

Isolation of an Alkaloid from Chloroform Extracts of *Acacia catechu* Bark

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ABSTRACT

The Medicinal Plants are widely used worldwide to cure and protect various human ailments and to boost the immune system. *Acacia catechu* Willd (AC) (Family: Fabaceae and subfamily: Mimosoideae) known as Black Cutch has a diverse pharmacological properties and has been widely used in Ayurveda. The main objective of the present study is to isolate various secondary metabolites such as alkaloids, terpenoids, flavonoids, steroids from the chloroform extracts of *Acacia catechu*. The present study involves the isolation of white crystals of an alkaloid from the chloroform extracts of bark of *Acacia catechu*.

Keywords: *Acacia catechu*, Fabaceae, Chloroform Extracts, Alkaloid.

INTRODUCTION

Ayurveda originated in India several thousand years ago. The term "Ayurveda" combines the Sanskrit words ayur (life) and Veda (science or knowledge) thus; Ayurveda means "the science of life. The botanical name of khadira is *Acacia catechu*. *Acacia catechu* is medium sized thorny deciduous tree mainly found in India and also found in deciduous forests around the world. It grows up to 13 meters in height. The foliage is softly textured; light green and oval-shaped. The Sanskrit word Khadira literally means that which alleviates the diseases and stabilizes the body. [1-3]. The chief constituents of the plant are catechin and catechutannic acid. The wood contains epicatechin, Atzelchin, catechin tetramer, dicatechin, gallochin, gossypetin, phlobatannin, kaempferol, quercetin. Catechin is biologically highly active. It is used as a haemostatic. Taxifolin an other important constituent has antibacterial, anti-fungal, antiviral, antiinflammatory and antioxidant activity [4-7]. The wood contains epicatechin, Atzelchin, catechin tetramer, dicatechin, gallochin, gossypetin, phlobatannin, kaempferol, quercitrin, quercitin [8]. *Acacia catechu* is useful as a topical agent for sore gums and mouth ulcers. The bark of *Acacia catechu* in combination with other drugs is prescribed for snake bite. *Acacia catechu* also shows hypotensive effect. The decoction of bark mixed with milk is taken to cure cold and cough. The bark is said to be effective against dysentery, diarrhoea and in healing of wounds. The seeds have been reported to have an antibacterial action [9]. The extract of *Acacia catechu* have been reported to have various pharmacological effects like immune modulatory, anti pyretic, hypoglycaemic, antidiarrhoeal, hepatoprotective activity. Heartwood is used to yield concentrated aqueous extract i.e. cutch. Cutch (extract) is astringent, cooling, and digestive. It is useful in cold and cough, ulcers, boils and eruptions of the skin, bleeding piles, uterine haemorrhages, atonic dyspepsia, chronic bronchitis etc. An antibacterial mouthwash made from the extract

treats gingivitis and mouth sores [8]. The main objective of the present study is to isolate some new compounds with therapeutic values.

II. EXPERIMENTAL

2.1 General The melting point was determined on Lab fit melting point apparatus. A UV spectrum in ethanol was obtained on SHIMADZU UV-1800 UV spectrophotometer. An IR spectrum was recorded on SHIMADZU FTIR-8400S (Fourier Transforms infrared spectrophotometer). ¹H-NMR (400MHz) and ¹³C-NMR were recorded in MeOD on Bruker, Avance 400 MHz NMR spectrometer. Chemical shifts are given as δ with TMS as internal standard. A HR-mass spectrum was recorded on Agilent, 6540, Q-TOF (HR-MS) mass spectrometer.

2.2 Collection and Identification The bark of the plant *Acacia catechu* was purchased from an authentic seed shop of Jammu District and Identified by Dr. Rajesh Manhas of University of Jammu, India.

1.3 Extraction The bark was then dried on laboratory benches at room temperature for seven days, crushed, soxhlated with chloroform to get crude extracts. The shiny white crystals were obtained after two months which were recrystallized five times with ethanol to get pure crystals.

III. RESULTS AND DISCUSSION

3.1 Spectroscopic Analysis of shiny white Crystals The crystals respond positively to Dragendroff's reagent confirming the presence of alkaloid. The molecular formula was established as C₁₁H₆O₃ by Agilent, 6540 Q-TOF (HRMS) mass spectrometer.

3.2 UV Spectral Analysis The presence of indole chromophore is supported by UV absorption peak at 273 nm as shown in Fig. 1 which is in accordance with the literature [10].

