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Short Communication

Chemical Constituents from *Senecio bombayensis*

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ABSTRACT

Plants belonging to the family Asteraceae and the genus *Senecio* were reported to contain varied compounds with medicinal importance. *Senecio bombayensis,* a species of *Senecio* was not studied chemically and hence the authors have taken up for analysis. Four compounds β- sitoterol, stigmasterol, β- amyrin and betulinic acid were isolated from the chloroform extracts of the whole plant.

Key Words: *Senecio, S. bombayensis,* Asteraceae, Phytoconstituents

INTRODUCTION

Senecio is one of the important genera with about 3000 species, distributed throughout the world[1,2]. Phytochemical research on this genus indicated a great diversity of compounds ranging from terpinoids, pyrrolizidine alkaloids, glycosides, phenolic and flavonoid compounds [3-,5]. An attempt was made to screen *Senecio bombayensis* for its phytoconstituents which afforded β-sitosterol, stigmasterol, β-amyrin and betulinic acid from the chloroform extract of the whole plant.

MATERIALS AND METHODS

Column chromatography and TLC were carried out using silica gel (60-120 mesh) and silica gel G (Acme) respectively. Visualization of the TLC plates was done by spraying 5% methanolic sulphuric acid. Melting points were recorded by Boietus melting point apparatus. UV spectra were obtained on systronics UV spectrophotometer, IR spectra were recorded on BUCK scientific -500 spectrophotometer using KBr pellets. ^{1}HNMRspectra were taken on BRUKER AM 400 with TMS as an internal standard.

Collection of the plant material: The plant material was collected from Tillari Ghat of Maharashtra (Western Ghats) and the identity was established by Dr.M.Venkaiah, Department of Botany, Andhra University, Visakhapatnam.

Extraction of the plant material: Air dried powdered whole plant (2 Kg) of *Senecio bombayensis* was extracted with chloroform (3.5lt) for three hours and repeated for three times. The extract was concentrated and dried under vacuum to get a residue of 18 gms. The extract was diluted with respective solvents and screened chemically.

Preliminary phytochemical screening of the plant extract:

Phytochemical screening of the extract was performed as per the standard procedure:

1. Detection of alkaloids: Extract was dissolved in dil HCl and filtered, the filtrate is used for the tests:

a) Dragendroff's test: Filtrate was treated with Dragendroff's reagent (solution of potassium bismuth iodide). Formation of red precipitate indicates the presence of alkaloids.
b) Mayer's test: Filtrate was treated with Mayer's reagent (Potassium Mercuric iodide). Formation of a yellow coloured precipitate indicates the presence of alkaloids.
c) Wagner's test: Filtrate was treated with Wagner's reagent (Iodine in Potassium iodide). Formation of brown/ reddish precipitate indicates the presence of alkaloids.
d) Hager's test: Filtrate was treated with Hager's reagent (saturated picric acid solution). Formation of yellow coloured precipitate indicates the presence of presence of alkaloids.

2. Detection of carbohydrates: Extract was dissolved in 5ml distilled water and filtered

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and the filterate was used for the presence of carbohydrates.

a) Molisch's test: To the filterate, 2 drops of alcoholic α- naphthol solution was added in a test tube. Formation of the violet ring at the junction indicates the presence of carbohydrates.
b) Benedict's test: Filterate was treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.
c) Fehling's test: Filterate was hydrolysed with dil.HCl, neutralized with alkali and heated with Fehling's A & B solutions. Formation of red precipitate indicates the presence of reducing sugars.

3. Detection of glycosides: Extract was treated with dil. HCl, and then subjected to test for glycosides

a) Modified Borntrager's test: Extract was treated with ferric chloride solution and immersed in boiling water for about 5 minutes. The mixture was cooledand extracted with equal volume of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose-pink colour in the ammonical layer indicates the presence of anthranol glycosides.
b) Legal's test: Extracts were treated with sodium nitroprusside in pyridine and sodium hydroxide. Formation of pink to blood red colour indicates the presence of cardiac glycosides.

