PRELIMINARY PHYTOCHEMICAL SCREENING OF CURCUMA AMADA

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Abstract

Mango ginger (Curcuma amada Roxb.) is a unique spice having morphological resemblance with ginger but imparts a raw mango flavour. The biological activities of mango ginger include antioxidant activity, antibacterial activity, antifungal activity, anti-inflammatory activity, platelet aggregation inhibitory activity, cytotoxicity, antiallergic activity, hypotriglyceridemic activity, brine-shrimp lethal activity, enterokinase inhibitory activity, CNS depressant and analgesic activity. The main use of mango ginger rhizome is in the manufacture of pickles and culinary preparations. The aim of this study was to evaluate phytochemical constituent of Curcuma amada Roxb. In our studies it was investigated that alkaloids, Phytosterols, Terpenoids, carbohydrates, tannins, anthraquinones, glycosides, Quinones, Oils and flavonoids are present in Curcuma amada, whereas saponins and amino acids were found to be absent. This article brings to light the major active components present in C. amada that may be important from the pharmacological point of view.

Keywords: Curcuma amada, phytochemical screening, Alkaloids, Tannins, Flavonoids.

Introduction

According to World Health Organization medicinal plants would be the best source to obtain a variety of drugs. About 80% of individuals from developed countries use traditional medicine, which has compounds derived from medicinal plants [1]. Therefore, such plants should be investigated to better understand their properties, safety and efficiency. Various medicinal plants have been used for years in daily life to treat disease all over the world [2]. They have been used as a source of potent and powerful drugs [3]. There has been a revival of interest in herbal medicines. This is due to increased awareness of the limited ability of synthetic pharmaceutical products to control major diseases and the need to
discover new molecular structures as lead compounds from the plant kingdom [4]. This worldwide interest in medicinal plants reflects recognition of the validity of many traditional claims regarding the value of natural products in health care. [5]. Herbal products are suitable for treating a wide range of infections and diseases [6].

*Curcuma amada*, commonly known as mango ginger (amba haldi) has wide distribution in India, Thailand, Indochina, Malaysia, Indonesia and Northern Australia. [7] Rhizomes of *C. amada* are buff colored outside with a light yellow or white inner epidermal layer. They are used in folklore medicines, in culinary preparation such as preserves, candy and for manufacture of oleoresin, essential oil, etc. [8]. Phytochemical studies were carried out for hexane, chloroform and methanol extracts of *Curcuma amada* to detect the presence of different phytochemical constituents like steroids, terpenoids, tannins, flavonoids, saponins, glycosides, amino acids etc by using standard procedures. [9-11]. The most important of these bioactive constituents of plants are Alkaloids, Tannins, Flavonoids and Phenolic compounds [12]. The detailed and systematic pharmacognostic and phytochemical evaluations of *Curcuma amada* give valuable information in order to produce standardized finished herbal products.

**Materials and Methods**

**Collection of Plant Material:**

The plant material used in present study was collected from (Gudala, Allavaram and Amalapuram) Andhra Pradesh. The plant materials were further identified in the Department of Botany, Dr.V.S.Krishna College, Visakhapatnam, India.

**Preparation of Rhizome Extracts:**

The collected Rhizome was shade dried, powered and extracted with hexane, chloroform and methanol using soxhlet apparatus for 8 hours. The extracts were filtered and filtrates were concentrated under reduced pressure at 40°C using a rotaflash evaporator and stored at 4°C until use for phytochemical screening.

**Screening of Phytochemicals:** About 20g of the rhizome powder was soaked in 100 ml methanol solvent and incubated for 48 hrs and then filtrated using Whatmann No.1 filter paper and obtained methanol extraction. Phytochemical analysis was carried out using Methanol plant extract using standard methods [13-16].

**Identification Tests for Phytochemical Constituents:**

The tests were performed to find out the presence of active chemical constituents such as alkaloids, terpenes, flavones, flavonoids, steroids, reducing sugars, proteins, aminoacids, carbohydrates, tannins, anthraquinones, glycosides, cardiac
glycosides by the following procedure. Phytochemical analysis was carried out for all the extracts using standard methods.