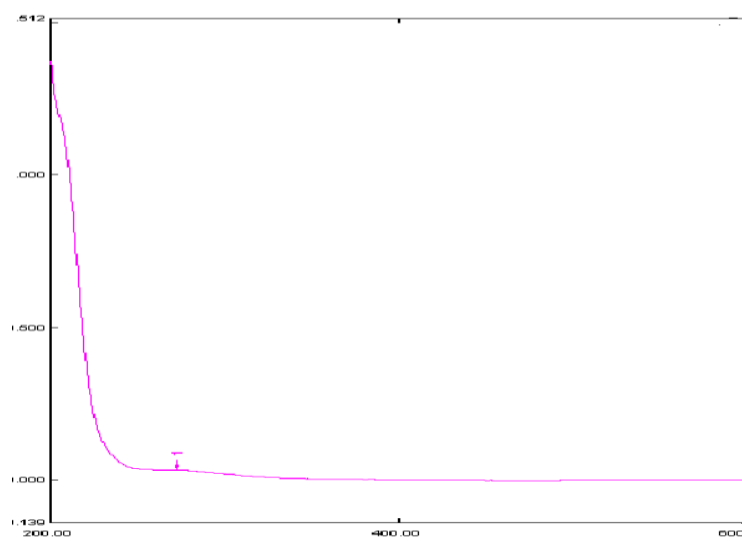


Figure 1: UV Spectra of White crystals

3.3 IR Spectral Analysis IR spectral peaks at 3450 cm^{-1} is due to the presence of NH group and at 1633 corresponds to amide moiety shown in Fig. 2.

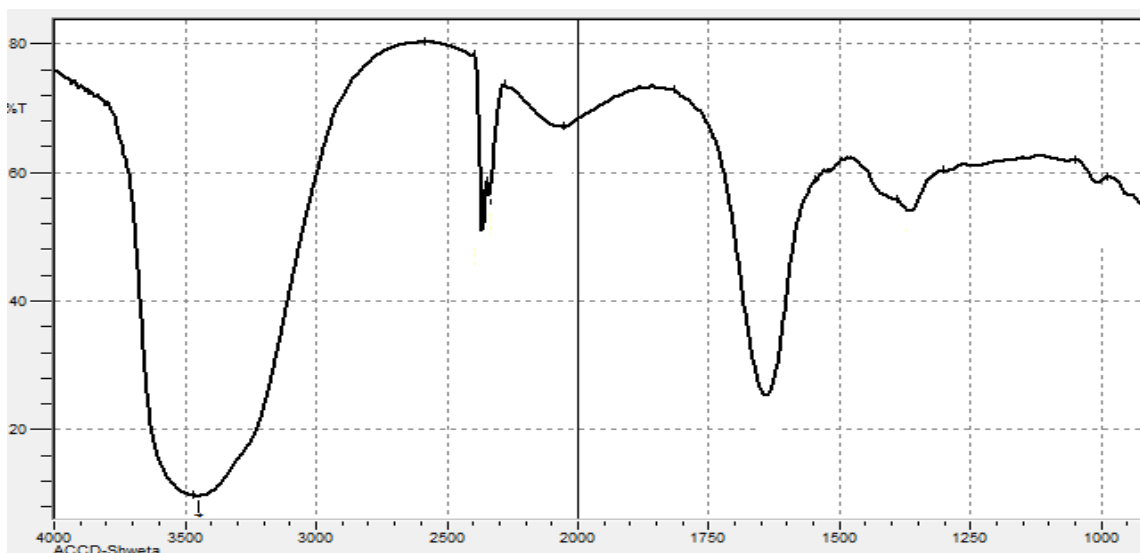


Figure 2: IR Spectra of White Crystals

3.4 ¹H-NMR Spectral Analysis The 400 MHz ¹H-NMR spectrum showed signals at δ 4.6 due to CH₂, δ 1.8 due to alpha -C=O, δ 2.6 is due to presence of OH group, at δ 8.36 is due to hydrogens at C-2 as shown in Fig. 3

