

# Proximate And Spectroscopic Analysis Of *Passiflora Foetida* L.

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**ABSTRACT:** A medicinal plant, *Passiflora foetida* belonging to the family of Passifloraceae. The plant was chemically screened for nutritional values such as moisture content, ash, crude fat, crude protein, crude fibre and carbohydrate. It was assessed with a view of establishing and understanding their nutritional uses. The plant contained crude protein (25.83 to 26.05%), crude fibre(9.55 to 90.61%), crude fat (2.87 to 2.98%), Ash (28.55 to 28.84%), carbohydrate (40.46 to 40.69%) and moisture (1.79 to 1.96%). The significance of the plant in traditional medicine and importance of the nutritional value in the pharmaceutical industries were discussed. The infrared spectroscopy analysis was also carried out to know the molecular structure of the sample. It is showed that the molecular structure of the oil in the plant signifies five important peaks which include stretching, bending and double bond absorption. A peak of  $1640.93\text{cm}^{-1}$  in the oil indicates the formation of an acid functional group(C=O-N).This makes the oil to be unsaturated. It is therefore recommended that more research is needed to be done in the area of characterization of the plant constituents for further use as a medicinal plant

**Keywords:** Passiflora, Nutritional Values, Traditional medicine, Spectroscopy, unsaturated.

## INTRODUCTION

Since time immemorial, man has used various parts of plants in the treatment and prevention of many ailments (Sofowora, 1993). According to the WHO (1991), a medical plant is any plant which contains substances that can be used for therapeutic purposes in one or more of its organ. The efficacy of medicinal plant species which has been thoroughly investigated by ethnobotanist and other related workers constitute enormous potential source of chemicals useful to man. These active constituents make each plant to function the way they are. One of such plant is *Passiflora foetida*. *Passiflora foetida* has a common name known as passion flower. It belongs to Passifloraceae family. According to Rao and Sung (1995) it is a native to the South western United States, Mexico, Carribbean, Centra America and South America. Chandel and Rastogi, (1980) reported that the plant is one of the 304 high pharmaceutical plants in cote d' ivoire where 5000 species have been listed. *Passiflora foetida* has played a vital role in the treatment of various categories of human ailments and diseases. Yuldasheva *et al.*, (2004) has subjected *Passiflora foetida* to phytochemical analysis with result that it has potent anxiolytic and sodative effect. This plant is used in homeopathic medicine for the treatment of insomnia, epilepsy, tetanus and muscle spasms (Woode *et al.*,2009).

Mohanasundari *et a.,l* (2007) recorded the Pharmacologically active component of the plant such as hemolysins and cytolysins as potential bactericidal and anticancer drugs. The leaves infusions are used to fight hysteria and insomnia in Nigeria and the population of Benin uses aerial parts to cure Kteria, Hepatitis, Constipation, Oesophagy and Pain (Santosh et al 2011). It is reported by Yuldasheua *et al.*, (2005) that there are a few publications about the proximate and cytotoxic analysis of the family Passifloraceae. Moreover, due to the medicinal importance of the plant and large scale unrestricted exploitation to meet increased demands by the pharmaceutical industries, coupled with limited cultivation and insufficient attempts for its reforestation, the wild stock of this important plant species has been markedly depleted (Wood *et al.*, 2009). Therefore, this paper would highlight the nutritional value and simple characterization of *Passiflora foetida* in Nigeria.

## MATERIALS & METHODS

### Collection and Preparation of Samples

The plant of *Passiflora foetida* used for this study was collected from Forestry Research Institute of Nigeria, Ibadan, Oyo State Nigeria. The leaves of the plant were collected, screened, air dried and then transferred into a mechanical grinder. The powder obtained after grinding was stored in a dry polythene bag prior to extraction and analysis.

### Extraction

49.65g of the powdered was weighed into a stopper glass container with 500ml of ethanol for cold extraction and was left for about one week. The mixture is then filtered and the residue is returned back into the container with fresh solvent added for further extraction.

