Preliminary Pharmacognostic and Phytochemical Study on *Corn Silk* and *Sour Orange.*

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Abstract

Aim: *To evaluate Pharmacognostic features including macroscopic, microscopic and physicochemical parameters of the corn silk and sour orange juice.*

Methods: *Corn silk and sour orange were studied macroscopically and microscopically. Preliminary phytochemical investigation of plant material was done.*

Result: *The colour, shape, size, odor, and surface features had been observed from hair of corn silk and peel and juice of sour orange by using electron microscope, Microscope images of cross selection of corn silk and sour oranges existence of cork cells, presence of oil globules, vertical lines, lower epidermis, oil glands, epidermal cells, globular chromoplast, crystalline chromoplast, pictures taken by iPhone camera. Phytochemical testing revealed the existence of flavonoids, alkaloids, tannins, phenols, steroids, acid compounds, glycosides, amino acids, and proteins. Physicochemical parameters including moisture content, ash value, extractive value and fluorescent behavior of corn silk extract and sour orange juice had been identified.*

Conclusion*: The present studies useful in a strive to supplement the data with consider to its identity standardization, and performing additional exploration on Ayurveda approach to medicine*.

Keyword: *Urolithiasis, Ethylene Glycol, Calcium Oxalate, Corn, sour orange*

1. **Introduction:**

Corn silk tea prepared by boiling corn silk in water is applicable for bladder problems. (1) Drinking Corn silk tea increases the manufacture of urine and helps in the easy removal of kidney stones due to its diuretic activity. This is also helping for managing diabetes and blood pressure-related problems. Diabetic patients are advised to consult a physician before taking Corn silk tea as its potency cause too much overcast of blood sugar due to its blood sugar-lowering property. Its ability also causes allergies like skin rash and irritation among hypersensitive particular, (2) Corn, also known as Maize, is one of the most popular cereal grains in the world. It contains various nutrients and phytochemicals (such as carotenoids and phytosterols) that play a very important role in managing various diseases. Corn flour is also very beneficial for health as it contains important B vitamins, iron, potassium, magnesium and other nutrients. Apart from Corn, Corn silk (which are long strands attached to an ear of corn) is also used for medicinal purposes. (3) Citrus aurantium (Rutaceae), the unripe fruit of bitter orange is used in traditional medicine to treat urolithiasis. (4) Previous studies have shown that Citrus aurantium have numerous bioactive compounds, including Polyethoxylated flavones (PMFs), flavonoid glycosides, alkaloids these active components demonstrate pharmacological activity; antioxidant, antimicrobial effect. (5) Citrus fruits, including oranges, grapefruits, and lemons, and the juices produced from these fruits, are central components of the modern diet and enjoy growing popularity with recent health trends. The consumption of these juices might influence the evolution of kidney stones

in several aspects. On the one hand, the protective effects include the liquid intake itself entailed with juice consumption, the high citrate content, and the alkalinizing effect on urinary pH. (6)The products containing *p*-synephrine and *C. aurantium* extract gained on popularity after products containing Ma hung or Ephedra species have been outlawed. Ephedra extracts contain ephedrine, a protoalkaloid with β-agonist properties. Ephedrine use may result in increased physical capabilities, thermogenesis, and appetite reduction. These effects are even more pronounced if ephedrine is combined with training and/or caffeine intake. However, ephedrine may cause serious adverse reactions, even with death outcomes. As a result, ephedrine supplements are banned in many countries (Bent et al., 2004). Numerous food supplement producers have tried to find appropriate substitute for Ephedra and ephedrine in their formulations. As an herbal product with similar protoalkaloid, *p*-synephrine, *C. aurantium* has been perceived as such (Preuss et al., 2002; Westanmo, 2007). Trials on human subjects have shown that *C. aurantium* and *p*-synephrine may increase resting metabolic rate and energy expenditure, as well as decrease weight when given for 6–12 weeks (Gougeon et al., 2005; Preuss et al., 2002; Stohs et al., 2011). The flavonoids present in the *C. aurantium* extract also contribute to the observed effects (7)

