Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2016, 8(4):677-679

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Isolation and characterization of *β*-amyrin palmitate from fruit of *Ficus aurata* (Miq.) Miq.

Nurhamidah[a], Hazli Nurdin[b], Yunazar Manjang[b], Abdi Dharma[b] and Suryati[b]

[a]Department of Chemistry, Faculty of Education and Sciences, Bengkulu University, Bengkulu,Indonesia
[b]Department of Chemistry, Faculty of Mathematics and Sciences, Andalas University, Padang, West Sumatera, Indonesia

---

ABSTRACT

This research aimed to isolation and characterization β-amyrin palmitate (olean-12-en 3β-ol hexadecanoate) from fruit of Ficus aurata (Miq.) Miq.Separation of compounds were done by column chromatography and thin layer chromatography. The presence of this compound was reported for the first time from this medicinal plant. The structure of this compound was characterized based on spectroscopic analysis and comparison with published in the literature.

Keywords: *Ficus aurata* (Miq) Miq, fruit, *β*-amyrin palmitate

---

INTRODUCTION

*Ficus*is a genus from Moraceae family found in India, Nepal, Vietnam, Thailand, Myanmar, South China, Sumatra, Java and Taiwan [1]. 11 species of this genus are found as medicine, and *Ficus bengalensis*spesies is mostly used for the treatment of many diseases. *Ficus*genus is used as anticancer, diabetes, inflammation, allergy, stress, and others [2-8]. Leaf and fruit extracts of *Ficus aurata* (Miq.) Miq. are also potential as antioxidant [9]. 7-hydroxycoumarin, apigenin, eriodictyol, and quercetin have been isolated from stem bark and leaves of *Ficus sarmentosa* var. *Henryi* [10]. From *Ficus nervosa*leaf extract also found 8 compounds are Triterpenes: Lupenone, *β*-friedelinol, Squalene, *β*-sitosterol, Cycloeucalenol, Lupeol, *α*-amyrin dan *β*-amyrin [11].*Ficuspalmata*extract contains one new isomer from psoralenoside is trans-psoralenoside and psoralene, bergapten, vanillic acid, rutin, and germanicol acetate [12]

Based on phytochemical screening, fruit of *Ficus aurata* (Miq.) Miq. the contains triterpenoid, steroid, phenolic, flavonoid and coumarin compounds to be explored.

EXPERIMENTAL SECTION

Plant Material

Fruits werefound in Limau Manis area, Andalas University, Padang, Indonesia. This plant was identified in Herbarium of Andalas University (ANDA) of Biology Department, Andalas University, with identification number of 204/K-ID/ANDA/VI/2014. Based on identification, this plant belongs toMoraceae family with one of its species *Ficus aurata* (Miq.) Miq.

General

Column chromatography and thin layer chromatography (TLC) were performed on silica gel G60 (Merck) and overprecoated silica gel G60-F_{254} respectively. Preparative plate (20x20 cm, 0.5 mm thickness, E Merck). IR spectra were recorded on Perkin Elmer FT-IR Spectrometer, NMR spectral analysis were carried out with JEOL Delta2-NMR spectrometer at 500 MHz (^{1}H NMR, ^{13}C NMR and DEPT) in $CDCl_3$ with TMS as an internal standard.

Extraction and Isolation

Fruit powder of *Ficus aurata* (Miq.) Miq. was macerated using n-hexane for 5 replications. The extracts was filtered and evaporated using a rotary evaporator at 40^{o}C to yield n-hexane crude extract. The n-hexane crude extract (30 g) was then purified with gravity column chromatography used n-hexane 100 % and n-hexane : ethyl acetate (9.5:0.5 untul 5:5) to afford some vials. Each vial was monitored by TLC and the same pattern were combined to afford 7 fractions (F_{1-7}). Fraction F_4 was purified by column chromatography with eluents n-hexane : DCM (9:1) successively, yielded compound as white crystalline (31 mg); Rf 0.27 in n-hexane : DCM (9:1) and 0.36 in n-hexane : DCM (8:2).

