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ISOLATION AND CHARACTERIZATION OF A FLAVONE FROM *CORDIA SINENSIS* (BORAGINACEAE)

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ABSTRACT
Information on the constituents of medicinal plants used in Sudanese ethnomedicine could provide a rationale for their traditional uses. Hence this study was designed to investigate the phenolics of the medicinally important species *Cordia sinensis* which is widely used in ethnomedicine to treat a wide array of human disorders. A Flavone was isolated from the stem bark and its structure was partially elucidated on the basis of its spectral data (UV, ^{1}HNMR and MS).

Keywords: *Cordia sinensis*, Flavone, Isolation, Characterization.

INTRODUCTION
Flavonoids are phenolic compounds widely present in plants and foods of plant origin [1-4]. Flavonoids contain fifteen carbon atoms in their basic nucleus-flavan, arranged in a C_6-C_3-C_6 configuration consisting of two aromatic rings (A and B) linked by a three carbon unit which may or may not form a third heterocyclic ring (C). There are six major subgroups: chalcones, flavones, flavonols, flavanones anthocyanins and isoflavonoids. Flavonoids encompass a large group of polyphenolic substances with marked physiological potential including: antibacterial, anti-inflammatory, antiallergic, antifungal, antimutagenic, antivirl and vasodilator effects [5-7].

The genus Cordia belongs to the family Boraginaceae with some 300 species distributed worldwide, mostly in warmer regions of the world [8]. The bark of *Cordia sinensis* is used for stomach disorders and for chest pains [9].

The plant of cordia genus posses potential therapeutic actions including: analgesic, anti-inflammatory, antimicrobial, antiviral and antifertility activities. Various bioactive compounds like flavonoids, triterpenes, tannins, alkaloids and fatty acids were investigated in the genus of cordia [8].

MATERIAL AND METHODS
Materials
Plant material
The stem bark of *Cordia sinensis* were collected from Kordofan, west Sudan in October 2018. The plant was authenticated by the direct comparison with a herbarium sample.

Instruments

The ultraviolet lamp used in visualizing paper chromatograms was a multiband UV Hanova lamp (6 watt S/Y and L/W). Ultraviolet absorption spectra were obtained in spectroscopic methanol on a Shimadzu UV-Visible Spectrophotometer. The electron impact ionization (EIMS) mass spectrum was run on a solid probe using a Shimadzu QP-class-500 Spectrometer. ^{1}HNMR spectrum was obtained on a Bruker AM 500 Spectrophotometer (Germany) operating at 500 MHz in spectroscopic grade DMSO-d6. The chemical shifts values are expressed in δ(ppm) units using (TMS) as an internal standard and the coupling constants (J) are expressed in Hertz (Hz).

Methods

Isolation of flavonoids from *Cordia sinensis*

(1Kg) Of powdered air-dried plant material was macerated with 80% aqueous methanol (5L) for 24hr. at room temperature with occasional shaking and then filtered off. The extraction process was repeated two more times with the same solvent. Combined filtrates were concentrated under reduced pressure yielding a crude product, which was suspended in 300 ml water and left overnight in a refrigerator and then filtered. The aqueous filtrate was partitioned successively with n-hexane, chloroform, ethyl acetate and n-butanol. Open column (80x4cm) was used for fractionating the n-butanol fraction. Polyamide was used as stationary phase and water/methanol (4:1; 3:2; 2:3; 1:4 ;v:v) was used as mobile phase to afford collective fractions. Fraction 1(4:1; water: methanol) was further purified by paper chromatography followed by a Sephadex column eluted with water: methanol(1:1; v:v) to yield compound I.

RESULTS AND DISCUSSION

Compound I was isolated as a pale yellow powder from *Cordia sinensis*. The structure of this isolate was partially elucidated on the basis of its spectral data (UV, ^{1}HNMR and MS). The UV spectrum of compound I gave λ_{max} (MeOH) 268, 331nm. (Fig.1). Such absorption is usually given by flavones [10,11]. The sodium acetate spectrum (Fig.1) revealed a bathochromic shift diagnostic 7-OH function 1. No detectable bathochromic shifts were observed with other shift reagents.

