Journal of Medicinal Plants Research Vol. 1(3), pp. 060-062, October 2007
Available online at http://www.academicjournals.org/JMPR
ISSN 1996-0875 © 2007 Academic Journals

Short Communication

Isolation and characterization of 3, 5, 6-trihydroxy-7-octyl-5, 6-dihydro-1-naphthalene carboxylic acid from the stem methanolic extract of *Vitellaria paradox*

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Accepted 25, September 2007

The methanol extract of the stem bark of *Vitellaria paradoxa* used variously in ethno medicinal treatments in Southern and Northern parts of Nigeria was studied. A silica gel column chromatography of the methanol extract of the stem bark using chloroform eluted a whitish gummy substance which was identified purely by spectral analyses as 3, 5, 6-trihydroxy-7-octyl-5, 6-dihydro-1-naphthalene carboxylic acid.

Key words: *Vitellaria paradoxa;* 3, 5, 6-trihydroxyl-7-octyl-5, 6-dihydro-1-naphthalene carboxylic acid, chromatography.

INTRODUCTION

Vitellaria paradoxa (Sapotaceae) is a plant that is locally abundant in Nigeria in the derived Savannah zones particularly near towns and villages (Keay, 1989). The species is easily distinguished by its very long leaf stalks, more widely spaced nerves and abundant white latex when slashed and in the petiole. Shea butter is the fat extracted from the kernel of this plant (Hall *et al*., 1996). The shea butter contains high level of UV-B-absorbing triterpene esters (Wiesman *et a*l., 2003). Its anti-oxidant properties have led to its use to protect the skin from sunburn, eczema and as a skin rejuvenator (Badifu, 1989). Analysis of the kernel revealed the presence of phenolic compounds such as gallic acid, catechin, epicatechin, epicatechin gallate, gallocatechin, epigallo-catechin, epigallocatechin gallate as well as quercetin and transcinnamic acid (Steven *et al*., 2003). Various works on this plant were basically focused on the fruit, kernel, seed and the fat from the seed (Collinson and Zewdie-Bosuener, 1999; Bauer and Moll, 1942).

MATERIALS AND METHOD

The stem bark plant of the plant was collected from Zaria, Kaduna State, Nigeria in March 2005 and identified by Mallam Abdullahi Musa of the Herbarium, Department of Biological Sciences, Faculty of Science, Ahmadu Bello University, Zaria, Nigeria. The voucher specimen, number 105347 was kept in the Herbarium. The sample was air-dried, pulverized using wooden pestle and mortar and stored in polythene bags and kept away form moisture until they were ready for use.

Extraction procedure

The air-dried pulverized plant material (60 g) was packed in a soxhlet extractor. This was defatted using redistilled petroleum spirit (60 – 80^{o}C) to yield 1.3 g (2.2%) of fatty acids and their derivatives. This was then exhaustively extracted with redistilled methanol and concentrated *in vacuo* at 40^{o}C using rotary evaporator to obtain 6.3 g (10.5%) of crude methanol extract. The two crude extracts were subjected to an *in vitro* antimicrobial screening using eight clinical isolates and the methanol extract was found to be more active hence this fraction was column chromatographed on silica gel. Elution was done using chloroform to obtain a whitish gummy substance. It was further purified using silica gel preparative thin layer chromatography to obtain a compound (vpo1-7.28 mg) with R_f value of 0.75 (petroleum spirit: chloroform, 1:1).

Spectral measurements

The ^{1}Hnmr and ^{13}Cnmr spectra of this component were obtained using Bruker AMX -400 instrument using deuterioted chloroform as solvent. The results obtained are as shown in Figures 1 and 2. ^{13}Cnmr spectrum of this component had signals at; (ppm) 166.82, 150.93, 145.94, 144.27, 139.56, 134.47, 128.81, 128.01, 124.20,

