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Review Article

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Nephroprotective Effect of Corn Silk: A Review on its Mechanism of Action and Safety Evaluation

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Abstract

The traditional and indigenous methods of treating diseases have been very common since time long. The COVID 19 outbreak made people more inclined towards the use of herbs and plants more than drugs and pharmaceuticals. Corn silk which is commonly dumped as agricultural waste can also be used for some remedial purpose. Corn silk is the long silky threads that develops on the cob of corn. Renal health is an important aspect of overall well-being. Kidney diseases are usually caused by secondary or indirect conditions that stress the kidneys and gives extra load on it. The antioxidant properties which scavenge the free radicals and protects the cells of the kidney from oxidative stress, the anti-inflammatory properties, diuretic properties which helps promote urine production and thus reducing the load on kidneys, the spasmodic effect which help relax the urinary tract and improve urine flow, and uric acid lowering property of corn silk are the combined causes that makes it a potential nutraceutical for treating kidney ailments. The aim of this review paper is to thoroughly access the scientific research and to emphasise the potential advantages of corn silk in preventing and treating kidney ailments. The mechanism of action and experimental evidence pertaining to the positive outcomes of corn silk on kidney function is examined in this review. By providing a comprehensive overview this review aims increase comprehension of nephroprotective functions of corn silk and serve as a roadmap for future research and therapeutic intervention in various kidney diseases.

Keywords

Phytochemicals, Antioxidant, Corn silk, Diuretic, Anti-inflammatory, Renal health

Introduction

Chronic kidney disease (CKD) is a condition that has affected around 10% of the population worldwide. CKD which is a non-communicable disease has become one of the main causes of mortality around the globe over the past two decades. Global in 2017, Global Burden of Disease study, the Burden of disease collaboration identified CKD as significant cause of morbidity and death worldwide. Acute kidney injury and CKD are related illness and by 2040 CKD is expected to become the fifth biggest cause of death worldwide [1].

Various factors have led to the high prevalence of CKD worldwide. According to the data from the United Nations Children's Fund, 28% of children weigh less than 2.5 kg at birth which can be regarded as the significant reason for mortality around the globe.

Morbidity and mortality have grown because of inadequate awareness, de-

layed diagnosis, decreased accessibility, and greater expenses for renal care. CKD is also an important risk factor for cardiovascular disease and a significant reason of premature death and disability-adjusted life. In developing countries like India, chances of secondary and tertiary CKD prevention are frequently not found. Patients seek medical attention when already the disease has progressed much, and symptoms appear [2].

CKD is a serious threat in middle- and low-income countries where they are not well equipped to deal with its consequences. Hence more focused is required to develop inexpensive and herbal and natural methods of treatment to treat every possible ailment related to kidney even in shortage of equipment and facilities. The existence of nutrients and active ingredients makes the use of medicine and food more beneficial. Through regular ingestion of recommended amount prevent drug toxicity and side effects [3].

Corn is commonly known as maize, which requires warm temperature and has short shelf life. Corn (*Zea mays* L), also known as maize, is a member of the family Poaceae or Gramineae. When the mean temperature remains more than 20 ° C, the early varieties mature in around 80 to 110 days and medium varieties requires around 110-140 days to mature. United Nations, followed by China, Brazil, European Union, and Argentina are the largest producers of corn worldwide. According to World Agricultural Supply and Demand estimates (WASDE) around 1.172 billion tons of maize will be produced worldwide in the year 2022-23. Corn silk refers to the long, silky fibers that protrude from the husks of the ears of corn. Corn silk which is commonly dumped as agricultural waste can also be used for some remedial purpose. Corn silk is the female reproductive organ of the corn plant, which traps and receives the pollen for pollination. Corn silk first appears pale green in most cases before changing to red, yellow, or light brown. Each string of corn silk can lead to the production of one kernel of corn. To harvest Corn silk for medicinal purposes, it is typically collected just before pollination occurs. Corn silk grows to about 30 cm in length [4]. Corn silk may be used in either fresh or dried form, depending on the intended use. Some people may find the taste of fresh Corn silk to be slightly sweetish. It is commonly used in conventional treatment for its potential health benefits.