2. Materials and method

Chemicals: ferric chloride, gelatin solution, iodine, magnesium Solvents including water, ethanol, methanol, chloroform, acetic anhydride, glacial acetic acid, hydrochloric acid, nitric acid, and sulfuric acid and phytochemical reagents including bismuth sub-nitrate, bromine solution.ribbons,potassiumiodide,panisaldehyde, Dragendorff's reagent, and iodine were acquired from Sigma Aldrich Chemical Corporation.2,2-diphenyl-1-picrylhydrazyl (DPPH) ferric chloride hexahydrate Folin Ciocalteu, gallic acid, sodium carbonate, ascorbic acid aluminum chloride, and rutin hydrate, 2,4,6-tris(2-pyridyl)-s-triazine (TPTZ), acetate buffer, and Potassium bromide. (8)

3. Collection of Baby corn silk and sour orange

Baby corn silk samples were collected from Maharashtra and were cultivated through organic farming at the Ahmednagar district. The samples were identified, authenticated, and deposited at the herbarium of Department of Pharmacognosy, Faculty of Pharmacy, the colors of silk were yellow and red shown. The silk was harvested 7 days (silking stage) after their emergence. (9) (10)Fresh silk was cleaned with tap water. Distilled water, and dried at room temp, Fresh Sour Orange was collected from nearby farm of Ahmednagar district. The samples were identified, authenticated, and deposited at the herbarium of Department of Pharmacognosy shown in images.

4. Collection and authentication of plant material:

Authentication was done in Padmashri vikhe Patil College of arts, science and commerce, in department of botany and research center by Dr.S. P Giri head and research guide Dept. Of Botony and research Centre PVP College, loni, where identification of family of 1.*Citrus aurantium* was *Rutaceae* with local name Idlimbu, sour orange.2. Zea mays L belong to family Poaceae with local name corn, maka. Certificate shown in (fig.1)

PADMASHRI VIKHE PATIL COLLEGE OF ARTS, SCIENCE AND COMMERCE,

POST GRADUATE DEPARTMENT OF BOTANY AND RESEARCH CENTRE

Authentication Certificate

This is to certify that the plant specimen collected by Miss. Pooja Subhash Ighe, Student of S.Y.M. Pharmacy (Pharmacognosy) of Pravara Rural College of Pharmacy, Loni, Ahmednagar are

1. *Citrus sinensis* L. and belongs to family Rutaceae with local name Idlimbu, Sour Orange etc.
2. *Zea mays* L. and belongs to family Poaceae with local name Corn,Maka.

Identified by Verified b

Dr. S.P. Giri
Head and Research Guide
Dept. of Botany and Research Centre
PVP College, Loni

Date: 29th September 2022
Place: Pravaranagar
Ref. No./PVPC/Bot/2022-23/ 57

(11)

Figure 1. Certificate of authentication.

5. Pharmacognostic evaluation:

5.1 Organoleptic evaluation:

Organoleptic evaluation of corn silk and sour orange have been executed with respect the colour, size, odor, shape, taste, surface and fracture according to WHO Quality Control methods of herbal medicine. (12) **table no (1), (2)** The term organoleptic literally means the impression on five sense organs of man, namely, eyes, nose, tongue, ears, and touch. Organoleptic evaluation is a qualitative method wherein the worker (pharmacognosist) uses his sense organs to study the characteristic features of crude drugs, especially the crude drugs of plant origin. In this method, the worker uses the sense of sight, smell, taste, hearing, and feeling, to study the crude drugs and records data such as size, shape, colors (external and internal), markings, fractures, texture, odor, taste, and so on. The methodology involved in this study is known as Organoleptic in general and the data obtained is referred to as Sensory characters in particular. (13)

5.2 Microscopic evaluation

Preparation of sections: corn silk hair was kept in watch glass in water and in other watch glass sudden red reagent deep corn silk hair. Citrus peel was cut in section with sharp blade on glass slide white portion of peel was observed; in other watch glass pulp was removed from fruit of sour orange. The type of microscope employed for the study of different characters was compound microscope. (14)

5.3 Powdered microscopy: The powder microscopy was carried out in accordance with the procedure described in Khandelwal. (15)Powder microscopy is an evaluation quality control method, used for medicinal plants to study the specific microscopic characters using different staining reagent. The detection of adulterants in a sample by performing a comparison study using authenticated sample. Microscopic analysis has been widely used for the identification, and investigation of pharmaceutical materials. It enables detailed observations and measurement of the microstructures and the interaction between active pharmaceutical ingredient (API) and inert excipients.

