



## A REVIEW ON PRELIMINARY PHYTOCHEMICAL SCREENING OF *CURCUMA LONGA* LINN.

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### ABSTRACT

*Curcuma longa* commonly known as turmeric is a well herbal medicine traditionally used as a spice in Indian food. Turmeric is used in India for thousands of years as a major part of Ayurvedic medicine. It was first used as a dye and then later for its possible medicinal properties. Turmeric is traditionally used as a spice and colouring in foods due to curcuminoids curcumin, demethoxycurcumin, as important chemical constituents. *Curcuma longa* shows wide range of biological activities such as antiinflammatory, anticancer, antibacterial, antiviral, antioxidant, antiseptic, cardioprotective, hepatoprotective and digestive activities. This Review expresses the development of long from a traditional spice to a modern application in the present period.

**Keywords:** *Curcuma longa*; Turmeric; Curcumin; Ayurvedic medicine; Anti-inflammatory, Antioxidants; Anticancer; Antimicrobial activity.

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### INTRODUCTION:

Turmeric (*Curcuma longa* L.) belongs to the family Zingiberaceae includes more than 80 species of rhizomatous perennial herbs and has widespread existence in the tropics of Asia, Africa, and Australia.[1] It is a perennial herbaceous plant, which reaches a stature of up to 1 m. There are highly branched, yellow-to-orange, cylindrical, aromatic rhizomes. [2] *Curcuma longa* linn. commonly known as Haldi in India or Indian Saffron. Others various common name includes *Curcuma* (Sp. It. Fr.), *acafrão da Índia* (port.), *geelwortel* (Dutch), *kurkum* (Arab), *Manjano* (East Africa [KiSwahili]), *manjal* (Tamil), *kunyit* (Indonesia), *temukunyit* (Malaysian), and *iyu-chin* (Chin.).[3] The most important chemical components of turmeric are a group of compounds called curcuminoids, which include curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin.[4-5] The World Health Organization has suggested the use of turmeric as a spice. [6] Comprehensively, *Curcuma* is attainment importance as a growing source of new drug (s) to fight a variety of ailments as the species contain molecules validated with anti-fungal properties,[7] anti-

inflammatory, hepatoprotective, antitumor, antiviral,[8] and anticancer activities.[9]

Its rhizome is extensively used for imparting colour and flavour to food. As early as 3000 B.C., the turmeric plants were cultivated by Harappan civilization. The plant is indigenous to the South and Southeast Asian region. Rhizomes are oblong ovate or colour having characteristic odour and slightly pungent, bitter taste, root scars and annulations are present at the surface of rhizome. The fracture is horny and surface in orange. Its rhizomes are boiled for several hours and then dried in hot ovens, after which they're ground into a deep orange-yellow powder.[10]

#### Chemical Constituents of Turmeric

Phytochemical investigations carried out on *C. longa* revealed the presence of many rich sources of polyphenolic curcuminoids, i.e., curcumin, demethoxycurcumin, and bisdemethoxycurcumin. [11] Curcuminoids contain curcumin the principal curcuminoids (about 80%), and other two curcuminoids are demethoxycurcumin (about 12%) and

bisdemethoxycurcumin[12,13] along with other one's protein (6.3%), fat (5.1%), minerals (3.5%), carbohydrates (69.4%), and moisture (13.1%). [14] The essential oil (5.8%) obtained by steam distillation of rhizomes has a-phellandrene (1%), sabinene (0.6%), cineol (1%), borneol (0.5%), zingiberene (25%), and sesquiterpenes (53%).[15]

#### Medicinal Uses

As part of the ancient Indian medical system, Ayurveda, a poultice of turmeric paste is used to treat common eye infections and to dress wounds, treat bites, burns, acne, and various skin diseases. [16] In northern India, women are given a tonic of fresh turmeric paste with powder of dried ginger roots and honey in a glass of hot milk to drink twice daily after childbirth. Johnson and Johnson (An American Pharma Company) makes turmeric band-aids for the Indian market. [17] A poultice of turmeric is also applied to the perineum to aid in the healing of any lacerations in the birth canal.[18] Powdered turmeric when taken with boiled milk is helpful in curing cough and related respiratory ailment, and roasted turmeric is an ingredient used as an antidysenteric for children.[19] Turmeric is also used in the treatment of dental diseases, digestive disorders such as dyspepsia and acidity, indigestion, flatulence, ulcers, antioxidant, antifertility as well to alleviate the hallucinatory effects of hashish, and other psychotropic drugs.[20] In food and manufacturing, curcumin is currently used in perfumes and as a natural yellow-coloring agent, as well as an approved food additive to flavor various types of curries and mustards.[21] Recent emphasis on the use of natural and complementary medicines in western medicine has drawn the notice of the scientific community to this ancient remedy. Current researches have revealed that curcumin has a surprisingly wide range of beneficial properties, including anti-inflammatory, antioxidant, and chemopreventive and chemotherapeutic activity. These activities have been demonstrated both in cultured cells and animal models and have paved the way for ongoing human clinical trials.[22]

#### PRELIMINARY PHYTOCHEMICAL SCREENING

The chemical evaluation includes qualitative chemical tests which have been used for identification of various phytoconstituents present in the powdered crude drug. The Preliminary phytochemical investigations of aqueous extract, acetone extract, ethanolic extract, chloroform extract and methanolic extract of *Curcuma longa* rhizome using commonly employed precipitation and coloration reactions were performed by various researchers which reveals the presence such as carbohydrates, proteins, alkaloids, glycosides, terpenes, steroids, flavonoids, tannins and saponins [23].

