Research Article

Bioactive Compound from Rhizome Part of *Curcuma caesia*

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ABSTRACT

The present study was carried to isolate flavonoid present in Curcuma caesia rhizome extracts using column and thin layer chromatography separation techniques. And elucidated the structure by using, UV, IR, NMR & Mass. The spectral data proved it to be 2-Ethylbenzene-1, 3-diol.

Keywords: Flavonoid, UV, IR, NMR & Mass.

INTRODUCTION

Curcuma caesia also called black turmeric or black zedoary. It is a perennial herb with bluish-black rhizome, native to North East and Central India [1] Black turmeric is sparsely found in the Papi Hills of East Godavari, West Godavari, and the Khammam districts of Andhra Pradesh. The rhizome of black zedoary has lot of economic importance owing to its putative medicinal properties. In West Bengal, the rhizome of the plant is used in Puja of Kali, and hence the plant is called Kali haldi. The cultivation and harvesting practices are similar to that of common turmeric which is used in recipes [2].

The research on the volatile rhizomes oil of *Curcuma caesia* resulted in the identification of 35 components, representing 97.48% of the oil, with camphor (28.2%), ar-turmerone (12.4%), (*Z*)-ocimene (8.5%), ar-curcumene (6.7%), 1,8-cineole (5.8%), elemene (4.7%), borneol (4.6%), bornyl acetate (3.4%) and curcumene (2.92%) as the major constituents [3].

The rhizomes are used as a rub efficient to rub the body after taking a Turkish bath. It is used in the fresh state-turmeric. The rhizomes of the herb are often used by the Baiga, Sahariya, Agariya, Gond, Korku, and for the treatment of pneumonia, cough, and cold in children, and for fever and asthma in adults [4]. The powder of rhizomes is used by tribal women as a face-pack during their engagement and marriage period. Fresh rhizomes are crushed and applied as a paste on forehead for relief from migraine or applied on the body for sprains and bruises. Apply fresh rhizome paste on snake and scorpion bites [5].The rhizomes are claimed to have a property of acting against leukoderma, epilepsy, cancer and HIV/AIDS. Apply rhizome paste on the hydrosol using betel leaves. Powdered tuber is orally administered with water in stomachache and bloating [6].

The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids, and phenolic compound [7].Therefore, the analysis of these bioactive constituents would help in determining various biological activities of plants.

MATERIALS AND METHODS

Collection of Plant Material.

The rhizomes of Curcuma were collected from Sanjivani Ayurvedic Nursery Bhopal. All the plant materials were further identified in the Department of Botany, SNGGPG College Bhopal, Madhya Pradesh, India.

Preparation of Extract

The rhizomes were cut into pieces, and air dried at room temperature. The dried rhizomes were coarsely powdered and successfully extracted with methanol using soxhlet extractor at a temperature of 55-60°C for a period of 7-8 hrs [8].The solvents was distilled off at lower temperature under reduced pressure and concentrated to dryness (crude extract). The dried extract was weighed and then stored in a freezer.

Isolation of Compound

Column chromatography was performed on a classic 20 cm long × 2 cm diameter glass column packed with 40 g Silica gel Silica gel 60 (0.06-0.2 mm, 60-120 mesh) size as stationary phase and Crude drug were further subjected to column chromatography and eluted with specific solvent OF Chloroform: Methanol: Glacial acetic acid (6: 3: 0.5) to obtain fraction and this was collected and had yield compound 5mg. The compound yielded a positive Shinoda test and alcoholic solution $FeCl_3$.

Instrumentation

IR spectroscopy was performed on a PerkinElmer 1710 infrared fourier transformation spectrometer. Ultraviolet absorption spectrum was recorded on a PerkinElmer Lambda Bio 20 UV spectrometer. NMR spectra were recorded on a Bruker AVANCE DRX300. Chemical shifts are shown in δ values (ppm) with tetramethylsilane (TMS)

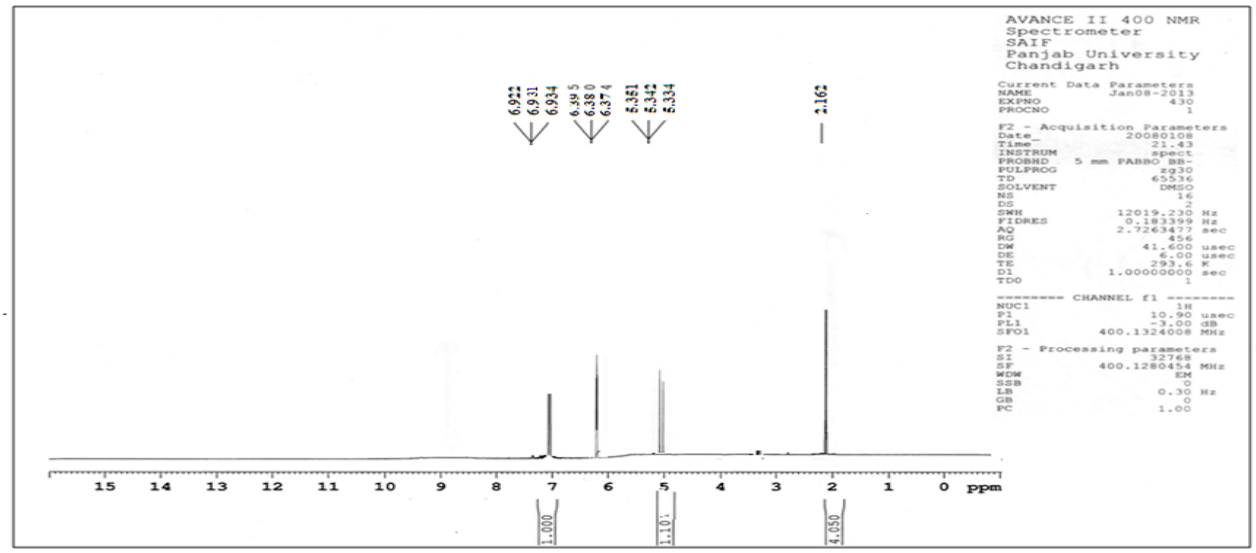
as an internal reference. Column chromatography was performed using silica gel (ASTM, Scharlu)

