



Chemical constituents from oleo gum resin of *Boswellia Serrata Roxb.*

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ABSTRACT

Three compounds α -amyrin, 3-isopropyl-4-Methyl-5-oxo-heptan-1-ol and β -sitosterol were isolated and characterized from defatted alcoholic extract of oleo gum resin of *Boswellia serrata* Roxb on the basis of spectral analysis. Key words: oleo gum resin, *Boswellia serrata* α -amyrin, -sitosterol. © 2008 Trade Science Inc. - INDIA

INTRODUCTION

The oleo gum resin exudate from *Boswellia serrata* (Burseraceae), known as dhup or Indian olibanum is used as incense and is also reputed to possess therapeutic properties^[1]. *Boswellia serrata* are also known to possess anti-tumor^[2] anti-inflammatory^[3], anti-hyperlipidemic^[4] and anti-asthmatic activity^[5]. The tree on injury exudes an oleo gum resin which is transparent, golden yellow and solidifies to brownish yellow tears or drops. The yield varies considerably from 0.9 to 2.5 kg/tree/year^[6].

EXPERIMENTAL

Five kg of the gum exudates of *Boswellia serrata* was collected from the local market, cut into small pieces & dried. After then it was macerated with 95% ethanol for one week & defatted with hexane. The defatted extract was then subjected to silica gel column chromatography. Three compounds were isolated using ethyl acetate, methanol, chloroform & benzene.

IR Spectra were recorded on Hitachi 570 infrared spectrophotometer using KBr,

¹H-NMR spectra on DPX 300 NMR spectropho-

tometer using TMS as internal standard.

Compound 1 : (α -amyrin) was obtained on elution with ethyl acetate-methanol (60 : 40) as a light brown solid, yield 85 mg, m.p. 182°C; IR (KBr) ν_{max} (cm⁻¹) : 3405, 2926, 1669; ¹H-NMR (CDCl₃) σ 0.74 (3H,s,-CH₃), 0.78 (3H,s,-CH₃), 1.08 (3H,s,-CH₃), 1.12 (3H,s,-CH₃), 1.0 (3H,s,-CH₃) 0.97 (3H,s,-CH₃), 0.93 (3H,s,-CH₃), 0.86 (3H,s,-CH₃), 3.9 (1H,s,-OH), 1.18-1.23 (18H, d,9X-CH₂), 1.59-1.64 (7H,d,7X-CH);

Compound 2: (3-isopropyl-4-methyl-5-oxo-heptan-1-ol) was obtained as reddish brown waxy liquid on elution with chloroform-methanol (40:60), yield 50 mg, bp-160°C; IR (KBr) ν_{max} (cm⁻¹) : 3422, 2929, 1703; ¹H-NMR (CDCl₃) : σ 3.94 (1H, s,-OH), 1.41 (2H,s,-CH₂), 1.62-1.77 (2H,m,-CH₂), 1.57 (2H,s,-2X-CH), 1.9-2.0 (2H, d,-CH₂), 1.22 (3H, s,-CH₃), 1.16 (3H, s,-CH₃), 1.57 (1H, s, -CH), 0.91 (3H, s,-CH₃), 0.84 (3H, s,-CH₃).

Compound 3 : (β -Sitosterol) was obtained as colourless solid on elution with ethyl acetate- benzene (20:80), yield 100 mg, mp. 136°C; IR (KBr) ν_{max} (cm⁻¹) 3435, 2923, 1700; ¹H-NMR (CDCl₃): σ 5.35 (1H,br, H), 5.20-4.95 (1H,m,-OH), 2.29-1.45 (29H,m,11X-CH₂ & 7X-CH), 1.25 (6H,s, 2X-CH₃), 1.02 (3H,s,-CH₃)

0.92 (3H,s,- CH₃), 0.81 (3H,s,- CH₃), 0.68 (3H,s,- CH₃).

RESULTS AND DISCUSSION

Compound 1 (α -amyrin)

The compound 1, yield 85mg, mp, 180°C; was obtained on elution with ethyl acetate-methanol (60:40), recrystallized with chloroform as a light brown solid. IR spectrum show a band at 3405cm⁻¹ due to hydroxyl group, -CH band at 2929cm⁻¹ and -C=C- band at 1699cm⁻¹. The ¹H-NMR spectrum of the compound displayed singlet at σ 3.9 for one proton which was assignable to an hydroxyl group at C-3, A doublet in the range of 1.18-1.23 representing eighteen protons could be due to nine methylenes. A doublet in the range of 1.59-1.64 for seven protons could be due to seven methines. A triplet at σ 5.1 for one proton which was assignable to olefinic proton. A singlet at σ 0.86 integrating to three protons suggested the presence of methyl group at C-23, A singlet at 0.43 for three proton was assignable to a methyl group at C-24. A singlet at σ 0.97 for three protons was assignable to a methyl C-25. A singlet at 1.0 for three protons for a methyl group at C-26. A singlet at σ 1.08 for three protons was assignable to a methyl group at C-27. A Singlet at σ 1.12 for three protons was assignable to a methyl group at C-28. A singlet at σ 0.78 for three protons was assignable to methyl group at C-29. A Singlet at σ 0.74 for three protons was assignable to a methyl group at C-30, The proposed structure is fully consistent with the literature data of the compound.

