



THE EFFECT OF CORN SILK HERBAL TEA AS AN IMMUNITY BOOSTER AND ITS MULTIDISCIPLINARY ACTIVITY

Hafsa Khan^{1†} & Ankit Mishra²

^{1,2}Shri Ram Murti Smarak College of Engineering & Technology (Pharmacy), Bareilly, Uttar Pradesh, India

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Corresponding Author:

† Hafsa Khan

Email:

hafsakhan191919@gmail.com

† Shri Ram Murti Smarak
College of Engineering &
Technology (Pharmacy),
Bareilly, Uttar Pradesh, India

ABSTRACT

Herbal tea is basically an herbal mixture made from leaves, seeds or roots of various plants. There is several “*tisanes*” (i.e.) herbal tea that has been used for their medicinal properties. Likewise, a research formulation is done on not so common ingredients including corn silk and stevia (along with lemon and cardamom) and a highly effective herbal tea is prepared in the form of tea bags. This tea not only start a good day with a soothing effect but also has wide range of pharmacological actions that include anti-diabetic, anti-hypertensive, anti-depressing, anti-inflammatory, prevent urinary tract infections and many more. Also, in order to prevent mistakes in traditional methods, to maintain a microbiologically safe product while allowing them to be consumed in every season, to find out value added material usage in beverage sector, herbal extracts are produced like the corn silk herbal tea. The corn silk herbal tea is rich source of natural bioactive compounds like carotenoids, flavonoids, terpenoids, saponins, phenolic acids and many more.

KEY WORDS: Corn silk, Stevia, Anti-diabetic, Anti-oxidant, Biological description, Pharmacological description

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INTRODUCTION

Corn silk (*Stigma maydis*) is an important natural herb used traditionally in India and native Asian countries to treat many diseases. It is also used as traditional medicine in many parts of the world. It enhances the immunity power in combination with stevia leaves. It is a potential antioxidant and various healthcare applications like diuretic agent, in hyperglycemia, as an anti-depressant and anti-fatigue use have been claimed in several reports. Other uses of corn silk herbal tea include treatment of urinary tract related problems. The potential use is very much related to its properties and mechanism of action of its plants bioactive constituents such as flavonoids and terpenoids. Corn silk (*Zea mays*) herbal tea is a green tea which is the nature’s treasure to mankind. It comprise of numerous advantages of corn silk with goodness of stevia leave (*Stevia rebaudiana*) along with flavor and benefits lemon and cardamom. There are variety of herbs which have been used since ages in treating various illness and form basic platform of modern medicines [1].



Fig 1: Corn silk tea bag



Fig 2: one corn silk tea box with 20 tea bags



Fig 3: Corn silk herbal (2g) each tea

Corn silk (*Stigma maydis*) is made from stigmas, the yellowish thread like strands from the female flower of maize. It is a waste material from the cultivation of corn and is available in abundance [2]. Corn silk is rich in antioxidants such as saponins, allantoin, sterols, especially beta sitosterol and stigmaterol, polyphenols, mucilage, vitamin K, vitamin C, anthocyanins, tannins, alkaloid and plant acid. Corn silk also contain numerous chemical nutrient compound including vitamins, proteins, carbohydrates, alkaloids, mineral salts, flavonoids, tannins, steroids as well as volatile chemicals. IgE antibody inhibition is done by glycoproteins present in corn silk along with enhancement of IgG and IgM formation. Corn silk has an appreciable pharmacological activity which includes anti diabolic, anti hypertensive, anti diuretic, immune function regulations, anti oxidation, anti tumour, urinary tract stone formation, and anti hyperlipidimic. In addition, it also show anti-fatigue activity and anti depressant activity [2,3]. It demonstrated protective effects in radiation and nephrotoxicity[4]. The liquid extract of corn silk is sold in market as a remedy for irritable condition of bladder [5].

Stevia rebaudiana Bertoni is a small, herbaceous, semi-bushy perennial plant also known as sweet herb, honey yerba, honey leaf, and candy leaf belonging to family *Asteraceae* (*Compositae*) whose leaves are used since ages in medicines and to sweeten drinks such as mate[6,7]. It is a short day plant and flowering is observed from January to March in Southern hemisphere. The flowers are white in colour with purple throat. A sandy soil along with warm sunny position is suitable for its growth [7]. The cultivation of stevia is attaining peak due to increased demand of natural sweeteners. The groups of natural sweeteners that have been extracted by stevia are Diterpene glycosides. The leaves of wild stevia plants contain 0.3% dulcoside, 0.6% rebaudioside C, 3.8% rebaudioside and 9.1% stevioside.

Lemon is also used in preparation of corn silk herbal tea due to its beneficial pharmacological profile which include prevention of kidney stone, support weight loss, soothe a sore throat, anti cancer properties, potassium power, bring down fever, balance pH, purifies blood, balance blood sugar, treats acne and pimples[8].