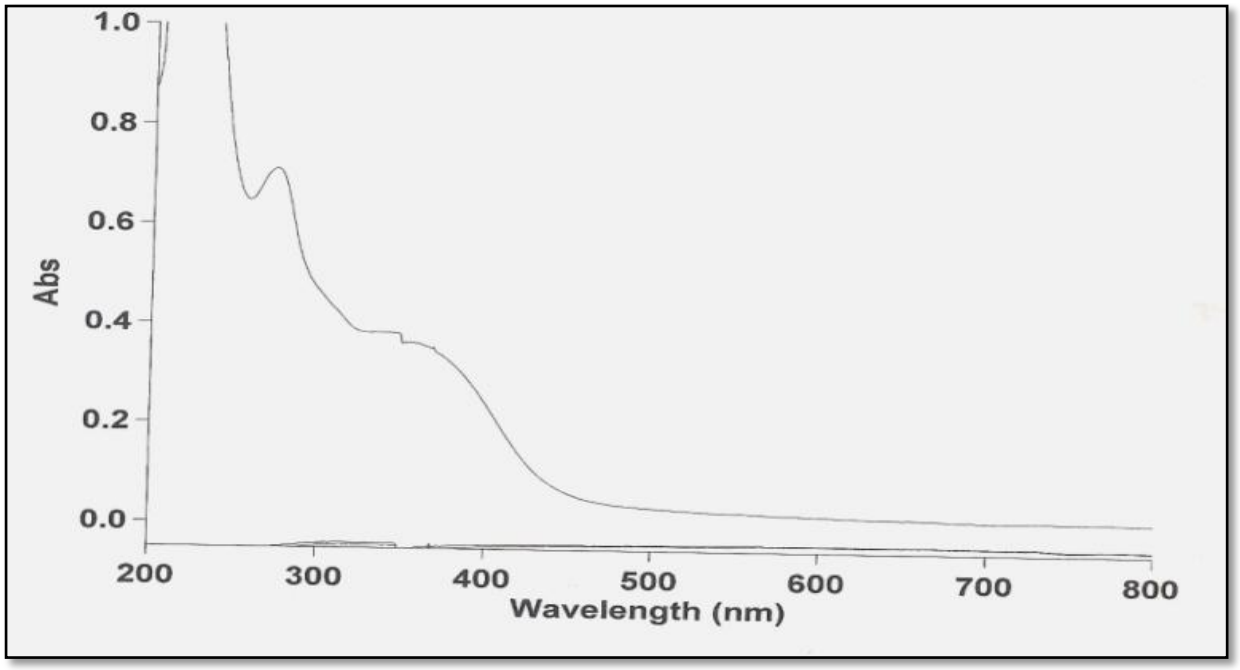


Fig.1: UV spectrum of compound I

The ^{1}HNMR spectrum (Fig. 2) showed: δ 1.35ppm assigned for a methyl group; δ 3.36 characteristic of a methoxyl function; δ3.50-4.64 assigned for sugar moiety; δ6.22 assigned for C_6-proton. Other aromatic protons appeared at δ6.47ppm, δ6.94 and 7.40(B ring) , while C_5 proton resonated as anticipated at lower field (δ7.88) due to the deshielding influence of the neighboring 4 keto function. The EI mass spectrum (Fig. 3) gave m/z283 for M^+ (aglycone).

