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PHYTO-CHEMICAL AND PHYSICO-CHEMICAL STUDIES OF *CURCUMA LONGA* RHIZOME

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ABSTRACT

The present article deals with study of phytochemical and physicochemical analysis of Curcuma longa. rhizome, a member of family Zingiberaceae. The rhizomes of Curcuma longa reported to have good medicinal values intraditional system of medicines. Phytochemical parameters of plant were studied and important chemicals constituents like alkaloids, flavonoids, aminoacids, carbohydrate, proteins, saponin and tannins were identified. Physicochemical screening of the rhizome powder showed 11.69% total ash, 0.89% acid insoluble ash, 4.07% water soluble ash, 15.16% water- soluble extractive, 16.10% alcohol soluble extractive and 3.6 pH. This information will be helpful in standardization for quality, purity and sample identification.

KEYWORDS: Curcuma longa, physicochemical screening, phytochemical parameters.

INTRODUCTION

Plant have been playing important role in curing the diseases of human being since time immemorial. The medicinal value of plants is due to some chemically active substances that produce a definite physiological action on the human body. Some important bioactive constituents of plants are alkaloids, tannins and flavonoid and phenolic compounds.[1] These compounds are synthesized by primary or rather secondary metabolism of living organisms. Secondary metabolites are chemically and taxonomically extremely diverse compounds with obscure function. They are widely used in the human therapy, agriculture, scientific research,

veterinary and many other areas.[2] Plant products are part of phyto medicines. This can be derived from barks, leaves, flowers, roots, fruits, seeds. Knowledge of the chemical constituents of plants is desirable because such information will be value for synthesis of complex chemical substances.[3,4,5]

According to World Health Organization(WHO), about 80% of individuals from developed countries use traditional medicines, derived from medicinal plants. However, such plants should be investigated to better understand their properties, safety, and efficiency.[6] Plants are used medicinally indifferent countries and are the source of potential and powerful drugs.[7] Now day's phyto chemicals studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques.

Plant synthesizes different types of chemical compounds, which can be differentiated on the basis of their chemical class, functional groups and biosynthetic origin into primary and secondary metabolites.[3] *Curcumalonga* Linn. belongs to family Zingiberaceae is a perennial herb with pulpy, orange, tuberous roots that grows to about 2feet in length and is cultivated in India, China, Bangladesh and other Asian countries with a tropical climate. *Curcumalonga* is widely used in Ayurvedic, Unani and Siddha Herbal System. It is recommended for treating diabetes, abdominal pains, menstrual disorder, wounds, eczema, jaundice, inflammation sand as a blood purifying activity. Many species of Curcuma are traditionally used for their medicinal properties. Antifungal, Antibacterial and Anti-inflammatory activity has been reported for species such as C. long, C. zedoria, C. aromatic and C. amada.[9]

MATERIALS AND METHODS: PLANT MATERIAL COLLECTION

Plant materials of Curcuma *longa* were collected plands growing at different (Erode, Perundurai, Salem, Namakkal, Alanganallur, Gobi Batlagundu) at Tamil Nadu in India. Intact root system was dug out and the rhizospheric soil samples were carefully taken in plastic bags and stored at 40C. The dried rhizomes were ground well in to a fine powder in a mixer grinder. The powder was stored in a polythene bag sat room temperatures.

Preparation of the extract

The powder plant material was subjected to hot continuous extraction in a sox let apparatus. The powder plant drug was successively extracted with methanol, Acetone, chloroform, Ethyl acetate and hot water. The liquid extracts were collected in tarred conical flask. The solvent was removed by distillation. These extracts were used to study to various qualitative chemical

tests and determine the presence of different phyto constituents like alkaloids, carbohydrates and glycosides, saponins, proteins and amino acid, phenolic compound and tannins, flavonoids etc.

Preliminary Phytochemical Screening

Phyto chemical screening of the *C. longa* was done by the standard procedures prescribed by Kokate and Harborne.[11,12]

Physico-chemical Evaluation

The different physicochemical evaluation of the powder rhizome of *c.longa* was done to evaluate the quality and purity of the extracted drug. The physicochemical parameters like moisture content, ash values, extractive values, pH etc were determined.[13,14]

RESULT AND DISCUSSION

Phytochemical analysis of rhizome of *Curcuma long a* was shown the presence of alkaloids, flavonoids, phenols, steroids, saponins, tannins, glycosides, carbohydrates, proteins, and amino acids while terpenoids found to be absent as given in Table no.1 The similar findings were reported with the extract of rhizome of *C.longa* by earlier workers.[15,16] Phytochemicals evaluation of rhizome in different solvent shows variations in presence of secondary metabolites. Methanolic extract contain10, chloroform extract 8,acetone extract 8,ethylacetate extract contain 7 where as hot water shows10numbers of secondary metabolites.

