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ISOLATION AND CHARACTERIZATION OF THE PHARMACEUTICALLY IMPORTANT NATURALLY OCCURRING ACID 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 acid from the stem of Acacia Nilotica. For isolation of 3,4 - diamethoxy cinnamic and 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 at atmospheric pressure and then the dark brown viscous liquid so obtained was mixed with silica gel and subjected to coulmn chromatography to isolate the compound. The isolated comround was characterized by using infrared spectra, ^{1}HNMR spectra and Mass spectra.

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 ferrugenea. 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 afforestration of wastelands because it can with stand some water inundation and a few such aras 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 scientcifc 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 as to get an extract (5).

EXPERIMENTAL

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

Extraction: The stem of acacia nilotica was cut into small pieces and dried. This material was fefluxed 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 coulmn chromatography. The isolated compound was further purified by preparatory TLC and was characterized by following spectroscopy techniques.

Infrared Spectra : Infrared spectra was recorded on (BIORAD FTS - 7) infrared spectrophotometer by using potassium bromide pellets.

^{1}HNMR spectra : The ^{1}HNMR spectra of the compound was recorded in $CDCl_3$ on a Bruker - 300 (300 MHz) nuclear magnetic resonance spectrometer using tetramethyl silane (TMS) as internal standard at sophisticated analytical shifts are in , ppm scale.

Mass spectra: The mass spectra of the compound was recorded on a SHIMDZU QP-5000 spectrometer.

RESULTS AND DICUSSION

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

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

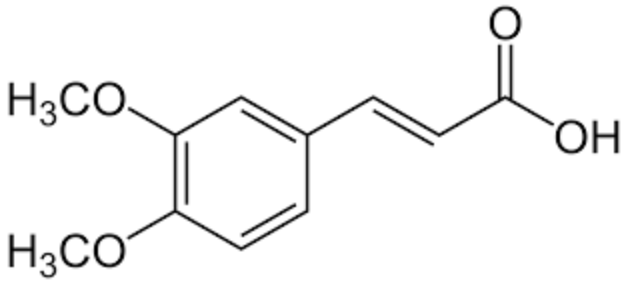
The isolation and characterization of the pharmaceutically important naturally occurring acid i.e. 3,4-dimethoxy cinnamic acid from the stem of the plant has been established as follows:

3,4-dimethoxy cinnmaic acid was obtained on elution with ethyl acetate : benzene(1:1) and crystallized from benzene. The observed melting point of the compound is 179^{0}C and the melting point according to the literature is 180^{0}C.

The IR spectrum of the compound shows peaks at 3440cm^{-1} (broad band due to presence of –OH stretching), 1682cm^{-1} due to presence of C=O group and at 1610cm^{-1} due to –C=C- stretching vibrations indicating presence of carboxy group along with a double bond.

The ^{1}HNMR spectrum of the compound in $CDCl_3$ exhibited doublet at δ6.38 and a doublet at δ7.76 (J=16Hz) due to trans coupled protons. One singlet at δ3.94 was attributed to the six methoxy protons. A doublet was shown at δ7.12 (J=2Hz) due to proton at C-2, one doublet at δ7.15 (J=7.0 Hz) was attributed to the proton at C-6, another doublet at δ7.03 (J=7.0Hz) was attributed to the proton at C-5. A prominent peak in the mass spectrum at m/z 169 confirmed the carboxylic moiety.

On the basis of ^{1}HNMR ,IR and mass spectra data following structure is assigned to the compound 3,4-dimethoxy cinnanic acid.



3,4-dimethoxy cinnamic acid

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