

Plumeridich acid (13-dehydroxy-15-O-demethyl allamandicin) isolation and characterization, on the basis of spectral studies

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Abstract: Chemical investigation of the stem bark of plumeria dichotoma afforded plumeridich acid (13-dehydroxy-15-O-demethyl allamandicin) characterization of this compound was done on the basis of spectral studies.

Index terms: family apocynaceac, exhibit antifungal, anti-inflammatory, antileukemic, antimicrobial, anti-HIV, anticancer, antifertility activities.

INTRODUCTION

Plumeria dichotoma, belongs to family apocynaceac and commonly known as Naag Champa in Santhal Pargana, Jharkhand, India. Various species of many diseases such as antipsychotic, diuretic and anti-tumor agent. A number of active principles are reported from genus plumeria. Various terpenes, iridoids, steroids, flavonoids etc. were isolated and characterized. The genus is reported to exhibit antifungal, anti-inflammatory, antileukemic, antimicrobial, anti-HIV, anticancer, antifertility activities in male rates and cytotoxic activity against Madison lung carcinoma. Terpenes are found to possess important antitumor properties.

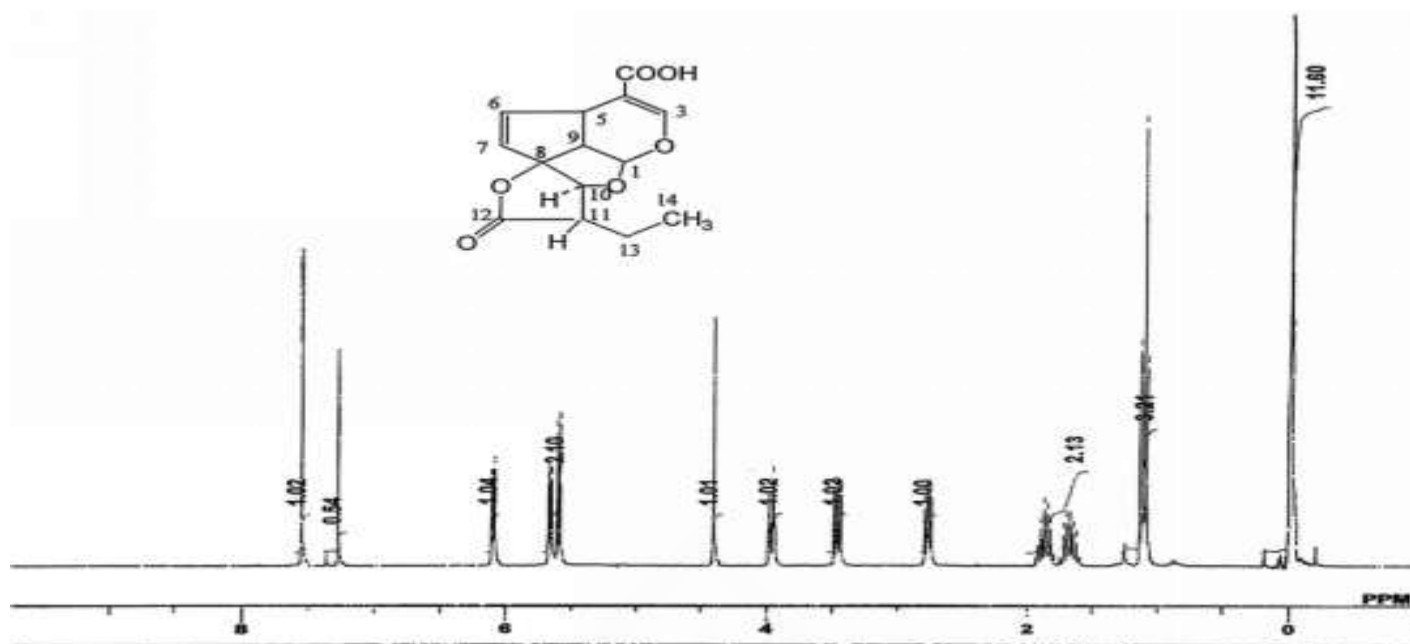
EXPERIMENTAL METHOD

Shade dried stem bark of plumeria dichotoma was powdered and extracted with ethanol, the extract was filtered hot and the solvent was removed under reduced pressure, the solvent free extract was redissolved in chloroform and then treated with acetonitrile to remove fats, the fat free chloroform soluble portion was concentrated under reduced pressure and chromatographed over silica gel. Where many compounds were isolated and characterized. Plumeridich acid is one of the important compounds present on it.