### Proximate Composition Analysis

The proximate analysis of the samples for moisture content, crude fiber total ash and were carried out in triplicate using method described by AOAC (1990). The Nitrogen was determined by micro Kjeldahl method described by Pearson (1976) and the nitrogen content was converted to protein by multiplying by a factor 6.25. Determination of crude fat

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content of the samples was done using soxhlet (cehm glass) type of the direct solvent extraction using petroleum ether (boiling range of 60-80°C) as solvent. At the end of the extraction, the solvent was evaporated and the flask dried in the oven at 60°C. Total carbohydrate content was estimated by difference. All the proximate values were reported in percentage (%).

### Infrared Spectroscopy Analysis

Infrared Spectroscopy (IR Spectroscopy) is the spectroscopy that deals with the infrared region of the electromagnetic spectrum (light with a longer wavelength and lower frequency than visible light). Analysis of these absorption characteristics reveals details about the molecular structure of the sample. A fourier transform infrared (FTIR) spectrometer from University of Ibadan Central Laboratory was used for this analysis (Buck-Scientific model 500) The I.R Spectrophotometers operate according to simple principles. The complex mechanical and electrical devices present in the system are necessary to transform very small variation in energy absorbed into an accurately recorded spectrum. (P.S. Kalsi, Spectroscopy of

organic compounds 6th edition) Liquid samples can be sandwiched between two plates of a salt commonly sodium chloride, or common salt, although a number of other salts such as potassium bromide or calcium fluoride are also used (Laurence *et al.*, 1989). The plates are transparent to the infrared light and do not introduce any lines onto the spectra.



**Passiflora foetida**

## RESULTS AND DISCUSSION

**Table 1: Proximate Composition (% dry weight) of Passiflora foetida**

Composition	% by Weight
Moisture	1.88 ± 0.08
Ash	28.70 ± 0.14
Crude fat	2.93 ± 0.05
Crude protein	25.90 ± 0.15
Crude fibre	9.58 ± 0.03
Carbohydrate	40.58 ± 0.11

Values are mean +\_standard deviation of triplicate determination.

The summary of the proximate composition (on dry weight basis) of *Passiflora foetida* leaf is shown in table 1. It shows that the moisture content of *Passiflora foetida* (1.88%) is quite low and the low moisture content is advantageous in terms of shelf life of the plant, which would enable them to be reserved for a longer period of time. The ash content (28.70%) of the plant is high. This is very useful in assessing the quality of grading of the plant. It also gives an idea of the amount of minerals present in the sample (Michael and David, 2002). It is observed that *Passiflora foetida* has a crude protein content of 25.90%. This value implies that the level of protein in the plant is relatively high. This value complies favorably with those of protein rich food such as soyabean, cowpea, pumpkin whose protein content ranging between 23.1 and 33.08 respectively (Olaofe *et al.*, 1994). This contributes to the friction of hormones which contains a variety of body functions such as growth, repair and maintenance (Mau *et al.*, 1999). It also showed that the plant has crude fibre of 9.58%. It has biochemical effect on the absorption of bile acid, re-absorption of dietary fats and cholesterol (Ojeh *et al.*, 2008). High percentage of carbohydrate (40.58%) was found in *Passiflora foetida*. This signifies that the plant contains starch.

