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## RESEARCH ARTICLE

### ISOLATION AND CHARACTERIZATION OF BETULINE FROM *Asteracantha longifolia* (L.) NEES

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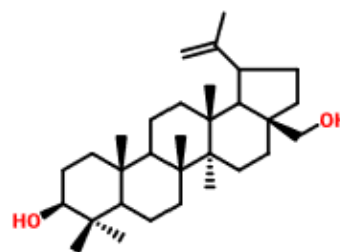
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#### ABSTRACT

*Asteracantha longifolia* (L.) Nees. belonging to the family *Acanthaceae* is known as *Talmakhana* in Unani and *Kokilasha* in Ayurveda system of medicine. It is a small, spiny weed found in most places throughout India. The plant is widely distributed in India, Srilanka, Burma and Nepal. The Plant Seeds, root and leaves are used for medicinal purpose. Many pharmacological studies have been conducted on *Asteracantha longifolia* which proved its aphrodisiac, hepatoprotective, antioxidant and analgesic activities etc. The present paper describes the isolation and characterization of a triterpenoid on the basis of chemical and spectral studies like IR, <sup>1</sup>HNMR, <sup>13</sup>CNMR and mass spectroscopy.

#### INTRODUCTION

*Asteracantha longifolia* (L.) Nees. belonging to the family *Acanthaceae* is known as *Talmakhana* in Unani and *Kokilasha* in Ayurveda system of medicine. It is a small, spiny weed found in moist places throughout India. The plant is widely distributed in India, Srilanka, Burma and Nepal (Government of India, 2007). The Plant Seeds, root and leaves are used for medicinal purpose. Seeds are aphrodisiac, semenogogue while root and leaves are diuretic in nature. *Talmakhana* is extensively used in Unani system of medicine for various ailments like oligospermia, low libido, premature ejaculation, ascites, hepatic obstructions, gonorrhoea, diseases of urogenital tract, and rheumatism etc. In Ayurveda system of medicine *Asteracantha longifolia* (L.) Nees is described as *ikshura*, *ikshugandha* and *kokilasha*, "having eyes like the Kokilaor Indian Cuckoo. The plant contains alkaloids, flavonoids, terpenoids, essential oil and phytosterols. Many pharmacological studies have been conducted on *Asteracantha longifolia* which proved its aphrodisiac, hepatoprotective, antioxidant and analgesic activities etc (Indian medicinal plants, 1995; Kabiruddin, 2010; Nadkarni, 2007; Chopra *et al.*, 1986). The present paper describes the isolation and characterization of a triterpenoid on the basis on the basis of chemical and spectral studies like IR, <sup>1</sup>HNMR, <sup>13</sup>CNMR and mass spectroscopy. The air dried powdery aerial part of the plant was extracted with hot ethanol to give a dark brownish



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Table 1. <sup>13</sup>C NMR spectral data

C	C <sub>δ</sub>	DEPT	C	C <sub>δ</sub>	DEPT
1	38.82	CH2	16	29.30	CH2
2	27.46	CH2	17	47.85	C
3	79.02	CH	18	47.85	CH
4	38.89	C	19	48.90	CH
5	55.43	C	20	150.46	C
6	18.36	CH2	21	29.89	CH2
7	34.36	CH2	22	34.01	CH2
8	41.02	C	23	28.02	CH3
9	50.52	C	24	15.35	CH3
10	37.24	C	25	16.09	CH3
11	20.92	CH2	26	16.09	CH3
12	25.36	CH2	27	14.80	CH3
13	37.43	CH2	28	60.62	CH2
14	42.80	C	29	109.63	CH2
15	27.16	CH2	30	19.13	CH3

Table 2. HNMR spectral data

Signals(δ, J in hz)	Assignments	Signals(δ, J in hz)	Assignments
0.76(3H,s)	H-23	3.20(1H,dd,9.0,6.0)	H-3α
0.83(3H,s)	H-25	3.34 (1H,d,11.0)	H-28
0.98(3H,s)	H-26	3.80(1H,d,11.0)	H-28
0.99(3H,s)	H-24	4.57(1H,bs)	H-29
1.03(3H,s)	H-27	4.69(1H,bs)	H-29
1.69(3H,s)	H-30		

semi solid mass which was fractionated into hexane soluble and insoluble fractions. The hexane soluble fraction was chromatographed over a column of silica gel. Recrystallization of crude solid obtained from hexane-benzene (1:1) eluate with methanol afforded white crystals(800 Mg), m.p.245-246<sup>o</sup> c, TLC R<sub>f</sub> 0.46 (C<sub>6</sub>H<sub>6</sub>:EtoAc,9:1), molecular formula C<sub>30</sub>H<sub>50</sub>O<sub>2</sub>,M<sup>+</sup> at m/z 442. It responded positively to LB and Noller test indicating triterpenoidal nature of the compound. IR spectrum showed the presence of hydroxyl (3404 cm<sup>-1</sup>), terminal methylene (1640 & 884 cm<sup>-1</sup>) and 3β hydroxyl groups (1030 cm<sup>-1</sup>) in the compound. Its <sup>1</sup>H and <sup>13</sup>C NMR (DEPT) spectra indicated the presence of 30 carbons (6 methyls,12 methylenes, 6 methines and 6 quaternary carbons in the molecule. Signals at δ 3.20(1H,dd),3.34(1H d),3.80(1H d) and at δ 60.62 (methylene), 79.02(methane) in <sup>1</sup>H and <sup>13</sup>C NMR indicated the presence of 3 β OH and a-CH<sub>2</sub>OH moiety

attached to a tertiary carbon. Further, signals at δ 4.57(1H, bs), 4.69(1H,bs) in former and at δ 109.63(methylene), 150.46 (quaternary carbon) in latter confirmed the presence of isopropyl unit in the molecule.

The mass spectrum of the compound showed the important ion fragments

At m/z 411(M<sup>+</sup>- CH<sub>2</sub>OH), 393(411-H<sub>2</sub>O), 219,207, 189, 138, 107, 82 and 68. These data suggested it to be Lup-20(29)-en-3β, 28-dialol (Betuline) (Shaikh Imtiyaz, 2013; Gupta *et al.*, 1983; Morris, 1986; Ngouela, 1991).

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