

Pharmacognostical Study, and Pharmacological Review of *Coccinia indica* Fruit and *Zea mays* Leaves

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Abstract

Since ancient time medicinal plants are playing a vital role in the treatment of various diseases. Plants consist of several phytoconstituents, phytochemicals which have great potential in the treatment of several disorders. Only one thing is there is a need to explore them and transform them in the form of affordable with less side effect and more patient compliance medicine. "Plant sources are rich with several chemical compounds, but due to so-called development of modern medicines, it has been ignored. However, now a days several research is going on the medicinal plants and claimed activities, even though there is a need of extensive and fruitful research work as the result may turn into safe, affordable and efficacious drug. Keeping the same in view this manuscript has been prepared wherein pharmacognostical study of *Coccinia indica* and *Zea mays* or its parts are being discussed which has several claimed activities but scientifically not proven yet, even very few literatures/manuscript has been published claiming their antidiabetic property. Hence, this manuscript may help the researchers in exploring the herbal medicines or the phytoconstituents which may be useful in the treatment of deadly disorders or diseases.

Key Words: Diabetes, Phytoconstituents, pharmacognostical, *C. indica*, *Z. mays*

1. INTRODUCTION

Plants are claimed for the treatment of several diseases from ancient time. Earliest description of curative properties of medicinal plants is found in Rig-Veda (2500 - 1800 BC). Charaka Samhita and Sushruta Samhita give extensive description on various medicinal herbs. The indigenous medicines like -Ayurveda, Siddha and Unani based plant products in amelioration of several diseases. Ayurvedic system of medicine is mostly based on the treatment of diseases by using plant/its parts. This system of medicine is one of the ancient systems which have been practiced when there was no allopathic system. It has been proven that phytochemical present in the plants would be a great tool for the treatment of diseases; only thing required is to explore them dedicatedly. Now in modern era several new diseases is a challenge for human being, and hence there is need of exploring new drugs for treatment, prevention and diagnosis of the same, and in this plants/phyto constituents can play a vital role. Country like India where more than seventy percent population rely on agriculture and the rate of illiteracy as well as poverty is more, there is a need of exploring efficacious but cost effective medicines so that each and everyone can have better treatment. Considering this in view, plants can be a great choice. We need to explore our ancient systems on the basis of vast research and clinical trials of the claimed uses of plant drugs.

Allopathic treatment has several associated side or adverse effect and therefore there is risk of late stage complications that means a patient will have several other painful complications throughout life and is difficult to get rid of them in case of chronic diseases. Medicinal plants with antidiabetic activities are therefore can play an important and alternative role. As we know that medicinal plant are less expensive, with less or no side effect and hence exploration of same would be great alternative for the treatment of such chronic diseases. Extensive research

and development efforts in this particular area is very much required so that potent antidiabetic agents, phytochemicals etc can be identified and thus effective and inexpensive new drug development can take place.

2. MATERIAL AND METHODS

- Collection of Plants
- Drying
- pH determination of powdered drugs
- Pharmacognostical Studies
 - Macroscopic study
 - Microscopic study
- Pharmacological review

3. PHARMACOGNOSTICAL STUDY OF *Coccinia indica*



Fig- 1 *Coccinia indica*

Botanical Name: *Coccinia indica*

Family: Cucurbitaceae

Synonyms: Tindora, Kowai fruit

Vernacular names: Ivy gourd, Kundru, Tindora, Kovakka

3.1 Habitat

It is a perennial climber with single tendrils and glabrous leaves especially found in African and Asian regions including India.

3.2 Description

Coccinia indica is a creeper that grows wild and also can be cultivated; this plant is especially found in abundance in Bengal.

Vegetable farming methods are commonly used for its cultivation.

Leaves: Leaves are 5-10 cm, long and broad, bright green above, paler beneath, studded and sometimes rough with papillae, palmately 5-nerved from a cordate base, often with circular glands between the nerves, obtusely 5-angled or sometimes deeply 5-lobed, the lobes broad, obtuse or acute, apiculate, more or less sinuate toothed, petioles 2 - 3.2 cm. long.

