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Antimicrobial activities of new (11 S*) 6α, 1β, 7β, 8β, 11 penta 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, 8β, 11 penta ethoxy-13-neoclerodan-15, 16 olide. Terpenoid has been isolated and characterized with help of FAB mass, ^{1}H, ^{13}C NMR studies.

Keywords: *Scutellaria scandens,* 13- neoclerodan-15, 16- olide terpenoid, antimicrobial activities.

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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 white crystal. Its molecular weight calculated 498 from its molecular ion peak in FABMS spectra and elemental composition showed molecular formula $C_{28}H_{50}O_7$. It give positive Lieberman Burchard test indicated the presence of Terpenoid.

^{1}H NMR spectrum of S.S.1 showed 16 protons signals. Signals for methylene protones as doublet at δ 4.90 with coupling constant of 5.6 Hz indicate a oxygen bearing methylene proton assigned for H-16, presence of double doubiets at δ 4.05 (J=4.0, 4.4 Hz) was assigned for H-14, presence of two triplet at δ 4.60 [J=5.6Hz] and 1.51 [J=6.8 Hz] were assigned for H-12 and H-4, presence of two multiplite at δ 2.68 and 2.38 for H-2 and H-3 and presence of multiplite at δ 3.35 for ethoxy methylene proton H-19. Signals for ethoxy methine proton two doublets at δ 4.44 [J=4.4Hz] and 4.33 [J=5.6Hz] for H-7 and H-6 and two multiplite signals at δ 3.10 and 2.90 for H-11 & H-1. Signals for three other methine two triplets at δ 2.30[J=7.4 Hz] and 2.2[J=1.8Hz] for H-9 and H-10, multiple at δ 3.75 for H-13. A sharp singlet at δ 1.23 for methyl proton H=17 and 20, triplet at δ 0.85[J=6.8Hz] for ethoxy methyl H-18. These values were again confirmed by ^{13}C NMR spectrum which displayed 20 carbon signals, in which seven methylene carbon signals, seven methine carbon signals, three methyl carbon signals, two quaternary and one carbonyl carbon signals. A highly downfield signal C-15 at δ 174.08 for carbonyl carbon. The presence of upfield ethoxy methyl C-18 at δ 13.07, two methyl groups attach at quaternary carbon C-17 and C-20 at δ 28.99 and 16.70. The presence of slightly 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-6, C-1, C-11 at δ 90.41, 85.00, 85.12, 85.61 respectively, other

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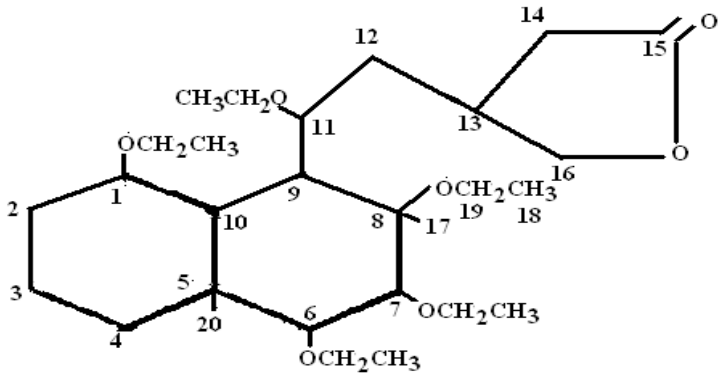
three methine signal for C-13, C-9, C-10 at δ 52.04 and 50.07, 49.62. The quaternary C-8 at δ 99.54 slightly downfield due to attach ethoxy group and at 53.21 for C-5 [table 1].

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

Table 1: ^{1}H NMR [400 MHz] and ^{13}C [75 MH$_2$] Data of Compound.

Position	δ H	J(Hz)	δ C	Multiplicity
1	2.90[m]	-	85.12	CH
2	2.68[m]	-	36.40	CH_2
3	2.38[m]	-	32.00	CH_2
4	1.51[t]	[6.8Hz]	28.67	CH_2
5	-	-	53.21	C
6	4.33[d]	[5.6Hz]	85.00	CH
7	4.44[d]	[4.4Hz]	90.41	CH
8	-	-	99.54	C
9	2.30	[7.4Hz]	50.07	CH
10	2.20	[1.8Hz]	49.62	CH
11	3.10[m]	-	85.61	CH
12	4.60[t]	[5.6Hz]	34.39	CH_2
13	3.75[m]	-	52.04	CH
14	4.05[dd]	[4.0, 4.4Hz]	43.01	CH_2
15	-	-	174.08	-COO-
16	4.90[d]	[5.6Hz]	73.90	CH_2
17	1.23[s]	-	28.99	CH_3
18	0.85[t]	[6.8Hz]	13.07	CH_3
19	3.35[m]	-	60.19	CH_2
20	1.23[s]	-	16.70	CH_3



Antimicrobial activities

The compound showed positive tests for some bacterial cultures by use agar well diffusion method [7]. 1).aqueous solution of compound showed 22 positive control (Rifampcin) and 15 mm zone of inhibition against *Klebsiella pneumoniae*. 2). aqueous solution of compound showed 18 positive control (Rifampcin) and 13 mm zone of inhibition against *Mycobacterium smegmatis*.

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