RESULTS AND DISCUSSION

The isolated compound gave red color with Lieberman-Burchard reagent indicating the presence of triterpenoid. IR spectra showed wide absorptions at 2916.90 and 2850.23 cm^{-1} for C-H stretching, 1710-1740 cm^{-1} for carbonyl group (C=O), and 1174.59 cm^{-1}for C-O ester. ^{1}H-NMR spectra showed one triplet signal at δ_H 5,18 ppm (1H, t) that is suitable for H-12 olefinic signal, one triplet signal at δ_H 4.51 ppm (1H, t) for H-3 metinoksi proton signal, and 8 singlet methyl proton signals. Besides these signals, there are also proton signals from fatty acid marked at 2.29 (2H, m) 1.56 (2H, m), and 1.25 ppm (24H, m) showing 14 multiple methylene signals at H-2', H-3' and H-4'-15' successively. There is also one signal at δ_H 0.89 ppm for one multiplet methyl signal for H-16'. ^{13}C-NMR spectra designed carbon signals at δ_C 121.45 and 145.41 ppm forolefinic carbon shift for C-12 and C-13, one tertiary carbon signal at C-3 δ_C 80.78 ppm indicating alkoxy carbon signal, one quaternary carbon signal at δc 173.90 for COO fatty acid carbon signal (C-1'),δc 35.07, 25.38, 32.12, 22.89, and 14.3 ppm for C-2', C-3', C-14', C-15', and C-16' carbons. Signal at δc 29.37-29.90 ppm is assigned as $(CH_2)_{10}$carbon signal from fatty acid. Meanwhile, DEPT spectra showed 8 quaternary carbon signals, five methine carbons, 24 methylene carbon signals, and 9 methyl groups. Spectral analysis of ^{1}H-NMR, ^{13}C-NMR, and DEPT of isolated compound and literature can be seen in Table 1.

Table 1.^{1}H-NMR and ^{13}C-NMR chemical shift values (ppm) of isolated compound and from literature (in $CDCl_3$).

No.	1H-NMR compound I	13C-NMR compound I	1H NMR literature 1	13C NMR literature 1	1H-NMR literature 2	13CNMR literature 2	DEPT
1		38,45		38,2		38,2	CH2
2		23,80		23,6		23,7	CH2
	4,50				4,12		
3	(1H, t)	80,78	4,50 (1H, t)	80,6	(1H, m)	80,4	CH
4		37,96		37,8		35,1	C
5		55,46		55,3		49,2	CH
6		18,46		18,3		18,0	CH2
7		32,80		32,6		33,1	CH2
8		40,02		39,8		39,7	C
9		47,75		47,6		47,8	CH
10		37,05		37,0		36,6	C
11		23,74		23,5		20,1	CH2
	5,18				5,14		
12	(1H, t)	121,45	5,18 (1H. m)	121,7	(1H, m)	123,6	CH
13		145,41		145,2		135,1	C
14		41,93		41,7		40,1	C
15		27,11		28,4		27,9	CH2
16		26,34		26,1		26,1	CH2
17		32,69		32,5		40,1	C
18		47,44		47,2		47,1	CH
19		46,99		46,8		45,9	CH2
20		31,28		31,1		29,8	C
21		35,07		34,7		35,1	CH2
22		37,34		37,1		39,3	CH2
23	0,87(3H, s)	28,59	0,88 (3H, s)	28,0	0,70(3H, s)	28,1	CH3
24	0,86(3H, s)	16,96	0,88 (3H, s)	16,8	0,94(3H, s)	14,2	CH3
25	0,97(3H, s)	15,74	0,96 (3H, s)	15,6	0,81(3H, s)	15,2	CH3
26	0,95(3H, s)	17,01	0,97 (3H, s)	16,8	0,89(3H, s)	19,0	CH3
27	1,12(3H, s)	26,15	1,13 (3H, s)	26,0	1,02(3H, s)	25,8	CH3
28	0,87(3H, s)	28,26	0,83 (3H, s)	26,9	0,86(3H, s)	28,0	CH3
29	0,87(3H, s)	33,52	0,87 (3H, s)	33,3	0,96(3H, s)	34,2	CH3
30	0,86(3H, s)	23,89	0,87 (3H, s)	23,7	1,71(3H, s)	25,0	CH3
1'		173,90		173,7		173,2	C
2'	2,29 (2H, t)	34,93	2,29 (2H, m)	31,9	2,28 (2H,m)	34,9	CH2
3'	1,56 (2H, m)	25,38			1,54 (2H,m)	23,7	CH2
	1,25		1,25				
4'-13'	(20H, m)	29,37-29,90	[(2H)n, m]	29,1-29,6	1,17 (2H,m)	29,2-29,7	$(CH2)_{10}$
14'	1,25 (2H, m)	32,12			1,17 (2H,m)	31,9	CH2
15'	1,25 (2H, m)	22,89			1,17 (2H,m)	22,6	CH2
16'	0,89 (3H, m)	14,3	0,87 (3H, m)	14,1	0,88 (3H,m)	14,1	CH3

Based on spectral data of isolated compound and by comparing with spectral data of previously reported compound [13] literature 1 and [14] literature 2, the isolated compound is assigned as *β*-amyrinpalmitatewith molecular formula $C_{46}H_{80}O_2$. Structure of this compound can be seen in Figure 1.

