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# ANALYSIS OF FLOWER EXTRACT OF *Michelia champaca* (L.,) BY FTIR SPECTRUM

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**ABSTRACT**

Infra red spectra of methanol extract of medicinal plant *Michelia champaca* Linn flowers were recorded. The vibrational assignments, intensities and wave number (cm-1) of dominant peak were obtained from absorption spectra. Probable assignments of the bands were made with respect to the components present in methanol extracts. From these analysis, functional groups such as alcohols, ketones, alkanes, amino acids, pyridines, phenols, sulfoxides , benzene and halides are present in the extract and the results indicated that the methanol extract of *Michelia champaca* have high therapeutic value. In future, it can be used as herbal drug for treating various diseases.

**Keywords**: Infrared spectra, *Michelia champaca*, functional groups, therapeutic value.

## INTRODUCTION

The discovery of new drugs has been expanding to include diverse subjects as negotiation of power based on medicinal plant knowledge [1]. Plants generally contain both primary metabolites as well as secondary metabolites. The different phyto constituents present in plants include anthraglycosides, arbutin, bitter drugs, flavonoids, alkaloids, saponins, coumarins, phenol, carboxylic acids terpenes and valepotriates. The phyto constituents confer specific characteristics and properties to plants. Therefore, the analysis of these constituents would help in determining various biological activities of plants. Natural products, either as pure compounds or as standardized plant extracts, provide unlimited opportunities for new drug [2].

Unlike synthetic drugs, herbal medicine is a complicated system of mixtures. Thus, the methods of choice for identification of 'botanical drug' are mainly intended to obtain a characteristic fingerprint of a specific plant that represent the presence of a particular quality defining chemical constituents. For such purposes, chromatographic techniques such as high performance liquid chromatography (HPLC), gas chromatography (GC), gas chromatography – mass spectrometry (GC-MS) and thin layer chromatography (TLC) were used widely used [3-5]. The Fourier Transform Infrared (FTIR) spectroscopy allows the analysis of a relevant amount of compositional and structural information in plants [6]. The analysis can be performed both on pure compounds and complex mixtures, without separation into individual components. IR spectrometry is more sensistive and selective than colorimetric methods. Moreover, FT-IR spectroscopy is an established time-saving method to characterize and analyze micro organisms and monitor biotechnological processes [7].

*Michelia champaca* L. (Magnoliaceae) commonly known as Svarna champa, a tall handsome tree with yellow fragrant blossoms, is commonly used by many traditional herbal preparations and it is also reported to have significant wound healing [8], antimicrobial [9], antidiabetic [10], antitumor [11], anti-inflammatory [12], antioxidant [13] and anti infective [14] properties.

## MATERIALS AND METHODS

### Collection of plant material

The *Michelia champaca* flowers were procured from the local areas of Udumalaipettai, Coimbatore District, Tamilnadu. The collected plant material was botanically identified and confirmed by Dr.S.John Britto, The Director, Rapinat Herbarium, St. Joseph's College, Tiruchirappalli, Tamilnadu. The herbarium specimens were preserved and submitted to Department of

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**Preparation of the extract**

The flowers were chopped into small pieces, shade-dried and coarsely powdered by using a pulverizor. The coarse powders were then subjected to successive extraction with methanol by Soxhlet method [15]. The extracts were then collected and distilled off on a water bath at atmospheric pressure and the last trace of the solvents was removed in vacuo and stored at 4˚C.

**FTIR spectrum analysis**

Methanol extract of *M.champaca* was ground into fine powder by using agate mortar and the FT-IR spectrometer in the region 4000-400cm-1 by employing standard KBr pellet technique. All investigations were carried with a Bruker 55 model FT-IR spectrometer.