4. Detection of saponins:

a) Froth test: Extract was diluted with distilled water to 20ml and was taken into a graduated cylinder for 15 minutes. Formation of 1cm layer of foam indicates the presence of saponins.

5. Detection of phytosterols:

a) Salkowski's test: Extract was treated with chloroform and filtered. The filtrate was treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of yellow color indicates the presence of triterpenes.
b) Libermann-Buchard's test: Extract was treated with chloroform and filtered. The filterate was treated with few drops of acetic anhydride, boiled and cooled. Conc. Sulphuric acid was added. Formation of brown ring at the junction indicates the presence of phytosterols.

6. Detection of tannins:

a) Ferric chloride test: Extract was treated with 4 drops of ferric chloride solution. Formation of bluish balck colour indicates the presence of phenols.
b) Gelatin test: To the extract 1% gelatin solution containing sodium chloride was added. Formation of the white precipitate indicates the presence of tannins

7. Detection of Flavonoids:

a) Shinoda'stest: Extract was evaporated and the residue was dissolved in ethanol and few drops of HCl and few magnesium turnings are added to it. Appearance of pink color indicates the presence of flavonoids.
b) Alkaline reagent test: Extract was treated with few drops of sodium hydroxide solution. Formation of intense yellow color, which becomes colorless on addition of dilute acid indicates the presence of flavonoids.
c) Lead acetate test: Extract was treated with few drops of lead acetate solution. Formation of yellow color indicates the presence of flavonoids.

RESULTS AND DISCUSSION

Characterization of the isolated compounds: *β-Sitosterol:* It was crystalized from petroleum ether as colorless needles, m.p- 134-136^0 C, gave positive color reaction with Liebermann Buchard test. The IR spectrum showed bands 2970, 2950, 2880, 1470, 1385 and 1055 cm^{-1}. The ^{1}H NMR spectrum showed peaks at δ 0.83-1.01(methyls), 3.47 (1H broad C_3α-H) and 5.35(1H, m, C_5-H).

Stigmasterol: It was crystalized from n-Hexane as white needle shaped crystals, m.p 169-170^0 C, gave positive color reaction with Liebermann-Buchard test. The IR spectrum showed bands at 3450 (OH), 1170, 1132, 1074, 971, 991. The ^{1}H NMR spectrum showed peaks at δ 3.52(m), 5.358(br, s), 0.68(s), 1.01(s), 0.92(d, j=6.4), 0.814(d, j=6.5),0.833(d, bj=6.5) and 0.845(d, j=7.5) ppm 3.52(m), 5.357(br, 5), 0.699(s), 1.02(d, j=7.5), 0.795(d, j=7.5), 0.846(d, j=6.5) and 0.804(t, j=7.5)ppm.

β- Amyrin: It was crystalized from petroleum ether aswhite needle shaped crystals, m.p 195-197^0 C, gave positive color reaction with Liebermann Buchard test (pink) for triterpenes. A hydroxyl and tri substituted double bond was noticedin IR spectrum at 3500, 2250, 1380, 1030, 820. The ^{1}H NMR spectrum showed peaks at δ 1.51, 1.01, 0.99, 0.95, 0.88, 0.82 and 0.90 (all s) and multiplet at δ 5.23 was indicative of the olefinic proton.

Betulinic acid*:* It was crystalized from methanol-chloroform as white fine needles, m. p 287-290^0 C, gave positive color reaction with Liebermann Buchard test. Chloroform-acetic anhydride layer turned to reddish violet at the junction of the two layers and green color (upper layer) indicates the

presence of triterpenoid. The IR spectrum showed bands at 3460, 1382 (-OH), 1690 (COOH), and at 1380, 1390 (gem dimethyl) and 1640 (double bond). The ^{1}H NMR spectrum showed peaks at δ0.83-1.60(methyls), 0.83-1.70 ($C=C-CH_3$).

CONCLUSION

The chemical examination of chloroform extract of the whole plant of *Senecio bombayensis* afforded four compounds, β- sitosterol, stigmasterol, β-amyrin, betulinic acid which were characterized by spectroscopy.

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