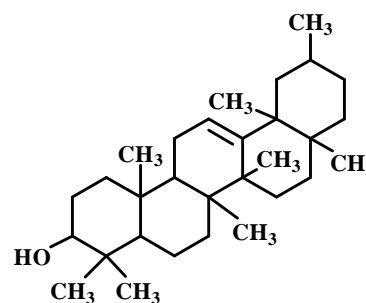
Compound 2 (3-isopropyl-4-methyl-5-oxo-heptan-1-ol)

The compound 2, yield 50 mg, bp 160°C was obtained on elution with chloroform-methanol (40:60) as a raddish brown liquid. IR spectrum displayed a band at 3422 cm⁻¹ for hydroxyl group, 2929cm⁻¹ for -CH group and 1703cm⁻¹ for carbonyl group. The ¹H-NMR spectrums displayed a singlet at σ 3.94 for one proton suggesting the presence of hydroxyl group. A singlet at σ 1.41 for two protons could be due to CH₂ group at C-1. A multiple in the range of σ 1.62-1.77 for two protons was assignable to CH₂ group at C-2. A singlet at σ 1.57 for two protons could be due to two -CH-

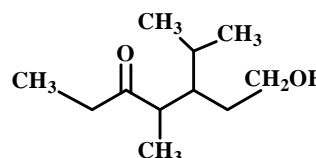
group at C-3,4. A doublet in the range of σ 1.9-2.0 for two protons could be due to -CH₂ group at C-6. A singlet at σ 1.22 for three protons could be due to methyl group at C-7. A singlet at σ 1.16 for three protons could be due to methyl group at C-4. Three singlets at σ 157, 0.91, and 0.84 for seven protons could be due to isopropyl group.

Compound 3 (β -sitosterol)

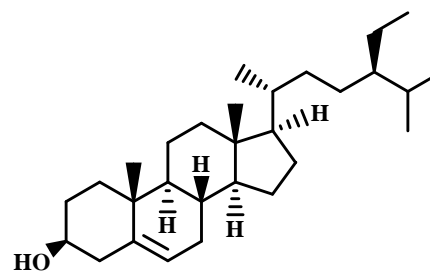
The compound 3, yield 100 mg mp 136°C was obtained on elution with ethyl acetate- benzene (20:80), recrystallized form benzene as coulerless solid. IR spectrum show a band at 3435cm⁻¹ for hydroxyl group, -CH band at 2923cm⁻¹ -C=C- band at 1700cm⁻¹. ¹H-NMR of the compound in CDCl₃ displayed a broad signal at σ 5.35 for one proton which was assignable to an olefenic proton. A multiplet in the range σ 5.20-4.95, representing one proton could be a proton α -position to a hydroxyl group. Another multiplet in the range σ 2.29-1.45 representing 29 protons could be due to seven methines and 11 methylenes. A singlet at σ 1.25 integrating for three protons could be due to methyl



Compound 1



Compound 2



Compound 3

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group at C-19. A doublet at σ 1.02 integrating to three protons suggested the presence of a methyl group at C-21. A triplet at σ 0.92 for three proton could be due to methyl group at C-29. Another doublet at 0.81 integrating for six protons was assignable to two methyl groups at C-26 and C-27 respectively. A singlet at σ 0.68 for three protons was assignable to a methyl group at C-18. The data of the compound 3 was in agreement with the literature^[7] data of β -sitosterol.

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REFERENCES

- [1] R.S.Pardhy, S.C.Bhattacharya; Indian J.Chem., **16B**, 171 (1978).
- [2] Bhatnagar et al.; J.Res.Indian Med., **8**, 77 (1973).
- [3] Pachnanda et al; Indian J of Pharmacology, **13**, 63 (1981).
- [4] Singh et al.; Ibid, **13**, 97 (1981).
- [5] Gupta et al.; Eur J, Med. Res, **3**, 511-514 (1998).
- [6] S.B.Kalidhar et al.; Prinsepiol, A Lignan from Stems of Prinsepia Utilis, Phtochem, Vol. **21**, 796-797 (1982).