International Journal of PharmTech Research
CODEN (USA): IJPRIF ISSN : 0974-4304
Vol.2, No.2, pp 1204-1206, April-June 2010

Phytochemical Investigation of *Polianthes tuberosa*

***J.Rammamurthy[1], S.Venkataraman[1], R.Meera[1], Satkar Prasad[1], A.J.M.Chiristina[2] , P.Devi[3]**

[1]Department of Pharmaceutical Chemistry, [2]Department of Pharmacology, [3]Department of Pharmacognosy, K.M.College of Pharmacy, Uthangudi, Madurai – 625 107. TamilNadu, India.

Corres.author: jraamamurthy@yahoo.co.in, meeraharsa@yahoo.com

ABSTRACT: The phytochemical studies on the leaves of *Polianthes tuberosa* resulted in isolation of 9,11 Dehydrohecogenin 3- O Glucose xylose galactoside, Kameferol 3-O ,α -D glucoside, Polianthoside B and C are being reported for the first time from this plant. These compounds have been characterized on the basis of spectral and other data.

Keywords : Phyto chemical, *Polianthes tuberosa,* IR, NMR.

INTRODUCTION

Polianthes tuberosa Linn [Family: *Amaryllidaceae]* distributed in hotter parts ,mainly Mexico or the andes of South America Besides its popularity as an ornamental garden plants with beautiful blossoms. Throughout India wild as well as cultivated especially in Karnataka as an ornamental in gardens in Dehradun. The tuberose is a night blooming plant thought to be a native of Mexico along with other species of *polianthes*. Flowers are used in perfume industry and also diuretic and emetic activity [1,2,3]. Bulbs are used for antigonorrhoea, diuretic, emetic and for curing rashes in infant [4,5,6].

EXPERIMENTAL

All the melting points were taken in Veego-Vmp 1 melting point apparatus are uncorrected. IR spectra were recorded on Perkin Elmer FT-IR spectrometer. NMR spectra were recorded on Bruker spectrospeir 200MHZ, the chemical shifts referenced to TMS.

MATERIALS AND METHODS

The aerial parts of *Polianthes tuberosa* were collected from Madurai during May 2008. It was authenticated in the department of Botany, The American College, Madurai-2. These aerial parts were dried, crushed into a coarse form and extracted.

EXTRACTION

The aerial parts powder was extracted with petroleum ether (60-80^{0}C) solvent was removed under vacuum and a crude mass was obtained. The marc was then re extracted with chloroform and the solvent was removed under vaccum and a crude semisolid mass was obtained. These dried crude extracts petroleum ether, chloroform were stored in a desiccators and used for further experiment after suspending in sodium carboxy methyl-cellulose (1% w/w) solution. The chemical constituents of the extract were identified by preliminary qualitative analysis and confirmed by thin layer chromatography (TLC) for the presence of carbohydrates, glycosides, alkaloids, phytosterols and flavonoids.

PREPARATION OF COLUMN CHROMOTOGRAPHY

Chloroform extract obtained from the aerial parts of *Polianthes tuberosa* was adsorbed on silica gel (60-120 mesh) for column chromatography. The slurry was air dried to remove any adsorbed moisture on surface and loaded on the top of the column of silica gel packed with disappearance or appearance of the existing /new spot, visualized on TLC. Various

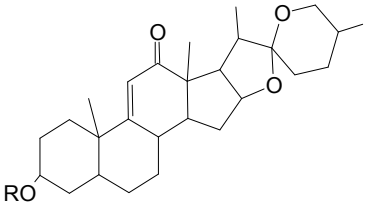
compounds isolated from the extract are listed below along with their spectral data.

PHYTOCHEMICAL INVESTIGATION[7,8,9]

Polianthes tuberosa

Compound A (9,11 de hydro hecogenin 3-O Glucose xylose Galactoside ,1)

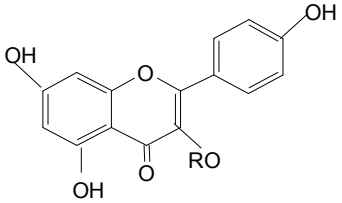
Elution of the column with benzene and chloroform fraction (7:3) yielded yellow semisolid residue 90mg. It was recrystallized from choloroform . Rf. 0.588 (chloroform : Methanol) (2:8) mixture. M.P-198^{0}c [10]. IR spectrum of compound A exhibited a band at 3405 (O-H Stretching), 2924 (C-H Stretching) , 2853 (C-H Stretching) , 2364 (hydroxyl Stretching), 1707 (C=O Stretching), 1513 (C=C Stretching), 1379 (C-H Bending) , 1217 (C-O Stretching), 1040 (C -O Stretching), 757 (C-H Bending out of plane), NMR ($CDCl_3$) (ppm): Spectrum showed signals of 0.830R-CH_3-threeprotons;1.253-1.562 ,R-CH_2;1.597 C-H-Protons; 2.063-ketone due to CH_2-proton adjacent to carbonyl group; 4.207-4.250 acyclic non conjugated, 5.345-5.695 CH_2-proton adjacent to ethylenic bond, 6.541-7.266 aromatic (Ar-H).The UV-spectra showed peaks in the region-240, 250, 260, 270, 280, 290 and 300 nm. UVλ max at 240nm was observed in compound –A.