Corn silk is a popular medicine used in various countries of the world, including China, Turkey, the United States, and France. It is believed to have diuretic, anti-inflammatory, and antioxidant properties, and is commonly used for care and cure of diverse urinary tract problems, such as cystitis, renal calculi, and urinary infections. Corn silk is also used to alleviate oedema as well as to promote weight loss and treat prostate disorders [5].

Nutritional composition of corn silk

Corn silk has a unique nutritional makeup that has several vital health benefits. The nutritional composition depends upon the variety of maize, the maturation stage of corn silk and environmental factors. Proteins, vitamins, carbohydrates, salts of calcium, potassium, magnesium, and sodium, volatile oils, and steroids like stigmasterol and sitosterol as well as alkaloids and saponins are also present. Corn silk is a potential source of flavonoids. Corn silk has a low-fat content because of which it can also be used to formulate foods which are low in fat or are fat free (Table 1).

Phytochemical composition of corn silk

Corn silk possesses a diverse array of phytochemicals that has health promoting properties. The biological actions of CS extracts, which are mostly a result of their flavonoid concentration, are dependent on their compositions. Research has been done on flavonoids including luteolin and apigenin glycosides such as orientin, maisin, vitexin (Table 2). Around twelve terpenoids were found in corn silk under the supervision of bioactivity guided strategy and Global Natural Products Social molecular networking [9].

Mechanism of corn silk in treating kidney diseases

Since ancient times, maize silk (*Stigma maydis*) has been applied to cure a broad range of illnesses, counting oedema, kidney stones, diabetes, hyperuricemia, obesity, and many more. Corn silk may be employed as an antioxidant in both food and medication since it has high antioxidant properties both *in vitro* and *in vivo*. Corn silk is thought to have therapeutic qualities because of its abundance of phytochemicals, including flavonoids, alkaloids, and saponins. The diuretic, antioxidant, anti-inflammatory, and antihypertensive properties of these substances have been demonstrated, that help explain the benefits of corn silk in renal health.

Table 1: The nutritional composition of corn silk.

Components	Composition	Ref
Immature corn silk		[6, 7, 8]
Moisture	89.14 - 89.57%	
Lipid	1.27 - 1.3%	
Protein	12.96 - 13%	
Calcium	1087.08 µg/g	
Magnesium	1219.17 µg/g	
Copper	5.60 µg/g	
Zinc	46.37 µg/g	
Mature corn silk		
Ash	5.29 ± 0.29	
Carbohydrate	56.16 ± 0.66	
Potassium	1135.78 ± 6.3	
Sodium	3654.21 ± 3	
Iron	4.50 µg/g	
Purple waxy corn silk		
Moisture	89.14 - 89.57%	
Ash	5.39 - 5.6%	
Carbohydrate	52.08 - 53.49	
Fibre	52.08 - 53.49%	
Lipid	0.89 - 0.97%	
Protein	3.74 - 4.01%	
Sweet corn silk		
Moisture	89.57 ± 1.01	
Protein	13%	
Carbohydrate	0.06 ± 0.03	
Fibre	53.49 ± 0.52	

Table 2: The phytochemical composition of corn silk.

Phyto-chemicals	Components	Composition	Properties	Ref.
Flavonoid	Rutin, catechin, protocatechin	30.1 - 88.8 µg RE/g dw	Antioxidants, antimutagenic, anti-inflammatory	[10-12]
Phenol	Alkaloids, steroids, tannins	80.8 - 117.1 µg GAE/g dw	Mucosal immune response, anti-tumour immunity	
Phenolic acid	Caffeic acid, vanillic acid, PABA			
Sterol	Beta sitosterol	92.76 ± 0.43%	Cholesterol lowering properties	
Carotenoids	Zea xanthin, beta carotene	11.3 ± 0.95 mg/kg	Photoprotector, antioxidants	
Tannins	Gallo tannins		Lowers blood pressure, lipid levels	

In a study thirty-five experimental rats were used and administered with different doses of corn silk extract for eight consecutive days. While one group was given distilled water, another group was given one dose of cisplatin. Their biochemical markers and histopathological conditions were examined, and it was found that pre-treatment with corn silk made a remarkable reduction in malondialdehyde levels in comparison to the levels received following cisplatin therapy alone. Besides, corn silk also showed protective function against increased uric acid levels and blood urea nitrogen. Hepatic function was enhanced in rats pretreated with corn silk [13]. Thus, corn silk may reduce the nephrotoxicity and elevated serum urea levels.

