Middle-East Journal of Scientific Research 5 (6): 441-444, 2010
ISSN 1990-9233

GC-MS Studies on the Bark Extracts of *Litsea polyantha* JUSS

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Abstract: *Litsea polyantha* Juss. (Lauraceae) has a long history of medicinal use among the traditional healers of Oraon and Munda community of Jharkhand. Powdered bark and roots are used for pains, bruises and contusions and for fractures in animals. The present study is carried out to identify the phytoconstituents present in *L. polyantha* Juss. bark extracts using GC-MS. We are reporting for the first time the presence of eugenol, chalcone and its derivatives from *L. polyantha* Juss. The studies also support the use of *L. polyantha* as an analgesic in the folklore medicine, since eugenol possesses analgesic properties.

Key words: Litsea polyantha · GC-MS · Eugenol · Chalcone

INTRODUCTION

Litsea polyantha Juss. (Lauraceae) also known as *Litsea monopetala* Roxb. is a small to medium sized evergreen tree. The bark of *L. polyantha* Juss. has a long history of medicinal use among the traditional healers of Oraon and Munda community of Jharkhand. It is known by the popular names of Pojo, Kakuri, Munga and Barkukuchita. The bark of *Litsea polyantha* Juss. is mildly astringent and is reported to be used for diarrhea. Powdered bark and roots are used for pains, bruises and contusions and for fractures in animals [1]. Previous chemical investigation of this plant has revealed the presence of beta-sitosterol and actinodaphnine in the bark [2] and an arabinoxylan containing D-xylose and L-arabinose in a molar ratio of 1:2 in leaves [3]. The anti-diarrheal activity of methanol extract of dried bark and aerial parts of *Litsea polyantha* has been evaluated in mice using different models [4]. The antioxidant activity of phenolic fractions of bark extract was carried out by various chemical and enzymatic methods [5]. The bark of *Litsea polyantha* has a strong characteristic aroma, but its phytochemical background has not yet been fully elucidated. Guided by the literature review on *Litsea* species and *polyantha* in particular, it was found worthwhile to study this species systematically with regard to its chemical, pharmacological and microbiological evaluations. The present study is carried out to identify the phytoconstituents present in *Litsea polyantha* Juss. bark extracts using the modern gas chromatography–mass spectrometry (GC–MS) technique. This technique is very suitable for the detection of the biological volatile organic compounds and corresponding volatile profile characteristics [6].

MATERIALS AND METHODS

Plant Material: The bark of *L. polyantha* Juss. was collected from BIT, Mesra of Ranchi with the help of tribal. The bark was authenticated and the voucher specimen (BIT 417; 2008-09) was preserved in the Department of Pharmaceutical Sciences, BIT, Mesra.

Extract Preparation: The dried and powdered plant material (Bark) was subjected to successive hot extraction in a Soxhlet continuous extraction apparatus with Petroleum ether (60-80) and Chloroform. The average time period for extraction was 48 hours. The extracts were filtered through Whatmann filter paper (No. 1); the solvent was removed under reduced pressure using rotary evaporator. The yield of Petroleum ether (PELP) and Chloroform (CELP) extracts were 1.01% and 3.45%, w/w respectively.

Instrumentations: The instrument use was Perkin-Elmer GC-MS Clarus 500. Elite 5 MS Column with a length of 20 m and internal diameter of 0.18µ was used. The software used for analysis was Turbo Mass, Wiley Access Mass Spectral Browser 3.2.2 and NIST MS Search 2.0 along with the Wiley Registry of Mass Spectral Data, NIST/EPA/NIN Mass Spectral Library and SDBS Database.

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GC-MS Method: Petroleum Ether Extract (PELP) and Chloroform Extract (CELP) were subjected to GC-MS studies in Perkin-Elmer GC-MS Clarus 500. Run time was set to 75 min with a ramp rate of 2°C per min up to 190°C and with a hold at 50°C for 5 min. Injection volume was 1µl. The carrier gas was Helium; 1ml/min [7]. Mass method used was Electron Ionization (EI+) 70 eV for m/z value 50 to 300 with a scan time of 0.3 sec and interscan delay of 0.1 sec. Compounds were identified by comparing their mass spectra with those of the National Institute of Standards and Technology (NIST) library [8].

RESULTS AND DISCUSSION

Both extracts showed a peak at retention time of 31.80 min with M^+ of 164. PELP showed a very prominent peak (100%). (Fig. 1) The Mass fragmentation peak for the same is shown in (Fig. 2).

