WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 8, Issue 11, 1182-1186. Research Article ISSN 2277– 7105

FTIR AND GC-MS ANALYSIS OF GOJIHVA (*Launaea nudicaulis* (L.) Hook. f.) – AN AYURVEDIC VEGETABLE AND HERB

Dr. Yashika Bidhuri[1], Dr. Shivani Ghildiyal*[2] and Dr. Tanuja Neasari[3]

[1]M.D. Scholar, [2]*Assistant Professor, [3]Head of Department
Department of Dravyaguna, All India Institute of Ayurveda.

Article Received on
14 August 2019,
Revised on 04 Sept. 2019,
Accepted on 24 Sept. 2019
DOI: 10.20959/wjpr201911-15930

***Corresponding Author**
Dr. Shivani Ghildiyal
Assistant Professor,
Department of Dravyaguna,
All India Institute of
Ayurveda.
drshivanighildiyal@gmail.com,
08765363310

ABSTRACT

The plant *Gojihva* (*Launaea nudicaulis* (L.) Hook. f.) is widely mentioned in classics and is advised to be used as a vegetable in fever, wound, diabetes etc. In spite of this fact, the drug is yet not mentioned in Ayurvedic Pharmacopoeia of India and ICMR databases and thus a complete monograph is still unavailable. The preliminary Phytochemical analysis shows presence of various active constituents viz. Alkaloids, Flavonoids, Glycosides, Steroids, Tannins, Saponins etc in different extracts but definite functional group analysis still remains. FTIR (Fourier-transform infrared spectroscopy) and GC-MS are tests to know the unknown functional groups and their structures. Thus, the FTIR and GC-MS study was planned to investigate the functional groups of the unexplored drug of Ayurveda *Launaea nudicaulis* L. Hook. f.

KEYWORDS: FTIR, GC-MS, *Launaea nudicaulis* (L.) Hook. f., *Gojihva.*

INTRODUCTION

Gojihva being extensively mentioned in classics can be said to be a store house of numerous active constituents. In *Charaka Samhita*, the drug is mentioned primarily in Vegetable grouphaving *Kapha pittahara* properties (pacifies Kapha and Pitta).[1] Further it is described in *Chikitsa Sthana* in treatment of Erysipelas (*Visarpa*) of *Vata pittaja* nature (Having predominance of Vata and Pitta).[2] It is mentioned in treatment of animal bite poisoning[3] and as external application in uninfected wound.[4] *Acharya Sushruta* also mentions *Gojihva* under *Shaakavarga* (vegetable group) and explains it to be taken in Haemorrhagic disorders, skin disorders, diabetes, fever etc.[5] In spite of wide description in classics, the plant has no monograph published in Ayurvedic Pharmacopoeia of India and

ICMR database. Thus, there is a need to know its functional groups in order to rationalize its use in various diseases mentioned in classics. As a result of this, FTIR (Fourier-transform infrared spectroscopy) and GC-MS (Gas chromatography–mass spectrometry) study are planned, from SICART Lab, Anand, Gujarat.

MATERIALS AND METHODS

Collection of plant

The plant was collected from All India Institute of Ayurveda, Herbal Garden. The drug authentication was done from Botanical Survey of India and a voucher specimen number - 118605 was obtained.

Leaf Extract Preparation

The plant was shade dried at room temperature of 25 degree Celsius and powdered in electric grinder. 20 grams of plant powder was weighed, 150 ml of ethanol was added and kept for 3 days. The extract was filtered using Whatman No.1 filter paper and the supernatant was collected. The residue was again extracted two times (with 3 days of interval for each extraction) and supernatants were collected. The supernatants were pooled and evaporated (at room temperature, 28 ± 1 C) until the volume was reduced to 150 ml. It was stored in air tight bottles for further analysis.[6]

FTIR Fourier-transform infrared spectroscopy

FTIR is a technique used to obtain an infrared spectrum of absorption or emission of a solid, liquid or gas. A FTIR spectrometer simultaneously collects high-spectral-resolution data over a wide spectral range.[7] The sample was sent to SICART Lab, Anand, Gujarat for FTIR Analysis. The instrument used was FT-IR Spectrometer of Perkin Elmer Spectrum GX Model having the range 10,000 cm-1 to 370 cm-1. Dried powder of ethanolic extract was used for FTIR analysis. 10 mg of the dried extract powder was encapsulated in 100 mg KBr pellet, in order to prepare translucent sample discs. The powdered sample of plant specimen was loaded in FTIR spectroscope.

