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Phytochemical analysis of black turmeric *Curcuma caesia* Roxby

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Abstract

Curcuma caesia Roxby. Is commonly known as kali haldi and it is the member of family Zingiberaceae. The plant has been used as antiparasitic, diuretic, hepatoprotective, Laxative and sedative ethanobotanically. The present investigation is carried out to brighten the phytochemical profile of rhizome extract of plant. The extracts (Methanolic, chloroform, Petroleum ether and water) show presence of phytoconstituent Alkaloids, Triterpenoid, Steroids, Saponin, Tannin, Flavonoids, Cardiac glycoside, Protein and amino acids, Carbohydrates, Fats and Fixed Oils. All these attribute magnify its significance in herbal medicine.

Keywords: Turmeric, phyto-chemical screening, *curcuma*, bioactive, metabolites

Introduction

Nature can be described as the bygone and most comprehensive pharmacy of all times, and it has been practiced for health benefit in different world wide system of traditional medicine. According to WHO around 80% of world population use herb as traditional medicine. Plants play the prime role in remedy and large number of drugs are plant derived. The significance of medicinal plants for prevention, mitigation and cure of various diseases are always recognized. Nowadays medicinal plants have huge demand and popularity, As many people are using traditional medicine. The indigenous system of medicine namely Ayurveda, Siddha and Unani have been in existence for several centuries. These systems of Medicine use ethanobotanical techniques for preparation of decoction. Ethanobotanically this plant has been used as antiparasitic, diuretic, hepatoprotective, Laxative and sedative. *Curcuma* Linn. is a large genus belonging to the family of Zingiberaceae. It include about 70 species of rhizomatous herbs distribute in Southeast Asia as wild and cultivated plant. *Curcuma* species have substantial importance for its curative value and for a long time it has been used by ethnic communities in India. Black turmeric *Curcuma caesia* is a perennial herb with bluish-black rhizome. It is commonly called as kali haldi (hindi), Nalla Pasupu (Telugu). The leaves show a dark purple colour striations on midrib which is distinct feature that discrete it from different species of *Curcuma*. It is grown in North-eastern and central India. It is also found in Brahmagiri mountain range of western ghat region in Maharashtra. It is also grown in Hills of east Godavari region in Khamman district of Andhra Pradesh. The rhizome are used in the treatment of smooth muscle relaxant activity (Arulmozhi D K *et al.*). In Maharashtra, the plant is regarded as very auspicious and sacred, it is believed that the person who own the plant always have wealth and never encounter paucity of food. The plant also contain essential oils and Aroma. From over 3,00,000 species of higher plants to occur in nature, only about 2 present have been screened so far. The world is now looking towards India for new drugs to manage various formidable diseases because of its rich biodiversity of medicinal plant and abundance of traditional consciousness.

Taxonomic/Scientific classification

Kingdom: Plantae
Sub-kingdom: Angiosperm
Division: Monocots
Order: Zingiberales
Family: Zingiberaceae
Genus: *Curcuma*

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Species: *caesia*

Scientific name: *Curcuma caesia* Roxby.

Material and Method

Collection of plant material

Curcuma caesia plant was collected from Agricultural field on 10th October 2022 from Nashik (Maharashtra). The rhizome were cleaned and shade dried and coarsely powdered. Stored in air tight container until further use.

Methods of Extraction

1 gm of powdered plant material of rhizome were extracted with 10 ml of different solvents (chloroform, methanol, petroleum ether and water). Plant material soaked in different solvents and sonicated by using ultrasonic bath at 33 KHz at 40 °C for 40 min. Allowed to stand for at least 24 hrs (Bidve &Auti2021). Then extracts were filtered, concentrated and used for phytochemical analysis.

Phytochemical Screening

The commonly known phytochemical from plants are Alkaloids, Triterpenoids, Saponin, Tannins, Flavonoids, Cardiac Glycoside, Protein and Amino acids, Carbohydrates, Steroids and Fats and Fixed Oils The following qualitative tests were performed to explore phytochemical profile of plants.

Alkaloids.

Wagner's test: A few drop of Wagner's reagent is added to a few amount of plant extract and a reddish brown precipitate depicts the presence of alkaloids.