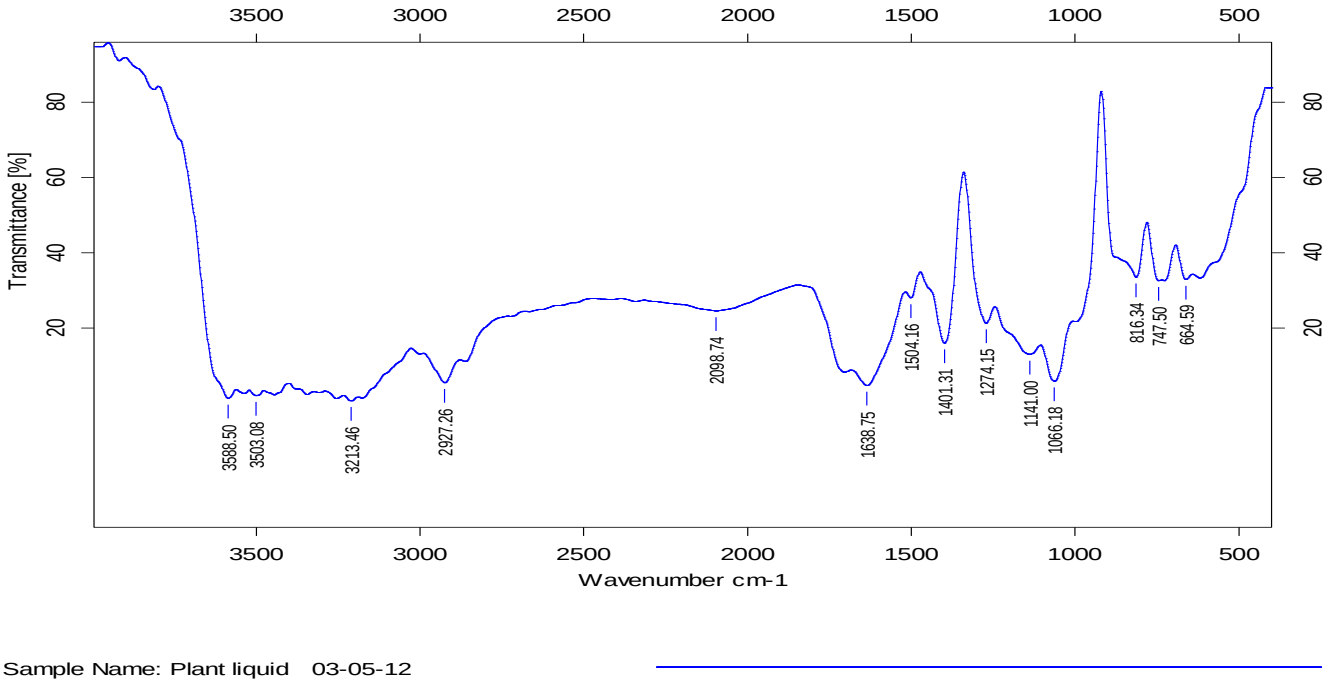
**RESULTS AND DISCUSSION**

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 methanol extract of *M.champaca* passed into the FTIR and the functional groups of the components were separated based on its peak ratio. The results of FTIR analysis confirmed the presence of alcohols, (O-H str), ketones (C=O str), alkanes, (-CH2-) amino acids (NH2 str) pyridines (C=C str), phenols , tertiary. alcohols (O-H def) , conjugated ethers (ROR str), Sulfoxides (S=O str), benzene ring with adjacent H atoms (C-H def) and , halides compounds (C-Cl str) which shows major peaks at 2927.26, 1638.75, 1401.31, 1066.18 ,816.34, and 747.50 respectively (Fig.1 and Table.1)

**Table 1. FTIR peak values of methanol extracts of *Michelia champaca* Linn flowers**

| **Peak values** (Wave Numbers Cm-1) | **Functional groups** |
|---|---|
| 3588.50 | Alcohols |
| 3503.08 | Oximes |
| 3213.46 | Ketones |
| 2927.26 | Alkanes |
| 2098.74 | Amino acids |
| 1638.75 | Amino acids containing NH2 group |
| 1504.16 | Pyridines, quinolines |
| 1401.31 | Phenols, tert. Alcohols |
| 1274.15 | Conjugated ethers |
| 1141.00 | Aliphatic ethers |
| 1066.18 | Sulfoxides |
| 816.34 | Benzene ring with three adjacent H atoms |
| 747.50 | Benzene ring with four adjacent Free H |
| 664.59 | Halides |

**Fig.1. FT-IR spectra of methanolic extract of *Michelia champaca* flowers**



From table 1, it is seen that the extract are rich in amino acids, the main group of protein synthesis and also it contain phenol, benzene, alcohol and halides play thus role of disinfectant. Protein plays a vital role in the physiology of living organisms. All the functions of an organism are regulated by enzymes and hormones, which are proteins. If any alteration takes place in the protein turnover, it may have an adverse effect on the important and complex groups of biological materials, comprising the nitrogenous constituents of the body and food intake and thus performing different biological events to maintain homeostasis of the cell. Therefore, the protein content of a cell can be considered a diagnostic tool to determine the physiological phases of a cell [16].

**CONCLUSION**

FTIR spectrum reflecting objectively the panorama of chemical constituents in a complex system is the most credible method to validate and identify the functional groups. Further research may help for the identification of new bioactive compounds in these medicinal plants.

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