GC-MS (Gas chromatography–mass spectrometry)

The sample was sent to SICART Lab, Anand, Gujarat for GC-MS Analysis. The instrument used was Autosystem XL GC with Turbomass having a mass range upto 620 amu. Gas chromatography–mass spectrometry (GC-MS) is an instrumental technique, comprising of a gas chromatograph (GC) coupled to a mass spectrometer (MS), by which complex mixtures of

chemicals may be separated, identified and quantified.GC-MS mainly consists of a regular Perkin Elmer Auto System XL Gas Chromatograph and final stage as mass spectrometer. Mass Spectrometry is a method to separate the ions or atoms of a compound by their mass.

RESULTS

I. FTIR

The FTIR spectrum of plant ethanolic extract of *L. nudicaulis* is given in Fig 1. The data on the peak values and the probable functional groups (obtained by FTIR analysis) present in the whole plant ethanolic extract is present in Table 1.

Table 1: FTIR spectral peak values and functional groups obtained for the ethanolic extract of whole plant Launaea nudicaulis.

Peak Values	Functional Groups Obtained Peaks from 4000cm^{-1} to 400 cm^{-1}
602.97	C-I Stretching Halo compound
1066.77	S=O stretching sulfoxide
1105.16	C-O Stretching Aliphatic Ether
1146.65	C-O Stretching ester
1254.04	C-O stretching
1326.96	C-H Banding
1383.70	C-H Banding
1419.56	C-H Banding
1637.25	C=C group
1737.20	C=O carbonyl group
2852.84	C-H stretching
2921.77	C-H stretching
3428.87	OH group

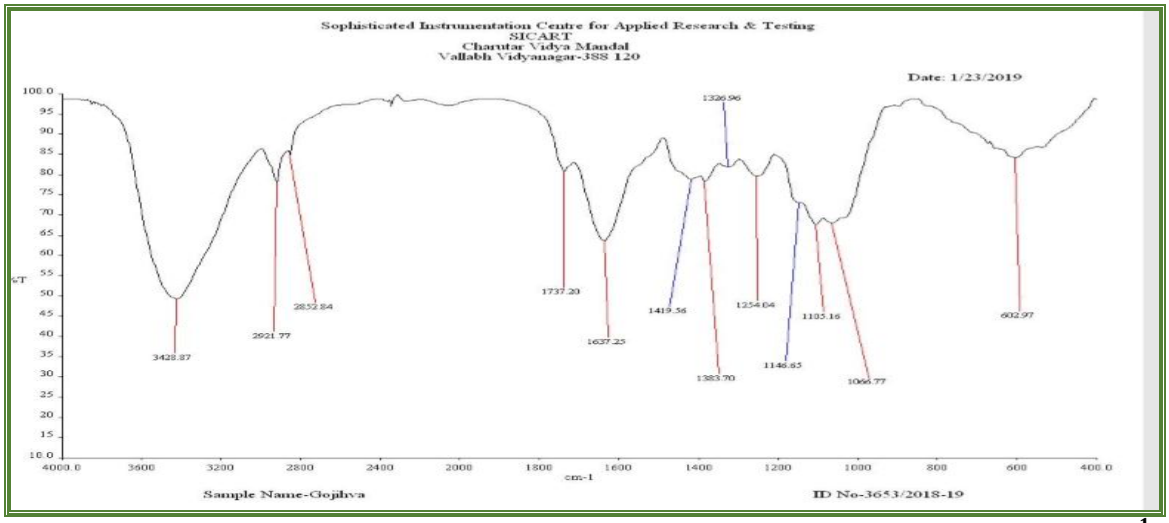

Fig. 1: FTIR Graph of *Launaea nudicaulis* (L.) Hook. f. in the range from 4000cm^{-1} to 400 cm^{-1}.

II. GC-MS

The study was conducted on ethanolic extract of powder of whole plant and no specific peak was obtained. As a result no Mass Spectra Data was obtained (Fig. 2).