A study aimed to ascertain how corn silk ethanol fraction affected the levels of uric acid in male white mice. The experimental mice were given beef liver for seven days and then underwent uric acid test. For seven days the mice received oral treatment of corn silk. On 7th day uric acid levels were accessed using an acid. Uric acid levels were shown to be decreasing. The advanced Duncan test analysis findings revealed that III dosages were used with decreasing uric acid levels between groups with positive control. The dose of 110 mg/kg BB is the one that displays the greatest decrease, nevertheless, making it the most efficient dose [14]. This clearly supports the fact that corn silk has a potential effect in lowering uric acid levels.

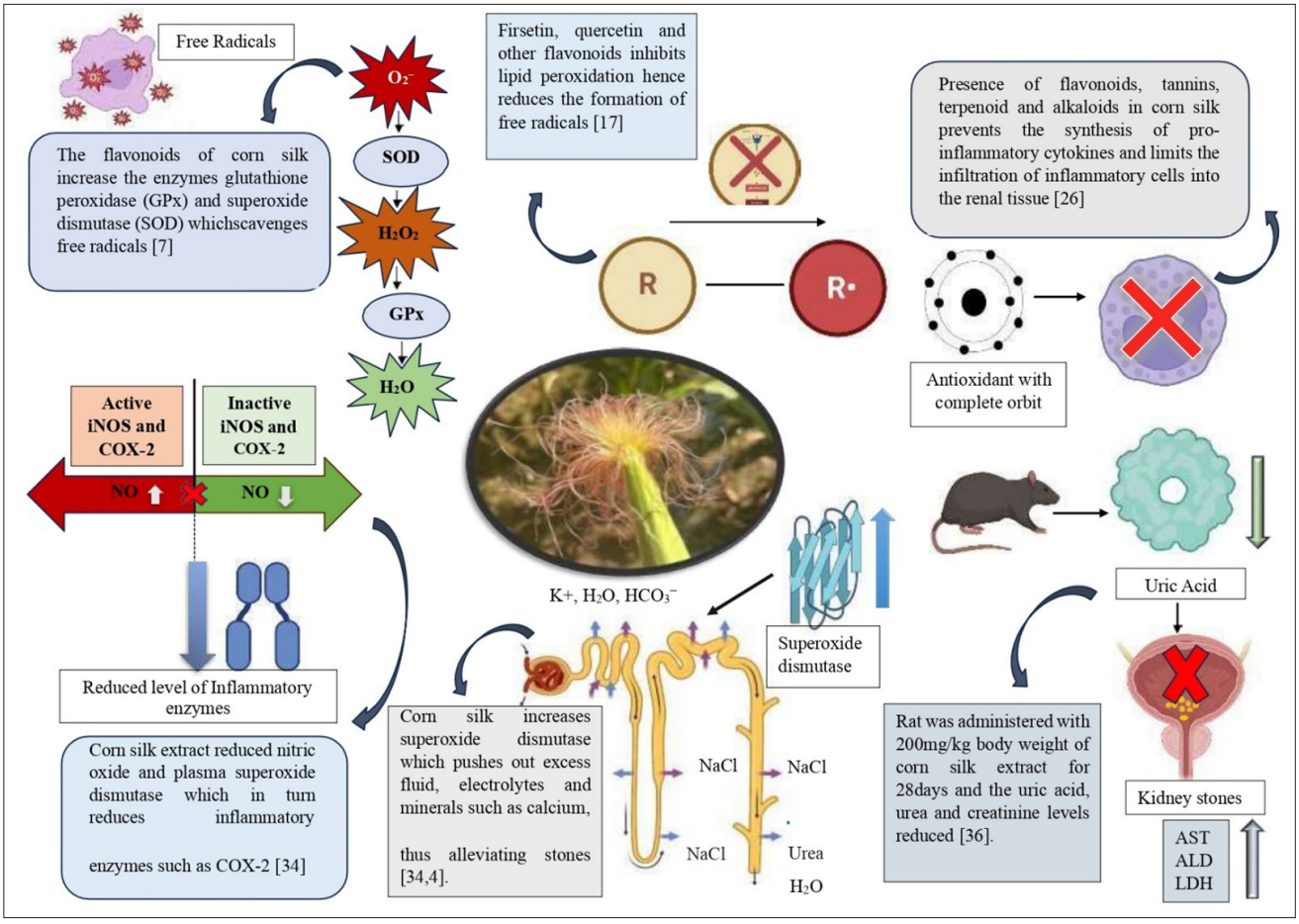

Figure 1: Nephroprotective functions of corn silk [4, 7, 17, 26, 34, 36].

