Study the Evaluation and Standardization Parameters of Citrullus Lanatus

Shraddha Nagesh Auti¹, Shreya Uttam Shirsat², Shubhangi Dnyaneshwar Panchal³, Sneha Suresh Sharma⁴, Priitam Dnyaneshwar Gole⁵, Rahul Vishnu Borkar⁶, Dr. Sachin C. Kale.⁷

¹,²,³,⁴,⁵,⁶,⁷ Anuradha College Of Pharmacy, Anuradha Nagar,Sakegaon Road Chikhli, Dist.Buldhana,443201

ABSTRACT :-

Watermelon (Citrullus lanatus) is a nourishing and popular fruit in the world. Watermelon is grown in favourable climates from tropical to temperate regions worldwide belong to the family Cucurbitaceae. Watermelon contains phytochemicals such as polyphenols, flavonoids, stilbenes/ lignans, and is rich source of carotenoids, lycopene. Watermelon contains cucurbitacin E which is anti-inflammatory phytounutrient and amino acids such as L-arginine and citrulline.

It is the major source of vitamin C and vitamin A. In the nutritional composition of watermelon includes carbohydrates, sugar, soluble and insoluble fibres. Moreover, it contains good amount of potassium and magnesium.

Watermelon by-products which can be produced such as juice, smoothies, dips, seed oils, medicines, ethanol etc., consumption of watermelons imparts various health benefits such as chemical components of watermelon enhance its capacity to scavenge the low-density lipoprotein (LDL) and high-density lipoprotein (HDL) in a cell membrane.

A plethora of evidence shows that it can be effective for weight loss. Several epidemiological studies showed it has phytochemicals that can reduce risk of Cardio Vascular Disease (CVD) aging related ailments, obesity, diabetes, ulcers, and various types of cancers.

Watermelon pomace is reported to be a concentrated source of lycopene as compared to the juice. This review shows up to date information on nutritional and Phytochemical constituents of watermelon, its wastage and by products and different methods used for dehydration, extraction and analysis of its chemical constituents.

Citrullus lanatus has been reportedly used widely in traditional herbal medicine. The leaves of Citrullus lanatus is analgesic, anti-inflammatory, mosquitocidal, gonorrhoea and anti microbial property. The fruits of Citrullus lanatus are eaten as a febrifuge when fullyripe or even when almost putrid. The fruit is used as a diuretic, anti-cancer, for treatment of high BP, antiviral and is effective in the treatment of dropsy and renal stones. The seed isalso a good vermifuge and has a hypotensive action. It is demulcent, pectoral and tonic. It is sometimes used in the treatment of the urinary tract infections as well as bed wetting. The root is purgative and in high dose it can also serve as emetic.

Fatty oil in the seed, as well as aqueous or alcoholic extracts, had been reported to paralyze tapeworms and roundworms. The seed oil has an anthelmintic action which is better than that of pumpkin seed oil.

INTRODUCTION

Medicinal Plants

A plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for semi-synthetic compounds. When a plant is designated as ‘medicinal’, it is implied that the said plant is useful as a drug or therapeutic agent or an active ingredient of a medicinal preparation. Medicinal plants may therefore be defined as a group of plants that possess some special properties or virtues that qualify them as articles of drugs and therapeutic agents, and are used for medicinal purposes.
History of medicinal plants

Plants have been used for medicinal purposes from 5000 BC with the emergence of the Indus Valley Civilization. The indigenous system of medicine, viz.-Ayurvedic, Siddha and Unani, have been in existence for several centuries. The country has 45,000 different plant species and 15000 medicinal plants that include 2000 plants used in Ayurveda, 700 in Unani, 600 in Siddha, 450 in Homoeopathy and 30 in modern medicines. The drugs are derived either from the whole plant or from different parts like leaves, stem, bark, root, flower, seed etc. Some drugs are prepared from excretory plant product such as gum, resins and latex.

Significance of medicinal plants to human beings

(1) Many of the modern medicines are produced indirectly from medicinal plants, for example aspirin.
(2) Plants are directly used as medicines by a majority of cultures around the world, for example Chinese medicine and Indian medicine.
(3) Many food crops have medicinal effects, for example garlic.
(4) Medicinal plants are resources of new drugs. It is estimated there are more than 250,000 flower plant species.

Hence studying medicinal plants helps to understand plant toxicity and protect human and animals from natural poisons. Cultivation and preservation of medicinal plants protect biological diversity, for example metabolic engineering of plants.

Future of medicinal plants

Medicinal plants have a promising future because there are about half million plants around the world, and most of their medical activities have not been investigated yet, and their pharmacological activities could be decisive in the treatment of present or future studies.

