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Research Article

**FTIR ANALYSIS OF BIOACTIVE PHYTOCOMPOUNDS FROM
METHANOL EXTRACT OF LEAF OF PLANT *SOLANUM
SURRATENCE* (SOLANACEAE)****Muthiah Chandran**Associate Professor, Department of Zoology, Thiruvalluvar University, Serkadu,
Vellore-632 115. Email: bothaguruchandran@yahoo.co.in**Abstract:**

The present study was carried out to characterize various bioactive phytoconstituents in the methanol extract of leaf of *Solanum surratence* (Solanaceae) using FTIR. The obtained results of the present study showed the presence of 13 peaks at 580.09 cm⁻¹, 657.78 cm⁻¹, 774.71 cm⁻¹, 962.12 cm⁻¹, 1059.83 cm⁻¹, 1150.34 cm⁻¹, 1377 cm⁻¹, 1519.56 cm⁻¹, 1610.06 cm⁻¹, 1727.02 cm⁻¹, 2362.12 cm⁻¹, 2854.69 cm⁻¹, 2925.97 cm⁻¹ and 3399.31 cm⁻¹ thereby confirming the existence of halo Compound, 1,3-disubstituted, alkene disubstituted (trans), primary alcohol, vinyl ether, sulfone, nitro compound, α,β -unsaturated ketone, α,β -unsaturated ester, carbon dioxide, alkane and aliphatic primary amine.

Key Words: FTIR, *Solanum surratence*, phytoconstituents, bioactive

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INTRODUCTION:

From the prehistoric period, the human population used the plants to treat various ailments and diseases. This tradition may be unknowingly come from animals through evaluation. Now a day, most of the drugs are produced from plants because of producing some secondary metabolites such as alkaloids, saponins, steroids, flavonoids and tannins (Jigna and Sumitra, 2007 and Kumar et al, 2009). These compounds have diverse pharmacological properties including antimicrobial, antioxidant and anticancer activities (Takeoka and Dao, 2003) and some other excellent medicinal properties. The medicinal plants are the richest bio-resources of folk medicines and traditional systems of medicine, and food supplements, pharmaceuticals industries and chemical entities for synthetic drugs (Ncube et al, 2008). Hence, the present study has been conducted to screen the phyto-constituents present in the methanolic extract of leaf of plant *Solanum surratence* (Solanaceae).

Biology of plants

Solanum surratence (Solanaceae) (SX) is an important medicinal herb in Ayurvedic medicine. Since, there are few articles on this plant.. Various studies indicated that SX possesses antiasthmatic, hypoglycemic, hepatoprotective, antibacterial and insect repellent properties. Although the results are very encouraging and indicated that some of the constituents of the plant like solasodine and diosgenin are important therapeutically, the herb should be studied more extensively to confirm these results and reveal other potential therapeutic effects. Various traditional claims like immune modulation, anti-inflammatory, anti allergic, anti-anaphylactic and antitumor effects of the plant are still remain to be validated scientifically. Clinical trials for the reported preclinical studies should be performed urgently to further validate the claims on humans.

Classification

Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Order: Solanales
Family: Solanaceae
Genus: Solanum
Species: surattense

Names in various languages

Tamil name: Kandankattiri, Hindi: Katai, Katali, Ringani, Bhatakataiya, Choti-kateri, English name: Wild Eggplant, Yellow-Berried Nightshade, Febrifuge plant, Bengali: Kantkari, Gujarati:

Bhoringni, Bhonya-ringani, Tamil: Kantankattiri, Malayalam: Kantkariccunta, Kantakarivalutana, Kantankattiti, Telugu: Callamulag, Kannada: Nelagulle, Trade name: Kantkari.

Distribution and Habitat

Plants are widely distributed throughout India in dry situation as weed ascending to 1500 meter on the Himalaya, abundant by road sides and waste lands, mainly in Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh and Haryana, Saudi Arabia, Yemen, Afghanistan, Iran, China, Bangladesh, India, Nepal, Pakistan, Sri Lanka, Myanmar, Thailand, Vietnam, Indonesia, Malaysia and Egypt.