A study [15] focused to examine the effects of nephroprotective agents namely gum arabic, parsley, and corn silk. The study aimed to probe the mechanism of lysosomal biogenesis as a function of protein linked receptors 41 and 43. Several parameters were assessed using western blotting. Following amikacin administration, BAX and cathepsin D levels increased, but LAMP-1 and nuclear TFEB levels decreased. The combined extracts raised the levels of LAMP-1 and nuclear TFEB while inhibiting BAX and cytosolic cathepsin D. The GPR modulatory signal was verified by docking. The mixed extracts demonstrated GPR signal modulatory abilities that induced the production of lysosomes and helped reverse the harmful effects of amikacin on renal tissues. Thus, the study shows the positive and curing outcome of corn silk on damaged kidney tissues.

In a study [16] 60 samples of kidney stone were taken from patients of a hospital. The materials of the stone were 60% calcium, phosphate 30%, oxalate 30%, and uric acid 5%. The samples were subjected to corn silk extract and Maidenhair fern. The effect of plant extract on degradation of stones were examined over a period of four weeks. The size of the stones significantly reduced, and they were degraded suggesting that these herbal remedies would prove to be beneficial in treating the renal calculi along with medications efficiently (Figure 1).

Antioxidants properties

Antioxidants shield the cells in the body from oxidative stress and free radical damage. The pathophysiology of many kidney diseases includes oxidative stress, the mediators of oxidative stress and inflammation which contribute to the development of many of the complications of diseases. Some of the primary substances implicated in the action of corn silk as antioxidant includes alpha terpineol, citronellol and eugenol. Corn silk effectively raises the level of antioxidant enzymes including glutathione peroxidase and superoxide dismutase [4]. The level of total phenol and flavonoids including firsetin, quercetin, naringin and myricetin also influences the antioxidant capacity [17].

Studies have demonstrated that maize silk extracts have antioxidant capabilities and may scavenge free radicals, preventing oxidative damage to the renal tissue. Corn silk supplementation has been demonstrated to lower oxidative stress and enhance renal function in animal models of kidney damage.

According to a study corn silk polysaccharide's capacity to heal cells and prevent calcium crystal adhesion and aggregation can both be enhanced by the carboxymethyl modification. Strong polysaccharide activity is produced by a high degree of carboxymethylation. Kidney stone development and recurrence risk are anticipated to be decreased with CCSPs [18]. Another study was conducted to find out the action of corn silk on induced nephrotoxicity by acetaminophen on 40 male wistor albino rats. The rats were administered with corn silk methanolic extract. All biochemical measures, histological alterations, and immunohistochemical parameters were nevertheless brought back to normal levels as in the control group following pre-treatment with CSME. In conclusion, CSME's antioxidant and anti-inflammatory protective mechanisms helped protect rats against the renal toxicity of acetaminophen [19].

In a study thirty male rats weighing 200 g each were subjected to biological experiment for six weeks. Gentamicin was injected to group 2, 3, 4 and 5 to induced renal and hepatic injury. Group 3, 4 and 5 were given various corn silk treatments and group 2 was kept as positive control. The result showed that when compared to positive group of corn silk and extract of corn silk. increased antioxidant enzymes such as superoxide dismutase, total antioxidant capacity, lipid peroxidation as measured by malondialdehyde, hepatic function, renal function, and kidney histopathology [20].

A study focused to determine the ethanol-water extract from CS's antioxidant capacity. The extract's iron chelating activity was lower than that of the usual components. The nitric oxide-scavenging impact of the CS extract was inferior to that of the reference agent (quercetin). The extract exhibited a strong reducing capacity. The extract inhibited linoleic acid peroxidation by more than 88%, according to the ferric thiocyanate technique. One could draw the conclusion that the antioxidant capabilities of CS account for some of its therapeutic benefits in conventional medicines [21]. On the phytochemical composition and antioxidant activity in maize silk, the effects of variety and harvest maturity were investigated. The findings revealed that the antioxidant activity of different regions of corn silk varied, and high pigmentation often occurred during the early stages of maturation and was directly associated with higher antioxidant activity [22].

