

An anthraquinone derivative from the pods of *Cassia nodosa* Linn

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Abstract: Various medicinal plants of cassia genus have been reported useful for animals and human beings as a medicinal values. Cassia genus plants was taken to analyse the compounds and extraction of pods of *Cassia nodosa* was done in different solvent, i.e., hexane, benzene and ethyl acetate. The analysed compounds was purified by column-chromatography and tested by paper chromatography for homogeneity. It is tested by different colour reactions and spectroscopic methods and was found to have a compound namely 1,8-di-hydroxy-3-methyl anthraquinone (chrysophanol).

(Key words : *Cassia nodosa* pods, chromic acid oxidation, acidic hydrolysis)

Introduction

Medicinal plants of *Cassia nodosa* belongs to *Caesalpiniceae* groups. An anthraquinone derivative has been found in pods of *Cassia nodosa* Linn. Height of the plants are more than 5-8 meters. Many parts of the plants are extracted and reported in different compounds used in medicine.

Experimental

A yellowish coloured compound, m.p. 195°C has molecular formula $C_{15}H_{10}O_4$ found to be petroleum ether extract of the plant¹. It is purified by P.C. and TLC and reduced with An/HCl solution and with Zn/NaOH solution². The compound was treated with aq. KOH (in the Benzene) the alkaline aq. layer turned red and the benzene layer lost its colour. Further treated with 5N NaOH solution gave red colour which depend on heating³. The compound was treated with Zn dust and liquor ammonia it gives red colour which

faded gradually⁴. On these basis an anthroquinone derivative was further supported.

The compound was soluble in petroleum ether benzene, ethyl acetate, methanol, ethanol and acetic acid. The compound was chromatographed over silica gel 'G' using mixture of benzene: Ethyl acetate (4:1 v/v) as solvent system⁵. Its elemental analysed to observed C=71.01% H=4.02% and calculated value C=70.86%, H=3.94%. The compound was acetylated with acetic anhydride and pyridine⁶ and a heated for 1-2 hours on water bath. On cooling, the solid compound was yielded, filtered, washed and dried. The crude product was crystallised from methanol. Methylation, Estimation of methonyl group to observed 21.73% and calculated for $C_{15}H_8O_2$ 21.99%. UV spectrum of the compound was found in the visible region λ_{max}^{EtOH} 251, 256, 288, 430 nm⁷ and IR spectrum was also found in KBr disc. ν_{max}^{KBr} 3400, 1675, 1620, 1450, 1375 cm⁻¹ ⁸

Results and Discussion

The compound appeared to be an anthraquinone derivative which was further supported by the λ_{max}^{EtOH} 430 nm of UV spectrum in the visible region.

The compound on Zn dust distillation gave 2-methyl anthraquinone, mp.-207°C. The basic skeleton of the compound under investigation can be represented as 2-methyl anthraquinone. The compound when on treated with ethanolic $FeCl_3$ to gave olive green colour showing the presence of phenolic nature of hydroxyl group. On treated with ceric amm. nitrate,

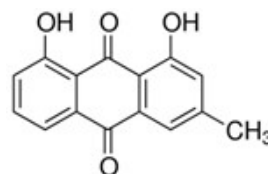
the compound failed to yield red colour, showing absence of alcoholic hydroxyl groups and it is also supported by the peak at 3400 cm^{-1} in IR spectrum.

Position of hydroxyl groups:

Mixture of ethanolic solution and compound when treated with CuSO_4 , yielded a green complex, it shows presence of hydroxyl group. UV spectrum found to be strong absorption peak 430 nm showing the presence of hydroxyl group at α -positions⁹. The compound when treated with 10% ethanolic KOH and HCONH_2 gave a deep red colour, indicates the presence of 1, 8-dihydroxy system in the molecule¹⁰, which is

confirmed by peak at 1685 and 1630 cm^{-1} ¹¹ corresponding to non-chelated in the compound.

All these experimental evidences and results show that the compound appeared to be chrysophanol which was finally confirmed by co-chromatography with authentic sample of the reference compound. Therefore the compound chrysophanol can be represented as follow:



1, 8-dihydroxy-3-methyl anthraquinone

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