Physico chemical evaluation of C.longarhizome was shown that the results of physicochemical constants found within limit.(Table no.2) This indicates that the quality and purity of raw material was good enough. The result of moisture content 3.64%**w/w** implies that the drug is properly dried and stored. The physicochemical parameter like to ash an important as it shows the purity of drug, which implies presence or absence of foreign material like metallic salts etc.[13] The physicochemical analysis result for total ash was found table 11.69**w/w.** The ash value lies with in limit implies purity and quality of crude drug. The water soluble extractive value found to be 15.16%**w/w**. While ethanol soluble extractive value found to be 16.10%**w/w**. The water soluble extractive value shows the presence of acid sand in organic compounds.[17,14] where as alcohol soluble extractive values represents the presence of polar constituents like phenols, alkaloids, steroids, glycosides, flavonoids.[14,15] The pH value of crude drug was found to be near about3.6which indicate acidic nature of rhizome.

Table 1: Preliminary Phytochemicals Screening of *Curcumalonga* Rhizome.

Sr. No.	Test	Hotwater	Methanol	Acetone	Chloroform	Ethyl Acetate
I	**Alkaloids**					
1	Mayer's Test	+	+	+	-	-
2	Dragandorff's Test	+	+	+	+	+
3	Wagner's Test	+	+	+	-	-
II	**Flavonoids**					
1	Shinodatest	-	-	-	+	+
2	Leadacetate test	+	+	-	-	-
III	**Phenolic compound and Tannins**					
1	FeCl3test	+	+	+	-	-
IV	**Terpenoids**		**IV**	**Terpenoids**		**IV**
1	Liebermann Burchards Test	-	-	-	-	-
V	**Steroids**					
1	Salkowskitest	+	+	+	+	+
VI	**Carbohydrates**					
	Fehling's Test	+	+	+	+	+
VII	**Protein**					
	Millon's Test	+	+	-	+	+
VIII	**AminoAcid**					
	Ninhydrin Test	+	+	+	+	-
IX	**Saponins**					
	Foam Test	+	+	+	+	-
X	**Glucosides**					
1	Keller-Killian Test	+	+	+	+	+
2	Legal's test	+	+	+	+	+

Where,+=present and-=absent.

Table 2: Physico-chemical analysis of *Curcuma longa* Rhizome.

Sr. No.	Physico-chemical parameters	Values (in % w/w)
1	Total ash value	11.69%
2	Water soluble ash	4.07%
3	Acid insoluble ash	0.89%
4	Moisture content	3.64%
5	Alcohol soluble extractive value	16.10%
6	Water soluble extractive value	15.16%
7	pH	3.6

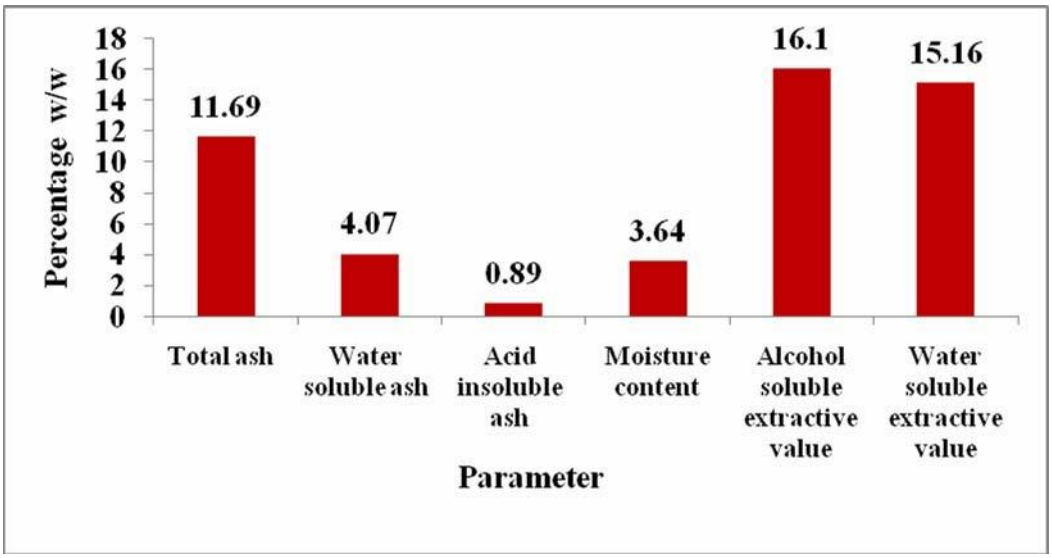

Fig. 1: Physico-chemical parameters of *Curcumalonga* Rhizom.

CONCLUSION

The phytochemical screening confirmed the presence of various phytochemical constituents such as alkaloids, flavonoids, amino acids, carbohydrate, proteins, saponin and tannins. Phytochemical constituents confirmed utilization of rhizome for treating diabetes ,abdominal pains, menstrual disorder, wounds, eczema, Jaundice, inflammations and as a blood purifying activity. Different Physico chemical parameters such as, total ash, acid insoluble ash, water soluble ash, water soluble extractive and alcohol soluble extractive value were observed. These value scan be useful to detect adulteration. All studied standardization parameters like phytochemical screening and physicochemical parameters provide the knowledge in the identification authentication of *Curcuma longa* rhizome.

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