A study conducted by [23] focused on the antioxidant properties as well as the inhibitory benefits of corn silk on diabetic nephropathy. In cells that have been activated with high glucose anti-diabetic nephropathy activity assay suggested that corn silk, ethyl acetate fraction and butanol fraction reduced the production of Col IV, FN, and IL-6. These results showed that corn silk antioxidant property may be responsible for some of its long promised therapeutic effects on diabetic nephropathy.

Thus, many studies support the fact that the potential antioxidant properties of corn silk play a crucial role in promoting renal health. By neutralising harmful free radicals and promoting antioxidant enzymes corn silk helps in protecting kidney from oxidative stress and damage.

Anti-inflammatory properties

The normal immunological response of the body includes inflammation. Yet, several disorders are associated with severe inflammation. This is clear that inflammation affects CKD development and prognosis, however the interconnection among inflammation and CKD onset is still up for dispute [24]. Chronic, low-grade inflammation has come to be recognised as a defining characteristic of CKD,contributing to the development of these patients' all-cause mortality. Oxidative stress, elevated production of pro inflammatory cytokines, acidosis, persistent and reoccurring ongoing infections, altered adipose tissue metabolism, and finally, gut microbiota dysbiosis—an underappreciated source of microinflammation - are few of the elements that influence the establishment of inflammatory condition CKD [25].

By relieving and soothing the inflamed cells corn silk reduces the burning feeling experienced during urination. Consuming corn silk for 15-20 days provide symptom alleviation because of the presence of flavonoids, tannins, terpenoid and alkaloids in its secondary metabolites. By preventing the synthesis of pro-inflammatory cytokines and limiting the infiltration of inflammatory cells into the renal tissue, corn silk extracts have been proven to have anti-inflammatory properties. For those with renal diseases including glomerulonephritis and interstitial nephritis, where inflammation plays a significant role in the pathophysiology of the illness, these effects may be advantageous [26].

Thus, there are several studies which suggest that anti-inflammatory effects of corn silk are beneficial in treating renal health.

Diuretic properties

Corn silk has been traditionally utilised as a diuretic agent in numerous cultures. Corn silk extracts or infusions have been shown in several trials to enhance urine production and decrease oedema. For people with renal diseases including nephritis and nephrosis, where excessive fluid retention can make the situation worse, these diuretic effects may be helpful.

A study investigated the effects of extracts from bearberry leaves (*Uva ursi* folium), parsley (*Petroselinum crispum*), and maize silk (*S. maydis*) on diuresis, electrolyte conformation, antioxidant capacity, and histological characteristics of kidneys of pretreated mice. Three groups of ten animals were taken and given corn silk, parsley, and bearberry leaf extract. The fourth group served as the control which were administered with water. Water and extracts were given as needed. The volume of the urine and the number of electrolytes were measured on days 0, 1, 7, 14, and 28 of the experiment. By measuring antioxidant enzymes and reduced glutathione levels, the antioxidant state of the kidneys was examined. They measured the overall antioxidant power, lipid peroxidation, and free radical scavenging ability. At the conclusion of the trial, kidneys underwent a pathological evaluation. Parsley and corn silk extracts might be suggested for future research as potential functional food components with antioxidant and diuretic characteristics based on the overall results that have been given [27].

The condition known as nephrocalcinosis occurs when calcium phosphate or oxalate deposits in the renal parenchyma. Patients with hyperparathyroidism, vitamin D toxicity, and renal tubular acidosis may experience it. Traditional Chinese medicine employed maize silk to ease kidney discomfort. A study was carried out to determine whether corn silk aqueous extract may reduce renal parenchyma calcium deposits in a model of nephrocalcinosis brought on by oxalic acid. Two groups each received one of fourteen healthy rabbits. Two hours before inducing nephrocalcinosis, one group was given water while the other group was given corn silk aqueous extract for continuous ten. Before induction and as well as the fifth and tenth post induction days blood samples were taken for biochemical analysis. To determine the amount of calcium deposits in urine, urine samples were collected. Blood urea nitrogen (5.2 ± 0.08 vs 7.3 ± 0.2) mmol/L, serum creatinine (85.9 ± 0.2 vs 97.3 ± 0.5) mmol/L and serum sodium levels (137 ± 0.2 vs 142.16 ± 0.7) mmol/L all significantly decreased in response to corn silk aqueous extract, but serum potassium levels (4.0 ± 0.02 vs 4.2 ± 0.05) did not significantly change. After ten days of treatment, there was a significant decrease in calcium deposition in renal parenchyma compared to the control group. Thus, it was concluded that calcium excretion from the urine was accelerated by the significant diuretic action of corn silk [28].

