IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

PHARMACOGNOSTICAL AND PHYSICOCHEMICAL EVALUATION OF CURCUMA LONGA LEAVES

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ABSTRACT

Turmeric, a spice that has long been recognized for its medicinal properties, has received interest from both the medical/scientific world. as it is the major source of the polyphenol Curcumin. It aids in the management of oxidative and inflammatory conditions, metabolic syndrome, arthritis, anxiety, and hyperlipidemia. It may also help in the management of exercise-induced inflammation and muscle soreness, thus enhancing recovery and performance in active people. In addition, a relatively low dose of the complex can provide health benefits for people that do not have diagnosed health conditions.

Most of these benefits can be attributed to its antioxidant and anti-inflammatory effects. Ingesting Curcumin by itself does not lead to the associated health benefits due to its poor bioavailability, which appears to be primarily due to poor absorption,rapid metabolism, and rapid elimination. There are several components that can increase bioavailability. For example, piperine is the major active component of black pepper and, when combined in a complex with Curcumin, has been shown to increase bioavailability by 2000%. Curcumin combined with enhancing agents provides multiple health benefits.

The purpose of this research is to provide a brief overview of the plethora of research regarding the health benefits of Curcumin.

Keywords: curcumin, turmeric, antioxidant, anti-inflammatory, polyphenol

INTRODUCTION

Curcuma longa, a perennial herb and member of the Zingiberaceae (ginger) family, grows to a height of three to five feet and is cultivated extensively in Asia, India, China, and other countries with a tropical climate. It has oblong, pointed leaves and funnel-shaped yellow flowers. The rhizome, the portion of the plant used medicinally, is usually boiled, cleaned, and dried, yielding a yellow powder. Dried *Curcuma longa* is the source of the spice turmeric, the ingredient that gives curry powder its characteristic yellow color. Turmeric is used extensively in foods for its flavour and color, as well as having a long tradition of use in the Chinese and Ayurvedic systems of medicine; India has a rich history of using plants for medicinal purposes. Turmeric is a medicinal plant extensively used in Ayurveda, Unani and Siddha system of medicine as home remedy for various diseases. Turmeric is widely consumed in the countries of its origin for a variety of uses, including as a dietary spice, a dietary pigment, and an Indian folk medicine for the treatment of various illnesses. It is used in the textile and pharmaceutical industries and in Hindu religious ceremonies in one form or another. Current traditional Indian medicine uses it for biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism, and sinusitis. The old Hindu texts have described it as an aromatic stimulant and carminative. Powder of turmeric mixed with slaked lime is a household remedy for the treatment of sprains and swelling caused by injury, applied locally over the affected area. In some parts of India, the powder is taken orally for the treatment of sore throat. This non-nutritive Phytochemical is pharmacologically safe, considering that it has been consumed as a dietary spice. Turmeric (*Curcuma longa*) is extensively used as a spice, food preservative and colouring material in India, for the last few decades, extensive work has been done to establish the biological activities and pharmacological actions of turmeric and its extracts. Curcumin (diferuloylmethane), the main yellow bioactive component of turmeric has been shown to have a wide spectrum of biological actions. These include its anti-inflammatory, antioxidant, anticarcinogenic, Antimutagenic, anticoagulant, antifertility, antidiabatic, antibacterial, antifungal, antiprotozoal, antiviral, antifibrotic, Antivenom, antiulcer, hypertensive and hypocholesteremic activities. Its anticancer effect is mainly mediated through induction of apoptosis. Safety evaluation studies indicate that both turmeric and curcumin are well tolerated at a very high dose without any toxic effects. Thus, both turmeric and curcumin have the potential for the development of modern medicine for the treatment of various diseases.

SYNONYMS

Curcuma. Curcuma longa rhizoma. Curcumin. curcuminoid. Haldi. haridra. Indian saffron

BOTANICAL CLASSIFICATION

Kingdom	Plantae
Subkingdom	Tracheobionts
Super division	Spermatophyta
Division	Mangoliophyta
Order	Zingiberales
Family	Zingiberaceae
Genus	Curcuma
Speices	longa

Scientific Name Curcuma Longa

MATERIAL AND METHODS

Plant leaves of *Curcuma longa* were collected from Village Itaura, district Azamgarh, Uttar Pradesh, India in the month of October to December and authenticated by Prof Anil Kumar, department of Pharmacognosy, Pharmacy College Azamgarh Uttar Pradesh, India. A voucher specimen No- Pca-012/08, has been preserved in Department of Pharmacognosy, The leaves parts were dried under shade and powdered (40 mesh size) and stored in airtight containers

Physico-chemical standardization of leaves:

Determination of Ash value:

Ash contains inorganic radicals like phosphates, carbonates and silicates of sodium, potassium, magnesium, calcium etc. Sometimes, inorganic variables like calcium oxalate, silicate, carbonate content of the crude drug affects total ash value. Such variables are then removed by treating with acid like hydrochloric acid and used to determine quality and purity of a crude drug. Ash content in the investigated plant species *curcuma longa* was calculated by the methods given below:

Determination of Total Ash:

Weigh and ignite flat, thin, porcelain dish or a tared silica crucible Weight about 2 g of the powdered drug into the dish or crucible. Support the dish on a ring of retort stand. Heat the burner, till vapours almost cease to the evolved, then lower the dish and heat more strongly until all the carbon is burnt off. Cool in the desiccator. Weight the ash and calculate the percentage of total ash with reference to the air-dried sample of the crude drugs.