5.4 Preparation of extracts and preliminary phytochemical analysis: Aqueous extraction is distinguished from mechanical extraction by one characteristic: all of the aqueous methods depend on the use of water or another liquid to extract the ore, and often the water is used to aid in the gravity separation of the valuable mineral. Aqueous extraction part used corn hair, solvent used distilled water, method used reflux extraction, and The Corn silk has been extracted with aqueous water 100g of drug in 500ml of water extracted for 3 hrs. aceration at room temperature for 24 hours and Evaporated. Then, the extracts were confronted with preliminary phytochemical screening as mentioned in standard methods. (14) Sour orange juice diluted with water and test was performed. (16)

5.5 Physicochemical analysis

Physicochemical parameters including ash value, moisture content and extractive values had been established based on the techniques described in WHO quality control methods for herbal materials (17) shown in **table no (3)** (18) (19)Physicochemical analysis has evaluated the particular chemical properties of test substances, which have been identified as key structural components contributing to penetration, irritation, or sensitization. (20) (21)

5.6 Thin layer chromatography (TLC) investigation.

Thin layer chromatography (TLC) is an affinity-based method used to separate compounds in a mixture. TLC is a highly versatile separation method that is widely used for both qualitative and quantitative sample analysis. TLC can be used to analyze virtually any substance class, including pesticides, steroids, alkaloids, lipids, nucleotides, glycosides, carbohydrates, and fatty acids. (22) TLC analysis of extracts was with a stationary phase of TLC silica gel, glass slide, spread silica gel on slide dry, Thin Layer Chromatography is a technique used to isolate non-volatile mixtures. The experiment is conducted on a sheet of aluminum foil, plastic, or glass which is coated with a thin layer of adsorbent material. The material usually used is aluminum, cellulose, or silica gel**.** The mobile phase has different properties from the stationary phase. For example, with silica gel, a very polar substance, non-polar mobile phases such as heptane are used. The mobile phase may be a mixture, allowing chemists to fine-tune the bulk properties of the mobile phase. (23)

Aqueous extract, of *Corn silk* Stationary phase: Silica Gel G, Mobile phase: chloroform: methanol Aqueous extract of *Sour orange* Stationary phase silica Gel G Mobile phase: chloroform: methanol (24) shown in **fig no (8), (9).**

6. Qualitative analysis

6.1: Phytochemical investigation

6.3: Tests for flavonoids.

Each of the extracts was reveal to phytochemical analysis for of chemical components using procedures as report valuable. All tests were finished in triplicate. **Table no (4)**

6.2: Tests for steroids and terpenoids.

Liebermann Burchard test: The extract was treated with acetic anhydride and chloroform followed by concentrated sulfuric

6.4: Tests for tannins.

Acid, and shaken well. Appearance of green and reddish-brown colors indicates the presence of steroids and terpenoids, respectively. Salkowski test: Each extract solution was added to chloroform, and then concentrated sulfuric acid was carefully poured into a mixture. The development of reddish purple and reddish brown at the interface confirmed the presence of steroids and terpenoids respectively.

Cyanidin's test (Shinoda's test): The methanolic solution of the extract when treated with magnesium ribbons and concentrated hydrochloric acid gave the magenta color of flavonoid solutions.

Ferric chloride test: The extract was reacted with some drops of 10% w/v ferric chloride solution. The resulting blackish green color designates the existence of flavonoids

Gelatin solution: 5% w/v Gelatin solution and 10% w/v sodium chloride solution were poured into the solution of extract. If white precipitates are obtained, tannins are present. Ferric chloride test: 10% w/v Ferric chloride solution was added to the extract solution. A green or brownish green color indicates the presence of tannins. Bromine water test: The bromine solution was added to the extract solution. If yellow precipitates are observed, tannins are present.

