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FT-IR STUDIES OF ETHANOLIC EXTRACT OF *IPOMOEA DIGITATA*

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ABSTRACT

In the present study an attempt has been made to establish FT-IR profile and identify the functional components of Ipomoea digitata. FTIR method was performed on a Thermo Scientific Spectrophotometer system which was used to detect the characteristic peak values and their functional groups. The results of Ipomoea digitata roots FTIR analysis confirmed the presence of alkyne, alkane and C-F bonding which shows major peaks at 2360-2312 $cm^{-1,}$ 1616 $cm^{-1,}$ peak between 1456 and 1076 cm^{-1} respectively. The results of the present study produced the FTIR spectrum profile for the medicinally important plant Ipomoea digitata.

KEY WORDS

Ipomoea digitata, FTIR, Spectroscopy, Functional groups and Phytoestrogens.

INTRODUCTION

Fourier transform infrared spectrometry is a physico-chemical analytical technique that does not resolve the concentrations of individual metabolites but provides a snapshot of the metabolic composition of a tissue at a given time[1]. FTIR can be employed to determine the structure of unknown composition and the intensity of the absorption spectra associated with molecular composition or content of the chemical group [1, 2]. The FT-IR method measures the vibrations of bonds within chemical functional groups and generates a spectrum that can be regarded as a biochemical or metabolic "fingerprint" of the sample. By attaining IR spectra from plant samples, it might possible to detect the minor changes of primary and secondary metabolites [2, 3]. At present, particularly in phytochemistry, FT-IR has been exercised to identify the concrete structure of certain plant secondary metabolites [4-6]. But, on pharmacognosy front FT-IR is still a novel tool to characterize and identify the commercial components from the adulterant. FT-IR method has been successfully utilized in the characterization of bacterial, fungal and plant species [7-19]. FT-IR is one of the most widely used methods to identify the chemical constituents and elucidate the compounds structures, and has been used as a requisite method to identify medicines in Pharmacopoeia of many countries [12.] At the pharmacological front FT-IR is helpful tool to identify the compounds responsible for respective pharmacological activities.

Ipomoea digitata popularly called Vidarikanda is the dried tuber belonging to family *Convoluaceae,* a large, perennial climber with tuberous roots, upto 60 cm long and 30 cm thick, even weighing upto 35 kg, from about 5 or 10 kg; they are distributed nearly throughout India. Ipomoea digitata has various pharmacological properties like Spasmogenic effect, Revitalizing effect, Antioxidant activity, Antidiabetic activity, Hepatoprotective activity, Cardioprotective effect and Antihypertensive activity[21].

MATERIALS AND METHODS

Collection and processing of plant material:

Ipomoea digitata was procured from the authorized botanist Dr. Madhukar Reddy of Heritage bionaturals, Habsiguda, Hyderabad. Shade dried samples were grounded to fine powder using pulverizer. The powdered samples were then stored in a refrigerator for further use.

Extraction of plant material:

The powdered bulbil of *Ipomoea digitata* were extracted using ethanol with gentle stirring for 72 h separately at room temperature. The extracts were then filtered through Whatmann No. 1 filter paper and concentrated using rotaevaporator.

FTIR Spectroscopic Analysis:

