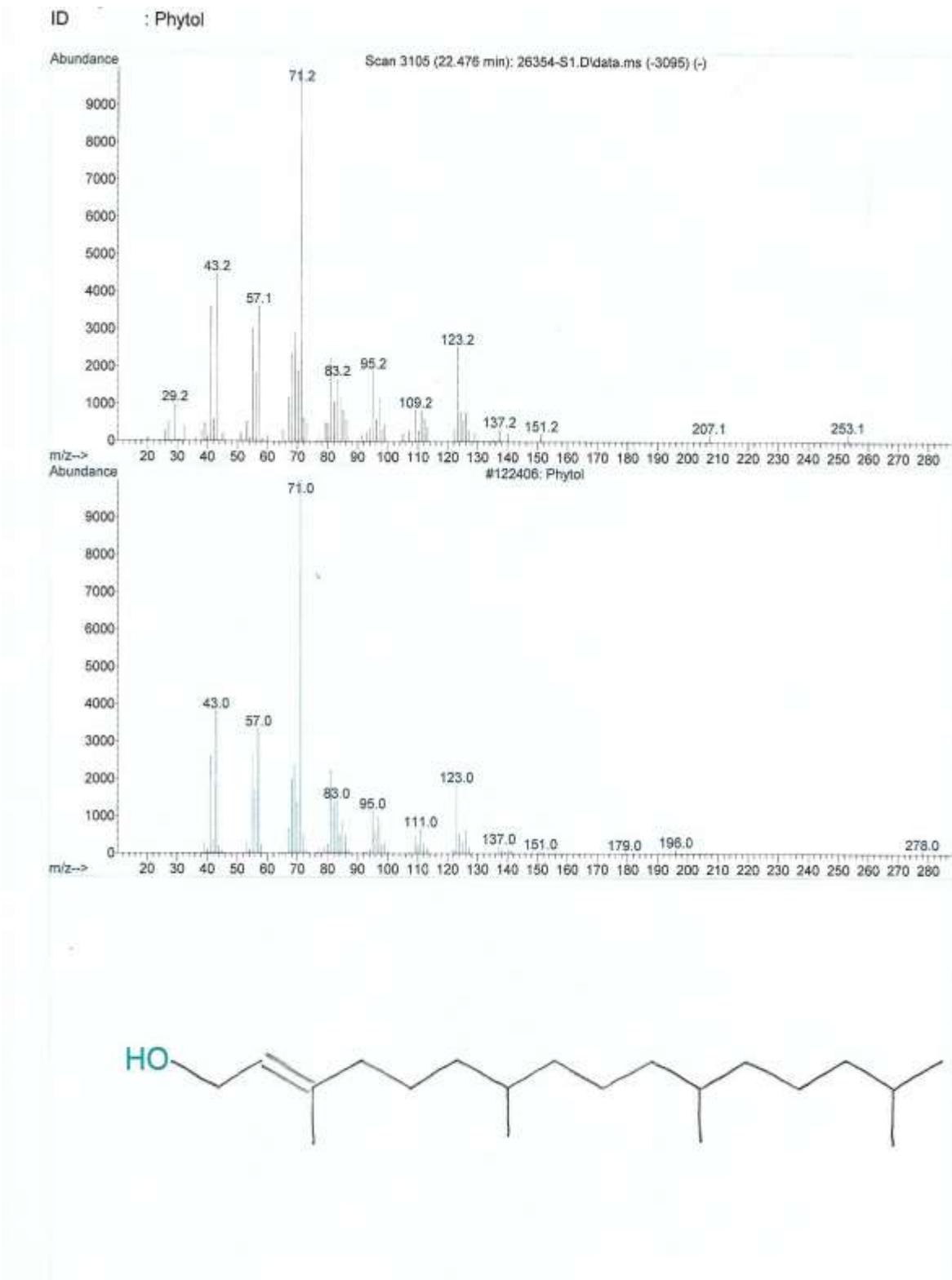


Figure 12: Mass spectrum of Phytol

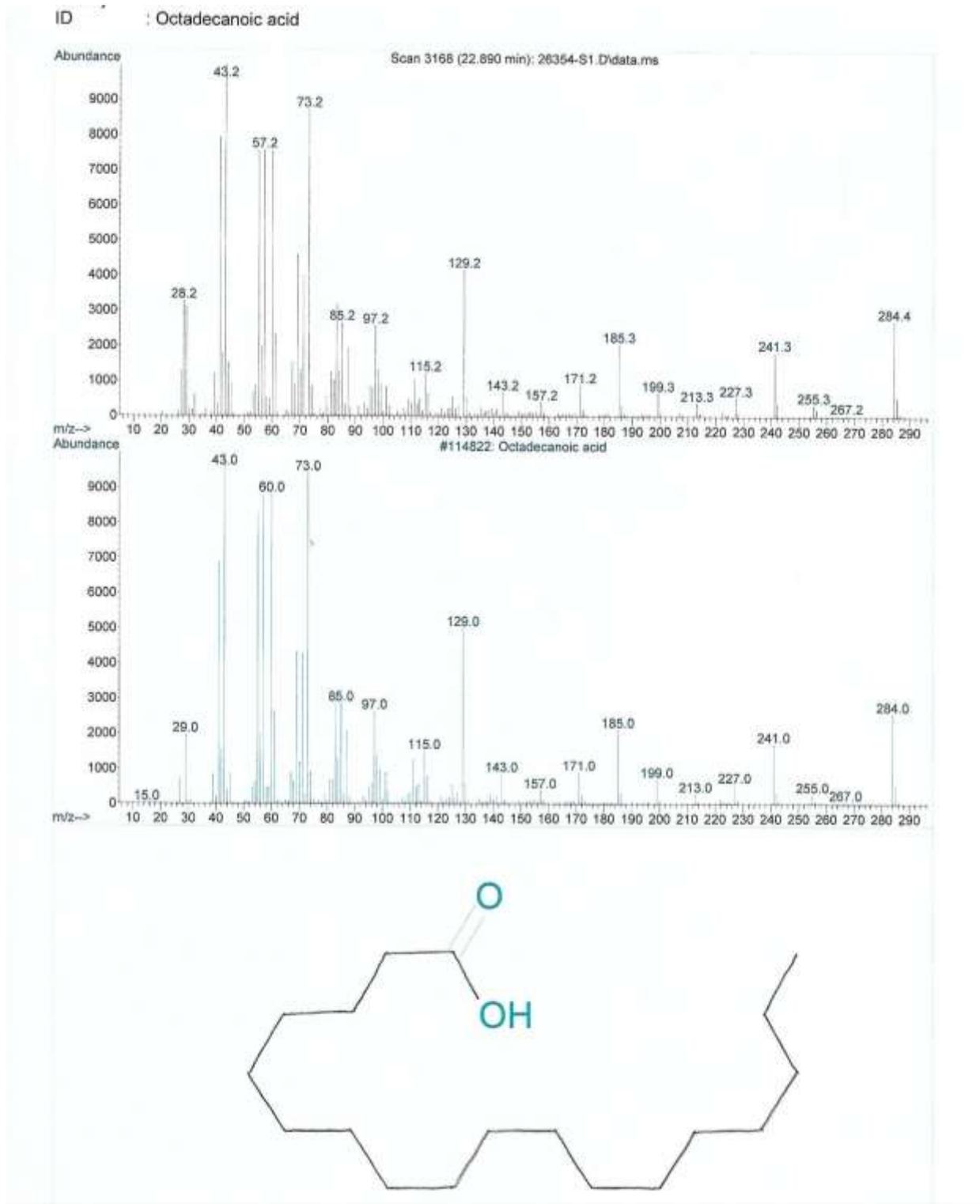


Figure 13: Mass spectrum of Octadecanoic acid

Table 1: Components detected in *Grewia flavescens* juss whole plant using GC-MS.

S.no.	Name	Molecular formula	Molecular weight	RT in Minute
1	Ethanamine, N,N-dimethyl	C ₄ H ₁₁ N	73.139 g/mol	2.652

2	Acetic acid	CH ₃ COOH	60.05 g/mol	2.889
3	Ethane,1,1-diethoxy-	C ₆ H ₁₄ O ₂	118.176 g/mol	4.097
4	Pyridine	C ₅ H ₅ N	79.102 g/mol	4.327
5	Diethyl phthalate	C ₁₂ H ₁₄ O ₅	222.24g/mol	17.156
6	Ethyl.alpha-d-glucoopyranoside	C ₈ H ₁₆ O	208.209 g/mol	17.642
7	4-((1e)-3-hydroxy-1-propenyl)-2-methoxyphenol	C ₁₀ H ₁₂ O ₃	180.200 g/mol	18.824
8	n-hexadecanoic acid	C ₁₆ H ₃₂ O ₂	256.43 g/mol	20.972
9	hexadecanoic acid ethyl ester	C ₁₈ H ₃₆ O ₂	284.48 g/mol	21.301
10	Desaspidinol	C ₁₁ H ₁₄ O ₄	414.7067 g/mol	21.419
11	Phytol	C ₂₀ H ₄₀ O	296.539 g/mol	22.476
12	Octadecanoic acid	C ₁₈ H ₃₆ O ₂	284.477 g/mol	22.890

DISCUSSION:

The 12 components were identified in the ethanolic extract of *Grewia flavescens* juss whole plant by GC-MS in Figure 2,3,4,5,6,7,8,9,10,11 and 12. The active components with molecular structure, molecular formula, molecular weight and retention time are tabulated in Table 1.

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