Flowers: Male flowers: Peduncles are 2 - 3.8cm. long and subfiliform. Calyx-tube is glabrous, broadly campanulate 4 -5 mm. long. Corolla is 2.5 cm. long, veined, pubescent inside and glabrous outside. Female flowers: Peduncles are 1.3 - 2.5cm. long. Ovary is fusiform, glabrous and slightly ribbed.

Fruits: The fruits of *coccinia indica* is green to yellowish green and red, which has great nutritional and antidiabetic effect. Fruits are fusiform-ellipsoid, slightly beaked, 2.5-5 by 1.3-2.5 cm. sized, marked when immature with white streaks, bright scarlet when fully ripe.

Seeds: Seeds are ovoid and rounded at the apex, slightly papillose, much compressed and yellowish grey.

Roots: The fresh root is thick, tuberous, long tapering, more or less tortuous with a few fibrous rootlets attached to it. Roots are flexible, soft and break with a fibrous fracture. A transverse section of root shows circular outline and is characteristic of storage type. Parenchyma is full of starch grains and thorough permeation of parenchyma with

vascular elements is observed. The cork is composed of rows of cells.

3.3 Taxonomical Classification

Kingdom-	Plantae
Subkingdom-	Tracheobionta
Superdivision-	Spermatophyta
Division-	Magnoliophyta
Class-	Dicotyledons
Subclass-	Dilleniidae
Order-	Violales
Family-	Cucurbitaceae
Genus-	<i>Coccinia</i>
Species-	<i>Coccinia indica</i>

3.4 Chemical compound:

Pectin; Pectin present in the fruit of *coccinia indica* is basically methyl esters of polygalacturonic acid and their sodium, potassium, calcium, and ammonium salts.

Types of Pectin:

- High methoxyl
- Low methoxy

3.5 Macroscopic Study

- Color- Outer surface is dark green to greenish yellow
Inner surface is yellowish pink
- Odour- None
- Taste- Characteristic
- Shape- Oblong, Irregular

3.6 Microscopy (T.S) of *Coccinia indica* Fruit

T.S of *Coccinia indica* fruits shows:

- Epicarp
- Mesocarp
- Endocarp
- Unilocular ovary

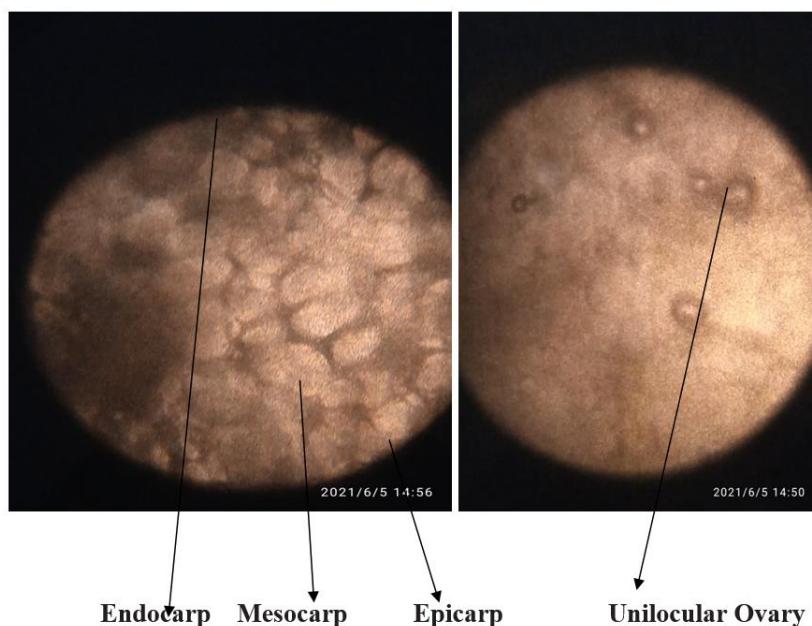


Fig-2 T.S of *Coccinia indica*

3.7 Determination of pH of powder drug (*coccinia indica*)

Materials:

- 1 gm powder drug
- 100ml distilled water
- Filter paper
- pH meter with standardized glass electrode

Method:

1gm of accurately weighed drug was heated with 100ml of distilled water and filtered. pH of the filtrate was checked with a pH meter having standardized glass electrode. The pH of the filtrate was found to be 5.54

4. PHARMACOGNOSTICAL STUDY OF *Zea Mays*



Fig-3 *Zea mays*

Botanical Name: *Zea mays*

Family: Poaceae

Synonyms: Corn, Maize, Indian corn

Vernacular Names: Makai, Bhutta, Makka cholam, Mokka Jovanalu

4.1 Habitat

It is grown during April or early May, *Zea mays* can grow in light (sandy), medium (loamy), and heavy (clay) soils. Although, it can thrive in many different types of soils it requires that the soils are well-drained especially found in United states, China, Argentina, Brazil, France, Mexico, and Romania, including India

4.2 Description

Maize, *Zea mays*, is an annual grass in the family Poaceae and is a staple food crop grown all over the world.

Stem: The maize plant possesses a simple stem of nodes and internodes.

Leaves: A pair of large leaves extend off of each internode and the leaves total 8–21 per plant. The leaves are linear or lanceolate (lance-like) with an obvious midrib (primary vein) and can grow from 30 to 100 cm (11.8–39.4 in) in length.

Flowers: The male and female inflorescences (flower bearing region of the plant) are positioned separately on the plant. The male inflorescence is known as the 'tassel' while the female inflorescence is the 'ear'. The ear of the maize is a modified spike and there may be 1–3 per plant.

Maize Grains: The maize grains, or 'kernels', are encased in husks and total 30–1000 per year. The kernels can be white, yellow, red, purple or black

4.3 Taxonomical Classification

Kingdom:	Plantae
Subkingdom:	Tracheobionta
Superdivision:	Spermatophyta
Division:	Magnoliophyta
Class:	Liliopsida
Subclass:	Commelinidae
Order:	Cyperales
Family:	Poaceae
Genus:	<i>Zea</i>
Species:	<i>Zea mays</i>

4.4 Chemical Constituent:

- Phenols,
- Flavan-3-Ol,
- Steroids,
- Flavanones,
- Proanthocyanins And
- Resveratrol

