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ISOLATION AND CHARACTERISATION OF 27-HYDROXYNONACOSAN-3-ONE FROM ADHATODA VASICA

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Medicinal plants are important source of synthetic and herbal drugs. In the commercial market medicinal herbs are used as raw drugs or crude extract. The extract of the aerial part of Adhatoda vasica finds application in pharmaceutical and cosmetic industries. It is well known drug in Ayurvedic and Unani system. A new hydroxyketone has been isolated from the aerial part of the Adhatoda vasica from the benzene extract. This paper describe the isolation, separation and structure determination of compound from physical and spectral data.

KEYWORDS : Medicinal plants, Adhatoda vasica, Isolation, Separation, Structure determination.

INTRODUCTION

India particularly the state of Jharkhand is endowed with a rich wealth of medicinal plants. Adhatoda vasica are reported to possess pharmacological activities for therapeutic use. Adhatoda vasica is an important source of synthetic and herbal drugs. Adhatoda vasica is one of the two Indian species of genus. It is well known for its weedicide and antihelmintic properties. It is a small evergreen subherbecious bush 1-3 meter long. It belongs to family Acanthaceae, sub-class – Asteridae and species Adhatoda. It is commonly known as Basak, Adusa, Adulsa, Baansa, Bhekkar, Vasa, Vasaka, Shwetavasa and Malabar in different languages and regions of India [1-4]. The plant is common in sub –Himalaya forest and throughout the plains of India. Adhatoda vasica is well known drug in Ayurvedic and Unani systems of medicine. Ethnomedical survey found that Adhatoda vasica is used for the treatment of over 30 common diseases. It is used in the treatment of respiratory troubles, asthama, conjunctivitis, swelling gums and painful teeth, jaundice, ulcer etc [5-8]. The root of this plant is reported to be rich source of alkaloids, vacicine, vascinone, deoxyvasicine, oscine , peganine, anisoline, quertetin and glucosil oxychalcone. Along with quinazoline alkaloids, hydroxyl ketones, aliphatic alcohols, terpenoid were isolated from Adhatoda vasica [9-11]. The yield of the alkaloid from different samples in India ranged from 0.541 to 1.105 percent on dry basis.

This paper describes the isolation and structure determination of a new hydroxyketone from benzene extract of aerial part of the Adhatoda vasica . The compound is characterised by chemical and spectral studies.

EXPERIMENTAL

Plants of Adhatoda vasica is collected from nearby village of Jamshedpur, Jharkhand and was identified by Late Dr. V.K. Singh, Department of Botany, Jamshedpur Co-operative College, Jamshedpur. The aerial part of the Adhatoda vasica were collected and dried for a month in a shed and then in oven at 30° to 40°C for 2 hours. The dried material was then subjected to size reduction to coarse powder by using grinding mills. Around 250 g of powdered material was packed in a soxhlet. This is first defatted with petroleum ether and then extracted from benzene. The benzene extract was dissolved in acetone (50 ml) and was subjected to column chromatography over silica gel (60-120 mesh). The elutes of the column were combined together on the basis of TLC results and was concentrated to dry mass. This was finally purified through thin layer chromatography using solvent n-hexane –benzene in 4:3 ratio to obtain pure compound as colourless crystalline flakes, 64°C.

RESULTS AND DISCUSSION

Melting point was determined in soft glass capillaries in an electro-thermal melting point apparatus and are uncorrected. IR spectra were recorded on Perkin Elmer 577 Spectrophotometer using KBr pellets. 1H –NMR spectra were recorded at 300 MHz in $CDCl_3$ with TMS as an internal reference on Bruker Advance 400 Nuclear Magnetic Resonance Spectrophotometer, 13 CNMR spectra were recorded at 100 MHz in $CDCl_3$ as solvent on the Bruker DRX-300 Nuclear Magnetic Resonance Spectrophotometer.

Melting point – 64°C

Colourless crystalline flakes

Elemental analysis

Found C- 79.11, H- 13.02

$C_{29}H_{58}O_2$ requires C-79.45, H-13.24

IR max(KBr) : 3601 cm^{-1} (s, OH gr), 3430 cm^{-1} (b, OH stretching intermolecular hydrogen bonding), 2919 and 2850 cm^{-1} (CH_2 stretching), 1705 cm^{-1} (CO stretching), 1467 cm^{-1} (CH_2 bending), 1379 cm^{-1} and 1353 cm^{-1} (CH bending coupled with CH wagging), 1262 cm^{-1} (OH bending), 1097 cm^{-1} and 1025 cm^{-1} (C-CO-C stretching and bending), 724 cm^{-1} (CH_2 rocking of aliphatic chain).

1HNMR ($CDCl_3$, 300 MHz) : 0.85 and 0.88 (3H, J = 9 Hz, CH_3 group), 1.30 (CHOH group), 1.56 (CH_2CO group), 1.25 (42 H, brs, $21CH_2$), 0.90 (CH_2CHOH).

13CNMR ($CDCl_3$, 100 MHz) : 9.2 (C-1), 27.2 (C-2), 21.4 (C-3), 46.6 (C- 4), 29.9 (C-5), 29.7 (C-6), 29.5(C-7), 28.8 (C-9), 28.5 (C-10), 28.4 (C-11), 28.2 (C-12), 28.0 (C-13), 27.9 (C-14), 27.7 (C-15), 27.3 (C-16), 27.1 (C-17), 27.0 (C-18), 29.2 (C-19), 29.5 (C-20), 30.3 (C-21), 30.0 (C-22), 30.2 (C-23), 30.6 (C-24), 39.0 (C-25), 39.4 (C-26), 40.2 (C-27), 73.8 (C-28) ppm.

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