

FT-IR analysis of the crude sample of *Centella asiatica* (L.) Urb. leaves.

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Abstract

Medicinal Plants play an important role in the development of potent therapeutic agents. About 80% of people in developing countries rely on traditional medicine based largely on various species of plants for their primary health care. Herbal medicines are currently in demand and their popularity is increasing day by day. Hence, keeping the present need in mind, the present study was undertaken to assess the presence of phytochemicals in the crude powdered sample of Centella asiatica (L.) Urb. leaves.

Keywords: medicinal plants, traditional, health, herbal, phytochemicals.

1.1 INTRODUCTION

Centella asiatica (L.) Urb. commonly known as Indian Pennywort, also known as 'Brahmi' or 'Gotu Kola' belongs to the family Apiaceae. Plant is a perennial herb with creeping stem, rooting the nodes with simple, reniform, long arachnoid, petioled leaves. Inflorescence is glabrate to finely arachnoid. Involcre of 2 ovate bracts. Umbel 2-4 flowered. Flowers pink. Traditionally, it is used as a medicinal herb to stimulate the regeneration of skin in burns while preventing the formation of scar tissue. Also used for leprosy, lupus, varicose ulcers, eczema, psoriasis, diarrhoea, fever, diseases of female genitourinary tract, depression, blood purifier, treating high blood pressure, memory enhancement, promoting longevity, for revitalizing the nerves and brain cells (Gohil et al., 2010, Qureshi and Solanki, 2018).



Centella asiatica (L.) Sony DSC-H2

1.2 METHODOLOGY

The plant parts were collected from the Gujarat University campus identified by Prof. Hitesh Solanki at Department of Botany with the help of Flora of Gujarat (Shah, 1978) and the voucher specimen was submitted to Gujarat University Herbarium. The leaves were collected, washed and dried in shade according to WHO Quality control standards. The leaves when properly dried were grinded to fine powder and stored in airtight containers

for further use. Using the Single Reflection Attenuated Total Reflection (ATR), the powdered plant samples were placed on the diamond crystal and FT-IR analysis was performed for the powdered *C. asiatica* leaf sample.

1.3 RESULTS

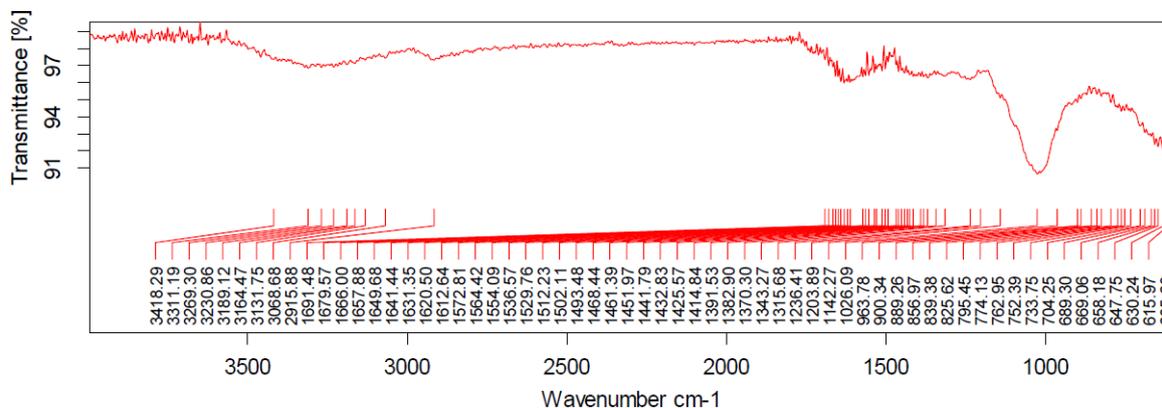


Fig.1. FT-IR analysis of Centella asiatica (L.) Urb. Leaves

1.4 DISCUSSION

Centella asiatica leaf IR spectra (Fig.1) showed 18 peaks. Aromatic ethers, trans alkenes, alkanes, secondary aliphatic amines, primary aromatic amines, secondary aromatic amines, carboxylic acids, aliphatic nitro compounds, nitrites, tertiary aromatic amines, conjugated alkenes, esters, acetates, alcohols, ketones, esters, cis alkenes. The wavenumbers were: 3418.29cm⁻¹, 3311.19cm⁻¹, 3269.30cm⁻¹, 3230.85cm⁻¹, 3189.12cm⁻¹, 3164.46cm⁻¹, 3131.75cm⁻¹, 3068.68cm⁻¹, 2915.88cm⁻¹, 1691.47cm⁻¹, 1679.56cm⁻¹, 1666.00 cm⁻¹, 1657.88cm⁻¹, 1649.68 cm⁻¹, 1641.43cm⁻¹, 1631.34 cm⁻¹, 1620.50 cm⁻¹, 1621.64 cm⁻¹. Sultan et al. (2012) studied the FT-IR spectrum of the powdered aerial parts of *Centella asiatica*. Their results revealed the peaks at wavelength- 3365.2 cm⁻¹, 2916.6 cm⁻¹, 2843.6 cm⁻¹, 1632.80 cm⁻¹, 1023.7 cm⁻¹. The possible functional groups for wavelength-3365.cm⁻¹ were OH and COOH and the compounds that maybe responsible for peak are tyrosine, astragaline, kaempferol, sitosterol, ascorbic acid, stigmasterol, arginine, glutamic acid, aspartic acid, water and others. The possible functional groups for wavelength-2916.6 cm⁻¹ and 2843.6 cm⁻¹ were CH and the compounds responsible maybe glutamic acid, arginine, histidine, sitosterol, stigmasterol, tyrosine and others. The functional groups for 1632.80 cm⁻¹ were C=C and R-NH₂-C=O and the compounds responsible for the peaks maybe centellin, stigmasterol and others. The possible functional group for wavelengths were 1023.7 cm⁻¹ was CO and the peaks for it were centellin, asiaticin, tyrosin, arginine, glutamic acid and aspartic acid. Agme et al. (2017) studied the FTIR spectra of *C.asiatica* and found the following functional groups with respective wavenumbers. 3425.82 cm⁻¹- Functional group -OH in alcohol and phenol, 2922.15 cm⁻¹-Functional group-CH₃ and -CH₂ in aliphatic compounds, 2853.49 cm⁻¹-Functional group-Aldehyde -C-H, 1736 cm⁻¹-Functional group-C=O, 1629.22 cm⁻¹- Functional group- C=O (amide), 1437.36 cm⁻¹- Functional group-C=C, 1374.42 cm⁻¹-Functional group-S=O. 1322.00 cm⁻¹-Functional group-C-N, 1245 cm⁻¹-Functional group- F, 1055 cm⁻¹-Functional group-Aryl/vinyl ether, 893.13 cm⁻¹-Functional group-Aromatic -C-H, 779.46 cm⁻¹-Cl, 622.41 cm⁻¹-Functional group-Br/-I. Byakodi et al. (2018) studied the IR spectra of *C. asiatica*. Their results revealed the presence of 13 peaks for different functional groups, some of which were carboxylic, hydroxyl, aromatic rings, alkyl and amine groups.

1.5 CONCLUSION

Centella asiatica (L.) Urb. is highly important in Ayurvedic medicines. However, the use of leaves is done in formulations due to its good antioxidant potential and presence of essential phytochemicals. The presence of Phytochemicals was confirmed by the FT-IR studies. Hence, it can be considered as one of the quality parameters to assess the quality of the powdered material.

1.6 ACKNOWLEDGMENTS

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