Cardamom is also an ingredient used in corn silk herbal tea due to its pleasing flavor and numerous medicinal properties like antiseptic (pulmonary), stomachic, sialogogue, emmenagogue, diuretic, cardiogenic, cephalic, antibacterial, anthelmintic, expectorant, aphrodisiac, and antispasmodic (neuromuscular)[9].

The aim of this article is the development of a new herbal tea that has multi disciplinary effect. It not only cures certain disease but also a perfect drink for start of a day full of nutritions.

BIOLOGICAL DESCRIPTION

1) Corn Silk

Maydis stigma are soft fibre like growth, and accompanies the ear of corn.[5] They belong to family Poaceae or Gramineae.

Corn (*Zea mays* Linnaeus) is indigenous to Mesoamerica and was domesticated in Mexico 9000 years ago. It is used as traditional medicine in many parts of the world like China, Turkey, United States & France.[10]

2) Stevia leaves

Stevia rebaudiana is a sweet herb which belong to the genus `Stevia` and family Asteraceae.[11]

The first country to commercialize and use crude, unpurified extracts of *Stevia rebaudiana* was Japan in 1970s and eventually spread to several countries like Asia and Latin America. Now stevia plant is commercially cultivated in Argentina, Columbia, Brazil, China, Paraguay, Malaysia, South Korea, Australia, Vietnam, Israel, United States and Kenya.[12]

3) Lemon

Citrus limon is a plant of genus Citrus and belong to the family Rutaceae.[8]

It is one of the most important species of citrus with a production totaling of 4.4 million tones. Argentina with 1.2 million tones is currently the world`s largest producer of lemon.[13]

Geographically, it is indigenous to North India, but cultivated on a very large scale in countries like Sicily, Italy, and Spain. It is also cultivated in India, Florida, and California. The cultivation in India is carried out in U.P, M.P, Punjab, and Karnataka.[8]

4) Cardamom

Elettaria cardamomum is a valuable spice with multi properties belonging to family Zingibaraceae and also known as `Queen of Spices`. It originates from coastal regions of India and now grown in Tanzania, Gautemala, El Salvador, Sri Lanka, Vietnam, Cambodia and Laos. It is indigenously grown in evergreen forests of Western Ghats in South India.[9]

PHARMACOLOGICAL DESCRIPTION

1) Corn silk

The pharmacological activity of corn silk include-

1.1) **Antioxidant activity** – The main characteristic of an antioxidant is its ability to trap free radicals. Corn silk is traditionally used medicine for its antioxidant properties.^[2] This can prevent risk of number of diseases like atherosclerosis, cancer, diabetes, aging, neuro degenerative disorder & inflammatory problems. It is also considered to be less toxic than synthetic antioxidants like butylated hydroxyanisole (BHA) & butylated hydroxytoluene (BHT)^[1] This antioxidant activity is due to the presence of alkaloids, flavanoids, tannins, glycosides, phenols & steroids in corn silk.^[2]

1.2) **Anti-Diabetic activity** – Corn silk is beneficial for for the condition of diabetes mellitus, which is associated with the abnormal functioning of hormone `insulin` that is secreted by the pancreas in the Islets of Langerhans by Beta cells.^[2] Experimental study showed that corn silk extracts markedly reduced hyperglycemia in alloxan-induced diabetic mice.^[3] in biological phenomenon, reducing sugars like fructose & glucose are able to react non-enzymatically with proteins to form Schiff bases and Armadori products, which later produce advanced glycation end products (AGEs). Hence, total phenol content of corn silk extracts & and its resistance to certain fungal infections such as *Fusarium graminearum* showed its potential for development of natural AGE inhibitors in prevention of diabetic and aging complications.^[1]

1.3) **Urinary tract infection** – such infections are more common in females in comparison to males. Throughout the world, there are several reports that state use of corn silk as a herbal treatment for urinary tract infections.^[2] Corn silk has tendency to soothe and coat irritated & inflamed tissue. Corn silk extract also helps to stimulate the kidney & bladder and increase the flow of urine and can also treat kidney stones in adults. It is also believed that corn silk herbal tea diminish prostate inflammation & the accompanying pain during urination.^[3] It also treats the stones in kidneys.