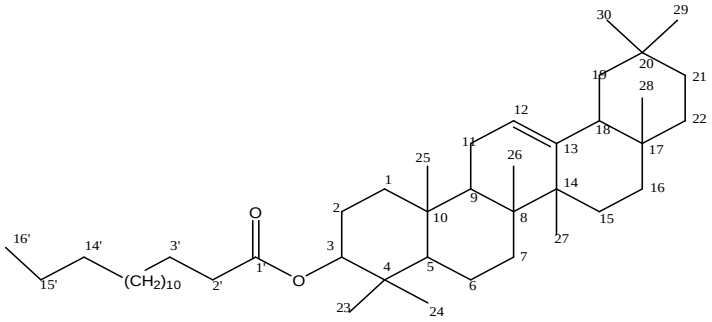

Figure 1. Structure of *β*-amyrin palmitate

CONCLUSION

Based on spectroscopy analysis (IR, ^{1}H-NMR, ^{13}C-NMR, and DEPT) and also by comparing with literature, the isolated compound was assigned as *β*-amyrin palmitate. The presence of this compound was reported for the first time in this plant.

Acknowledgements
The authors are grateful to Directorate General of Higher Education (DIKTI) for the grant through Beasiswa Pendidikan Pascasarjana Dalam Negeri (BPPDN).

REFERENCES

[1] SC Kedar;KM Kumaranag and RK Saini,*Journal of Entomology and Zoology Studies*,**2014,**2(4): 268-270.
[2] P Dhungana;P Devi and SK Borthakur,*International Journal of Pharmacy & Life Sciences*,**2013,** 4(1): 2314-2319.
[3] EK Pranuthi;K Narendra;J Swathi;KM Sowjanya;KVNR Reddi;Rev Fr S Emmanuel;SJAK Satya,*Journal of Pharmacognosy and Phytochemistry*,**2014,** 3(1): 57-61.
[4] B Josephand SJ Raj,*International Journal of Pharma and Bio Sciences*,**2010,** 1(4): 246-253.
[5] S Gautam; A Meshram;SS Bhagyawantand Srivastava,*International Journal Pharmaceutical Sciences and Research.* **2014,** 5(5): 1616-1623.
[6] N Sirisha;M Sreenivasulu;K Sangeeta; CM Chetty,*International Journal of PharmTech Research*,**2010,** 2(4): 2174-2182.
[7] J Kaur,*Journal of Pharmacognosy and Phytochemistry*,**2012,** 1(4): 105-111.
[8] N Somashekhar; NARM Nayeem,*International Journal of Universal Pharmacy and Bio Sciences.***2013,** 2(6): 558-570.
[9] Nurhamidah;H Nurdin;Y ManjangA Dharma and Suryati,*Journal of Chemical and Pharmaceutical Research.***2015**, 7(11): 270-273.
[10] W Xue-gui; W Xiao-yi; Xing-yan; S Li-tao; T Yong-qingand X Han-hong,*Agricultural Sciences in China*. **2011**, 10(9): 1402-1409.
[11] CY Ragasa;VAS Ng and CC Shen,*Journal of Chemical and Pharmaceutical Research*. **2013**, 5(12): 1070-1073.
[12] SI Alqasoumi;OA Basudan;AJ Al-Rehaily; MS Abdel-Kader, *Saudi Pharmaceutical Journal.***2014**, 22. 460-471.
[13] YC Koay; KC Wong; H Osman; IMS Eldeen and MZ Asmawi, *Rec. Nat. Prod*. **2013**, 7(1): 59-64.
[14] Khine Swe Nyunt. Isolation of Antitrypanosomal Compounds from Myanmar Medicinal Plants. Hokkaido University Collection of Scholarly and Academic Papers. Japan, **2014.**