Characterization of *Momordica charantia* Ussing FT-IR Spectroscopy

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Abstract

Momordica charantia (bitter melon) belongs to the family of *Cucurbitaceae*, a climbing vine which is commonly seen growing on walls and shrubs in the tropics. To demonstrate the result of studies which shows that the plant used as stomachic, carminative, tonic, antipyretic, antidiabetic, in rheumatoid arthritis and gout, the present investigation was carried to characterized a principal components of plant using FT-IR technique.

Keywords: *FT-IR, medicinal properties, Momordica charantia*

Introduction

Momordica charantia (Bitter Melon), a tropical vegetable, is a common food in Indian cusine and it is used extensively in folk medicine as a remedy for diabetes. The major parts used are leaves, fruits and flowers. Bitter melon has been used in various Asian traditional medicines for a long time. Leaves are simple; usually palmately 5-7 lobed, tendrils unbranched or 2 branched. The herbaceous, tendril bearing, vine grows to 5 m. It bears simple, alternate leaves 4-12 cm across, with 3-7 deeply separated lobes. The main constituents of *M. charantia* are alkaloids, charantin, momordicin, ascorbic acid, phenol and protein (Sathish *et al.* 2010).

The fruit has claimed to contain charantin, steroidal saponin, momordicosides, carbohydrate, mineral matters, ascorbic acid, alkaloids, glucoside (Oragwa, 2013). The anticancerous and antileukemic activity of *Momordica charantia* against numerous cell lines including liver cancer, human leukemia melanoma and solid sarcomas have also been documented (Zhu, *et al*. 1990). Most recent researches on the plant show that it has ability to inhibit the enzyme guanylate cyclase that is thought to be associated with psoriasis, leukemia and tumor pathogenesis (Grover *et al*. 2004), (Takemoto *et al*. 1983). Crude extracts of the fruit of *Momordica charantia* possess antidiabetic activity (Rathi, 2002), (Guevara,1989) and many cucurbitane-type triterpenoids have been isolated from the fruits, (Hardman,1980), seeds (Rathi, 2002), (Okabe, 1982) and leaves of the plant.

Aims and objectives

The aim of this study was to identify the chemical compounds of *Momordica charantia* through FT- IR techniques. Vibrational spectral techniques, FT- IR, offer several advantages in the context of current research and using this techniques we can identify molecular components in the studied samples.

Materials and methods

For FT-IR measurements were performed in the absorbance with a spectrophotometer FT-

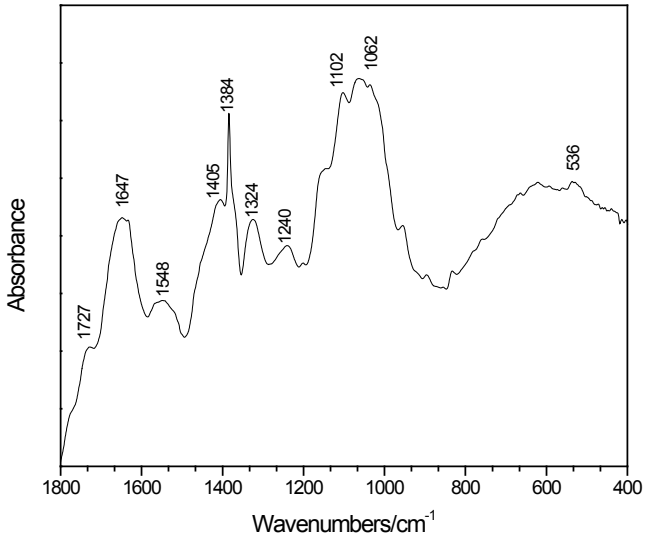

Fig. 1. FT-IR spectrum for *Momordica charantia* fruit

IR-4100 Jasco, using the KBr pellet technique. The spectra were obtained in the wavenumber range 265 cm^{-1}. Spectral resolution was set at 4 cm^{-1} and all spectra were acquired over 256 scans. The sample was obtained from 0, 003 g of dried plants (fruits) and ground.

Results and discussion

The vibrational fundamentals from the FT-IR spectra, presented in Fig. 1. for *Momordica charantia* (fruits) were analyzed by comparing the experimental vibrational modes with the previous published data (Hlaing *et al*. 2005). In the "fringerprint" region the intense and broad absorption band characteristic of C-C, C-O and C-H is present. The infrared spectra of *Momordica charantia* showed the presence of C-C stretching band at 1548 cm^{-1} and 1324 cm^{-1}, C-O stretching band at 1240 cm^{-1}.

The strong peaks at 1647cm^{-1} were assigned to the C=C stretching modes. The very weak band at 1102 cm^{-1} were assigned to the C-O stretching and the same attribution is available for the weak peaks at 1062 cm^{-1}. The in-plane bending modes of C-H are attributed to the strong peak at 1384 cm^{-1} and in plane symmetrical bending of CCC is presence at 536 cm^{-1}.

Conclusion

Using vibrational spectroscopy, it was proven that we can identify key molecular components in the samples studied and their molecular structure. This study has contributed to the characterization and identification of compounds in *M. charantia* seeds.

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