

An anthroquinone derivative from seeds of *Cassia fistula* Linn.

Sanjeev Kumar and N. K. Yadava

Department of Chemistry, Magadh University, Bodh Gaya-824234

Email : kumar729sanjeev@gmail.com

Manuscript received online 26 February 2020, accepted on 06 April 2020

Abstract: Many plants of Cassia genus (Caesal piniaceae family) have been isolated and reported as a medicinal drugs (medicine) for animal and human beings. Seeds of Cassia genus fistula has been analysed and has been found that it contains an useful compound, i.e., 1,8-dihydroxy-6-methoxy-3-methyl anthraquinone (physcion).

(Key words : Chromic acid oxidation, *Cassia fistula* seeds, hydrolysis (acid).

Introduction

An anthraquinone derivative has been found in seeds of *Cassia fistula* Linn. It belongs to leguminosae family in plant kingdom. Height of the plant is 6-7 meters. Pale grey colour in developed tree and dark brown when old. 50 different parts of this plants and extracted has been reported in different compounds very useful in various types of diseases, i.e., analgesic, antiviral, antifungal.

Experimental

The air dried and crushed plant material about (2.5kg) were exhaustively extracted in a big size soxhlet extractor using different solvent such as petroleum ether, benzene and ethyl acetate successively until condensing solvent got colourless¹. The extract obtained were analysed separately.

Hexane and benzene gave β sitosterol, chrysophanol and physcion. The above extract obtained was filtered and concentrated to a 10ml volume over silica gel, it was chromatographed using different organic solvent as eluants of

increasing polarities. The eluate petroleum ether: benzene (8:2 v/v) mixture on concentrating yielded a physcion m.p. 206°C which was crystallised from ethyl acetate petroleum ether mixture². Physcion was found soluble in ethyl acetate, ethanol and methanol. It was chromatographed over silica gel G platel. The developed chromatogram was dried and exposed to ammonia vapours, a pink spot of distinct colour was obtained³. About 50g of compound was acetylated with $(\text{CH}_3\text{Cr})_2\text{O}$ 5ml and 2ml $\text{C}_5\text{H}_5\text{N}$ in 100ml round bottom flask kept for two days. The mixture poured into ice cold water and crystallised. Observed value 22.97% and calculated value 23.66% determined by Weisenberger method⁴. Methylation, Estimation chromic acid oxidation was done and UV Spectrum $\lambda_{\text{max}}^{\text{EtOH}}$ 256, 266, 288, 435 nm⁵ obtained. IR Spectrum was also found $\nu_{\text{max}}^{\text{KBr}}$ 3400, 2925, 2857, 1678, 1505 cm^{-1} .⁶

Identity of hydroxyl group :

The light yellow coloured m.p. 206°C molecular formula $\text{C}_{16}\text{H}_{12}\text{O}_5$ gave characteristic colour reactions of hydroxyl anthraquinone which was also supported by UV spectrum $\lambda_{\text{max}}^{\text{EtOH}}$ 430 nm⁷ and formation of 2-methyl anthracene as Zinc distillation product. The peaks in IR Spectrum of the compound at 2857 cm^{-1} ⁸ and 1180 cm^{-1} suggested the presence of methoxyl group and the compound was analysed for only one methoxyl group⁹.

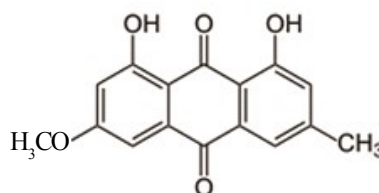
The compound formed a diacetate m.p. 188°C and a dimethyl ether m.p. 122°C which showed the presence of two hydroxyl groups it is

supported by peak at 3400 cm^{-1} ¹⁰ in IR Spectrum the ethanolic solution of compound gave specific colour reaction for 1,8-dihydroxy system which was also supported by IR peak at 688 and 1620 cm^{-1} corresponding to non-chelated and doubly chelated carboxyl group in the IR Spectrum¹¹. Single methoxyl group at 6 position has been determined by chromic acid oxidation of methyl ether of the compound. The methyl ether of the compound was 3,5-dimethyl phthalic acid¹².

Results and Discussion :

On the above procedure and results the compound was identified as physcion which was

confirmed by mixed m.p.s. of their derivatives and co-chromatographed with an authentic sample of the compound. The compound can therefore represented as below.



1,8-dihydroxy-6-methoxy-3-methyl
anthraquinone (Physcion)

References

1. P. Karrer, "Organic chemistry, 4th Edition, Nardomam New York, P. **591** (1950).
2. R.H. Thomson, "Naturally occurring quinones." *Butterworths scientific publication press*, London, P.I. (1957).
3. J. Lemli, R. Sequcker and Cuvelee, *J. Pharm, Weekrslad* **99** (19), 351 (1964).
4. A. Bloom, Briggs, L.H. & Clevery, B., *J. Chem, Soc.* 178 (1959).
5. R.D. Hill, and G.D. Meakin, *J. Chem. Sco.*, **760** (1958).
6. J.V. Bell, J. Heisler, Tanner bawn & Goldenson, *J. Anal Chem.* **25**, 1700 (1953).
7. Oray, H.A. *Anal. Chem.* **32**, 509 (1960).
8. Graebe, *Annalen*, **211**, 349 (1906).
9. Feigl, F. & Anger, V "Spot tests in organic analysis". 7th edition, Elsevier Amsterdam, P. 347-49 (1966).
10. Sanjeev Kumar, N.K. Yadava and G. Prasad *J. Chemtracks* **10**, 295 (2008).
11. Sanjeev Kumar and N.K. Yadava *J. Chemtracks* **11** (1) 195 (2009)
12. D. Ashok and P.N. Sharma, *Phyto Chemistry* **24** (II), 2673 (1985).

Abstracted / Indexed in : Chemical Abstract U.S.A.

JC-1396/2K20 (ISSN:0973-239X), INDIA

Journal Chemtracks Vol. 22 (1&2), 287-288, January to December 2020