R = Glucose, Xylose, Galactose

Compound B (Kaempferol-3-O- Xyloside ,2)

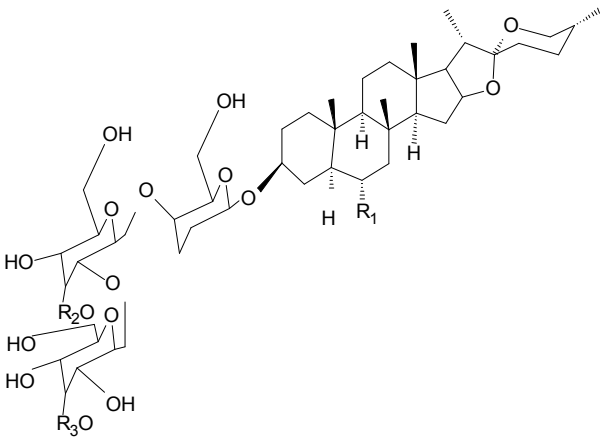
Elution of the column fraction of methanol, ethylacetate (1:9) yielded 50mg of pale yellow semisolid residue. It was recrystallized from methanol. Rf: 0.769 (Benzene: Methanol) 8.5:1-5 mixture M.P-178^{0}c [11] . I.R. Spectrum showed the bands at 3484,2931,2364,1634,1439,1371,1220,907,801,671.The NMR-Signals ($CDCl_3$ δ ppm) at 7.92,7.08,6.78,3.94-5.64,2.32,2.17,2.12,2.06,2.04,1.98.The UV-absorption spectra showed peaks at 245, 250, 260, 270, 280, 290, 300 nm. The UV λ max at 245nm was observed in compound B.



R= Xylose

Compound C (Polianthoside B and C ,3)

This was obtained as yellowish brown in colour as semisolid from the fraction of chloroform, ethylacetate (9:1,8:2) yielded 90 mgs of compound. Rf: 0.468, Chloroform; methanol (9.5:0.5) M.P-160^{0}C[12]. I.R Spectrum showed the bands at 3396cm^{-1} (OH-Stretching); 2920, 2852cm^{-1} (-C-H-stretching); 2362,1728cm^{-1} (hydroxyl Stretching), 1714cm^{-1} C=O-stretching; 1510cm^{-1} C=C-stretching symmetric; 1460,1263cm^{-1}C-H Bending, 1026cm^{-1} C-O Stretching,977,902 cm^{-1} C-H Bending (Out of plane) HNMR Signals (δ ppm) ($CDCl_3$) 0.807-1.158-R-CH_3 protons (methyl groups); 1.253-1.598-R-CH_2 protons; 2.681-2.814-RC=O-CH_2 ketones; 3.493- due to OH; 4.164-4.588 acyclic non conjugated bond, 4.872-5.608 CH_2protons attached to ethylinicbond, 6.788-7.260 Ar-H-aromatic compounds. The UV-absorption spectra showed peaks at 240, 250, 260, 270, 280, 290, 300, 310, 320, 220 nm. The UV λ max at 280n.m was observed in compound C



RESULTS AND DISCUSSION

The melting point of the isolated compounds were found out by open capillary tube method and the results were uncorrected. The purity of the compounds was checked by TLC using silica gel G as an adsorbent, ethyl acetate and chloroform (9:1) were used as mobile phase. The spot was visualized by iodine vapour or dinitrophenyl hydrazine solution. The structure of the isolated compounds was characterized by its IR, HNMR spectral analysis in which it complies with the normal values.

REFERENCES

1. The Wealth of India, A dictionary of Indian raw material and industrial products, Raw material, Vol VIII, (Ph-Re) 1991.p.184-185.
2. Husain Akhtar, Virmani OP, Popli SP, Mishra LN, Gupta MM, Shrivastava GN ,Abraham Z and Singh AK *Dictionary of medicinal plant* 1992.p. 362.
3. Yoganarasimhan SN. *Medicinal Plants of India* 2000 . p.198.
4. Chopra RN, Nayar SL and Chopra IC Glossary of Indian medicinal plants, National Institute of Science communication ,Council of scientific and Industrial research, New Delhi, India 1999. p.199.
5. Guide to the economic plants of South India p.186-187.
6. Chopra RN, Sharma BS and Chopra IC, Suppliment to Glossary of Indian medicinal plants.
7. John R.Dyer Applications of absorption spectroscopy of organic compounds, 1st edition, Prentice-Hall of India (P),New Delhi,(1969).p. 33-38.
8. Robert M. Silverstein, Francis X. Webster, Spectrometric identification of organic compounds, John Wiley and sons, Inc.(1998).
9. McLafferty FW, Interpretation of mass spectra, 2nd edition, W.A. Benjamin. Inc. Publishers, NewYork (1974).
10. Ali A, Ross SA and Moghazy AM, *Fitoterapia* 1981, 52,137-139.
11. Buckingham.J, Eds., In: *Dictionary of Natural Products*, Chapman Hall, London 1994.p. 2570.
12. Jain-Ming Jin and Ying-Jun Zhang. *Journal of Natural Products* 2004, 67, 675- 679.

*****