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CONSTITUENTS AND CYTOTOXICITY OF *POLYGALA ERIOPTERA*

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ABSTRACT

Helioxanthin has been isolated from petroleum ether extract of whole plant of *Polygala erioptera*. The petroleum ether extract and helioxanthin showed cytotoxicity on HeLa cell line.

Key words : *Polygala erioptera,* Helioxanthin, Cytotoxicity.

INTRODUCTION

Polygala erioptera, Linn. (Polygalaceae) is grown as weed in most tropical countries and widely distributed throughout the India and it is commonly called "Nelajanuma" in Telugu[1,2]. The Lambadi tribals of north Telangana districts of Andhra Pradesh use this plant for the treatment of pain, gastrointestinal disorders and infectious diseases. It is widely used for healing of wounds and is also effective against chronic white discharge[3, 4].

There is no previous record and research work available on the traditional medicinal values of *Polygala erioptera*. Most of the ancient knowledge systems continued to survive by oral communication from generation to generation in rural as well as in tribal communities. The preliminary phytochemical studies reveal the presence of lignans, flavones, fatty acids and flavonoid glycosides. Lignans are large group of natural products, which show diverse biological effects[5]. Lignans may serve as lead compounds for the development of new therapeutic agents with antibacterial and antifungal activities.

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Therefore, the present study was undertaken to demonstrate scientifically the cytotoxicity activities of the petroleum ether extract and helioxanthin of *Polygala erioptera*.

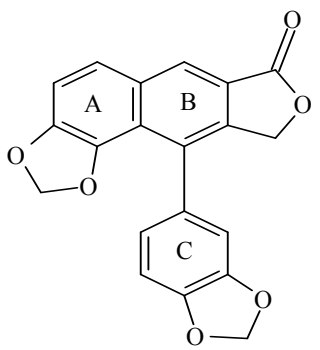
EXPERIMENTAL

Plant material

Polygala erioptera Linn**.** whole plant material were collected freshly in and around our university campus, Warangal, South India. The plant material was identified in august 1996 and authenticated taxonomically by Dr.V.S.Raju, Department of Botany, Kakatiya University, Warangal. A voucher specimen of the collected sample was also deposited for the future reference.

Whole plant of *Polygala erioptera* was crushed into small pieces, which were dried in shade and grind into fine powder. The dried powder (200 g) was extracted successively with 2.5 litres of petroleum ether (60-80^{o}C) in Soxhlate apparatus. The extract was evaporated to dryness under vacuum and dried in vacuum desicator. The dried material was fractionated with benzene to yield helioxanthin.

Isolated constituent: Helioxanthin[5], from the petroleum ether extract of whole plant.



Pale yellow crystalline compound: UV (C_2H_5OH): λ_{max} 266.3, 292.6 and 355 nm (log ε: 4.66, 3.70 and 3.88): IR bands (KBr) 1790, 1650 and 940 cm^{-1}:

PMR: $CDCl_3$ and DMSO-d_6: δ 5.3(s) (2H), lactone methylene, doublets at 6.08 (2H) and 6.18 ε C.21 (AB quartet) (2H) methylenedioxy groups of A and C-rings, respectively: δ 7.0 (3H), singlet accounting for three aromatic protons, δ 7.5 an 7.9 (d) (J_{AB}

9 H_2), accounting for the ortho-aromatic pair A singlet at δ 8.5 (1H) indicated a retrodisposition of lactone carbonyl[6, 7].

Mass spectrum: 348 (100%), 310 (16%), 291, 261, 233, 205, 189, 187, 176, 174, 163, 159, 151, 150, 131 and 116.

Tested materials: Petroleum ether extract and the isolated compound helioxanthin

Studied activity: Cytotoxicity by MTT – assay. DMSO was used as solvent control. Tests were done in triplicate.

Cell line used: HeLa – Human cervical cancer cell line cultured in RPMI – 1640 medium with 10% fetal brovine serum, under 5% CO_2 environment[8].

RESULTS AND DISCUSSION

The results of MTT method are given in Table 1.

Table 1. Cytotoxic activity of petroleum ether extract and helioxanthin of *Polygala erioptera*

Tested material	Concentration (µg/mL)	Mortality (%)[a]	IC_{50} (µg/mL)[b]
Petroleum ether extract	10	20.0 + 3.51	
	20	31.5 + 2.05	50.876
	50	48.5 + 3.21	(-64.33 to -14.35)
	75	56.78	
	100	72.30 + 4.81	
Helioxanthin	10	24.12 + 4.81	
	20	31.15 + 2.51	
	50	48.67 + 6.78	55.785
	75	62.03	(-57.73 to -24.49)
	100	71.3 + 6.25	

[a] Values are mean ± 50 (n = 3)

[b] Confidence limits 95% in parentheses.

Helioxanthin was found to be cytotoxic against HeLa – cell line and petroleum ether extract did not show activity.

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