The FT-IR spectrophotometer used was Shumatzu at Osmania University. KBr is an important sample matrix for FTIR scanning. The KBr used was of IR grade (SD Fines). About 500 mg of KBr was placed into a mortar and grind it until there is no evidence of crystalinity. The KBr powder was transferred into the drying box at a temperature of 40°C. 10 mg of solid sample was placed into the mortar and again grind it until a fine powder is formed. Weigh 1mg of solid fine powder of sample (as per requirement of the die) and 200mg of dry fine powder of KBr. Weighed quantities were transferred into a mortar and mix well with the help of a spatula. Bottom and top portion of KBr were assembled at press assembly and one of the 13 mm die with the polished surface up inside the press. The KBr sample mixture was transferred to KBr press assembly. Second die was transferred inside the KBr press assembly with polished side down so that KBr sample mixture was sandwiched between the polished surfaces of the each die. The KBr was transferred to press assembly to press. Vacuum line was connected to evacuate air from the KBr press assembly with a vacuum pump. The die is slowly compressed in KBr press assembly until a pressure of 2000 kg/cm2 is achieved on gauge with the vacuum on. Making sure that pressure release valve is closed. After 60 s, slowly the pressure release valve is open to release the pressure and also the vacuum line is disconnected. The disc is checked if it is translucent and the sample is homogenously distributed in the disc[20]. The prepared disc is then subjected for scanning between 500-4000^{-1} cm.

RESULTS AND DISCUSSION

The FTIR spectrum was used to identify the functional group of the active components based on the peak value in the region of infrared radiation. The bulbs powder and ethanolic extracts evaporated powder of *Ipomoea digitata* was passed into the FTIR and the functional groups of the components were separated based on its peak ratio.

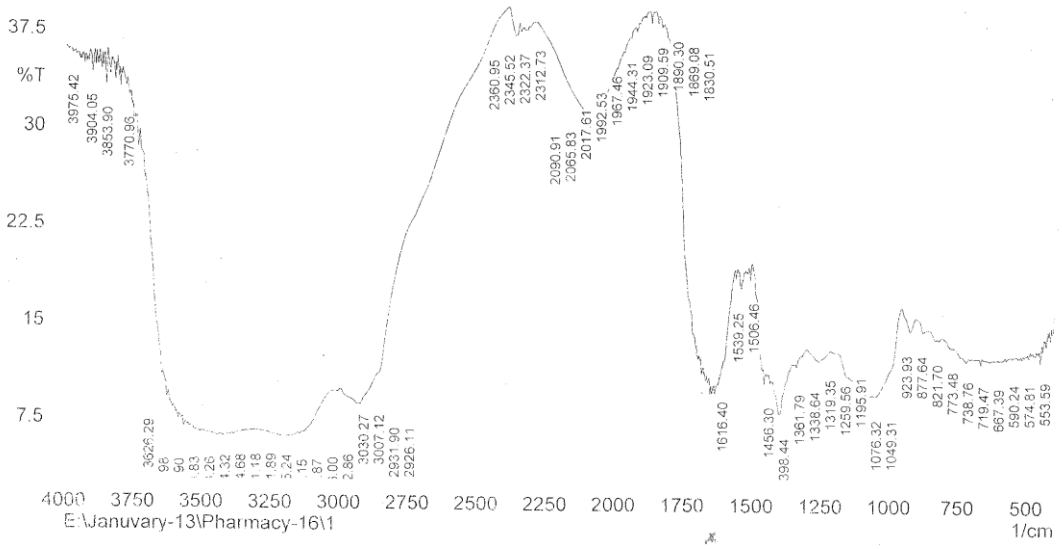

Fig 1: Showing the peaks of FT-IR scan of ethanolic extract Ipomoea digitata.

The results of *Ipomoea digitata* roots FTIR analysis confirmed the presence of alkyne, alkane and C-F bonding which shows major peaks at 2360-2312 cm$^{-1,}$ 1616 cm$^{-1,}$ peak between 1456' and 1076 cm^{-1}respectively. While the peak at 2090-1992^{-1}cm was observed was unidentified for any organic constituents. The results of the present study produced the FTIR spectrum profile for the medicinally important plant *Ipomoea digitata*.

CONCLUSION

Many researchers applied the FTIR spectrum as a tool for distinguishing closely associated plants and other organisms [(1-19)]. The results of the present study coincided with the previous observations observed by various plant biologist and taxonomist. The results of the present study developed novel phytochemical marker to identify the medicinally important plant. Further advanced spectroscopic studies are required

for the structural elucidation and identification of active principles present in the leaves of *Ipomoea digitata*.

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