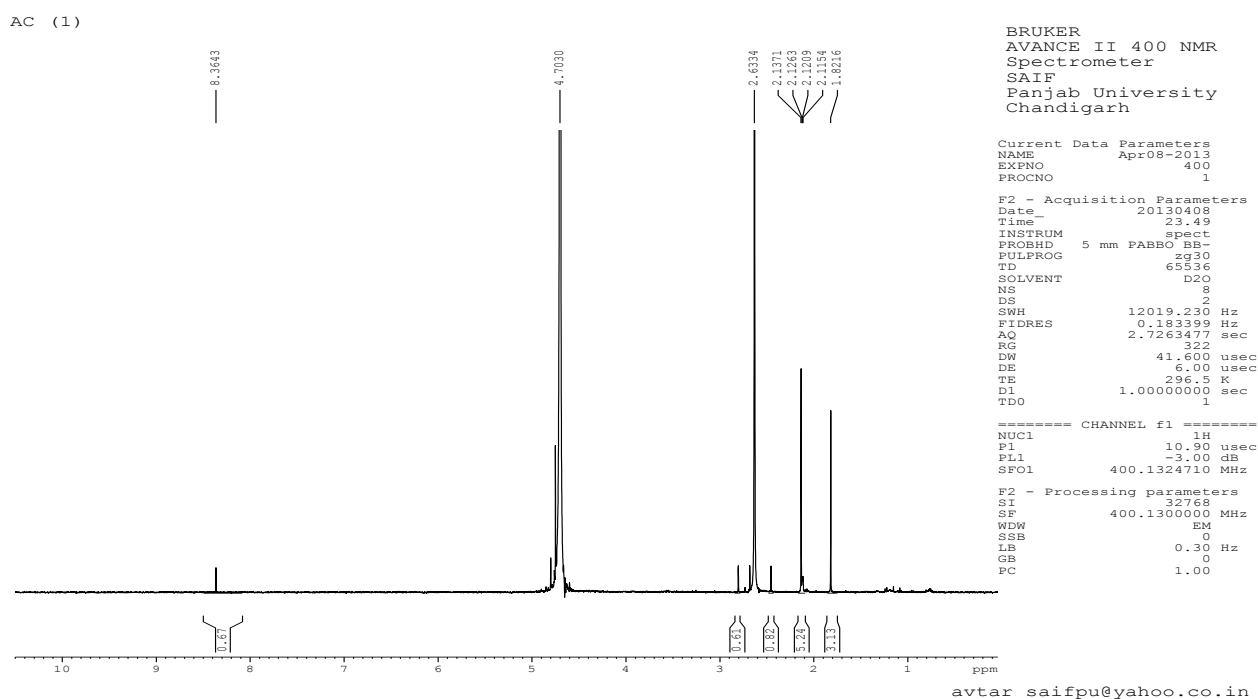


Figure 3: ¹H-NMR of White crystals

3.513C-NMR Spectrum:

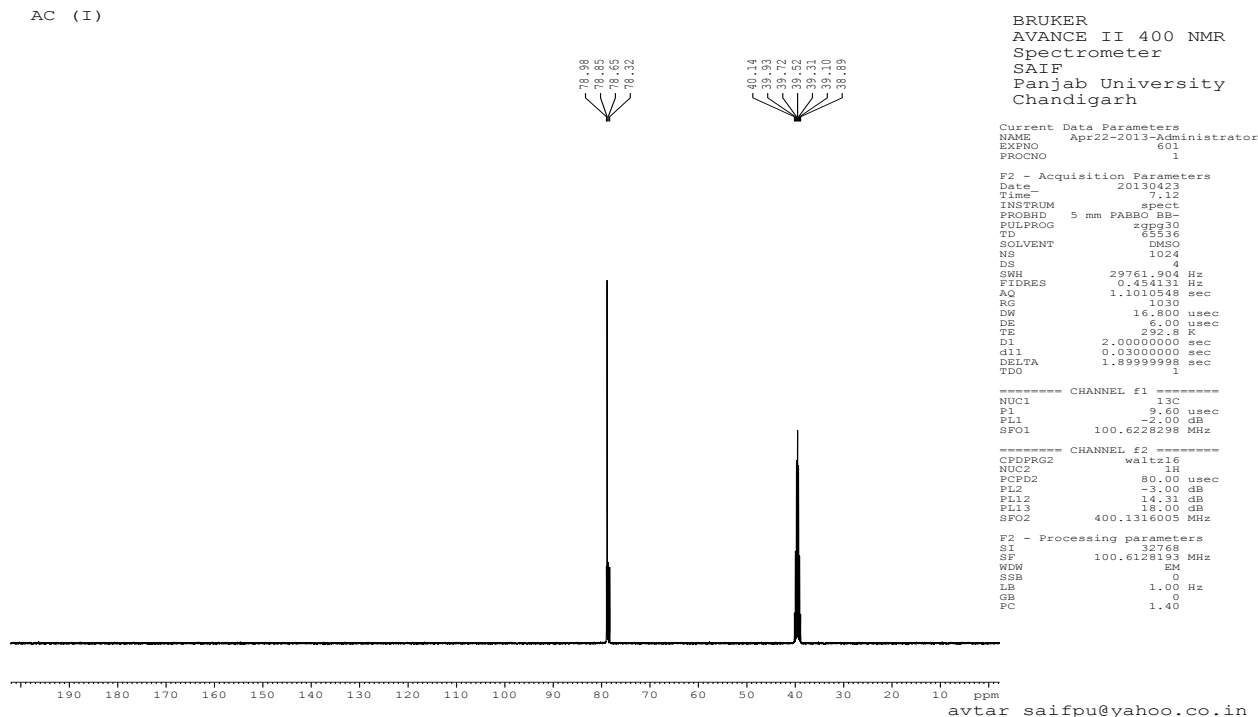


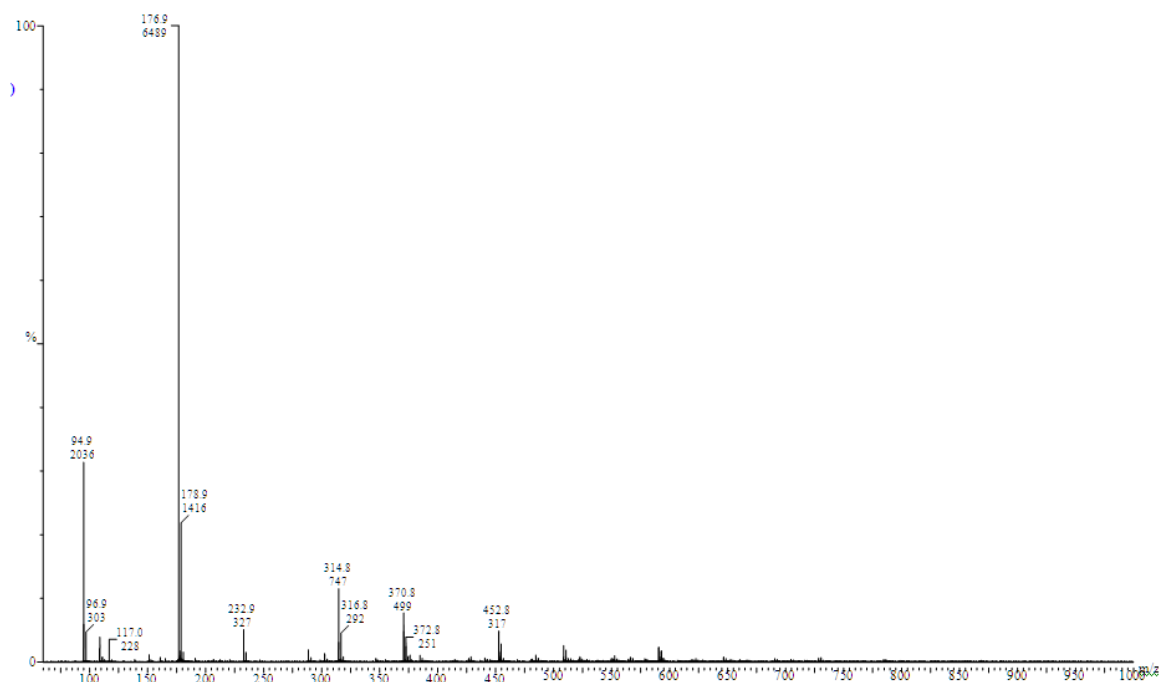
Figure 4: 13C-NMR Spectra of White crystals

3.6 Mass spectral analysis is shown in Table 1 and Fig. 5.

Table 1: Mass Spectral peaks of white crystals

S. No.	Peaks	Justification
1	176	[M+2H] ⁺
2	178	[M+4H] ⁺
3	94	[M-C ₄ H ₂ O ₂ +2H] ⁺
4	314	[Indole + 2Ca] ⁺
5	370	[2M+ H ₃ O] ⁺

Figure 5. Mass Spectra of White Crystals



IV. CONCLUSIONS

Phytochemical screening of Chloroform extracts has shown the presence of alkaloid ($C_{10}H_9NO_2$) 2-Hydroxy-1-(1H-indol-3 yl) ethanone, on the basis of above spectral analysis, that can act as a source of new useful drugs. These secondary metabolites are likely to combat many diseases and also boost the immune system. The phytochemical characterization of the extracts, the identification of responsible bioactive compounds and quality standards are necessary for future study.

V. ACKNOWLEDGEMENTS

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