Table-1 Extract value of curcuma longa leaves

S. No	solvent	Wt. of powder (gm.)	% yield	Colour
1	methanol	15	0.6	Brownish
2	Aqueous	05	14	Brownish

Table-2 physiochemical parameters of curcuma longa leaves

S. No	Physiochemical parameters	Observation
1	Loss of drying	7.8%
2	Ash value	3,3%
3	Swelling index	0.7 cm
4	pH	6,7

Preliminary Phytochemical Screening of Extract

The extract obtained after extraction of the plant material viz., Curcuma longa. Leaves was subject to phytochemical screening which revealed the present of various active phytoconstituents. The results were presented in table no-3.

Table-3 Phytochemical screening of Curcumin longa Leafs extract

S.No	Chemical test	Methanolic extract	Aqueous extract
1	Alkaloids	-ve	-ve
2	Glycosides	+ve	+ve
3	Tannins	+ve	+ve
4	Flavonids	+ve	+ve
5	saponins	+ve	+ve
6	Resin	-ve	-ve
7	proteins	-ve	-ve

Fluorescence Analysis of Powdered drug

The powdered of the plant Curcuma longa (Leaves) in various solvents were examined under ordinary light and UV light (short and long). The powder was also treated with various chemical reagents and the changes in color were recorded and reported in Table no-4**.**

Table- 4 Fluorescence Analysis of Curcumin longa leaf Powder

S.No	treatment	Normal light	U.V (short wave length	U.V (short wave length
1	Chloroform	Brown	Brownish	Brown
2	benzen	Brown	Brownish	Gold brown
3	Dil. Acetic acid	Dark Brown	Brownish red	Brownish
4	Iodine	Redish brown	Redish brown	Brownish black
5	Dil. Hcl	Greenish brown	Redish brown	Brownish
6	Dil. H_2SO4	Brownish green	Brownish colour	Light Brown

Table 5 Foaming index of Curcumin longa leaves powder

Treatment	Sample number of the test tube									
	1	2	3	4	5	6	7	8	9	10
Dilutions (drug+Water)	1:9	2:8	3:7	4:6	5:5	6:4	7:3	8:1	9:1	10:0
Height of foam(cm)	0	0	0	0	0	0	0	0	0	0

Pharmacognostical studies

The plant was macroscopically studied. Free hand transverse sections of leaves were taken and examined. Surface preparation was done and both the surface of leaves were observed. Organoleptic evaluation was done for the appreciation of color, odour, and taste. The powder microscopy of dried leaves was also carried out. The microphotographs were taken using the compound microscope.

Transverse Section of leaf

The epidermis is found on both upper and lower surfaces of the leaf. Single-layered oval-shaped cells covered with cuticle, some cells stomata present at both the sides, mesophyll undifferentiated compactly arranged thin-walled isodiametric, chlorophyllous with intercellular spaces. Some cells filled with tannin materials. The vascular bundles, xylem, phloem, parenchymatous cells, sclerenchyma, and starch grains are present (Figure no-1)

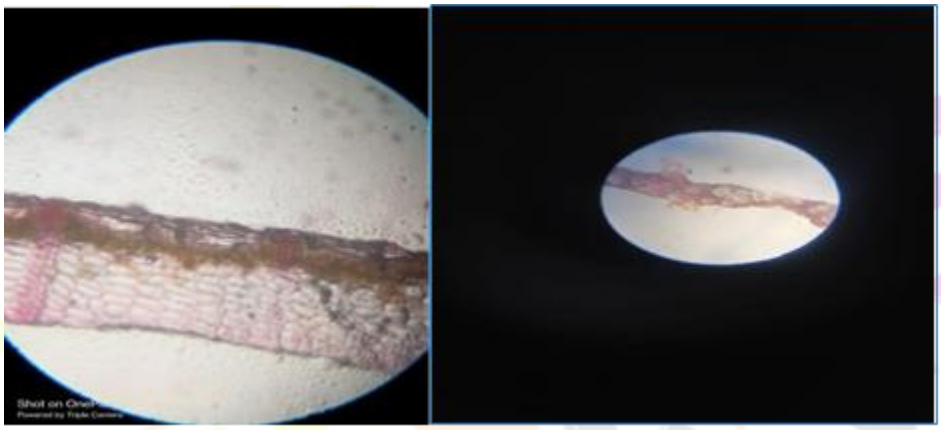

Fig- 1 Curcuma longa leaf

Powder Microscopy

Leaves were shade dried and made in to coarse powder for the powder microscopy. The diagnostic features observed were the trichomes, vessels, fibres etc. which are helpful in identification and authentication of the plant material in future works [Figure-2].

Fig-2 Powder microscopy of curcuma leaf

Conclusion

The available textual information regarding the herb *C. longa* is very minimum and inadequate. As the drug is widely used in conditions like inflammation, antimicrobial, hepatoprotective and several diseases by folklore practitioners, and to adopt it in current herbal medicinal practice, it is essential to conduct the Pharmacognostical and phytochemical analysis that covers the preliminary steps of standardization. Therefore, this study was carried out with the objective of claiming identification and also to investigate the physico-chemical analysis. The microscopic parameters and other physico-chemical reports, which are obtained in this

work, can be used for the confirmation and diagnosis of this plant may act as a stepping stone for further cavernous research works on *C. longa* in the field of plant science and medicine.

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