The corresponding tests performed by various researchers were being compiled from standard published literatures which are described below.

#### Preparation of the Extract

The rhizomes of *Curcuma longa* were collected and sun dried, cut into small pieces The small piece of dried rhizome was then grinded to get a fine powder, which is ready for use.

#### Test for Alkaloid

The extract was mixed with 3 ml of dilute hydrochloric acid and then filtered thoroughly. The filtrate was tested carefully with following test

**(a) Mayer's Test:** To a 1 ml or 2 ml of filtrate, few drops of Mayer's reagent are added by the side of the test tube. The white or creamy precipitate indicated test as positive (presence of alkaloids).

**(b) Wagner Test:** 1 ml or 2 ml of the filtrate extract was treated with Wagner's reagent; formation of brown reddish precipitate shows positive result of alkaloids.

**(c) Dragendorff's Test:** To a few ml of filtrate, 1–2 ml of Dragendorff's reagent was added formation of prominent yellow precipitate indicates the presence of alkaloids. [24]

#### Test for Glycosides

**(a)** To 2 ml test solution, added with equal quantity of Fehling's solution A and B and solution was heated gives the positive result of glycoside. A brick red precipitate was observed.

**(b) Legal's Test:** To 2 ml or 1 ml test solution, pyridine and alkaline sodium nitroprusside was added ,get a blood red or pink colour indicate presence of glycoside .

**(c) Keller-Killani Test:** To 2 ml glacial acetic acid containing a drop of FeCl<sub>3</sub> treated with extract .Formation of a brown colour ring indicates the presence of glycoside.

**(d) Bortrager's Test:** Firstly extract was boiled with dilute sulphuric acid, filtered and to the filtrate chloroform was added and shaken well. The organic layer was separated to which ammonia is added slowly. It also shows positive result, by pink to red colour in the ammonical layer.[25]

#### Test for Flavonoids

**(a) Shinoda Test:** 2 ml test solution added with few fragments of Magnesium ribbon, dropwise conc. H<sub>2</sub>SO<sub>4</sub> was added. The results shows pink scarlet or crimson red colour.

**(b) Alkaline Reagent Test:** The test solution, was treated with sodium hydroxide solution, which gives a yellow or red colour.

**(c) Zn Test:** 2 ml extract were mixed with Zn dust and conc. HCl, after a few minutes red colour observed and it means presence of flavonoid.

#### Test for Tannins

**(a) Ferric Chloride Test:** The extract solution mixed with drops of ferric chloride solution. Presence of gallic tannins, blue colour was observed and green black for catecholic tannins.

**(b) Gelatin Test:** A white precipitate is obtained by mixing of 2 ml test solution and 1% Gelatin solution containing 10% sodium chloride.[26]

#### Test for Saponins

**Foam Test:** 5 ml extract was shaken with 20 ml distilled water and then heated to boil. Frothing shows the presence of saponins.[27]

#### Test for Triterpenoids

**Salkowski Test:** The test solution was added with 2 ml chloroform and few drops of conc. Sulphuric acid (3 ml), and shaken well. Formation of reddish brown colour at lower layer indicates presence of steroids and yellow colour shows the presence of triterpenoids.

**Test for proteins and amino acids**

**(a) Millon's Test:** 2 ml test solution is added with Millon's reagent gives a white precipitate, which on heating changes to red.

**(b) Ninhydrin Test:** To 2 ml test solution, ninhydrin solution was treated and then boiled. Formation of blue colour indicates the presence of amino acid. Again 2ml test solution, 0.2% ninhydrin solution was treated with amino acids and proteins, and then boiled shows a violet colour. [28]

**Test for Carbohydrates** The extract was dissolved in 5–10 ml of distilled water and filtered through Whatmann No.1 filter paper and the filtrate is used for the following test of carbohydrates.

**(a) Molish Test:** Firstly 2 ml solution was placed in a test tube then 1 drop of Molish Reagent was added. 2 ml of conc. HCl was added from the sides of the test tube. A violet ring was observed in the test tube. Formation of a violet ring at the junction of the two liquids indicates presence of carbohydrates.

**(b) Fehling Test:** Dilute HCl was hydrolysed with 2 ml 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. [29]

**Table 1: Previous phytochemicals analysis studies on *Curcuma longa***

Phytochemical	Result
Alkaloids Wagner's	+
Dragen droff's	+
Mayer's	+
Saponin	+
Tannin	+
Protein	-
Amino Acid	-
Flavonoids	+
Cardiac Glycosides Legal's test	+
Kellar-Killiani test	+
Carbohydrate Molisch's Test	+
Fehling Test	+

Note: + = Present; - = Absent

**Conclusion:**

It has been revealed by wide-range of survey of the literature that *Curcuma longa* with diverse pharmacological characteristics is considered as a

Universal panacea among the herbal medicine. This plant considered as a versatile medicinal plant which is responsible for the various usefulness as it possess various types of chemical compounds. So, it is obvious that to combat with the diseases a wide-ranged research is required to find their therapeutic utility. According to the previous Phytochemical screening of *Curcuma longa* linn. the presence of alkaloids, Saponins, tannins, flavanoids, cardiac glycosides and carbohydrates were to be found.

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