The fragmentation pattern was searched in Wiley Registry of Mass Spectral Data and NIST/ EPA/ NIN Mass Spectral Library database. The fragmentation pattern was found to be similar to eugenol. It was then conformed by comparison

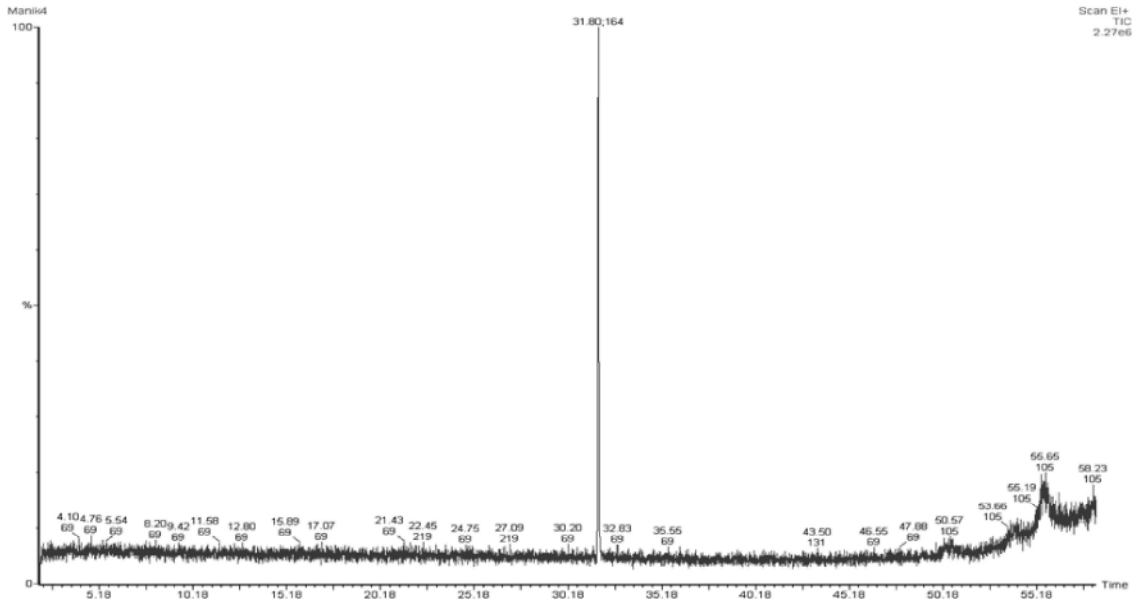

Fig. 1: GC chromatogram of PELP with a prominent peak at retention time of 31.80 min and M^+ of 164 (PELP: Petroleum Ether Extract of *Litsea polyantha* Juss

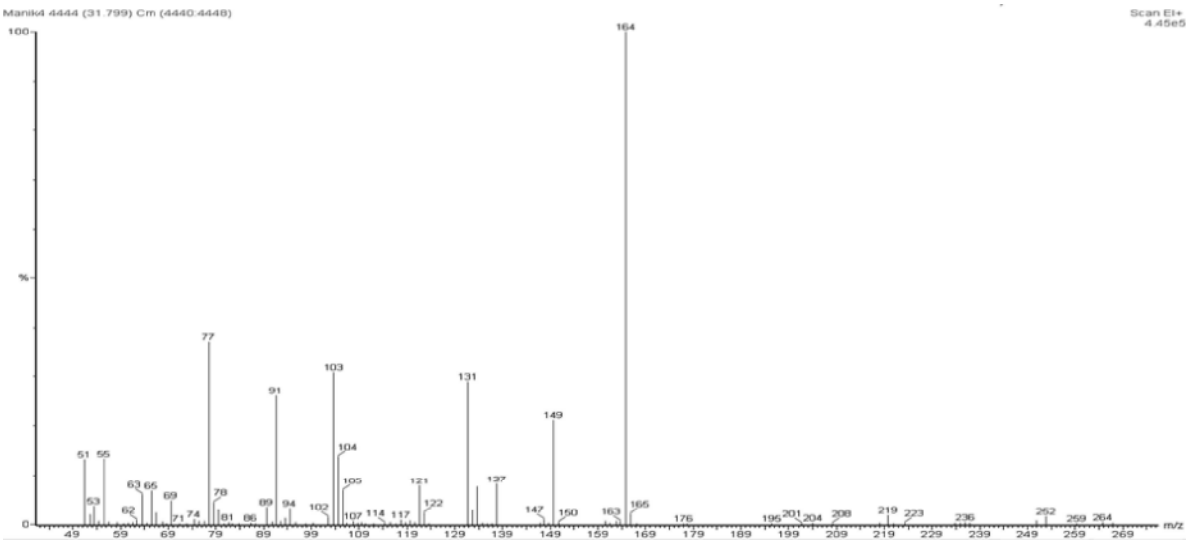

Fig. 2: The Mass fragmentation of the prominent peak at retention time of 31.80 min and M^+ of 164