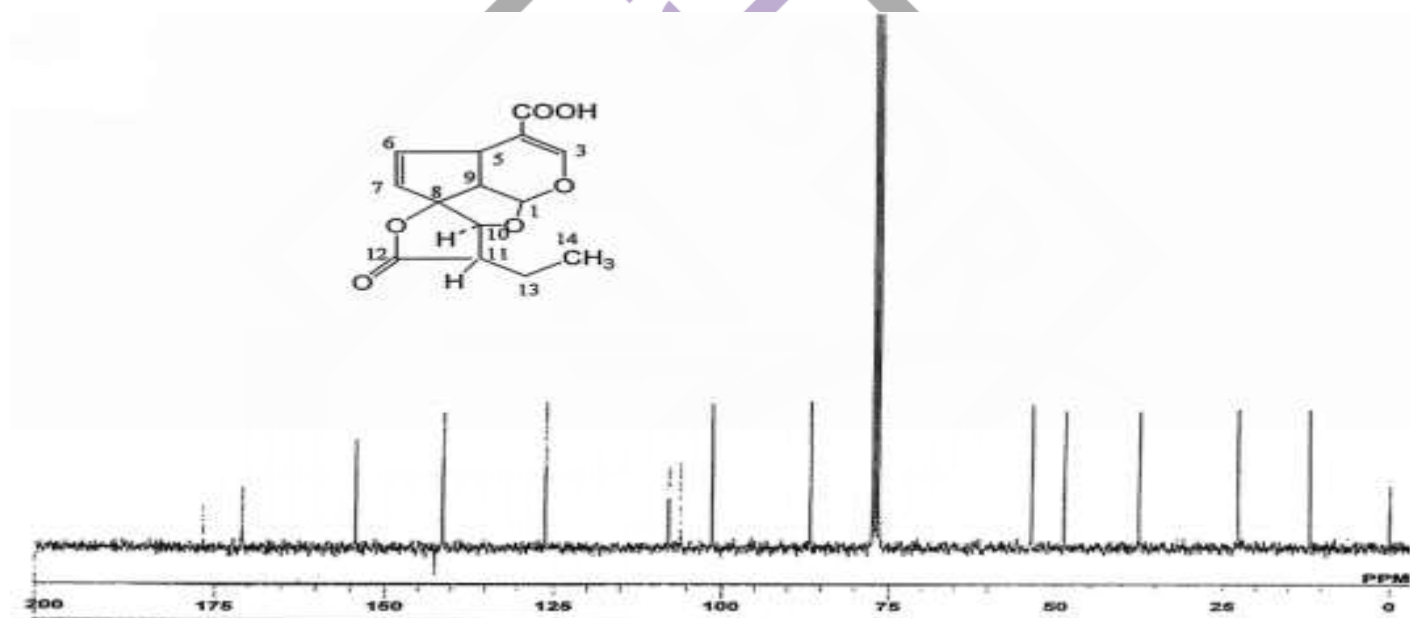
CHARACTERIZATION

The mass spectrum of compound showed molecular ion peak at m/z 278 (M^+). On the basis of 1H NMR spectrum the number of protons were calculated as fourteen and the ^{13}C NMR spectrum also showed fourteen signals for carbon atoms. Thus on the basis of these observations the molecular formula for compound was assigned as $C_{14}H_{14}O_6$.

The proton NMR spectrum (δ ppm, $CDCl_3$) of compound showed a sharp singlet at 7.54, which was accounted for one proton at C-3 position. The signals for olefinic protons were observed at 6.09 ($J=2.19$ Hz, 7.68 Hz) and 5.66 ($J=2.01$ Hz, 7.50 Hz) as double doublets and characterized for the protons present at C-6 and C-7 positions respectively. The proton attached at C-1 position was observed as a doublet at 5.59 ($J=5.85$ Hz). A sharp singlet observed at 4.41 for one proton was characterized for the proton present at C-10 position. A triple doublet and a multiplet established for one proton each of C-5 at 3.99 ($J=2.01$ Hz, 9.72 Hz) and C-9 at 3.48 respectively. A multiplet present at 2.77 confirmed the presence of one proton attached at C-11 position. The multiplets for two protons at 1.87 and 1.67 confirmed the presence of a methylene group at C-13 position in the title compound. The methyl group located at C-14 position showed a triplet at 1.11 ($J=7.50$ Hz). Thus, the presence of signals at 1.87 and 1.67 as multiplet clearly indicates the presence of ethyl group at C-11 position. Besides these values, ^{13}C NMR also confirms the presence of ethyl group by the absorptions at 22.70 and 11.92 respectively. Other absorptions in ^{13}C NMR spectrum (δ ppm, $CDCl_3$) of compound were observed at 101.50 (C-1), 154.39 (C-3), 106.17 (C-4), 37.60 (C-5), 126.22 (C-6), 141.42 (C-7), 107.87 (C-8), 53.73 (C-9), 86.76 (C-10), 48.78 (C-11), 176.72 (C-12), 22.70 (C-13), 11.92 (C-14) and their assignment was done on the basis of reported values for iridoids.

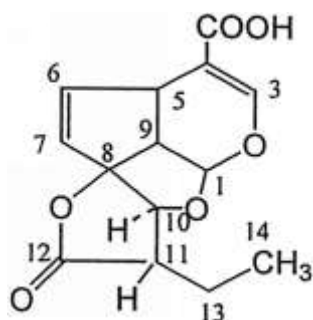


¹H NMR Spectrum of Compound



¹³C NMR Spectrum of Compound

On the basis of above discussion and spectral data compound was identified as plumeridich acid (13-dehydroxy-15-O-demethyl allamandicin). Isolation and characterization of compound is being reported for the first time.



CONCLUSION

On the basis of the characterization of plumeridich acid, it concluded that it has so many clinical uses such as antifungal, antimicrobial and cytotoxic activity against madison lung carcinoma.

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