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Isolation and Characterization of the Pharmaceutically Important Naturally Occurring Amine from the Stem of *Acacia Nilotica*

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Abstract: *Acacia* are established as very important plants since early times as a source of tannins gums, timber, fuel and fodder. They have pharmacological and toxicological effects. The present work deals with the isolation and characterization of pharmaceutically important naturally occurring amine from the stem of *Acacia Nilotica*. For isolation of 2-phenylethanamine the stem of *Acacia Nilotica* was procured and the stem was cut into small pieces and refluxed in methanol on a water bath. The methanol extract was concentrated in atmospheric pressure and then the dark brown viscous liquid so obtained was mixed with silica gel and subjected to column chromatography to isolate the compound. The isolated compound was characterized by using infrared spectra, ¹HNMR spectra and Mass spectra.

I. INTRODUCTION

Acacia is a large genus comprising more than 1000 species belonging to the family Leguminosae, subfamily Mimosoideae. They are distributed in the warm and drier regions of the world mainly in the tropics and subtropics and are more prevalent in Australia and Africa. *Acacias* are established as very important plant since early times as source of tannins, gums, timber, fuel and fodder. They have significant pharmacological and toxicological effects. Tannins mostly from bark, are extensively used for tanning hides and skins. Some indigenous species like *acacia sinuata* also yield saponins used traditionally as native soap for washing. Flowers of some species are fragrant. Cassie perfume is obtained from *Acacia ferruginea*. The heartwood of many *acacias* are used for making agricultural implements and also as firewood and are grown near villages for these purposes. *Acacia* gums find extensive use in medicine and confectionary and as sizing and finishing materials in the textile industry. Lac insects can be grown on several species. *Acacia nilotica* have been used for afforestation of wastelands because it can withstand some water inundation and a few such areas have become bird sanctuaries.

Acacia species are known to be rich source of flavanoids, alkaloids, terpenoids and carbohydrates etc. Chemical analysis of pods from *Acacia nilotica* wild revealed presence of carbohydrate (47.75%), protein (1.67%) and lipid (1.41%) glucose, galactose, fructose, maltose, aspartic acid, glutaric acid, glycine, alanine, proline, leucine, amine and threonine isolated from seeds (1 - 3). Many *acacia* species have important uses in traditional medicine. Most of the uses have been shown to have scientific basis, since chemical compounds found in the various species have medicinal effects. In ayurvedic medicine, *acacia nilotica* is considered a remedy that is helpful for treating premature ejaculation. A 19th century Ethiopian medical text describes a potion made from an Ethiopian species of *Acacia* mixed with the root of the tacha, then boiled, as a cure for rabies (4). An astringent medicine, called catechu or cutch, is procured from several species, but more especially from *acacia catechu*, by boiling down the wood and evaporating the solution so as to get an extract (5).

II. EXPERIMENTAL

All the chemicals used were of AR grade. The adsorbents used were silica gel (60-120 mesh) and silica gel (G).

- 1) **Extraction:** The stem of *acacia nilotica* was cut into small pieces and dried. This material was refluxed in methanol on a water bath. The methanol extract was concentrated at atmospheric pressure which yielded a dark brown viscous liquid. It was mixed with silica gel and subjected to column chromatography. The isolated compound was further purified by preparatory TLC and was characterized by following spectroscopy techniques.
- 2) **Infrared Spectra:** Infrared spectra was recorded on (BIORAD FTS - 7) infrared spectrophotometer by using potassium bromide pellets.
- 3) **¹HNMR Spectra :** The ¹HNMR spectra of the compound was recorded in CDCl₃ on a Bruker - 300 (300 MHz) nuclear magnetic resonance spectrometer using tetramethyl silane (TMS) as internal standard at sophisticated analytical shifts are in δ , ppm scale.
- 4) **Mass Spectra:** The mass spectra of the compound was recorded on a SHIMADZU QP-5000 spectrometer.

III. RESULTS AND DISCUSSION

Acacia nilotica is widely distributed in India on road side and forests. Its compound reported to have central nervous system depressant activity.

Previous phytochemical work on the plant reported the isolation of flavan glycoside, three isomeric flavan - 3,4-diols, amines, a dihydroflavanol, flavanone, flavonal and polymeric polyphenols.

The isolation and characterization of the pharmaceutically important naturally occurring amine i.e. 2-phenylethanamine from the stem of the plant has been established as follows.

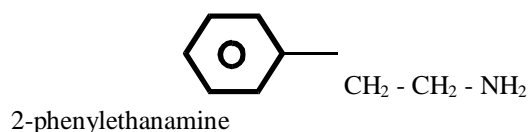
The methanol extract of powdered stem of *acacia nilotica* on chromatographic purification on silica gel column yielded an amine portion.

The compound shows three peaks in I.R. spectrum at 3400 cm^{-1} , 3060 cm^{-1} and 2960 cm^{-1} which from literature corresponds to the presence of -NH_2 group, one phenyl ring and last is due to $\text{-CH}_2\text{-}$ unsymmetrical stretching.

The ^1H NMR spectrum of the compound shows a singlet at δ -3.4 due to 2H of amino group. The two protons on C-2 produced a signal in the form of multiplet at δ 2.75 due to hydrogen of C-1. The doublet at δ 2.61 due to hydrogen of C-1. The methylene proton being adjacent to the electronegative nitrogen atom, resonant at lower field. The unsymmetrical pattern at δ 6.8 - 6.55 due to H of aromatic ring.

A base peak at m/z 30 and another peak at m/z 70 indicate the primary amine and phenyl present as the side chain.

On the basis of I.R. ^1H NMR and mass spectral data, following structure is assigned to the compound 2-phenylethanamine.



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