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A NOVEL PENTACYCLIC TRITERPENOID ISOLATED FROM *CARALLUMA ATTENUATA* ROOT

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ABSTRACT

From the root of *Caralluma attenuata* belonging to the family *Asclepiadaceae*, a novel pentacyclic triterpeniod was isolated. The structure was elucidated on the basis of spectroscopic data. This is the first report of such novel pentacyclic triterpenoid from *Caralluma attenuata* root.

KEYWORDS: *Caralluma attenuata, Asclepiadaceae,* pentacyclic triterpenoid.

INTRODUCTION

In the course of our investigation on the chemical constituents of *Carallumas* we have isolated a number of triterpenoids and flavanoids. Isolation and characterization of oxypregnane glycosides,[1,2] pregnane glycosides,[3-9] triterpene saponins,[10] flavanoids,[11] pregnane esters,[12] bisdesmosidic glycosides,[13,14] flavone glycosides[15] were earlier reported from the same genus. In this report we report the structural elucidation of a novel pentacyclic triterpenoid derivative from *Caralluma attenuata*.

EXPERIMENTAL

The plant material of *Caralluma attenuata* was collected in Tirumala forests during Nov-2009.

MPs uncorr. IR ν_{max}^{KBr}, UV λ_{max}^{EtOH}, ^{1}HNMR □ppm, 300 MHz $CDCl_3$, ^{13}C NMR □ppm, CC and TLC on silica gel.

2.1 Spectral Data

2.1.1 U.V λ_{max}^{EtOH} 281 nm

2.1.2 IR ν_{max}^{KBr} 3442.02, 2919.20, 2849.43, 1737.16, 1463.03, 1463.03, 1382.16, 1261.84, 1168.99, 1100.34, 1020.19, 801.58, 719.47 cm^{-1}

2.1.3 ^{1}HNMR δ 5.30, 4.05, 3.60, 3.59, 2.35217, 2.333, 1.63723, 1.6180, 1.5955, 1.5681, 1.3021, 1.2544, 1.20244, 1.0117, 0.89751, 0.88134, 0.86383, 0.84590, 0.80608, 0.68149, 0.07045 ppm.

2.1.4 ^{13}C NMR δ140.736, 138.322, 129.288, 121.719, 77.333, 77.017, 76.699, 71.831, 64.419, 56.879, 55.973, 51.247, 50.168, 42.270, 37.265, 34.428, 33.888, 31.927, 31.628, 29.710, 29.453, 29.368, 29.266, 29.173, 28.664, 25.948, 25.041, 24.731, 21.086, 22.694, 21.086, 19.394, 14.112 ppm

2.1.5 MASS [M^+] m/Z 413, 391, 279, 193, 177, 167, 149, 133, 105, 71, 57

2.2 Extraction and isolation

The air dried roots of *Caralluma attenuata* were powdered and extracted with n-hexane, benzene, acetone and methanol in a soxhlet extractor.

n-Hexane extract (28gms) was subjected to column chromatography using silica gel (10-40μ mesh). It is eluted with hexane:benzene 1:1 fraction yielded a white crystalline solid MP 136^{0}C (3.75mg) with Rf 0.67 (benzene as developing solvent). This was recrystallised from benzene and analysed by spectral data.

3.1 RESULTS AND DISCUSSIONS

The compound was isolated as white crystalline needles with melting point 139^{0}C and analysed for $C_{28}H_{44}O_2$ ([M+] m/z = 412).

The compound showed positive test for steroid (Libermann Burchard reaction). The IR spectrum showed bands at ν_{max}^{KBr} 3442 cm^{-1} (-OH group) and a weak band at 1600 and 1650 cm^{-1} indicating the presence of conjugated homodiene system. This is further confirmed by the presence of two olefinic proton signals at δ 5.30 and ^{13}C signals at δ129.28, 121.71, 138.3, 140.7 ppm along with UV spectrum at λ_{max}^{EtOH} 281nm.[16]

The characteristic ring protons ranging from δ0.6-δ1.8ppm indicated the presence of pentacyclic triterpenoid with olean diene skeleton.[17]

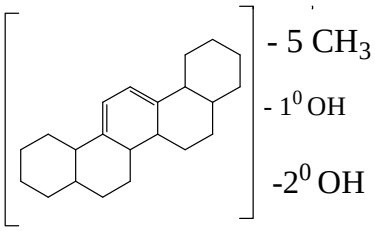
A one proton downfield signal at δ3.6 (1H,d) and 4.05 (1H,t) ppm indicated the presence of a secondary and primary hydroxyl group accounting for all oxygens in the molecule.