1.4) **Anti-depressant activity** – This activity of corn silk was detected by force swimming tests (FST) & tail suspension tests (TST) on mice for 6 & 5 min, respectively. 1hr after treatment with 125, 250, 500, 1000, 1500 mg/kg extract.^[14] Recent studies also supported this finding in corn silk showed an anti-depressant activity towards streptozotocin-induced diabetic rats.^[15]

- There are numerous other pharmacological actions of corn silk like diuresis & kaliuresis effect, anti-fatigue activity, anti-hyperlipidemic effects, nephrotoxicity reduction, anti-inflammatory activity, neuroprotective effect ^[1], anxiolytic effect^[2], anti-microbial activity, and has high nutritional value^[3]

2) Stevia leaves

Stevia has wide range of pharmacological activities which include anti-oxidant, anti-tumor, anti-microbial, anti-fungal and annti-carcinogenic activities.^[16,17] leaves of *Stevia rebaudiana* are recommended as a treatment for various chronic and non-chronic disorders like diabetes, hypertension, cardiovascular disease, cancer, renal disease, diarrhea, obesity & dental crises. Steviol glycosides are involved to enhance insulin production by directly acting on beta-cells without modifying the activity of K⁺-ATP channels and Camp levels in islets, thus providing their efficiency to cure diabetes.^[11]

The Japanese have performed over 40,000 clinical studies on stevia and found it to be safe. In raw form, stevia has a very subtle liquorice essence to it. A sign of excellent stevia product is that it is free from this liquorice essence and still not bitter (Tateo et al. 1998 ^[6]). Genus Jan (2002) concluded that Stevia and Stevioside are safe when used as sweetener. Stevia is used for both diabetic and Phenyl ketonuria patients as well as for the persons who do not want sugar in their diet in order to lose weight. And best part about this natural sweetener is that it do not have any allergic reactions.^[6]

3) Lemon ^[8]

There are numerous pharmacological benefits of lemon that are as follows:-

3.1) **Support weight loss-** it contains pectin, a soluble fibre which promote weight loss.

3.2) **Prevent kidney stones-** lemon use enhance the citrate levels in urine and studies proves that this reduced the calcium stones in kidney.

3.3) **Stop an itch-** lemon juice show anti-inflammatory action.

3.4) **Start your day right-** Use of corn silk herbal tea with goodness of lemon despite of Caffeinated drinks stimulate digestive tract and add vitamin-C.

3.5) **Balance pH-** it balance the pH of the body.

3.6) **Bring down fever-** it also maintain the body temperature.

3.7) **Anti-cancer properties-** studies have proven lemon to be anti-cancerous, compounds that protect cells from damage which is formation of cancer cells.

3.8) **Potassium power-** it contains 80mg of Vit-C minerals, which helps the body to remain strong & nimble.

4) Cardamom ^[9,18]

Cardamom possesses various medicinal properties like antiseptic (pulmonary), antispasmodic (neuromuscular), aphrodisiac, expectorant, anthelmintic, antibacterial, cephalic, cardi tonic, stomachic, sialogogue, emmanagogue and diuretic.

Major pharmacological actions include:-

- 4.1) **Anti-ulcerogenic**- it treats several intestinal disorders.
- 4.2) **Anti-inflammatory**- it treat infections in teeth and gums, prevent throat troubles, congestions of lungs and pulmonary tuberculosis, digestive disorders and inflammation of eyelids.
- 4.3) **Antidote** to snake venom
- 4.4) **Hepatoprotective**- promotes elimination of bile and reduces congestion of liver.

Table 1: composition of corn silk tea bag

Ingredients	Quantity taken (in grams)
Corn silk powder	1.00
Stevia leaves powder	0.50
Lemon powder	0.25
Cardamom powder	0.25

PROCEDURE

Firstly collect the corn silk from corn cob in clean and dry 500ml beaker and add 100-150ml of clean and purified water which is kept overnight for 24 hours. After that, filter the corn silk with the help of suction pump and refiltration & purification can be done for 2-3 times with help of distilled water. Then filtered corn silk can be transferred in large Petri dish and dried in oven at 140-150 ° C for 5-6 hours. After that, the dried and purified corn silk is collected and transferred in 500ml round bottom flask and extraction can be done by soxhlet apparatus with purified water for 5-6 hours. Further, the collected corn silk is again dried in oven for 6-10 hours. Then, it is converted into the powdered form and mixed with other ingredient as per required quantity as mentioned in above table for a 2g tea bag (as shown in figure 4).

**Fig 4: Packing of 2g tea bag of corn silk herbal tea****CONCLUSION**

A very famous saying states that "Prevention is better than cure". The corn silk herbal tea is a natural therapy that can be used in daily life in order to achieve fit and a healthy body. And from this article, it can be concluded that scientific evidence of the health and medical effects of corn silk herbal tea on consumption provides balance of blood-glucose level, digestion, mind relaxation, prevention of cancer and a good start of day with numerous other health benefits.

The main ingredient (i.e.) corn silk, which is normally treated as waste product make this tea a considerable and low cost product. Also the presence of natural sweetener (stevia) with goodness of lemon and widely acceptable flavor of cardamom makes it a pre-eminent herbal tea.

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