



PRELIMINARY PHYTOCHEMICAL SCREENING ON THE FLOWERS AND RHIZOMES OF *HEDYCHIUM FLAVESCENS* CAREY EX ROSCOE

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Abstract

Phytochemicals are non-nutritive plant chemicals that have protective or disease preventing properties for the plant. The screening of phytochemical constituents in rhizome and flowers of *Hedychium flavescens* were performed using generally accepted laboratory technique for qualitative determinations. The phytochemical screening showed that rhizomes were rich carbohydrate, starch, sugar, protein, cardiac glycoside, phenols, saponins, alkaloids, tannin, phlobatannin and terpenoids. Carbohydrate, ketose protein, phenols, saponins and terpenoids were present in flowers.

Key words : Rhizome, flower, phytochemical analysis.

Introduction

Herbal medicines have been used by the mankind since time immemorial. *Ayurveda*, the oldest traditional system of India, reveals that ancient Indians had a rich knowledge of medicinal value of different plants. India has been endowed with a very rich flora owing to the extreme variations in climate and geographical conditions prevalent in the country. With the advent in science, many of the crude drugs used in traditional system have been investigated scientifically.

The use of herbal medicine for the treatment of diseases and infections is a safe and traditional therapy. Hence, medicinal plants have been receiving great attention worldwide by the researchers because of their safe utility. The curative properties of medicinal plants are mainly due to the presence of various complex chemical substances of different composition which occur as secondary metabolites (Karthikeyan *et al.*, 2009 and Lozoya *et al.*, 1989). Medicinal plants form a large group of economically important plants that provide the basic raw materials for indigenous pharmaceuticals (Augusti *et al.*, 1996).

Natural products and their derivatives represent more than 50% of all the drugs in clinical use in the world today. Higher plants contribute no less than 25% on the total (Farnsworth *et al.*, 1985; Cragg and Newman,

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2005). In the last 40 years, many potent drugs have been derived from flowering plants.

Hedychium flavescens (Yellow ginger) belongs to the Zingiberaceae family (the ginger family). A wonderful and strong fragrance makes this ginger the favourite flower of the Dai ethnic minority people. The rhizome of this plant is used by certain tribal groups of Bihar (India) as a febrifuge and is considered as an antirheumatic, tonic, and excitant in Moluccas (Ajaikumar *et al.*, 2008). Several *Hedychium* sp. were reported to possess as a laxative, stomachic, carminative, stimulant, tonic to the brain, in liver complaints, diarrhoea and pains (Kirtikar and Basu, 1987). The essential oil of rhizomes exhibited inhibitory activity against *Shigella shigae*, *Clostridium welchii*, *Escherichia coli*, *Alternaria hellanathi*, *Rhizoctonia solani* and *R. bataticola*. Essential oil also showed effect on central nervous system, tranquilising effect and showed anthelmintic activity and was found to be better than piperazine phosphate (Dixit and Varma, 1979). Based on review of literature, no reports were available regarding phytochemical screening of *Hedychium flavescens*. Hence, the present study gains importance to screen the rhizomes and flowers of *Hedychium flavescens*.

Materials and Methods

Rhizomes and flowers of *Hedychium flavescens* were collected from Botanical Garden of St. Mary's College which was supplied and authenticated by M S

Table 1 : Phytochemical analysis of rhizomes and flowers of *Hedychium flavescens*.

Primary/Secondary metabolites	Name of the test	Powdered flowers	Powdered rhizomes
Carbohydrates	Molisch's test	+	-
Carbohydrates	Fehling test	+	+
Starch	Iodine test	-	+
Sugar	Benedict's test	+	+
Ketose	Seliwanoff's test	+	-
Proteins	Lowry's method	+	+
Fats	Filter paper test	-	-
Quinone	NaOH test	-	-
Cardiac glycoside	Kellar-Killani test	-	+
Steroids	Liebermann-Burchard test	-	-
Flavonoids	Ethyl acetate test	+	-
Phenols	Folin test	+	+
Saponins	Foam test	+	+
Alkaloids	Mayer's test	-	+
Tannin	Iron salt test	-	+
Phlobatannin	HCL test	-	+
Terpenoids	Salkowski test	+	+
Aminoacid	Ninhydrin test	-	-

+ indicate the presence of constituents and - indicate the absence of constituents.

Swaminathan Research Foundation, Wayanad. Collected rhizomes and flowers were dried at 50° C and homogenized to fine powder and stored in air tight bottles for further use. Preliminary phytochemical tests were performed using specific reagents through standard procedures (Trease and Evans, 1989; Harborne, 1984).

Results and Discussion

Phytochemical screening of rhizomes showed the presence of primary metabolites like carbohydrate, sugar, starch, proteins and secondary metabolites like cardiac glycoside, alkaloids, saponins, phenols, tannins, phlobatannin and terpenoids. The analysis of flowers indicated that it consists of primary metabolites like carbohydrate, sugar, proteins and secondary metabolites like saponins, phenols, terpenoids and flavonoids. The results were tabulated in table 1.

In the present era, medicinal herb resources are abundant, but these resources are dwindling fast due to the onward march of civilization. Although a significant number of studies have been used to obtain purified plant chemical, very few screening programmes have been initiated on crude plant materials. It has also been widely observed and accepted that the medicinal value of plants lies in the bioactive phytocomponents present in the plants.

Saponins are a special class of glycosides which have

soapy characteristics. It has also been shown that saponins are active antifungal agents (Sodipo *et al.*, 1991). Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional proteins unavailable for them (Sodipo *et al.*, 1991). The growth of many fungi, yeasts, bacteria and viruses was inhibited by tannins (Chung *et al.*, 1998).

Terpenes are probably the most common of all the phytochemicals and are found in almost all plant life and have a beneficial role for the plants themselves. Terpenes in our diet help prevent certain cancers and heart disease. Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer and also to have antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, antiinflammatory and immunomodulatory properties (Sultana and Ata, 2008; Shah, 2009).

Alkaloids have many pharmacological activities including antihypertensive effects, antiarrhythmic, antimalarial activity and anti-cancer activity (Cordell, 1983).

Phenolic is one of the major groups of phytochemical that can be found ubiquitously in certain plants. Phenolic compounds are potent antioxidants and free radical scavenger which can act as hydrogen donors, reducing agents, metal chelators and singlet oxygen quenchers.

Studies have shown that phenolic compounds such as catechin and quercetin were very efficient in stabilising phospholipid bilayers against peroxidation induced by reactive oxygen species (ROS) (Gulcin *et al.*, 2010 and Gulcin, 2010).

Phytochemicals are protective and disease-preventing particularly for some forms of cancer and heart diseases. The most important action of these chemicals with respect to human beings is somewhat similar in that they function as antioxidants that react with the free oxygen molecules or free radicals in our bodies. Free radicals can damage the cells of our bodies and must be removed. Strictly speaking, phytochemicals are chemicals produced by plants. More than a thousand phytochemicals have been identified. Phytochemical study is helpful to isolate the pharmacologically active principles present in the drug. Further research is necessary to isolate the active principles. The observations justify the ethnobotanical approach in the search for novel antibiotic bioactive compounds.

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