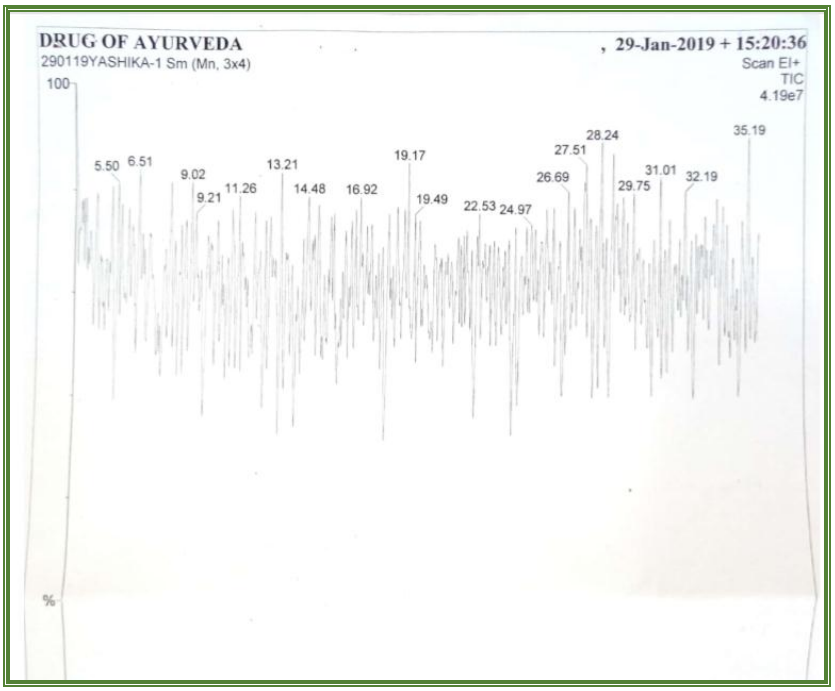

Fig 2: GC-MS Graph of *Launaea nudicaulis* (L.) Hook. f.

DISCUSSION

FTIR and GC-MS are new analytical techniques used for qualitative and quantitative estimation of phytoconstituents. FTIR identifies molecular components and structures and thus analyses the organic, polymeric and in-organic constituents of the tested material. The analysis of plant *Launaea nudicaulis* (L.) Hook. f., showed presence of various functional groups in the plant which can said to be responsible for its therapeutic effect in various disorders as mentioned in classics. GC-MS allows analysis and detection of components present even in minute amounts and is considered a gold standard in qualitative and quantitative analysis.[8] In the present study, the GC-MS was performed using powdered drugs in which no specific peak was obtained thus the sample was not found to have any essential oils. However, further studies using various extracts of the plant may give the presence of essential oils, as reported by Mahrezi et al[9] in which essential oil was extracted from aerial parts of the plant and GC-MS analysis of the oil revealed E-Citral and Z-Citral along with other fifteen compounds.

CONCLUSION

GC-MS and FTIR analysis are used to ascertain the chemical constituents present in the plant. Further, it also provides lead to quantification of active constituents in future studies.

REFERENCES

1. Acharya Agnivesha, *Charak Samhita, Sutrasthan, Annapanavidhi Adhyaya* 27/97, *Vidyotini* edited by Kashinath Pandey, Gorakhnath Chatturvedi, Chaukhamba Bharti Academy, Varanasi, 2009: 538.
2. Ibidem *Charak Samhita (i) ChikitsasthanVisarpaChikitsaAdhyaya* 21/84, 603.
3. Ibidem *Charak Samhita (i) ChikitsasthanVishaChikitsaAdhyaya* 23/220, 663.
4. Ibidem *Charak Samhita (i) ChikitsasthanDwivarniyaChikitsaAdhyaya* 25/89, 711.
5. VridhaSushruta, *Sushruta Samhita, Sutrasthan, AnnapaanvidhiAdhyay* 46/262-264, *Ayurvedtatva Sandeepika* edited by Kaviraj Ambikadutt Shastri, Chaukhamba Sanskrit Sansthan, Varanasi, 2010; 265.
6. R Ashokkumar, M. Ramaswamy, Phytochemical screening by FTIR spectroscopic analysis of leaf extracts of selected Indian Medicinal plants, International journal of current microbiology and applied sciences, 2014; 3(1): 395-406.
7. Peter R. Griffiths, James Haseth, Fourier Transform Infrared Spectrometry, 2nd Edition, John Willy and Sons Publications, 2007.
8. https://en.wikipedia.org/wiki/Gas_chromatography%E2%80%93mass_spectrometry as on September 11, 2019.
9. Jamila A. Al-Mahrezi, Jamal Nasser Al-Sabahi, Mohammed Sohail Akhtar, Dina Selim and Afaf Mohammed Weli, Essential oil composition and antimicrobial screening of *Launaea nudicaulis* grown in Oman, International Journal of Pharmaceutical Sciences and Research, 2011; 2(12): 3166-3169.