Plant Morphology

The branches are spreading on the ground. The plant is very prickly diffused bright green perennial herb, somewhat woody at the base. Branches are numerous, the younger ones clothed with dense stellate tomentum, prickles compressed, straight, yellow, glabrous, shining often exceeding and 1.3 cm long. Leaves are 5-10X2.5-5.7 cm, ovate or elliptic, bearing stellate hairs on both sides (especially so beneath), sometimes becoming nearly glabrous with age. Petioles are 1.3-2.5 cm long. Flowers are axillary but some flowers are cymes and bluish-violet in colour. Pedicels are short, curved with stellate hairy. Calyx is nearly 1.3 cm long, densely hairy and prickly, tube short, globose, lobes 11 mm long, linear-lanceolate, acute and prickly outside. Corolla is purple, 2 cm long, lobes deltoid, acute, hairy outside. Filament is 1.5 mm long, glabrous, anthers 8 mm long, oblong lanceolate and opening by small pores. Ovary is ovoid, glabrous and style glabrous. Fruits are berry, 1.3-2.0 cm in diameter, yellow or white with green veins and surrounded by the enlarged calyx. Seeds are 0.25 cm in diameter, glabrous, smooth, sub- reniform and yellowish-brown.

Medicinal Properties

Whole plant used in bronchitis, cough, constipation and in dropsy, decoction used in gonorrhoea and promotes conception. Fruits, flowers and stem: prescribed in vesicular and watery eruption, juice of the berries beneficial in sore throat, fine powder mixed with honey cures children chronic cough. Leaves: juice with black pepper given in rheumatism. Root: useful in catarrhal affections, pain in the chest. Alterative, antiasthmatic, aperient, astringent, bitter, digestive, diuretic, febrifuge, pungent, carminative, anodyne, antiemetic and expectorant.

Photo-1. The plant *Solanum surratence* with leaves and fruits**MATERIALS AND METHOD:****Collection and processing the plant materials**

The plant *Solanum surratence* were collected from the garden of the Thiruvalluvar University located just opposite to Academic block. The confirmation regarding the identification of plants was once again checked by local traditional siddha practitioners. In this way, local name of these medicinal plants and their medicinal uses were recorded with the help of aged farmers and local people. The leaves of this plant have full of thorns here and there, therefore, too much of care was taken during collection of leaf from plants.

The fresh leaves having dust, insects and dirty materials were completely removed by washing it in running tap water. All the leaves were chopped into small pieces and spread on newspaper under shade at room temperature. They were exposed to air until completely dried. The leaves were turned over at least twice a day. This process permits rapid and uniform drying of leaves. After the confirmation of complete drying, the dried leaves were made into fine powder by using mixer (grinding machine). The known weight 10 gms of dried powder suspended in adequate amount of methanol and stirred in magnetic

stirrer at room temperature for 1 h and then filtered through Whatman no-1 filter paper. Volatile of the greenish filtrate was removed under reduced pressure to afford a sticky solid. These sticky solid compounds were taken to FTIR analysis. 10mg of the dried extract powder was taken which is mixed with 100mg of KBr to prepare the pellet and applied pressure in order to prepare translucent sample discs. These KBr encapsulated translucent pellet was loaded in FTIR spectroscope (Shimadzu, Japan) and scanned under wave range from 400 to 4000 cm^{-1} with a resolution of 4 cm^{-1} .

FTIR analysis

The FTIR analysis was made to trace out the functional groups of *Solanum surratence* methanolic plant extract showed 13 spectral peaks. The methanolic extract of leaf of *Solanum surratence* showed characteristic absorption bands at 3399.31 cm^{-1} (N-H stretching) indicate the presence of aliphatic primary amine, 2925.97 and 2854.69 cm^{-1} that could be assigned to C-H stretching vibration of alkane functional group. Peak at 2362.12 cm^{-1} (O=C=O stretching) prove the existence of carbonyl oxide group, peak at 1727.02 cm^{-1} (C=O stretching) evidenced the presence of α,β -unsaturated ester.