The ^{1}HNMR spectrum showed presence of δ 0.89775, 0.80608, 0.84590, 0.86383 and 0.8813 ppm indicated the presence of five angular methyl groups.[18]

The ^{13}C NMR values at δ 138.3, 129.2, 121.7 and 140.7 ppm supported the presence of conjugated double bond in ring C.[19]

The ^{13}C signals at δ 71.83 and 64.41 indicated the presence of secondary and primary hydroxyl group respectively. Peaks at δ 3.6 and 4.05 (t) indicated the presence of CH_2OH group.[21]

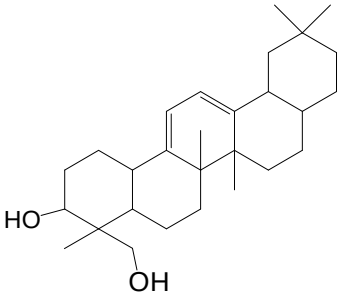
This accounts for all the carbons and oxygens in the molecular formula and the partial structure of the molecule can be assigned as



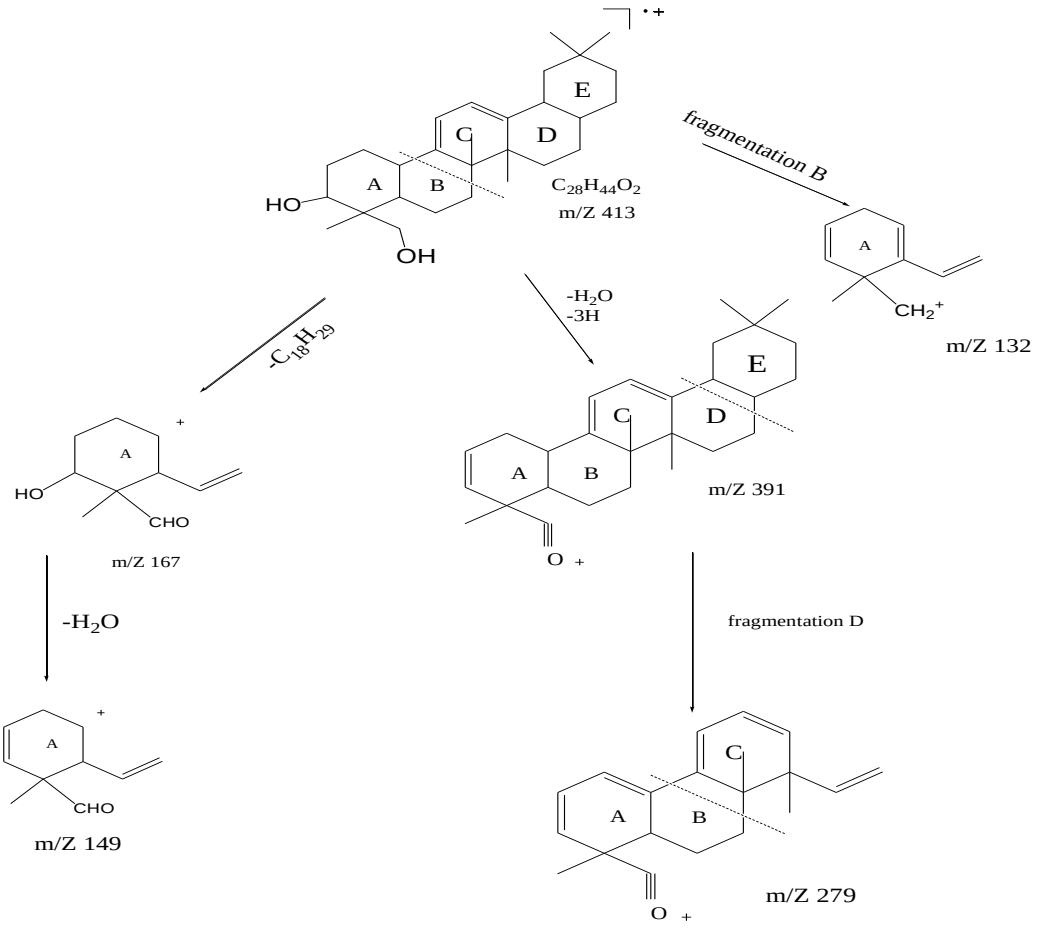
The IR frequency at ν_{max}^{KBr}, 1463-1382 indicated the presence of gem dimethyl groups which is further supported by ^{13}C values at δ 34.42 and δ 24.73 for gem dimethyl group[20].

The presence of olean type of skeleton indicates the position of angular methyl groups. All the methyls are attached to tertiary carbon atoms.

Thus, the structure of the compound is given as



This is further proved by mass spectral fragmentation as shown in the scheme-I



Thus, the triterpenoid is which is the first report from *Caralluma attenuata* and is the first of its kind. The IUPAC name of the isolated compound is 1,2,3,4,4a,5,6,6a,6b,7,8,8a,9,10,11,12,12a,14b-octadecahydro-4-(hydroxymethyl)-4,6a,6b,11,11-pentamethylpicen-3-ol

