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(11 S*) 6α, 1β, 7β, 11 tetramethoxy, 8β-ethoxy, 13-neoclerodan-15, 16- olide from *Scutellaria scandens*.

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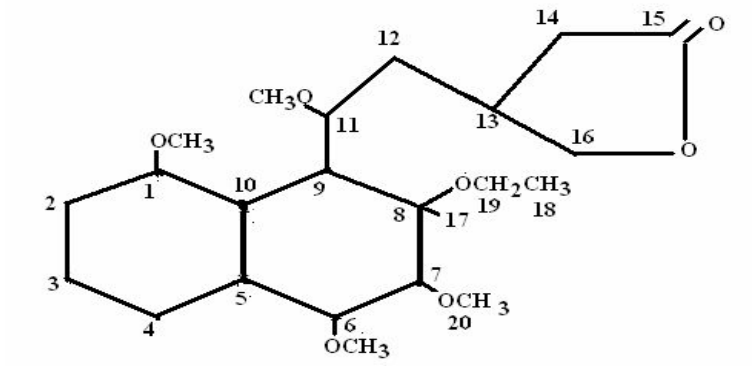
Abstract: From ethanolic extract of *Scutellaria scandens* plant a new (11 S*) 6α, 1β, 7β, 11 tetramethoxy, 8β-ethoxy, 13- neoclerodan-15, 16- olide. Terpenoid has been isolated and characterized with help of FAB mass, ^{1}H and ^{13}C NMR studies.
Keywords: Scutellaria scandens, 13- neoclerodan-15, 16- olide terpenoid. Klebsiella pneumoniae. Mycobacterium smegmatis.

Introduction

Scutellaria scandens belong to family lamiaceae perrinnial erect shrub with actual 4-angled, glabresecent or hairy branched, leaves ovate-lanceolate flower, pale-yellow or nearly white interminal. Occure in open places edges of fields and forest floor to 2500m altitude. Localy it is used in antivomating and antidisentry [1]. S.scandens [leaves] Pinosylvin-3-O-β-D-glucopyranoside and 3,5-dihydroxytras-stilibene-2-carboxylic acid. 2, 4 dihydroxy-phenylethy 6-O-sinapoly-β-D glucopyranoside and 4-methoxy carbonyl methyl phenyl 6-sinapoly[2]. S.prostrata [Root] 5-6-2'-6'-tratrahydroxy-7-8-dimethoxyflavone, 5, 6, 2' trihydroxy-7-8-6' trimethoxy, 5-7-2' trihydroxy 8-methoxy flavone, 7'-O-β-D-glucopyranoside, 2-ethyl-1-O-β-D-glucopyranoside[3]. S.indica [Root] 2" dihydroxy-7-8-6'-trimethoxy flavone, 5-2" dihydoxy-6-7-6'-trimethoxy flavonone, 5-7 dihydroxy-6-7-6' trimethoxy flavonone, 5-7-dihydroxy-8-2'-dimethylflavanone, rivularia-5-2'-trihydroxy-7-8-dimethylflavone, scutevurin-5-7-4' trihydroxy-8-methyl flavone[4]. The structure of compounds have been elucidated through. mass, ^{1}H, ^{13}C NMR spectra and their biological activities.



Experimental

General

^{1}H-NMR at (400 MHz),^{13}C-NMR at (75 MHz) TMS as internal standard, using DMSO as solvent column chromatography was carried out on silica-gel 60-120 mesh (Merck). TLC was performed on percolated silica-gel. The eluting solvent was $CHCl_3$-MeOH spots were visualized by 7% H_2SO_4 followed by heating.

Plant material

The whole plant of *Scutellaria scandens* were collected from Bacchear District. Chamoli Uttrakhand in the month of October and identified by Department Botany, P.G. College Gopeshwar where vaucher specimen was deposited.

Extraction and isolation

The air dried whole plant (3kg) was exhaustively extracted with 90% aqueous EtOH for 72 hours. The ethanol extract was concentrated to dryness. The dry ethanolic extract was chromatographic over silica-gel using Methanol Chloroform (20:80) as elution solvent which afforded the compound.

Result and discussion

Compound was Crystallized from methanol as colourless crystal. Its molecular weight calculated 428 from molecular ion peak in FABMS spectra and elemental composition showed molecular formula $C_{23}H_{40}O_7$. Fragment peaks at 413, 397, 369 etc. It give positive Lieberman- Burchard test indicated the presence of terpenoid.

^{1}H NMR spectrum of compound showed 18 proton signals. Signals for methylene protons as double doublet at 4.90 [J=3.6, 5.2 Hz] indicate oxygen bearing methylene proton assigned for H-16 and other double doublet at δ 4.05 [J=4.4, 4.4 Hz] was assigned for H-14, presence of two triplet at δ 4.60[J=5.6Hz] and 1.51[J=7.0Hz] was assigned for H-12 and H-4, presence of two multiplite at δ 2.68 and 2.38for H-2 and H-3, a multiplite at δ 3.60 for ethoxy methylene proton H-19. Signals for ethoxy methine proton two doublets at δ 4.44 [J=4.4Hz] and δ 4.33[J=5.2Hz] for H-7 and H-6 and two multiplite signals at δ 3.10 and 2.90 for H-11 and H-1, signals for three other methine two triplets at δ 2.30[J=7.4Hz] and 2.2[J=2.4Hz] for H-9 and H-10, doublet at δ 3.75[J=2.4Hz] for H-13, multiplite at δ 3.46 for H-5 a sharp singlet at δ 1.23 for methyl proton H-17 and sharp singlet at δ 3.30 for methoxy group H-20, triplet at δ 0.85 [J=6.8Hz] for ethoxy methyl H-18. These values were confirmed by ^{13}C NMR spectrum. Which display 20 carbon signals in which seven methylene corbon signals, eighy methine carbon signals, three methyl carbon signals, one quaternary and one carbonyl carbon signals. A highly downfield signal C-15 at δ 174.08 for carbonyl carbon. The presence of upfield methyl of ethoxy C-18 at δ 13.07, one methyl groups attach at quaternary carbon C-17 at δ 28.99 and one methoxy group C-20 at δ 55.16. The presence of slighyly downfield signal for oxygen attach methylene C-16 at δ 73.90, ethoxy methylene C-19 at δ 60.19 and carbonyl attach methylene C-14 at δ 43.01, other methylene signals for C-2, C-12, C-3, C-4 at δ 36.40, 34.39, 32.00, 28.67 respectively. The presence of slightly downfield methine signals for C-7, C-9, C-1, C-11 at δ 85.41, 50.07, 80.12, 80.61 respectively, other four methine signals for C-13, C-9, C-10 and C-5 at δ 52.04, 50.07, 49.62, 48.21. The quaternary C-8 at δ 99.54 slightly downfield due to attach ethoxy group.

The Identity of compound was compared with the reported data of Neoclerodene diterpenoids isolated from Scutellaria Caerulea [5] and Scutellaria alpine [6] and hence it was identified (11 S*) 6α, 1β, 7β, 11 tetramethoxy, 8β-ethoxy, 13- neoclerodan-15, 16- olide.

Biological activity:

The compound showed positive tests for some bacterial cultures by use agar well diffusion method [7]. 1).aqueous solution of compound showed 24 positive control (Rifampcin) and 18 mm zone of inhibition against *Klebsiella pneumoniae*. 2). aqueous solution of compound showed 20 positive control (Rifampcin) and 15 mm zone of inhibition against *Mycobacterium smegmatis*.

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