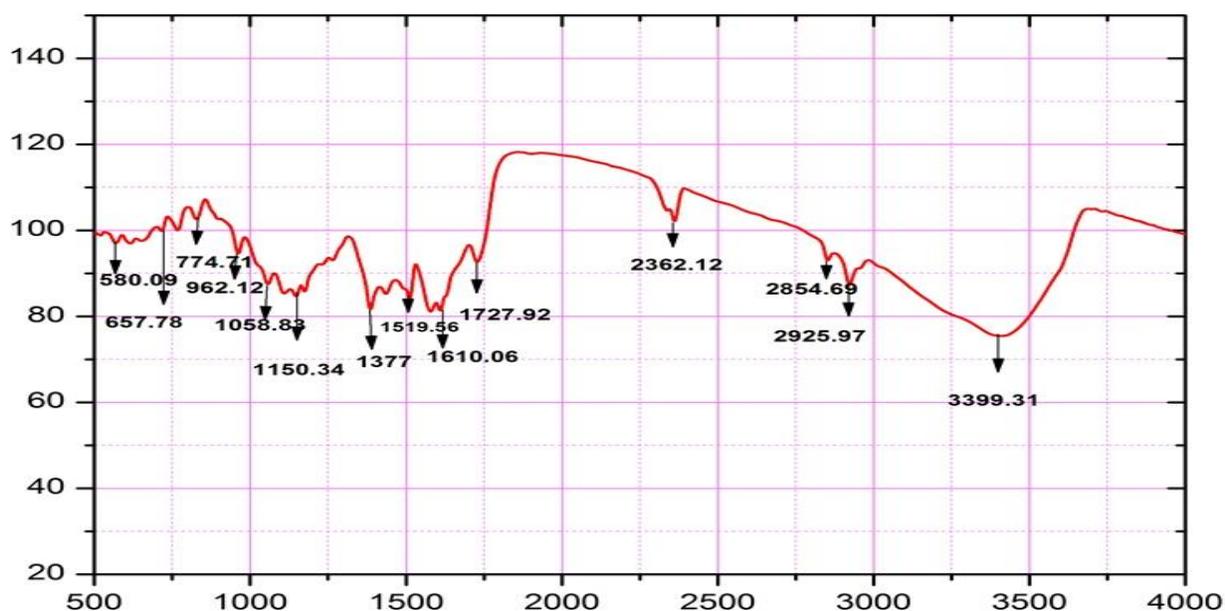
Peak at 1610.06 cm⁻¹ (N=O stretching), 1519.56 cm⁻¹ (N-O stretching), 1377 cm⁻¹ (S=O stretching) 1150.34 cm⁻¹ (C-O stretching), 1059.83 cm⁻¹ (C-O stretching), 962.12 cm⁻¹ (C=C bending strong), 774.71(C-H stretching) and 657.78 cm⁻¹ and 580.09 cm⁻¹ (C-Br and C-Clstretchings) indicated the presence of α,β - unsaturated ester, nitro compound, sulfone, vinyl ether, primary alcohol,

alkene,halo compound respectively. FTIR is very useful to measure the vibration of bonds within functional groups which is biochemical fingerprint of the plant samples. By using this technique it may possible to detect even a minor changes occur in the primary and secondary metabolites of any samples(Surewicz et al, 1993 and Mc Cann et al, 1992).

Table 2. FTIR peak values and relevant functional groups of methanol extract of *Solanum surratence*

S. No	Peak Value absorption (cm ⁻¹)	Bonds	Functional group
1	580.09	C-Cl stretching	Halo Compound
2	657.78	C-Br stretching (strong)	Halo Compound
3	774.71	C-H bending (strong)	1,3-disubstituted
4	962.12	C=C bending (strong)	Alkene disubstituted (trans)
5	1059.83	C-O stretching (strong)	primary alcohol
6	1150.34	C-O Stretching (strong)	vinyl ether
7	1377	S=O stretching(strong)	sulfone
8	1519.56	N-O stretching(strong)	nitro compound
9	1610.06	C=C stretching(strong)	α,β -unsaturated ketone
10	1727.02	C=O stretching (strong)	α,β -unsaturated ester
11	2362.12	O=C=O Stretching (Strong)	Carbon dioxide
12	2854.69 2925.97	C-H stretching(medium)	Alkane
13	3399.31	N-Hstretching(medium)	aliphatic primary amine

Figure.2: FTIR pattern of methanol extract of leaf of *Solanum surratence*



REFERENCES:

1. Jigna P and Sumitra CV. In vitro antimicrobial activity and phytochemical analysis of some Indian Medicinal plants. *Turk J Biol.* 2007;31:53-58.
2. Kumar A, Ilavarasan R, Jayachandran T, Decaraman M, Aravindhana P, Padmanaban N and Krishna MRV. Phytochemical investigation on a tropical plants. *Pak J Nutri.* 2009;8:83-85.
3. McCann MC, Hammouri M, Wilson R, Belton P, Roberts K, Fourier transform infrared microspectroscopy is a new way to look at plant cell walls, *Plant Physiol*, 100, 1992, 1940-1947.
4. Ncube NS, Afolayan AJ and Okoh AI, Assessment techniques of antimicrobial properties of natural compounds of plant origin. Current methods and future trends. *African J Biotechnology.*(2008);7; 1797-1806.
5. Surewicz WK, Mantsch HH, Chapman D, Determination of protein secondary structure by Fourier transform Infrared Spectroscopy: A critical Assessment *Biotechnology*, 32(2), 1993, 389-393.
6. Takeoka GR, Dao LT. Antioxidant constituent of almond (*Prunus dulcis* (Mill.)D.A.Webb) hulls. *J Agri Food Chem.* 2003;51:496-501.