Characteristics of medicinal plants

Medicinal plants have many characteristics when used as a treatment, as follow:

• Synergic medicine - The ingredients of plants all interact simultaneously, so their uses can complement or damage others or neutralize their possible negative effects.
• Support of official medicine - The components of the plants proved to be very effective in the treatment of complex cases like cancer diseases.
• Preventive medicine - It has been proven that the component of the plants also has the ability to prevent the appearance of some diseases which can help to reduce the use of the chemical remedies and reduce the side effect of synthetic treatment.

REVIEW OF LITERATURE

A literature review is an evaluative report of studies found in the literature related to the selected area of research. The review describes, summarizes, evaluates and clarifies the literature available in the present research. It is a step towards further investigation on a particular work. It denotes with works derived from primary and secondary sources.

Itoh T et al., (1981) has demonstrated the co-occurrence of the C-24 epimers spinasterol and chondrillasterol in seeds of Citrullus lanatus (Cucurbitaceae) and seeds of bottle guard (Langenaria leucantha var. gourda) by 13C NMR spectroscopy method.[12]


AIM AND SCOPE OF THE PRESENT STUDY

The use of herbal products is global importance because of their low side effects, accessibility and affordability when compared with conventional medicine. Citrullus lanatus (watermelon) is popular in indigenous system of folk medicine and it is known to contain bioactive compounds such as cucurbitacin, triterpenes, sterols and alkaloids, vitamins, minerals.
Citrullus lanatus has been reportedly used widely in traditional herbal medicine. The leaves of Citrullus lanatus is analgesic, anti-inflammatory, mosquitocidal, gonorrhoea and antimicrobial property. The fruits of Citrullus lanatus are eaten as a febrifuge when fully ripe or even when almost putrid. The fruit is used as a diuretic, anti-cancer, for treatment of high BP, antiviral and is effective in the treatment of dropsy and renal stones. The seed is also a good vermifuge and has a hypotensive action. It is demulcent, pectoral and tonic. It is sometimes used in the treatment of the urinary tract infections as well as bed wetting. The roots are purgative and in high dose it can also serve as emetic. Fatty oil in the seed, as well as aqueous or alcoholic extracts, had been reported to paralyze tapeworms and roundworms. The rind of the fruit is prescribed in cases of alcoholic poisoning and diabetes. Citrullus lanatus is used in Northern Sudan for burns, swellings, rheumatism, gout and as laxative.

The biological activities reviewed include antimicrobial, antioxidant, anti-plasmodial, anti-inflammatory, anti-prostatic hyperplasia activity, anti-oxidant, analgesic properties, its effects on the histology of the kidney of adult Wistar rats, antidiabetic, laxative, antisucregenis and hepatoprotective activities. In view of its wide pharmacological and biological activities, it's traditionally reported therapeutic potential such as, antihypertensive, anti diabetic, as well as its in-depth toxicity studies.

PLANT PROFILE

DESCRIPTION

It is an annual climbing or trailing herb, with hairy stem up to 10m long. Tendrils divided at the tip into two or three parts. Separate male and female flowers are borne on the same plant.

Botanical Source: Citrullus lanatus (Thunb). Matsum. & Nakai

Family: Cucurbitaceae

Synonyms: Citrullus vulgaris Schrad., Colocynthis citrullus Linn., Citrullus citrullus (L.), Cucubertia citrullus L., Anguria citrullus Mill., Momordica lanata Thunb.

Common Names: Watermelon, wild watermelon, sweet melon (English); Egusi melon (English, Kenya); pastèque, melon d’eau (French).

Vernacular Names

Malaysia : Tembikai
English : Watermelon
India : Karingda
Chinese : Da zi gua zi xi gua.
Tamil : Pittcha.
Sanskrit : Tarambuja.
Hindi : Tarbuj

GEOGRAPHY & DISTRIBUTION:

Citrullus lanatus is thought to be native to Africa. It is found in grassland and bushland, mostly on sandy soils, and often along watercourses or near water, up to 1,785 m above sea level. It flourishes in dry climates and requires only limited rainfall. Some say that the Kalahari region (Botswana, Namibia and South Africa) as the area of origin, whereas others suggest it is native to north eastern Africa.

HABITAT: Grassland and bushland, often along watercourses.

Classification:

Kingdom : Plantae - Plants
Subkingdom : Tracheobionta - Vascular plants
Superdivision : Spermatophyta - Seed plants
Division : Magnoliophyta - Flowering plants
Class : Magnoliopsida – Dicotyledons
Subclass : Dilleniidae
Order: Violales
Family: Cucurbitaceae
Genus: Citrullus
Species: Citrullus lanatus (Thunb.) Mastum. & Nakai var lanatus

PHARMACOGNOSTICAL STUDIES

Pharmacognosy is the study of medicines derived from natural sources. The study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources is the definition given by The American Society of Pharmacognosy.