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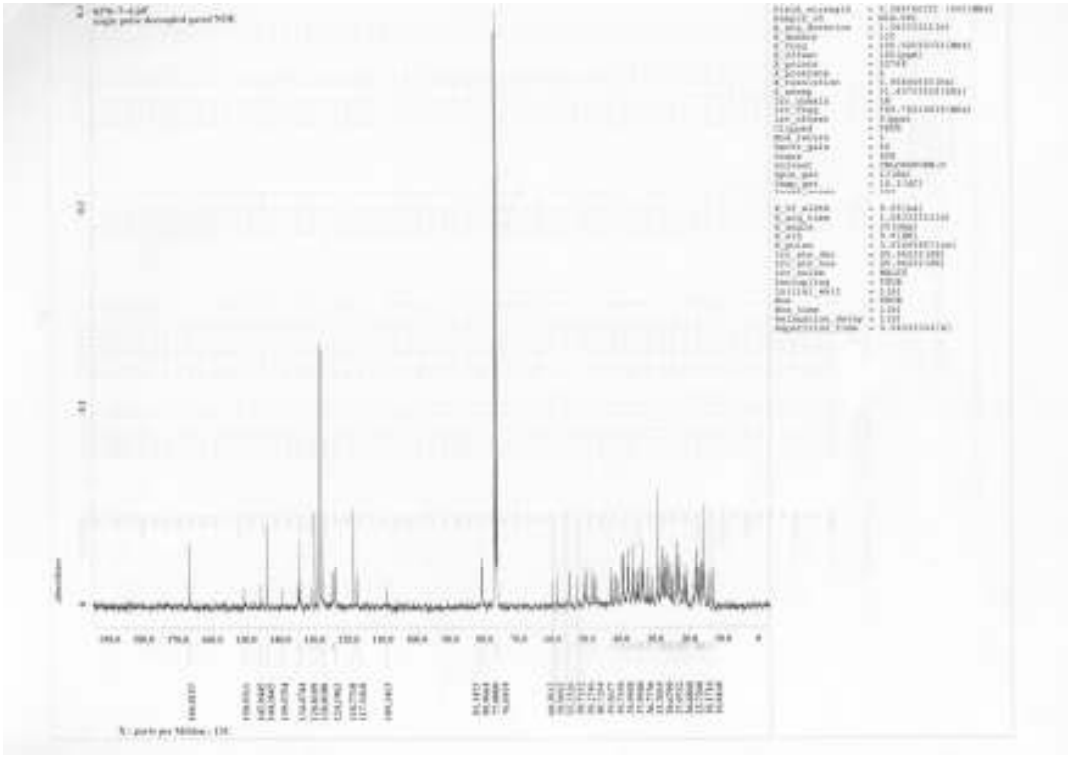

Figure 1. ^{13}C-NMR spectrum of vpol.

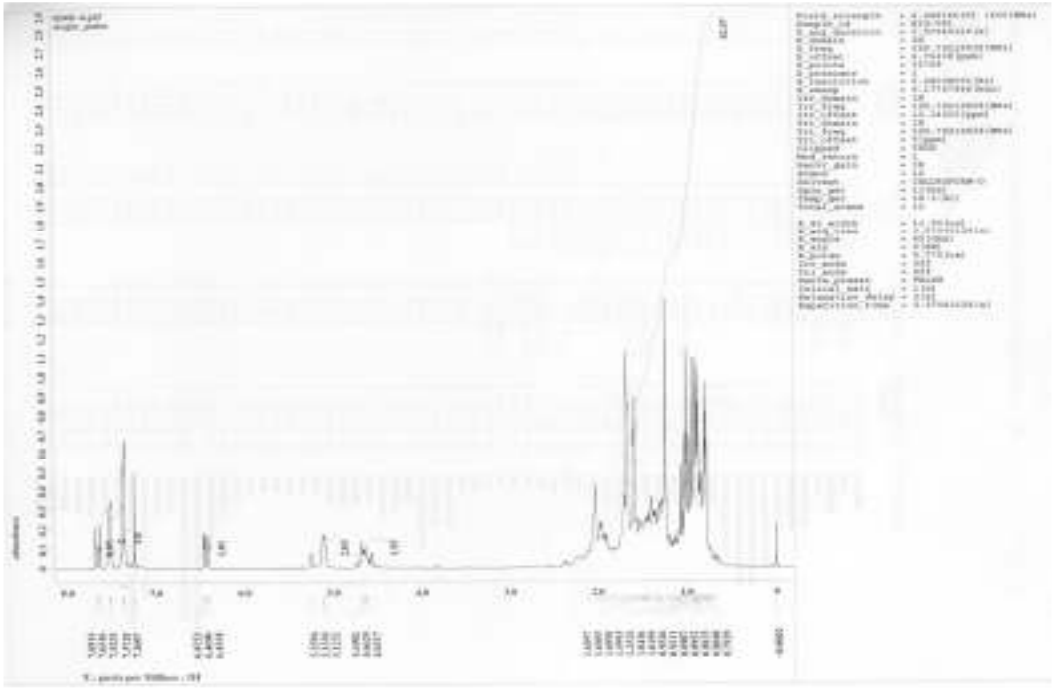

Figure 2. H^{1}-NMR spectrum of vpol.