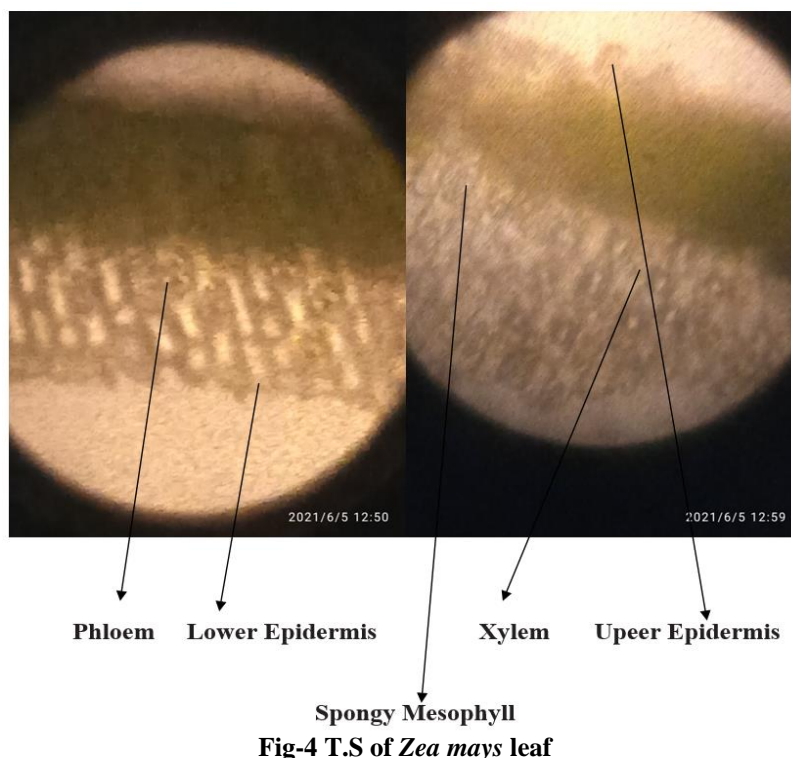
4.5 Macroscopy of *Zea mays* Leaf

- **Color-** Green, yellowish green
- **Odour-** Foul
- **Taste-** Characteristic
- **Shape-** Broad, Long
- **Arrangements-** Alternate, in two vertical rows on the opposite side of the axis

4.6 Microscopy (T.S) of *Zea mays* Leaf

A transverse section shows:-

- Spongy Mesophyll
- Upper epidermis
- Phloem
- Lower cuticle
- Xylem
- Lower epidermis



4.7 Determination of pH of powder drug (zea mays)

Materials:

- 1 gm powder drug
- 100ml distilled water
- Filter paper
- pH meter with standardized glass electrode

Method:

1gm of accurately weighed drug was heated with 100ml of distilled water and filtered. pH of the filtrate was checked with a pH meter having standardized glass electrode. The pH of the filtrate was found to be 6.12

5. PHARMACOLOGICAL ACTIVITY OF *Coccinia indica* and *Zea mays*

Table-1 Pharmacological activity of *Coccinia indica* and *Zea mays*

Plant Name	Pharmacological Activity	Reference
<i>Coccinia indica</i>	Anti inflammatory, anti pyretic and analgesic activity of fruits and leaves. Leaves are in use for the treatment of several ailments such as wound healing, ulcers, fever, asthma, hepatoprotective, antioxidant, anti-inflammatory, and antinociceptive, antidiabetic, hypolipidemic, antibacterial and antitussive activities	[1]
	Hypoglycemic activity of coccinia indica leaves,	[2],[3],[4]
	Antibacterial	[5]
	Anthelmintic activity	[6]
	Potential for controlling An. stephensi mosquito	[7]
<i>Zea mays</i>	Edema, cystitis, gout, nephritis, kidney stones, obesity, as well as prostatitis and similar ailments	[8]
	Corn silk possesses hypoglycemic, anti-tumor, antioxidant, anti-fatigue and anti-fungal properties	[9]
	Antioxidant	[10]
	Anti-prostatitis and antispasmodic	[11]
	Diuretic and a decoction of the silk is taken for the treatment of urinary troubles and gallstones	[12]
	Antihyperlipidemic	[13]
	Anti-obesity	[14]
	Antidiabetic	[15],[16]
Anti tumor,Anti cancer	[17]	

RESULTS & DISCUSSION

The pharmacognostical studies has been done which is till date not published in any literatures especially the microscopic study and pH has not been estimated. The results has been noted and the figure has been illustrated with the help of microscope. The review of pharmacological activities of chosen plants shows that they are having several pharmacological activities which needs to be explored for the benefit of mankind. The phytochemicals present in these plants has potent antidiabetic effect, and if the phytoconstituents for this activity would be identified and turned into medicine will be of great value in terms of efficacy, cost effective and safety.

CONCLUSION

Since ancient times, plants have been an exemplary source of medicine. Ayurveda and other Indian literature mention the use of plants in treatment of various human ailments. India has about 45 000 plant species and among them, several thousands have been claimed to possess medicinal properties. Research conducted in last few decades on plants mentioned in ancient literature or used traditionally for the treatment of various ailments has as shown great potential of exploration of phytoconstituents for the treatment of various diseases.

Natural products compounds discovered from medicinal plants (and their analogues thereof) have provided numerous clinically useful drugs and still remain as an essential component in the search for new medicines. So, these traditionally used plants can be exploited effectively in order to find new chemical entity as an alternative and safe treatment of diseases sepecially for chronic diseases. Pharmacognostical profile of the plants chosen in this research has not been discussed yet in any literatures, and hence these information may help the reasearcher in further study.

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