Herbarium of Citrullus lanatus (Thunb)
MICROSCOPICAL EVALUATION

Anatomy of the leaf: The leaf has very thick abaxially hanging midrib and thin lamina. The midrib is 1.9mm thick and 1.7mm wide. It has four thick ridges alternatively deep furrows. The adaxial part of the midrib has short, tick cone. The epidermis has

Habitat and Whole Plant of Citrullus lanatus (Thunb.) Matsum. & Nakai
LEAF OF Citrullus lanatus (Thunb.) Matsum. & Nakai

FLOWER OF Citrullus lanatus (Thunb.) Matsum. & Nakai

FRUITS OF Citrullus lanatus (Thunb.) Matsum. & Nakai
SEEDS OF *Citrullus lanatus* (Thunb.) Matsum. & Nakai

DORSAL VIEW OF *Citrullus lanatus* (Thunb.) Matsum. & Nakai LEAF.

VENTRAL VIEW OF *Citrullus lanatus* (Thunb.) Matsum. & Nakai LEAF.
LINE DRAWING OF Citrullus lanatus (Thunb.) Matsum. & Nakai.

Uses Of Watermelon

<table>
<thead>
<tr>
<th>Parts</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>Anticancer, Gonorrhea, Renal Failure, UTI, Alcohol Poisoning, Oedema, Inflammation, High Blood Pressure, Burning Sensation in Body, Fatigue.</td>
</tr>
<tr>
<td>Seed</td>
<td>Increase Cardiovascular Health, Strengthen the immune system, Antihelminthic, Diabetes treatment, Beneficial for hair strength, Beneficial for healthy and glowing skin, Boost of energy level.</td>
</tr>
<tr>
<td>Leaves</td>
<td>Analgesic, Anti inflammatory.</td>
</tr>
<tr>
<td>Flower</td>
<td>Diuretic, Coolant</td>
</tr>
</tbody>
</table>

Result And Discussion

Mixture Of 25% HCL and 96 % Ethanol Observation and Calculation Of RF Values

\[
\text{R.F. Value} = \frac{\text{Distance Travelled By Solute}}{\text{Distance Travelled By Solvent}}
\]

R.F. Value = 5/6

R.F. Value = 0.83

SUMMARY AND CONCLUSION

The present study entitled the “Pharmacognostic, Phytochemical evaluation of the Leaves of Citrullus lanatus (Thunb.) Matsum. & Nakai. (Cucurbitaceae)” focuses on a plant which is commonly available throughout India and traditionally used in treatment of various ailments.
Studies on the leaves of *Citrullus lanatus* are still lacking. Hence to exploit its potential use prompted the present study to investigate the leaves of this plant with clear scientific protocol.

The chapter on **Literature Review** deals with the information regarding the pharmacognostical, phytochemical evaluation of the *Citrullus lanatus* plant and other species of Citrullus.

The chapter on **Pharmacognostical studies** highlights on

- Macroscopical features were studied and the adherence of general characters to the family *Citrullus lanatus* was found.
- Microscopical study reveals the presence of actinocytic stomata, multi cellular uniseriate unbranched epidermal trichomes. Vascular system of the midrib is multistranded, a large abaxial median bundle, two adaxial bundle. All the bundles are bicollateral having phloem strand both outer and inner side of the xylem. The epidermal cells are small elliptical or rectangular and thin walled. Spongyparenchyma cells small and spherical. Palisade zone consist of single layer of cylindrical cells, loosely arranged.
- Quantitative microscopical studies namely stomatal number, stomatal index, vein islet number, vein termination number, ash value, extractive value, loss on drying value etc.,
- Also studied cell powder microscopy, fluorescence analysis of powder and the results helps in achieving a trouble-free identification and authenticity of the plant leaf or in powder form in future.

The chapter on **Phytochemical Evaluation** deals with

- Preliminary phytochemical screening reveals the presence of carbohydrate, alkaloids, flavanoids, protein & aminoacids, glycosides etc.,
- Quantitative determination of secondary metabolites (phenol, flavanoid, tannin content) has been carried out.
- TLC

**REFERENCES**

1. www.medicinalplants in india mp.blogspot.in.
14. Ioh T et al., (1981) has demonstrated the co-occurrence of the C-24 epimers spinasterol and chondrillasterol in seeds of Citrullus lanatus (Cucurbitaceae) and seeds of bottle guard (Langenaria leucantha var. gourda) by 13C NMR spectroscopy method,[12]
15. Perkin S et al., (2006) have determined the carotenoid content (84.97%) of Citrullus lanatus by HPLC method and lycopene content of Citrullus lanatus by colorimetric assay. The total lycopene content was used to separate watermelon cultivars into low (more than50mg/kg fw), average (50-70mg/kg fw), high (70-90mg/kg fw), and very high (less than90mg/kg fw). Cultivars varied greatly in lycopene content, ranging from 33 to 100mg/kg).[38]

17. Ouassor I, Aqil Y, Belmaghraoui W, Hajjaji SE. 2020. Characterization of two Moroccan watermelon seeds oil varieties by three different extraction methods. OCL 27: 13. [CrossRef] [EDP Sciences] [Google Scholar]


