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Characterization of Plumerone, present in the Stem Bark of Plumeria Dichotoma (Medicinal Plant), on the basis of Spectral Studies

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Abstract: ***Chemical investigation of the stem bark of plumeria dichotoma which is a medicinal plant, afforded α-amyrin, lupeol acetate plumericin and plumerone etc. All these chemicals are used as medicine and have some biological activity such as antifertility activity, antimicrobial, anticancer etc.***

Keywords: Plumerone is used as antifungal, antiflammatory, antimicrobial, anti- HIV, anticancer, algicidal, antileukemic etc. Plumerone is present in the stem bark of plumeria dichotoma belongs to family Apocynaceae and commonly known as Naag-champa. Plumerone is used as medicine for the cure of diarrhea and veneral disease

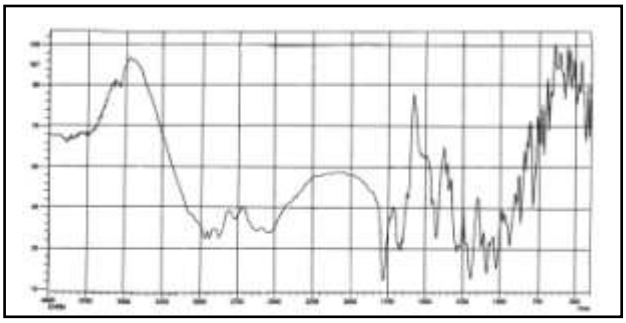
1. Introduction

Mass spectrum of compound Plumerone established molecular formula as $C_{15}H_{16}O_5$, because its M^+ peak was observed at m/z 276 and sixteen protons were appeared in ^{1}H NMR spectrum and fifteen carbons in ^{13}C NMR spectrum.

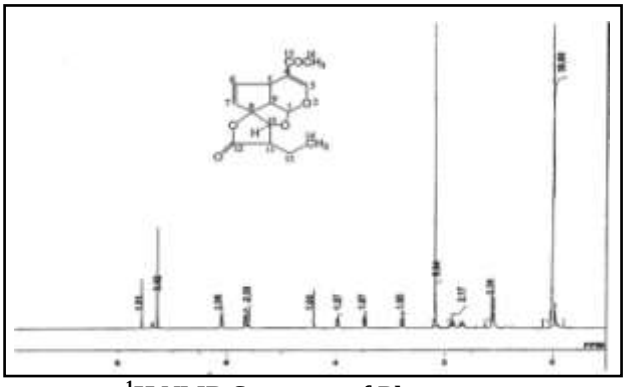
The IR spectrum (KBr, Cm^{-1}) showed characteristic absorption at 1770, which confirms the presence of >C=O stretching of acetyl group. The presence of >C=C< stretching was confirmed at 1690. The absorption at 2940 confirms at presence of C–H stretching of methyl group. The presence of ether linkage was confirmed by observing the absorption at 1190 and 1080.

In the proton NMR spectrum (δ ppm, $CDCl_3$) a singlet at 7.55 was assigned for one proton present at C–3 position. A double doublet at 6.10 a (*J*=7.50, 2.22 Hz) was established for a proton located at C–6 position. The double doublet at 5.67 (*J*=2.19 Hz) was established for an olefinic proton at C–7 position. The protons present at C–1 and C–10 positions were assigned as a doublet at 5.61 (*J*=5.85 Hz) and a singlet at 4.41 respectively. A triple doublet and a multiplet was observed at 3.98 (*J*=9.69, 2.01 Hz) and 3.47, confirmed the presence of the protons present at C–5 and C–9 respectively. The proton present at C–11 position showed a multiplet at 2.77. The three protons of acetyl group showed a singlet at 2.17. The two methylene protons at C–13 position were observed at 1.87 and 1.67 as separate multiplets. A triplet at 1.11 for three protons was assigned for the methyl group at C–14 position.

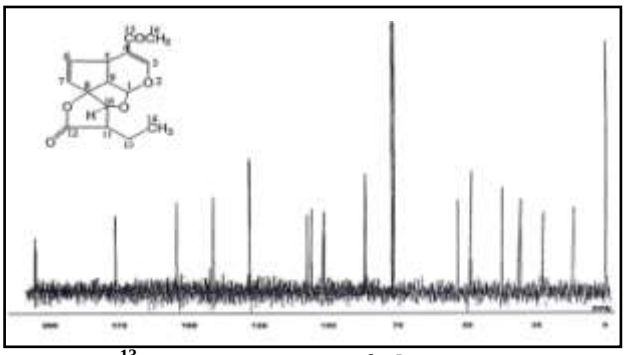
The ^{13}C NMR spectrum (δ ppm, $CDCl_3$) showed two signals at 205.41 and 30.95 were assigned for C–15 and C–16 respectively. Signals at 154.56, 106.14, 128.34 and 141.16 indicates the presence of olefinic carbon atoms i.e. C–3, C–4, C–6 and C–7 respectively. A signal at 176.67 was assigned for carbonyl carbon atom (C–12). The other signals were observed at 101.51 (C–1), 37.57 (C–5), 107.69 (C–8), 53.73 (C–9), 86.80 (C–10), 48.79 (C–11), 22.72 (C–13) and 11.92 (C–14).



IR Spectrum of Plumerone

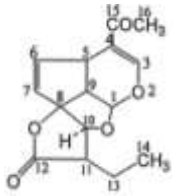


^{1}H NMR Spectrum of Plumerone



^{13}C NMR Spectrum of Plumerone

On the basis of above discussion and spectral data compound was identified as plumerone (13-dehydroxy-15-deoxy allamandicin).



Plumerone

2. Isolation

Compound Plumerone was obtained as white solid with 5% methanol in chloroform. The solvent was removed and it was crystallized from petroleum ether and benzene in the ratio of 1:3, as a while solid. It's melting point was found to be 243^{o}C and R_f=0.68 in chloroform and methanol (4.5:0.5) solvent system.

3. Conclusion

Plumerone is very useful chemical found in stem bark of Plumeria Dichotoma which is a medicinal plant and have biological activity for cure of several diseases.

References

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