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REFERENCES

1. Abdel-Sattar, E., Al-Yahya, M.A.A., Nakamura, N., Hattori, M. Penicillosides A-C oxy-pregnane glycosides from *Caralluma penicillata* (2001) *Phytochemistry*, 57: 1213-1217.
2. Abdel-Sattar, E., Meselhy, R.M., Al-Yahya, M.A.A.New oxypregnane glycosides from *Caralluma penicillata* (2002) *Planta Med.*, 68: 430-434.
3. Ahmad, V.U., Khan,U. and Rizwani, G.H. New pregnane glycosides from *Caralluma tuber-cualata* (1988) *J.Nat. Prod* ., 51(6): 1092-1097.
4. Al-Yalhya , M.A.A ., Abdel- Sattar, E. and Guittet , E. Pregnane glycosides from *Caralluma russeliana* (2000) *J.Nat.Prod.*, 63, 1451-1453.
5. Braca.A.Badar, A., Morelli, I., Scarpato R., Turchi,G., Pizza ,C. and D-Tammasi, N. New pregnane glycosides from *Caralluma negevensis* (2002) *Tetrahedron*, 58; 5837-5842.
6. Halim, A.F. and Khalil, A.T. Pregnane glycoside from *Caralluma retrospiciens* (1996), *Phytochemistry* 42(4): 1135-1139.
7. Hayashi, K., Lida,L., Nakao,Y and Kaneko, K. Four pregnane glycosides *Boucerosides* AI, AII, BI and BII from *Boucerosia aucheriana(1988) Phytochemistry* , 27(12): 3919-3922.
8. Lin, L.J., Lin,L., G.L., R.R., Cordell,G.A., Ramesh, M.,Srilatha, B., Reddy, B.M and Appa Rao, A.V.N .Pregnane glycosides from *Caralluma umbellata* (1994) *Phytochemistry*, 35(6): 1549-1553.
9. Tanaka,T., Tsukamoto, S., and Hayashi, K., Pregnane glycosides from *Boucerosia auch-eriana* (1990) *Phytochemistry*, 29(1): 229-237.
10. Jen-Woo Jhoo., Shengmin Sang, kantle., Xiaofong cheng., NargurzhuRuth., E.Stark., Qun Yizheng, Robert T. Rosen and Chi-Tang Ho, Characterisation of the triterpene saponins of the Roots and Rhizomes of Blue Cohosh *(Caulphyllum Thalictroides)* (2001) *J.Agri. Food Chem* 40: 5969-5974.
11. Kamil, M., Jayaraj, A,F., Ahmad, F., Gunasekhar, C., Samuel, S., Chan, K.and Habibullan, M.Identification and quantification of flavanoids from *Caralluma Arabica* and their quality control studies (1999) *J.Pharm*. Pharmacol, 51: 225.
12. Khalil, A.T. Pregnane esters from *Caralluma retrospiciens(1995) Fitoterapia*, 66(3): 261-264.
13. Qiu, S.X., Lin, L.,Cordell., G.A., Ramesh,M., Ravi kumar, B., Radhakrishna, M., Krishnamohan, G., Reddy, B.M.Rao, N.Y., Srinivas, B., Thomas, N.S. and AppaRao, A.V.N. Acylated C-21 steroidal bis-desmosidic glycosides from *C*aralluma *umbellata (1997) Phytochemistry*, 46(2): 333-340.
14. Qiu, S.X., Cordell. G.A., Ramesh, M., Ravikumar, B., Radhkrishna, M., Mohan, G.K., Reddy, B.M., Rao, Y.N.Srinivas, B., Thomas,N.S and AppaRao, A.V.N .Bisdesmosidic pregnane glycosides from *Caralluma lasiantha* (1999) *Phytochemistry*, 50: 485-491.
15. Ramesh, M., NageswaraRao, Y., RamakumarKumar, M., KrishnaMohan, G.Ravikumar, Madhakumar, B., AppaRao, A.V.N., Radhakrishna, M. and Madhava Reddy, B. Flavone glycoside from three *Caralluma species (*1999) *Biochemical systematics and Ecology*, 27:, 85-86.
16. 16. Bina Shaheen Siddiqui., Sabira Begum., Salimuzzaman Siddiqui and wolf Licher .Two cytotoxic pentacyclic triterpenoids from *Nerium Oleander (1995) Phytochemistry* 39: 71-174.
17. Jin-Woo Jhoo., Shengmin Sang.Kan He., Xiafang Chen., Nanqun Zhu., Ruth E. Stark., Qun Yi Zheng., Robert T. Rosen and Chi-Tang Ho. Characterisation of the triterpene saponins of the roots and rhizomes of blue cohosh (2001) *J.Agri. FoodChem* ., 49: 12 .
18. Viana et al. Triterpenoid saponins from stem bark of *Pentaclethra macrolobe (20*04) *J.Braz.Chem.Soc*. 15(4): 597.
19. Jengshow lai and kazuo ito. Studies on the constituents of *Marsdenia formosanna Masamune* V. Isolation and structure of a New triterpenoid , *Marsformosanone* (1979), *chem. pharm.Bull*. 27(9): 2248-2251.
20. Alexandro Branco. Angelo, C.Pinto; Raimundo Braz Filho. Chemical constituents from *V*ellozia *gramninifolia (Vellozia ceae)* (2004), *Anais da Academia Brasileria de liencias*, 76(3): 1-17.
21. Rosa Martha Perez Gutierrez. Pentacyclic triterpenes from *Cirsium pascuarense* (2005) *J.Chil. Chem .Soc*., 30(3): 585-589.