6.5: Tests for alkaloids. Dragendroff's test:

The extract solution was treated with Dragendorff's reagent (bismuth potassium iodide) and the development of orange red precipitates indicates the existence of alkaloids. Wagner's test: The Wagner's reagent (iodine in potassium iodide) was added to the extract solution. The emergence of reddish-brown precipitates indicates the existence of alkaloids.

6.6: Test for reducing sugars

A little amount of Fehling's reagent was added to the aqueous extract, and the mixture was boiled for 2 minutes. A brick red colour indicated the presence of glycosides.

6.7: Test for proteins

0.5 ml of aqueous extract was treated with equal volume of 1% sodium hydroxide, to which a few drops of copper sulphate solution was gently added. The solution turning to purple colour indicated the presence of proteins.

6.8 Test for carbohydrates

Molisch's reagent was added to 2 ml of aqueous extract. A little amount of concentrated sulphuric acid was added to it and allowed to form a layer. The mixture was shaken well, and allowed to stand for few more minutes, which was then diluted by adding 5 ml of distilled water. Purple precipitate ring showed the presence of carbohydrates.

6.9 Test for saponins

0.5 gm of ethanolic extract was boiled and the mixture was filtered. To 2.5 ml of the filterate, 10 ml of distilled water was added in a test-tube. It was shaken well for few minutes and was allowed to stand for sometime. Frothing along with the formation of honey comb indicated the presence of saponins.

6.10: Test for cardiac glycosides

2 ml of acetic anhydride was added to 0.5 gm of extract. Then one drop of 1% ferric chloride along with a little amount of concentrated sulphuric acid was added. A brown ring formation at the interphase indicated the presence of de-oxy sugars, which showed the presence of cardiac glycosides.

Results:

Organoleptic evaluation

Table no 1: microscopic characteristics of corn silk.

Table no 2: microscopic characteristics of sour orange

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Sr.no	Organoleptic characters	Observation
1	Colour	Pale yellow brown
2	Shape	Thread like
3	Odour	Unpleasant
4	Taste	Slightly sweet
5	Texture	Silky fibers

Table 1Organoleptic characters of Corn Silk (25)

Table 2 Organoleptic characters of Sour Orange (26)

Sr.no	Organoleptic Characters	Observation
1	Colour	Green
2	Shape	Oval
3	Odour	Characteristic
4	Taste	Bitter
5	Texture	Textured skin

Microscopic evaluation:

Corn silk was observed under microscope slide with drop of water and corn hair fig no (2) vertical lines observed. Corn silk hair with drop of sudden red fig no (3) oil globules present.

Sour orange peel was observed oil glands, epidermal cell fig no (4) sour orange pulp observed globular chromoplast. Fig no (5).

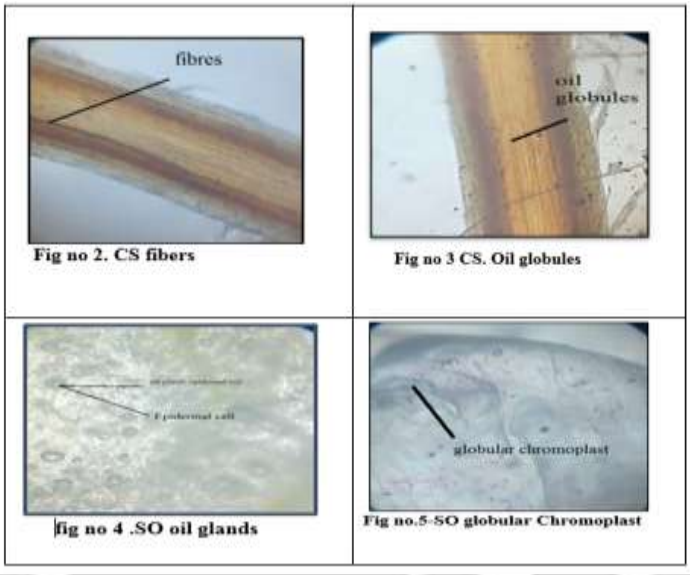

Figure 2 Microscopy of Corn Silk and Sour Orange

- **Physicochemical parameters: corn silk table no (3)**
  The results attained from various determinations of physicochemical analysis are tabulated in

