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DETERMINATION OF THE BIOACTIVE COMPONENTS OF *Abutilon indicum Linn.*

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ABSTRACT

Abutilon indicum Linn. is used in the treatment of various ailments either direct or in combination with other plants in many forms such as powder or liquid. This plant is the major source of various ayurvedic medicines, being made in ayurvedic pharmacies throughout the country. Looking the wider use of plant from the literature survey, it has been found that not much work has been carried out on this plant, so a detailed study has been undertaken for chemical investigation. For this purpose extraction, isolation and identification of medicinally valued materials has been carried out. 400 g shade dried powdered roots of *Abutilon indicum* Linn. were extracted with ethyl alcohol (95%) in a soxhlet extractor. The extract was filtered and the solvent distilled off leaving behind the extracted material. By the TLC, column separation two compounds have been separated and identified by melting points and interpretation of the peaks, matching the graphs with standards of the same compound. One compound is gallic acid in this four peaks obtained, one at 6.93 another at 8.83, 9.20 and 12.24. Another compound was β-sitosterol, from 0-7□ obtained at 0.70, 0.81, 0.84, 0.85, 0.92, 1.01, 3.52 and 5.36 by all these peaks the compound was β-sitosterol. The melting point of compound is 246-249^{o}C. The probable compound is gallic acid. The spectra matched with those of standard reference. The IR and NMR spectra supported the formation of the compounds. The melting point of compound is 135-136^{0}C. The spectra's matched well with standard references.

KEY WORDS: ***Abutilon indicum*** **Linn., soxhlet extractor, IR and NMR.**

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INTRODUCTION

DETERMINATION OF THE BIOACTIVE COMPONENTS OF Abutilon indicum Linn.

Plant metabolites such as alkaloids or terpenoids, carbohydrates, proteins, flavonoids etc. are useful for medicine theraputically[2]. The compounds that are used as medicine are physiologically active and attributes the plants and animals their therapeutic properties. The plant drugs are used as their active constituents are extracted and used as medicine. The active constituents of plants are required in the modern medicine[1]. For the study of any plant or animal drug the study of the chemical compounds are necessary. It is also a known fact that the plant and animal cells are biosynthetic laboratory and forms various type of components. The qualitative analysis of any drug comprises the study for the detection of the number of the chemical compounds present in the drug and therefore, it is considered as the preliminary chemical study. The chemical analysis comprises the study of the chemical compounds in details, starting from the isolation, purification, qualitative measures and their chemical nature including establishment of structural formulae and properties and the amount of the component present in the drug sample[3]. We must confine ourselves to the study of medicinal products only as a source of new drugs[4]. In identification, many of the tests can be used to estimate the content of the active ingredients, more sophisticated techniques, are necessary for the chromatographic and spectrometric analysis[5]. *Abutilon indicum* Linn. is used in the treatment of various ailments either direct or in combination with other plants in many forms such as powder or liquid. This plant is the major source of various ayurvedic medicines, being made in ayurvedic pharmacies throughout the country. Looking the wider use of plant from the literature survey, it has been found that not much work has been carried out on this plant, so a detailed study will be undertaken for chemical investigation. For this purpose, extraction and isolation of medicinally valued materials in different solvents and their physico-chemical study to be studied.

MATERIALS AND METHODS

(i) *Extraction*

400 g shade dried powdered roots of *Abutilon indicum* Linn. were extracted with ethyl alcohol (95%) in a soxhlet extractor. The extract was filtered and the solvent was distilled off leaving behind the extracted material. The extracted material was passed through a column which was packed with alumina to remove colouring matter and for separation the compounds. The material was subjected to separation and identification of number of components.

(ii) *Purification of components*

Root extracted material in ethanol was applied to the TLC plate with the help of capillary into the different ratio of solvents (petroleum ether and ethyl acetate). Four spots were present in the 65:35 ratio 4 cm. above from the edge of plate. Possibility of compounds may be four in number. Paper Chromatography, Thin Layer Chromatography. Each fraction were again carried out by TLC to confirm the compound in that fraction and then the each fraction washed with solvents (petroleum ether, methanol) and condensed by evaporating and distillation method to crystallization.

Experimental

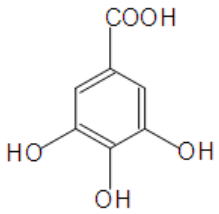
IDENTIFICATION BY SPECTROSCOPIC METHODS

Identification and characterization of purely isolated components by spectral analysis was carried out by following techniques. The spectroscopic techniques were used for this purpose are UV-Vis, IR, NMR spectroscopy[6,7]. UV-*Visible instrument used make systronics model visiscan-167showed maxima at 349, 397, 457, 435, 443*. The purified compounds were analyzed by I.R. in Perkin Elmer spectrum RX-I with specific mode i.e. KBr disc method. The NMR instrument was made up

of 300 Mhz, Bruker AC - 300 frequency, solvent as $CDCl_3$ and DMSO.