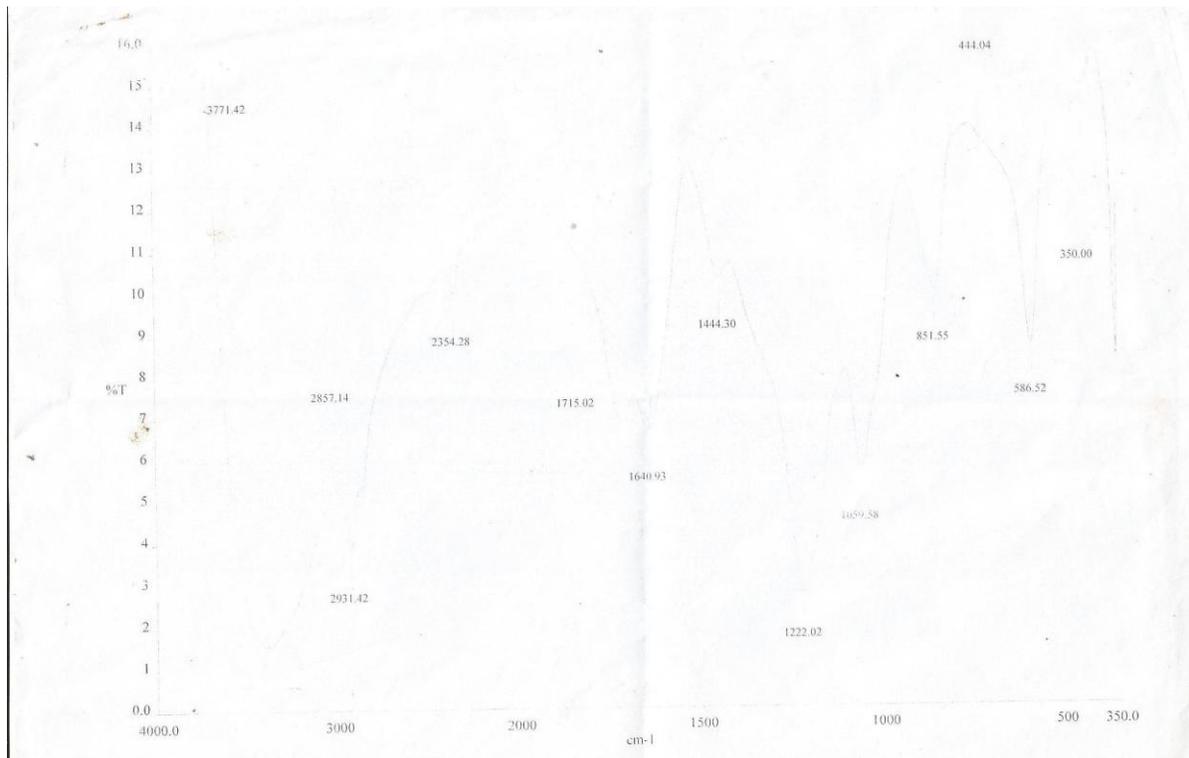
**Table 2: Preliminary phytochemical screening of ethanol extract of Passiflora foetida leaves.**

Phytochemical Constituents	Results
Saponins	+
Tannins	+
Cardiac glycosides	+
Alkaloid	+
Anthraquinones	+
Steroid	+
Flavonoid	+

Key + = Present

**Source;** Patil and Paikrao (2012)

Table 2 reveals the phytochemical constituents of *Passiflora foetida*. It shows that saponins, tannins, cardiac glycosides, alkaloids, anthraquinones, steroids and flavonoids are present in the plant. This indicates the efficacy of the plant for medicinal uses.



**Fig 1: The FTIR Spectrum of *Passiflora foetida* Oil.**

Fig 1 shows FTIR spectrum of *Passiflora foetida*. The spectrum shows five important peaks explaining the stretching, bending and double bond absorption of the oil sample. It was observed that the absorption band for the C-H stretching of  $\text{CH}_3$  occurs at wavelength  $2931.442\text{cm}^{-1}$  as well as the C-H stretching for  $\text{CH}_2$  occurs at wavelength  $2857.14\text{cm}^{-1}$ . Two peaks observed at  $1715.02\text{cm}^{-1}$  and  $1222.02\text{cm}^{-1}$  are due to stretching absorption of a ketone (C=O) and ester (C-O) respectively. A peak  $1640.93\text{cm}^{-1}$  in the oil signify the formation of an acid functional group (C=O)-N. The strong and sharp band present at  $851.55\text{cm}^{-1}$  can be attributed to a para substituted benzene ring. This shows that oil from the plant is unsaturated.

## CONCLUSION

*Passiflora Foetida* contained appreciable amount of the basic food nutrients; Protein, Fats, Carbohydrate, Ash, Moisture and Fibre. Each of the nutrients performs specific function in the body system. This really makes the plant to be highly medicinal with low level of toxicity. The moisture content of the leaf agrees with definition of vegetables which are characterized with high water content. Fibre also has a biochemical effect on the absorption and re-absorption of bile acids as well as the absorption of dietary fats and cholesterol. The extract of the leaves are found to contain the required nutritive compounds needed by pharmaceutical as well as in food supplements. Therefore, further research is needed to be carried out to determine the characterization of the plant constituents for its suitability in the area of pharmacy.

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