1. Alkaloids:

Extracts were dissolved individually in diluted hydrochloric acid. The resulting acidic solution was tested for alkaloids by adding Mayer’s reagent, Wagner’s reagent, Dragendorff reagent and Hager’s reagent. The formation of a faint turbidity or precipitation on the addition of the above reagents indicates the presence of alkaloids.

2. Flavonoids:

2-3 ml of plant extract was dissolved in 50% of methanol and warmed then add a piece of magnesium ribbon and 1 ml of conc. HCl. Red or yellow coloration of the solution indicates the presence of flavonoids.

3. Tannins:

A few ml of potassium dichromate added to the plant extract, formation of precipitate showed the presence of tannins and phenolics.

4. Saponins:

Frothing test: add 0.5 ml of plant filtrate to 5 ml of distilled water, frothing persistence means saponins were present.

5. Cardiac glycosides:

To the plant extract few ml of glacial acetic acid, ferric chloride and conc. H2SO4 were added. Green color indicates the presence of cardiac glycosides

6. Phenols:

Add a few drops of 10% aqueous FeCl3 to the plant extract, appearance of blue or green color indicates presence of phenols.

7. Carbohydrates:

a) Molish’s test: To few ml of plant extract 1 ml of alpha-Napthol solution and conc. H2SO4 was added along the walls of the test tube. Purple to reddish violet colour at the junction of the two layers indicates the presence of carbohydrates.

b) Fehling’s test: Equal volumes of Fehling’s-A & B were added. On heating the formation of brick red precipitate indicates the presence of carbohydrates.

c) Benedict’s test: To 5 ml of Benedict’s Reagent few ml of plant extract was added and boiled for 2 min, cooled. The formation of red precipitate indicates the presence of carbohydrates.
8. **Amino Acids**: 2 drops of Ninhydrin Reagent was added to the plant extract. Purple colour indicates the presence of amino acids.

9. **Quinones**: To 1ml of extract 1ml of conc.H2SO4 were added, formation of red color indicates the presence of quinones.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the Phytochemicals</th>
<th>Hexane Extract</th>
<th>Chloroform Extract</th>
<th>Methanol Extract</th>
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<tbody>
<tr>
<td>1</td>
<td>Phenols</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Phytosterols</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Terpenoids</td>
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<td>+</td>
<td>+</td>
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<tr>
<td>4</td>
<td>Glycosides</td>
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<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Saponins</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Flavonoids</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>7</td>
<td>Tannins</td>
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<td>8</td>
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<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>Quinones</td>
<td>-</td>
<td>+</td>
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</tbody>
</table>

**Fig 1**: Phytochemical Constituents Present in Different Extracts of *Curcuma amada*

**Results and Discussions**

This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important medicinal phytochemicals such as terpenoids, reducing sugar, flavonoids, alkaloids and phlobatannins were present in the samples. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids. Tannins have amazing stringent properties. They are known to hasten the healing of wounds and inflamed mucous membranes. Flavonoids are also present in all six selected medicinal plants as a potent water-soluble antioxidant and free radical scavenger, which prevent oxidative cell damage and also have strong anticancer activity [17-18]. It also helps in managing diabetes induced oxidative stress. Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer. Terpenoids are also known to possess antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, antiinflammatory and immunomodulatory properties [19-20]. Numerous studies have confirmed that saponins possess the unique property of precipitating and coagulating red blood cells [21-22] and steroids are responsible for cholesterol-reducing properties. Steroids also help in regulating the immune...
response [23]. Alkaloids represent a class which affects the central nervous system, reduces appetite and behaves as diuretic [24]. In our studies it was investigated that alkaloids, Phytosterols, Terpenoids, carbohydrates, tannins, anthraquinones, glycosides, Quinones, Oils and flavonoids are present in *Curcuma amada*, whereas saponins and amino acids were found to be absent.

**Conclusion**

The selection of crude plant extracts for screening programs has the potential of being more successful in initial steps than the screening of pure compounds isolated from natural products. The plant extract are the source of the secondary metabolites i.e., alkaloids, flavonoids, terpenoids, tannins etc. The phytochemical analysis of the *Curcuma amada* are important and have commercial interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases. Thus we hope that the important phytochemical properties identified by our study in the local plant of Gudala, Allavaram, Amalapuram will be helpful in the coping different diseases of this particular region.

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**References**


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