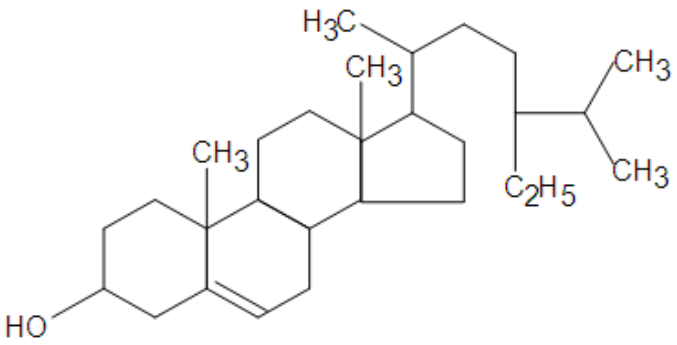
RESULTS AND DISCUSSION

The results obtain from the different fractions of compounds i.e. C–I and C–II of their IR and H^1 NMR spectra are summarized in as follows. The IR spectra of the fraction gave the idea about the functional group nature of the organic compound. From the above description two fractions were analyzed by the IR instrument and gave the peaks at different regions from 3700-600.The fraction I gave 3447, 2855, 2364,1731, 1630, 1462, 1377, 1273, 1123, 1073, 798, 743. Fraction II have given 3752, 3009, 2915, 2854, 1603, 1463, 1283, 1169, 1033, 946, 724. H^1MMR analysis of the fractions was done by the instrument, which gave five fractions the peaks at different values of □□(Delta). From the above spectral description, two compounds have been identified by interpretation of the peaks, melting points and matching the graphs with standards of the same compound. One compound is gallic acid in this four peaks obtained, one at 6.93 another at 8.83, 9.20 and 12.24. Another compound was β-sitosterol, from 0-70 obtained at 0.70, 0.81, 0.84, 0.85, 0.92, 1.01, 3.52 and 5.36 by all these peaks the compound was β-sitosterol. The compound-I and II obtained by the Column separation identified by IR and NMR spectroscopic techniques. The compounds have been identified by matching the spectra of compound with earlier reported literature. The structure of compound-II resembles with the gallic acid on the basis of infrared, ^1H NMR studies. IR spectrum in KBr shows a broad band in the region 3500-2300 cm^{-1} which could attributed to (OH) of carboxylic acid (COOH) as well as phenolic (OH) groups. A characteristic band at 1710 cm^{-1} is due to (C=O). Proton magnetic resonance spectrum shows a most intense peak at δ–6.96 ppm. Due to aromatic protons of benzene. A low intensity broad peak at 12.24 ppm is due to two OH at m-position and one OH at p-position. No splitting is observed in the spectrum as only very long range coupling is taking place between adjacent OH groups. The melting point of compound is 246-249°C. The probable compound is gallic acid. The spectra matched with those of standard reference.



Gallic acid

The compound-IV on the basis of IR spectra of compound in KBr shows bands in the 3500–1600 cm^{-1} which attribute to the –OH and CH_3 groups. It give positive liebermann-buchard test. In proton magnetic resonance spectrum this compound show, δ=0.70, δ=0.81, δ=0.85, due to CH_3 protons. δ=0.84 due to the CH_3 triplet and 0.92, doublets protons, δ=1.01 due to CH_3, 3.52 due to multiplet C_2H_5, 5.36 doublet due to OH. These data closely resemble with spectral data available in literature. Thus from the above discussion the compound is β-sitosterol. The IR and NMR spectra supported the formation of the compounds. The melting point of compound is 135-136 ^{0}C. Other compounds could not be identified by interpretation of spectra due to complex nature of molecules. The spectra were matched well with standard references[24-25].



β-Sitosterol

On the laboratory scale for the isolation of galic acid and β-sitosterol further optimization of this method is necessary to make suitable for the medicinal uses.

CONCLUSION

The plat *Abutilon indicum* Linn.is one of the important drug used in Ayurvedic system of medicine. In Bhaveprakash Nighantu the plant is used single or combination with other drugs.

As there is lot of work to do on medicinal plants research. The root of plant shows the medicinal properties for the antipyretic and used in uterine hemorrhagic discharge, leprosy, leucorrhoea and menorrhagia, toothache as on antiepileptic and in cuts and wounds. The gallic acid is works as antioxidant agent and β-Sitosterol is useful benign prostate hyperplasia (BPH) treatment.

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