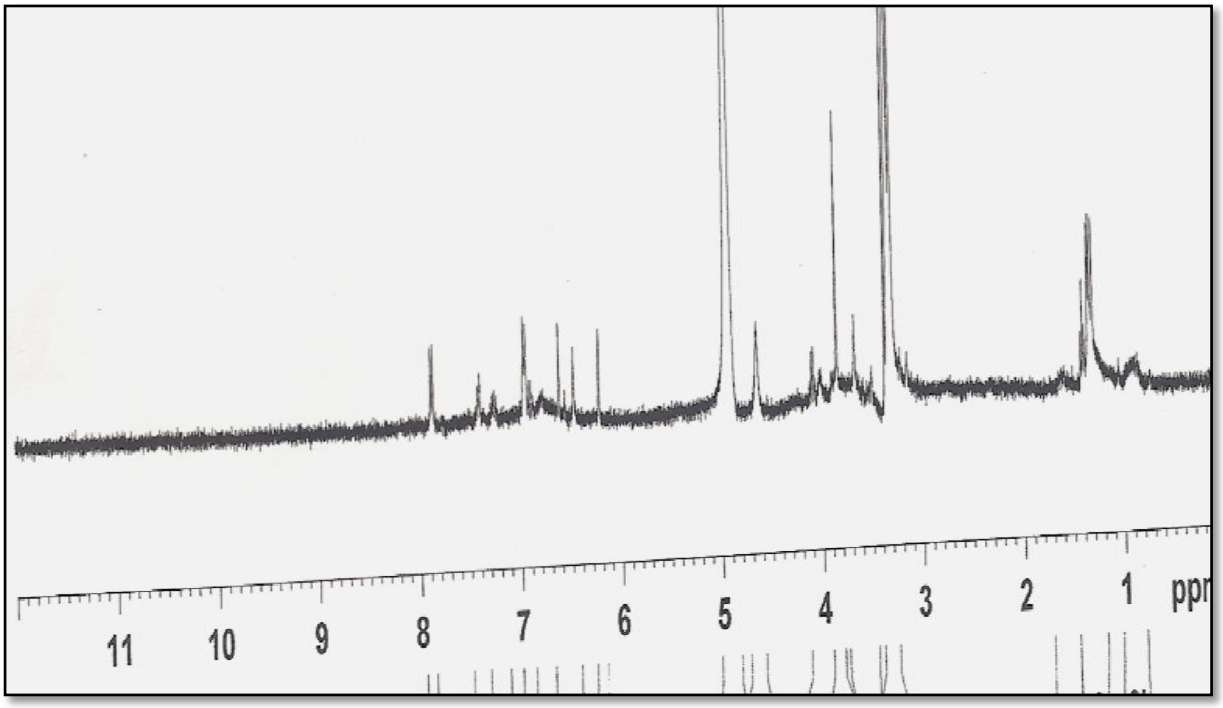


Fig. 2: ^{1}HNMR spectrum of compound I

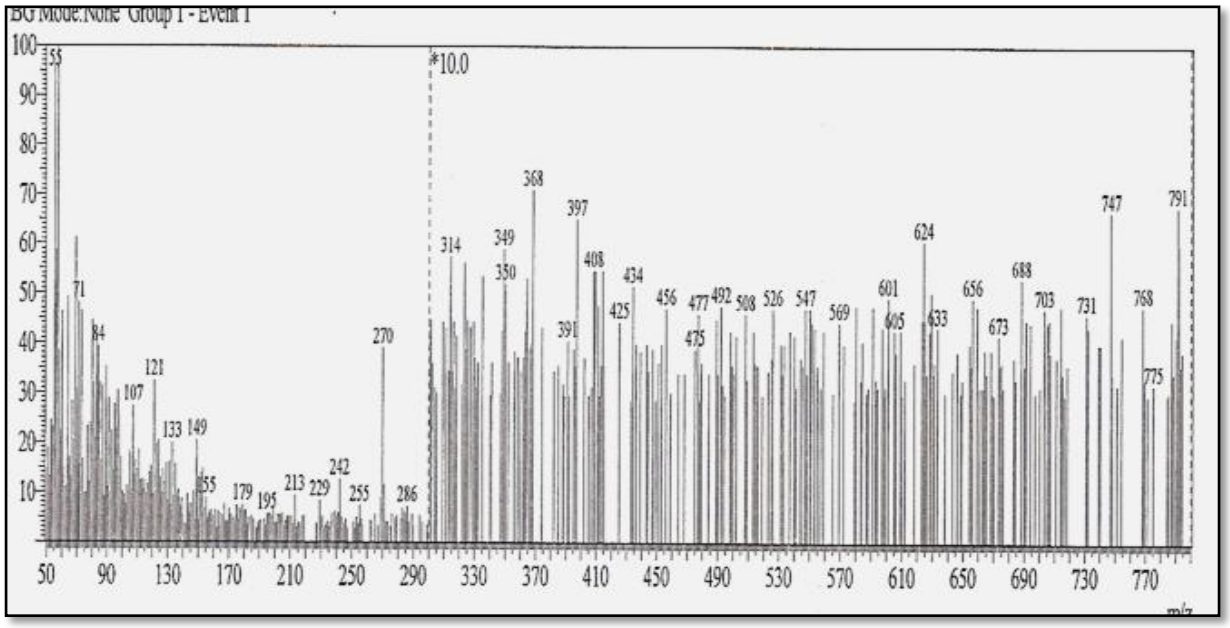
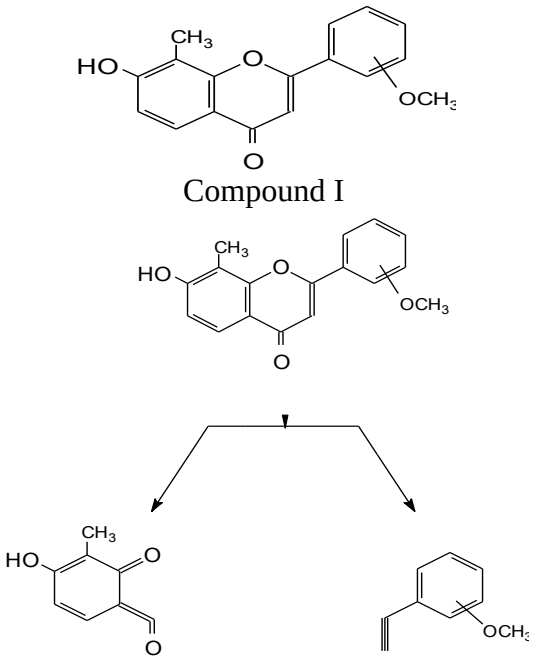