Sr.no	Parameters	Values
1	Moisture content (Loss on drying)	0.1 g
2	Total ash	35%
3	Water soluble value	0.17%
4	Alcohol soluble value	0.09%

Table 3 ***Physicochemical parameters corn silk table***

Thin layer chromatography (TLC) result

1. **TLC of sour orange shown in fig no (6)**

RF = dist. Travelled by compound / dist. Travelled by solvent

= 4.5 / 5.5

= 0.81

2. **TLC of corn silk shown in fig no (7)**

RF = dist. Travelled by compound / dist. Travelled by solvent

= 3.3 / 5

= 0.66

Figure 3 ***TLC of sour orange***

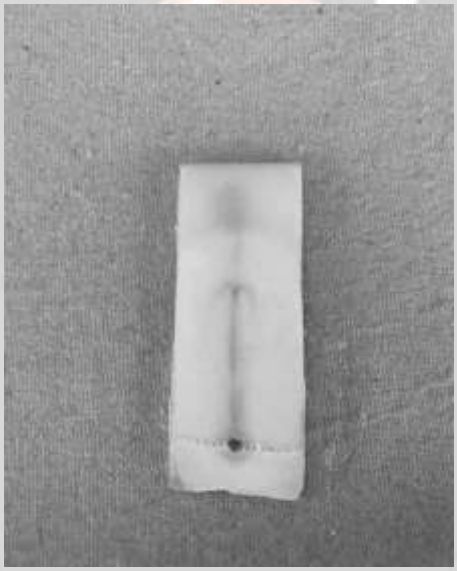

Figure 4 ***TLC of corn silk***

- **Preliminary phytochemical analysis**

The results of qualitative phytochemical analysis of corn silk and sour orange (29)

Table 4 Qualitative analysis of the phytochemicals of baby corn silk extracts.

Sr no.	Phytochemical	Test performed	Corn silk	Sour orange
1.	Carbohydrates	Molisch's test	+	+
2.	Alkaloids	Magner's dragendorff	+	-
3.	Tannins	Gelatin lead acetate	+	-
4.	Reducing sugar	Felling's test	+	+
5.	Protein	Biuret test	-	-
6.	Cardiac glycoside	Ring test	+	+
7.	Steroids	Ring test	-	+
8.	Phytosterols	Liebermann Burchard	-	-
9.	Phenols	FC method	-	+
10.	Flavonoids	Aluminum chloride	+	-

11.	Amino acid	Million tests	+	+
12	Fixed oils	Spot test	-	+
13.	Terpenoids	Liebermann Burchard	+	_-

+ = Present; – = Absent.

DISCUSSION:

Indian systems of medicine utilize majority of the crude drugs which are of plant origin. It is important that standards need to be set down to control and check the identity of the plant and confirm its quality before use. Hence a detailed pharmacogenetic assessment is an extremely an important prerequisite. In accordance with World Health Organization (WHO), the organoleptic and histological description of a medicinal plant could be the first step towards establishing its identity and purity and should be performed before to any tests tend to be undertaken (30) .

APPLICATIONS:

It is used for the treatment of cystitis, edema, kidney stones, diuretic, prostate disorder, and urinary infections as well as bedwetting and obesity soothes and relaxes the lining of the bladder and urinary tubules, hence reducing irritation and increasing urine secretion

CONCLUSION:

It has been reported to be used in the treatment of hypercholesterolemia, urinary infections, and associated diseases. Corn silk is also used as an important ingredient in development of various drugs. It has been found to be nontoxic and is safe for human consumption. Its potential antioxidant and healthcare applications as diuretic agent, in hyperglycemia reduction, as anti-depressant and anti-fatigue Sour Orange content in citrus fruit juices, which is one of the strongest inhibitors of urinary stone formation. Sour orange found in citrus fruits, helps block the formation of kidney stones and can help keep you safe.

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CONFLICT OF INTEREST

We have No Conflict of interest.

Authors Contribution Statement

Prof. Vikhe Sunaina had given her contribution to directing article and helps to find out different article based phytochemical analysis of baby corn silk (Stigma Maydis) extracts. Miss. Pooja dighe had given her contribution to collect

Data from different journal article and making manuscript.

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