RESULT AND DISCUSSION

The observed U.V Spectra of Isolated Compound Showed two peak in 288nm and 330.0 nm, The absorption peak in First band is 270-290 and second peak is 320-335 nm, data suggested that the compound can be catachol.

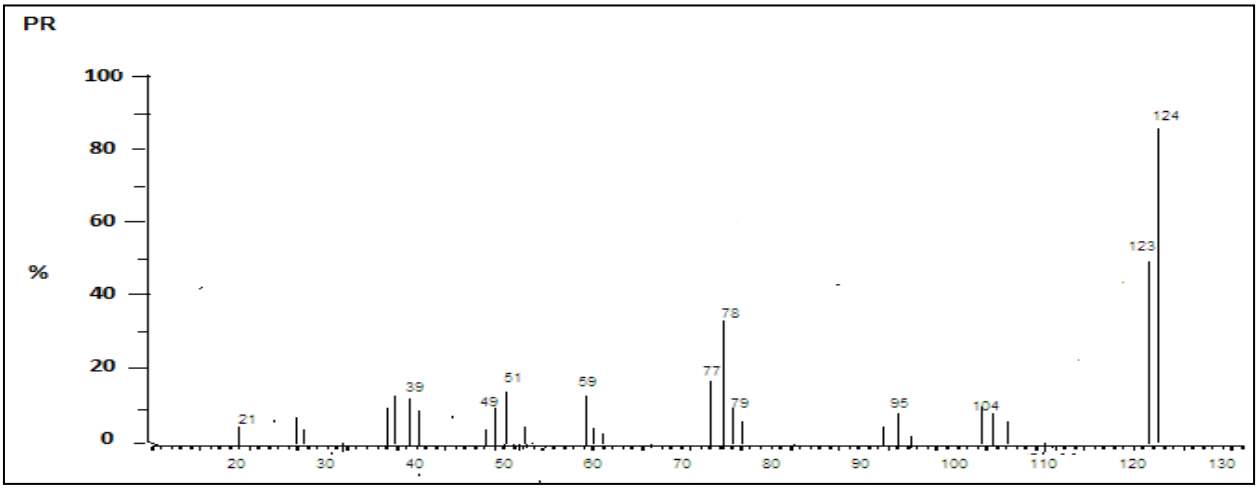
IR spectra of fraction shows the broad peak at 3474.78 cm-1 was due to –OH stretching, peaks at 2927.91 cm-1, 2855.77 cm-1 revealed aliphatic stretching in a compound, 1636.99 cm-1 shows presence of double bond (characteristic ring stretching) and 724.57 cm-1 due to Out of plan bending of aromatic stretching.

The NMR spectra graph:1 showed that presence of various singlet and multiplet at 2.16[3H,s,CH_3],5.35 [2H,m,H-3,1], 6.39 [2H,m,H-6,4] and 6.92 [H,m,H-5].



Graph 1: NMR Spectra of Curcuma *caesia* extract

In mass spectrum graph: 2 showed the fragments appears at 124 (95% m/z), at 123(50%m/z) corresponds to $[C_7H_8O_2]$ + & $[C_7H_7O_2]$ +. The compound further undergo degradation & give two peak at 78(45% m/z) &77(20% m/z) corresponds to compounds $[C_6H_5]$+ & $[C_6H_4]$+.



Graph 2: Mass Spectra of Curcuma caesia extract

Thus we have successfully isolated and identified a bioactive flavonoid Compound (Fig 1) as 2-methylbenzene-1, 3-diol from the rhizome *Curcuma caesia* on the basis of these spectral data,

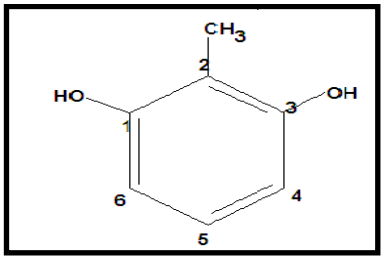


Figure 1: 2-Methylbenzene-1, 3-diol

CONCULSION

2-Methylbenzene-1,3-diol the compounds are the derivatives of phenolic acid and the past studied also revealed that the phenolic acid prevent cellular mutations and toxic to cancer cells, without showing any side effect. phenolic acid and its derivatives also have anti-viral and anti-fungal properties. It is a powerful antioxidant that helps to prevent oxidative damage. Finally, it can be used as a remote astringent, as it works to constrict tissues and stop bleeding.

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