Corn silk reduces the serum creatinine levels and fluid retention and thus helps in reducing oedema. Corn silk is reported to reduce potassium levels when used together with other medications [4].

The outcome of corn silk extract on carrageenan induced peripheral oedema in the hind paw of mouse was investigated in a study [29]. When given orally for a week, corn silk prevented the growth of oedema, epidermal swelling, and inflammatory cell infiltration into the dermis. Corn silk extract was examined on adhesion between monocytes and endothelial cells to better understand the action of anti-inflammatory properties. Thus, the study implies that corn silk extract may have an impact on membrane protein on monocytes that are crucial in their adherence to endothelial cells.

Another study also used carrageenan-induced rat paw oedema technique. Using this technique hydro-ethanolic extracts anti-inflammatory efficacy was assessed. After 5 h hydro ethanolic extract reduced the inflammation caused by carrageenan in concentration of 250 and 500 mg per kg body weight at 66.67% and 86.67%. However, the extract had a pro inflammatory effect at a dosage of 500 mg/kg. These preliminary findings appear to be in favor of traditional use of corn silk for the treatment of cystitis, oedema, nephritis, renal lithiasis, albuminuria, and slimming treatment [30].

Effect of corn silk on uric acid and creatinine levels

In a scientific work [3], the hypouricemic effects of corn silk flavonoids (CSFs), which were extracted using ethanol solution were examined *in vivo*. Hyperuricemia was induced in mouse model by giving potassium oxonate. It was reported that CSFs reduced the amount of serum uric acid. The strongest hypouricemic response was provided by CSF-B which reduced serum levels by 26.69% and xanthine oxidase activity by 11.29%. The inhibition of xanthine oxidase activity and excretion of uric acid were connected to the mechanism action of CSF-B. Twelve different flavonoids were examined which were thought to have impact on substance action in mice with hyperuricemia. Thus, suggesting that corn silk plays a major role in reducing serum uric acid levels.

According to a study conducted [31] corn silk shows antioxidant lowering activities by reducing xanthine oxidase and raises hypoxanthine-guanine phosphoribosyl transferase levels. Yet another study examined the role of corn silk in treating gout through network pharmacology method. Mandenol was found to be playing the key compound in treating gout. Mandenol is an essential fatty acid with antimicrobial and anti-inflammatory effects [32].

A study sought to determine the effects of high sodium diet on uric acid synthesis and role of corn silk in treating it.

Rat models were given 500 mg/kg corn silk extract, 8% high salt diet and corn silk with high salt diet. Blood samples were collected after six weeks. Corn silk extract reduced nitric oxide and plasma, plasma superoxide dismutase, but not endothelial nitric oxide synthetase. It also reduced nitric and VCAM-1. Thus, corn silk exhibit therapeutic potential in high salt induced oxidative damage or uric acid dependant endothelial diseases [33].

A study focused to ascertain the anti-urolithiasis properties of corn silk, nurvula bark and ayurvedic Neeri tablet. The capacity of the extracts to neutralise artificial crystals of calcium crystals in a semi-permeable egg-shell membrane was used to determine the *in vitro* anti-urolithiatic activity of the extracts. Titrimetric analysis was used to calculate the amount of calcium oxalate that wasn't dissolved depending on how much standard potassium permanganate ($KMnO_4$) was drank. The proportion of calcium oxalate that dissolves in each ml of 0.9494 N $KMnO_4$ is equal to 0.1898 mg of calcium, according to the calculation. The outcomes demonstrated that aqueous and methanolic extracts of *Crataeva nurvala* dispersed a calcium oxalate crystal at a rate of 60.42% in aqueous extract of maize silk, which was equivalent to Ayurvedic formulation Neeri at 59.52% and standard Cystone at 64.29%. The investigation concluded that the aqueous extract of maize silk has strong anti-urolithiatic action [34].