118.78, 117.54, 109.34, 108.97, 77.00, 76.69, 60.38, 58.99, 55.23, 50.79, 50.27, 48.72, 39.97, 39.72, 39.60, 39.94, 36.77, 33.70, 29.68, 27.97, 26.69, 23.72, 18.17 and 16.02.

The ^{1}Hnmr had peaks recorded as; (ppm) 7.69 (quartet), 7.65 (triplet), 7.53 (quartet), 7.37 (doublet), 7.26 (singlet), 6.48 (quartet), 6.47 (quartet), 6.44 (quartet), 5.29 (quartet), 5.13 (quartet), 5.12 (quartet), 4.68 (singlet), 4.66 (multiplet), 4.65 (multiplet), 1.69 (multi-

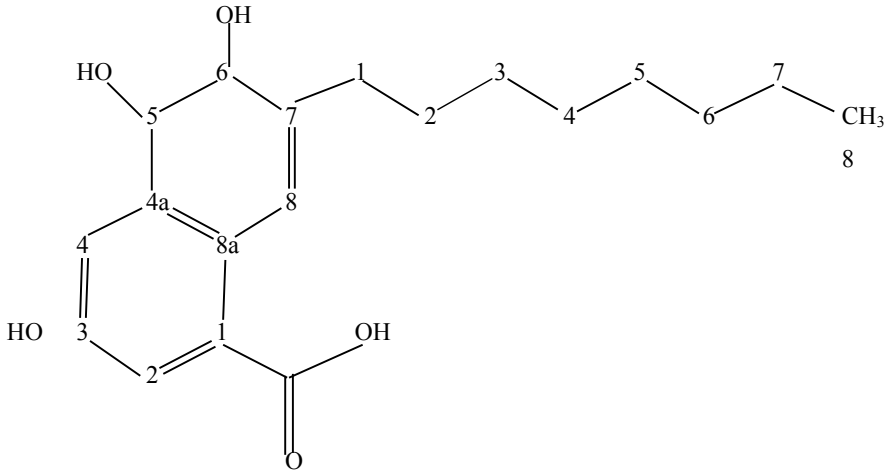

Figure 3. 3, 5, 6-trihydroxyl-7-octyl-5, 6-dihydro-1-naphthalene carboxylic acid.

tiplet), 1.61 (multiplet), 1.60 (multiplet), 1.25 (multiplet), 1.04 (multiplet), 1.02 (multiplet), 0.95 (multiplet), 0.92 (multiplet), 0.90 (multiplet), 0.88 (multiplet), 0.80 (multiplet) and 0.79 (singlet).

From the ^{13}Cnmr spectrum (Figure 1), the clusters of chemical shifts observed between 23.72- and 37.94 ppm are typical of methyllene groups which indicate the presence of linear alkyl chain(s). The singlet at 16.01 ppm is characteristic of methyl group while the signals observed to peak between 109.34- and 139.57 ppm is typical of aromatic ring carbon atoms. The peak observed at 166.82 ppm is a quaternary carbon which is typical of carbonyl carbon atom. The signal between 76.68- and 81.14 ppm may be due to the solvent ($CDCl_3$) effect.

The ^{1}Hnmr (ppm) signals at 7.69 (quartet), 7.65 (triplet), 7.52 (quartet), 7.37 (doublet) and a singlet at 7.26 are possibly from an aromatic nucleus. This indicates that this component may have a substituted benzene ring. The peaks at 1.25- (multiplet) and 0.92 ppm (multiplet) may be due to methylene and methyl protons respectively. The peak at 4.65- (multiplet) and 4.69 ppm (multiplet) are typical of undeuterioted protons in the solvent ($CDCl_3$) used.

Based on the above analyses and also on the information obtained from the advanced chemical development structural elucidator programme, this component (vpo1) was assigned a structure tentatively as 3, 5, 6-trihydroxy-7-octyl-5, 6-dihydro-1-naphthalene carboxylic acid (Figure 3). However efforts are being made to obtain more of this component so that its chemotherapeutic potentials could be fully investigated and established.

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