TriTerpenoids

0.5ml of plant extract was added to the test tube then 2ml of chloroform was mixed to the solution. 3ml of concentrated H₂SO₄ was added carefully from the wall of the test tube, to form a lower layer. Occurrence of reddish-brown color at the interface indicated the presence of triterpenoids.

Steroid

0.5 ml of plant extract was added to the test tube then 2ml of chloroform was mixed to the solution. 3ml of concentrated H₂SO₄ was added carefully from the wall of the test tube, to form a lower layer. Occurrence of reddish-brown colour at the interface indicated the presence of steroid.

Saponin

Foam test: The plant extract is diluted with distilled water up to 20ml and is shaken for 15 minutes in graduated cylinder. The formation of thick and dense foam indicate the presence of saponins.

Tannin

A few drops of 1% gelatin solution containing sodium chloride are added to plant extract. The formation of white precipitate indicates the presence of tannin.

Flavonoid

0.5 ml of extract 5 ml of d/w was added to test tube then it

was boiled. Few drops of concentrated H₂SO₄ were added. A yellow coloration indicate the presence of flavonoid, the yellow colour disappeared on standing.

Cardiac glycoside

0.5 ml of each extract was treated with 0.2 ml glacial acetic acid the 1 drop of 3.5% ferric chloride (FeCl₃) was added to the solution. This was layered with 1ml of concentrated H₂SO₄. A reddish brown ring was occurred at interface indicate the presence of cardiac glycoside.

Fats and Fixed Oils

Between the two filter papers small amount of the extract was pressed, the stain on the filter paper indicates the presence of fixed oils.

Protein and amino acids

Ninhydrin test: To 2ml test solution, ninhydrin solution was treated and then boiled. Formation of blue colour indicate the presence of amino acid.

Millon's Test: 2 ml test solution is added with millon's reagent gives a white precipitate, which on heating changes to red colour which show the presence of protein.

Carbohydrates

Fehling Test: Dilute HCl was hydrolysed with 2ml of extract and extract also neutralized with alkali and heated with fehling's solution A and B, formation of red precipitate it indicates the presence of reducing sugar.

Result and Discussion

The qualitative analysis of methanolic extract show presence of triterpenoid, Saponin, Tannin, Flavonoids, Fat Oils and Carbohydrate. At the Same time the phytochemical like Alkaloids, Steroids, Cardiac Glycoside were absent. The qualitative test for chloroform extract show presence of Alkaloids, Triterpenoids, Saponin, Tannins, Flavonoids, Cardiac Glycoside, Protein, Amino acids and Carbohydrates. It show absence of Steroids and Fats and Fixed Oils. The petroleum ether extract show presence of Alkaloids Triterpenoid, Steroids, Saponin, Tannin, Flavonoids, Cardiac glycoside, Protein and amino acids, Carbohydrates and absence of Fats and Fixed Oils. The phytochemical analysis for water extract show presence of Alkaloids Triterpenoid, Steroids, Saponin, Tannin, Flavonoids, Protein and amino acids, Carbohydrates and show absence of Cardiac glycoside. The qualitative analysis of phytochemical revealed the presence of the biomolecules such as Alkaloids, Flavonoids, Saponins, Steroids, Tannins and Triterpenoids respectively. The plant products over Synthetic Compound in the treatment of Diseases are needed, because it does not show detrimental effect on animals and man. It has been explored for its therapeutic efficacy in India. The phytochemical present in this plant can be further used as active principal for making medicine. Further investigation of anticancerous and anti-inflammatory are also recommended.

Table 1: Phytochemical screening of Methanol, Chloroform, Petroleum ether and water rhizome extract of *C. caesia* ('+++ve' indicate strong presence, '+ve' indicate moderate presence, '+ve' indicate weekly presence, '-ve' indicate absence of chemical.)

Test	Methanolic extract	Chloroform extract	Petroleum ether extract	D/W extract
Alkaloids	-	+	++	+
Triterpenoid	+	++	+	+
Steroids	-	-	++	+
Saponin	+	+++	+++	++
Tannin	+	+++	+	+++
Flavonoids	+	+	+++	++
Cardiac glycoside	-	+	+	-
Fats and Fixed Oils	+	-	-	++
Protein and amino acids	-	+	++	+
Carbohydrates	+	++	++	+

*Values are mean of triplicate determinations on dry weight basis.

Conflict of Interest

The author hereby declares no conflict of interest.

Consent for publication

The authors declares that the work has consent for publication.

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