A study by Almadiy et al. [35] highlighted the anti-urolithiatic effects of corn silk. Male albino rats (24) each weighing 200 - 250 g were taken and divided into four groups. First group was kept as control, second group was given normal diet along with ethylene glycol and 1% ammonium chloride. 3rd and 4th group were additionally given 200 mg and 400 mg/kg body weight of corn silk extract respectively for 28 days. On the last day it was found that the blood samples have significantly lower levels of aldosterone, angiotensin comforting enzyme urea, and creatinine levels as compared to control group. AST, ALT, and LDH were considerably higher in contrast to urolithaitic group. Therefore, the study clearly depicts the anti-urolithiatic effects of corn silk.

Safe limit of consumption and toxicity evaluation of corn silk

Corn silk is natural herbal remedy generally considered safe for huma consumption. However, it is always important to evaluate its safety limit and toxicity levels associated with it.

According to a study corn silk treated mice (7.5, 15, and 20 g/kg body weight) showed no mortality or any toxicity symptoms neither there were any changes in body weight or food intake compared to the healthy mice used as control group. Also, the relative importance of major organs and biochemical levels did not alter much [36].

There is no established safe limit of consumption of corn silk as it is not a standalone ingredient and is used in formulations, so the consumption is usually not in very large quantities. However, it is recommended to consume corn silk in moderation as a part of balanced diet.

In a study unknown hazardous toxic substances caused allergic response and uterine contraction in rabbits when corn silk was administered in large doses [37].

In another study mice were subjected with high oral doses (2000 mg /kg body weight) of maysin. Toxicity evaluation was done for 14 days. There were no reported deaths or unusual symptoms seen during investigation. Therefore, the consumption of more than 2000 mg/kg body weight was thought to be lethal amount [38].

In a toxicity test conducted by Ikpeazu et al. [39] rats were administered with 5 g/kg body weight of corn silk extract for toxicity test. Behavioural alterations, toxicological symptoms or even death was evaluated. Different doses of corn silk extract were administered for 28 days to test sub-acute toxicity. On 29th day several parameters such as lipid profile, serum chemistry and histology of kidney and liver was assessed. It was noted that corn silk was nontoxic up to the dose of 5 g/kg body weight. However, in sub-acute test LDL, VLDL and TAG were increased. According to this study, chronic usage of *S. maydis* aqueous extract at levels greater than 1000 mg/kg may be hepatotoxic. Therefore, the use of just lower dosages for therapeutic purposes should be promoted.

Taking in consideration it's nutritional as well as toxicity levels it is advised to adhere to the suggested doses published by reliable sources or get advice from healthcare provider if consuming it as a dietary supplement or herbal medicine. A dosage up to 5 g/kg body weight can normally be considered safe. Moreover, any individual suffering from maize or maize related allergies should abstain from using corn silk in any form.

Conclusion and Future Perspective

This review concludes by high lightening the possible advantages of using corn silk for promoting renal health. Firstly, corn silk has diuretic properties that boosts urine output and promotes the elimination of waste from the body. This property aids in the prevention and cure of several renal diseases. Moreover, corn silk also possesses antioxidant and anti-inflammatory properties that shield the renal cells from oxidative damage and inflammation. It also protects against nephrotoxicity caused by certain drugs and medicines. Therefore, the antioxidant, anti-inflammatory, diuretic effects of phytochemicals of corn silk including maysin, flavonoids and other bioactive chemicals support and promote kidney health.

Consumption or supplementation of corn silk benefit kidney health, urinary tract health and symptoms of urinary diseases. Corn silk thus serves as a natural cure or complementary medicine for preserving and promoting renal function. Including corn silk into dietary regimen and developing standardised herbal preparation may offer potential health benefits and a complementary approach to conventional treatment.

This review article on effects of corn silk on renal health gives an in-depth analysis of all possible advantages of corn silk on renal health. However, there are several areas that need deeper examination. Well conducted randomised controlled studies can provide stronger data on effectiveness and safety of corn silk in treating renal diseases which will enable the development of evidence-based recommendations. Further research is also essential for figuring out the molecular pathway.

Although the present research appear promising, further research is required to optimise the efficacy, underlying processes, ideal doses, long term safety and potential drug interaction. Corn silk may become a natural intervention to promote kidney functions and supplement current treatment modalities for several renal diseases as there is more and more knowledge about its beneficial uses.

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Conflict of Interest

None.

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