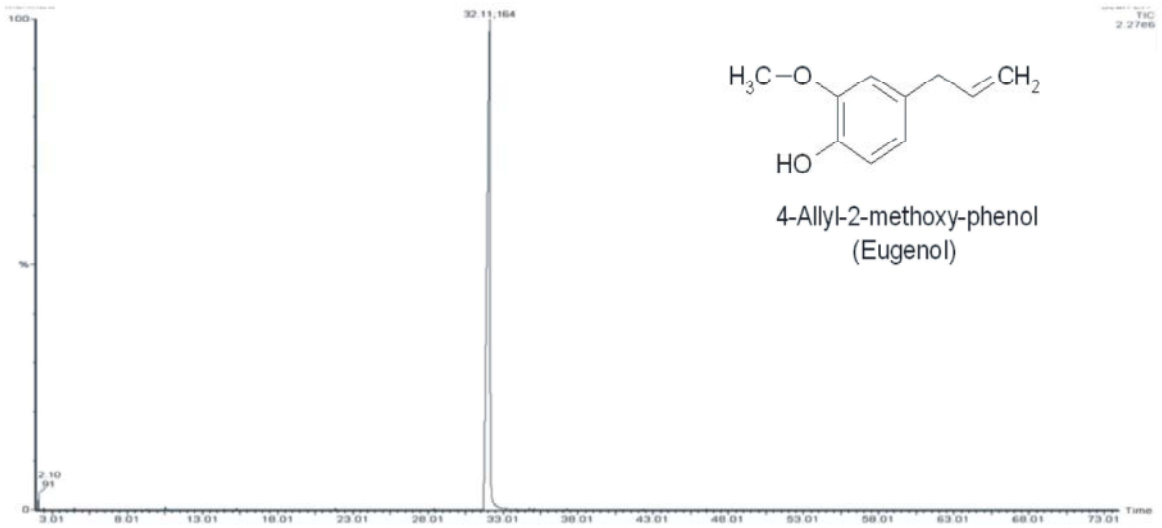

Fig. 3: GC chromatogram of eugenol; peak at retention time of 32.11 min and M^+ of 164

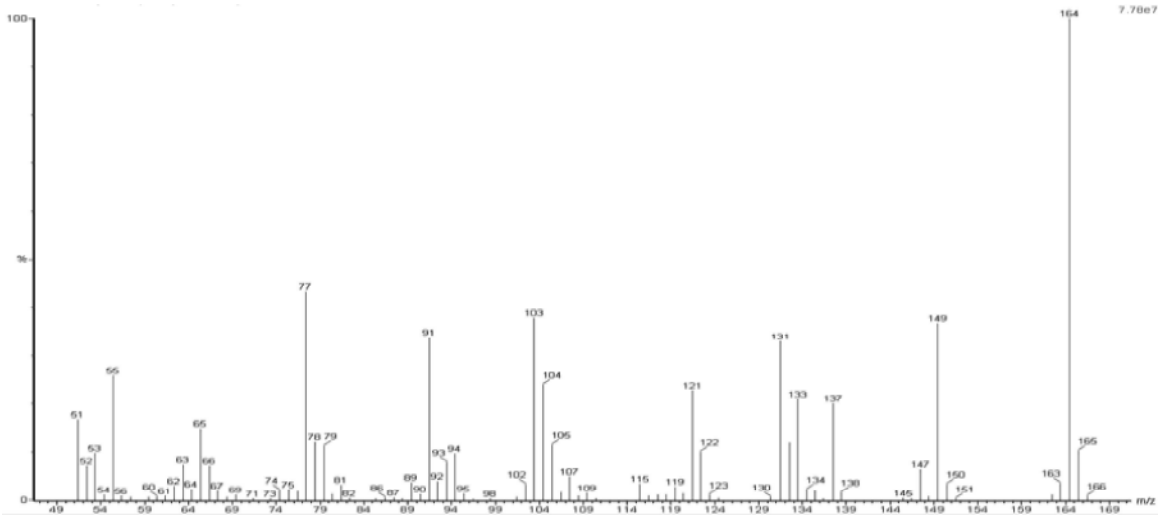

Fig. 4: The Mass fragmentation of eugenol

with standard eugenol, which showed a similar peak at retention time 31.83 min with M^+ of 164 [9, 10]. (Fig. 3 & 4).

By comparing the Test sample with Standard, the percentage of Eugenol in the Test sample was found to be 23 %.

CELP also showed the presence of other Phytoconstituents like Chalcone, β-methylchalcone and 1,2-diphenyl-2-butene-1-one. The Chalcone was having a peak at retention time 66.32 with M^+ of 207 and characteristic peaks at m/z 77 & 105 respectively. β-methylchalcone and 1,2-diphenyl-2-butene-1-one were having peak at retention time 62.41 with M^+ of 220.

CONCLUSIONS

We are reporting for the first time the presence of eugenol, chalcone and its derivatives from *Litsea polyantha* Juss. The studies also support the use of *Litsea polyantha* as an analgesic in the folklore medicine, since eugenol possesses analgesic properties.

ACKNOWLEDGEMENTS

The authors would like to thanks Vice Chancellor, Birla Institute of Technology and Head, Department of Pharmaceutical Sciences for providing the required

facilities to carry out this work. The authors would also like to thanks Dr. Manish Kumar, Department of Biotechnology, Birla Institute of Technology for his help in performing the experiments.

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