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CHEMICAL CONSTITUENT FROM THE ROOTS OF *GIRARDINIA HETEROPHYLLA*

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ABSTRACT

Uttarakhand is a land of diverse traditions and is inhabited by so many ethnic groups like Buxas and Tharus, the tribals having a rich socio-cultural and craft tradition. The fiber rich plants of the state like Bhimal (Greviaoptiva), Bhabhar (Eulolopsisbinnata), Bhang (Cannabis sativa), and Girardinia heterophylla (DansKandali) are found in large quantities and the properly dried plant of Girardinia hetertophylla, when cut into small pieces is a useful fodder for cows and pigs. Its roots are used as shampoo/soap for washing. Considering the importance of phytochemistry of Girardinia heterophylla, a Research and Development study was unsertaken and rutin was isolated from the roots of Girardinia heterophylla. The structure of compounds was confirmed by using spectroscopic techniques.

KEY WORDS

Girardinia heterophylla, ethnic groups,Rutin.

INTRODUCTION

Girardinia heterophylla is a dioecious herb, up to two meter high with grooved stems abundantly armed with stinging hair and is found in the Himalayas from Kashmir to Kumaun hills of Uttarakhand at altitude ranging from 2,100m to 3,200m [1]. Swollen base of roots of *Girardinia heterophylla*is used as soap/shampoo for washing. The leaves of this plant are boiled and cooked for vegetables. The whole plant is also used as cattle fodder to improve milk production. The stem portion of the plant yields the valuable fiber, which has been traditionally used by the tribal for making rope based products used for packing grains and transportation purpose. After extracting the fiber from the stem, residue of the bark portion is used as fuel wood. Traditionally, bark powder is also used as a bandage material for faster healing of wounds and setting of broken bones.This paper reports the isolation and identification from the extract of*Girardinia heterophylla* roots.

MATERIAL AND METHODS

Plant samples: The plant samples were collected from the Middle Himalayas at an altitudinal range of 22,00m to 25,00m in Mussoorie and Dhanaulti areas of Dehradun District.

Extraction of plant samples: The roots (600g) of *Girardinia heterophylla* were milled after air drying and were sequentially extracted with the solvent petroleum ether (60-80^{o}C) and methanol. The removal of the solvents under vacuum yielded methanol extracts (4.66%) and was further examined. The crude methanol extract was suspended in water and fractionated with the dichloromethane, ethyl acetate and n-Butanol and n-Butanol (0.7%) extract was examined.

Isolation of rutin: The n-butanol extract was column chromatographed over silica gel and elution of the column with varying amount of chloroform and methanol afforded one compound.

Weight of n-Butanol extract	= 4.00gm
Weight of silica gel used for adsorption of extract	= 85.5gm
Weight of silica gel used for building of column	= 243gm
Solvent used for packing column	= Chloroform
Retention volume	= 423
Volume of each fraction	= 100 ml

The details are given in **Table-1**.

Table-1: Compounds of n-Butanol Extract of Root and their TLC System with Eluents

Compounds	Eluents	Fraction no.	Volume	Solvent system for TLC
-	$CHCl_3$: MeOH (98:2)	1-85	85x100	BuOH: EtOAc: H_2O (7:2:5)
GHRBTF	$CHCl_3$: MeOH (95:5)	86-263	177x100	BuOH: EtOAc: H_2O (7:2:5)

Results and Discussion

The n-butanol extract was column chromatographed over silica gel and elution of the column with varying amount of chloroform and methanol afforded one compound.Compound GHRBTFwas obtained as green powder (5mg, 0.001% yield and m.p. 243- 245^{o}C. It was identified as rutin [Figure-1 and 2] by direct comparison with an authentic sample (m.m.p., Co-TLC and superimposable IR). This is the first report of isolation of rutin in the roots of *Girardinia heterophylla* from Uttarakhand origin.

Rutin shows antioxidative and radical-scavenging properties [2]. It has been reported as an oral capillary preservatory drug usually used for the therapy of chronic venous insufficiency and is also reported as an ingredient in a large number of multivitamin preparations and herbal remedies [3]. Rutin has been found to be used in cosmetic and pharmaceutical formulations to enhance their antioxidant and vasoprotective properties, promoting relief of the symptoms of lymphatic and venous insufficiency, and reducing capillary fragility [4]. Due to its antioxidant activity has been reported, it also protects liver cells and suppresses haemoglobin oxidation. Rutin has also been reported to show anti-inflammatory properties, which are displayed mostly in respect of chronic diseases. When administered to rats, rutin has also been reported to display chemo-preventive properties, acting as an agent blocking carcinogenesis induced by heterocyclic amines [5].

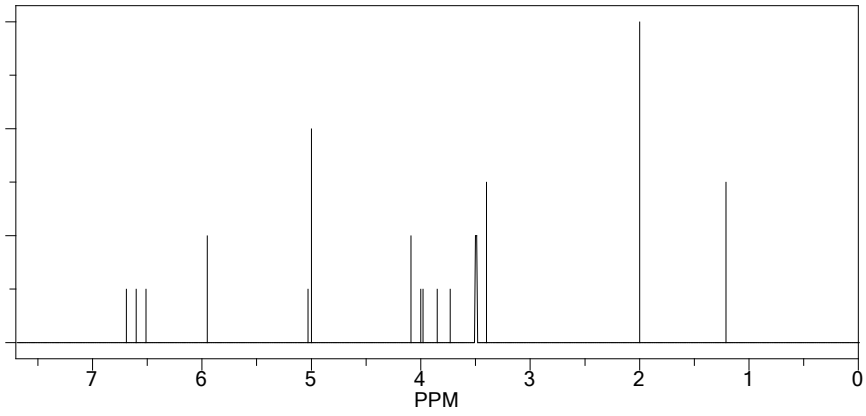

Figure-1: ^{1}H- NMR Spectra of Rutin

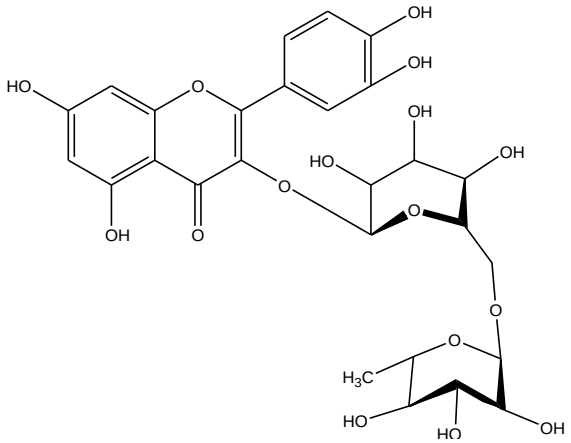

Figure-2: Structure of Compound GHRBTF (Rutin)

CONCLUSION

*Girardinia*species holds great potential for in depth investigation for medical sciences specially pharmacology. Rutin identified in the present study may help in validating the various medicinal applications of *Girardinia heterophylla* found in the areas of Mussoorie hills of Uttarakhand. Thus, this study elucidate the medical importance of this plant and puts light on isolated compound and their properties like anticancer effects, antioxidant as well as many others.

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