Fig.3: Mass spectrum of compound I

Two important fragments resulting from retro Diels – Alder fission and corresponding to intact A and B rings appeared at m/z151 and m/z131. This lends evidence for the following partial structure for aglycone of compound I:



Scheme. I: Retro Diels-Alder fission of compound I

CONCLUSION

Compound 1 was isolated from stem bark of *Cordia sinensis* and the pure compound was characterized by spectral analysis. .

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Markham, K.R. Techniques of Flavonoids Identification, 1982, Academic Press, London.
2. Harborne, J.B. Phytochemical Methods: A guide to Modern Techniques of Plant Analysis, Chapmaand Hall, London, 1973, pp. 1-74.
3. Nuutila, A.M., Kammiovirta, K.M., OksmanCaldentey, K.M., J. Food Chem, 2002; 76: 519.
4. Argaez, B., Flowers, B.A., Gimenez-Turba, A., Ruiz, G., Waterman, P.G., Pena-Rodriguez, L.M., J. Phytomed, 2007; 11: 214.
5. Skibola, C.F. and Smith, M.T., Free Radical Biology and Medicine, 2000; 29, 375-383.
6. Messina, M. and Messina,V., Journal of the American Dietetic Association,1991; 91: 836-840.
7. Dajas, F., Brazilian Journal of Medical and Biological Research, 2003; 36: 1613.
8. Thirupathi, K.; Kumar, S.S.; Raju, V.S.; Ravikumar, B.; Krishna, D.R.; Mohan, G.K. A review of medicinal plants of the genus *Cordia*: Their chemistry and pharmacological uses. *J. Nat. Remed.* 2008, *8*, 1-10.
9. Richard, M.M.; Callistus, K.P.O.; Nick, O.O.; Paul, O.O. Antitubercular and phytochemical investigation of methanol extracts of medicinal plants used by the Samburu community in Kenya. *Trop. J. Pharm. Res.* 2010, *9*, 379-385.
10. Anees A. S. Precise Chemistry of Natural Products and Heterocyclic Compounds. First Edition, Satish Kumar Jain. New Delhi-1110002. India (2014).
11. A.K. Pandey, Anti-staphylococcal activity of a pan-tropical aggressive and obnoxious weed Parihenium histerophorus: an in vitro study, *National Academy Science Letters*, 2007; 30(11-12), 383-386.