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A Phytopharmacological review on Zea Mays corn silk Extract

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Abstract-The reviews research paper render the Extract of Zea Mays Silk for Its Chemical Composition, Pharmacological Activities, and Potential Health Benefits, Bioactive components and pharmacological effects of corn silk (Zea mays L.). It highlights the main constituents, including flavonoids, polyphenols, and terpenoids, and discusses their various health benefits, such as lipid reduction, blood pressure lowering, and anti-inflammatory properties. The pharmacological Activities such as Antioxidant Activity, Anti-inflammatory and Analgesic Effects, Antidiabetic Properties, Anti-obesity Effects, Nephroprotective Effects, 7Antimicrobial and Anticancer Properties, have been mentioned. The potential health benefits and furthermore, comparative analysis of ethanolic extract covered with future directives and applications.

The review synthesizes recent research findings to support the further development and utilization of corn silk in medicinal applications.

KEYWORDS- Zea Mays, Phytochemicals, health benefits, pharmacological activities

1.0 Introduction

Zea Mays, commonly known as corn, is a cereal crop with significant agricultural and medicinal value. Corn silk, the stigma of the female flower, has been traditionally used in various cultures for its medicinal

properties. This review explores the phyto-pharmacological aspects of corn silk extract, focusing on its bioactive compounds, pharmacological activities, and potential therapeutic applications.

Zea Mays corn silk, traditionally viewed as an agricultural by-product, has garnered significant attention for its diverse health-promoting properties. This review evaluates the chemical composition, pharmacological activities, and potential health benefits of the ethanolic extract of corn silk, supported by recent scientific studies.

1.1 Phytochemical Composition

Phytochemistry studies have shown that the main bioactive components in corn silk include flavonoids, polyphenols, phenolic acids, fatty acids, and terpenoids. Pharmacological studies have shown that corn silk extract has various pharmacological effects, such as reducing blood lipids, lowering blood pressure, regulating blood sugar levels, anti-inflammatory effects, and anti-oxidation effects. In this paper, the related research on corn silk from the past few years is summarized to provide a theoretical reference for the further development and utilization of corn silk. (Bhatia et al., 2024)

Corn silk is rich in phenolic compounds and flavonoids, which contribute to its antioxidant and antimicrobial properties. The ethanolic extract contained high levels of total phenolic content and flavonoids, enhancing its therapeutic potential (Naeem, 2022)(Yucharoen et al., 2023).

Specific compounds identified include flavonoid glycosides and terpenoids, which are known for their health benefits (Nessa et al., 2021).Corn silk is rich in bioactive compounds, including flavonoids, polyphenols, phenolic acids, fatty acids, and terpenoids. These compounds are responsible for its diverse pharmacological effects. The presence of flavonoids such as luteolin and maysin contributes to its antioxidant and anticancer properties. Additionally, polysaccharides, proteins, and vitamins are present, enhancing its nutritional and medicinal value (Hasanudin et al., 2012) (Wang et al., 2024) (Pradhan & Dhrangdhariya, 2024).

1.2 Chemical Composition of Corn Silk

The ethanolic extract of corn silk is rich in bioactive compounds, including flavonoids, phenolic acids, and polysaccharides. These components contribute to its therapeutic potential. Key constituents identified include:

Flavonoids and Phenolic Compounds: Flavonoids like luteolin and phenolic acids such as ferulic acid are prominent, exhibiting antioxidant and anti-inflammatory properties (Pradhan & Dhrangdhariya, 2024) (Nikiforova et al., 2022) (Azevedo et al., 2022).

Polysaccharides: Corn silk polysaccharides (CSP) are noted for their antioxidant, hypoglycemic, and immune modulatory effects (Zhang et al., 2024).

Volatile and Fixed Oils: These include terpenoids and hydroxycinnamic acid derivatives, contributing to antimicrobial and anti-inflammatory activities (Azevedo et al., 2022) (Gwendlin et al., 2015).

2.0 Pharmacological Activities

2.1 Antioxidant Activity

Corn silk exhibits strong antioxidant properties due to its polyphenolic content. These compounds scavenge free radicals, protecting cells from oxidative stress and potentially reducing the risk of chronic diseases (Hasanudin et al., 2012) (Pradhan & Dhrangdhariya, 2024) (Zhang et al., 2024).

2.2 Anti-inflammatory and Analgesic Effects

The anti-inflammatory activity of corn silk is attributed to its bioactive compounds, which inhibit inflammatory pathways. Tannins and polyphenols contribute to its analgesic properties, making it effective in pain relief (Bhatia et al., 2024) (Rahmawati et al., 2022).

2.3 Antidiabetic Properties

Corn silk has been shown to reduce blood sugar levels by inhibiting xanthine oxidase and stimulating insulin activation. This makes it a potential natural remedy for managing diabetes (Apampa & Adedapo, 2024) (Rahmawati et al., 2022) (Dika et al., 2018).

2.4 Anti-obesity Effects

Corn silk extract suppresses adipogenesis and lipid metabolism, helping in weight management. It inhibits the expression of adipogenic transcription factors, thus preventing fat accumulation (Arya et al., 2023) (Rahmawati et al., 2022).

2.5 Cardiovascular Health

The extract has been found to improve blood lipid profiles by reducing total cholesterol, triglycerides, and LDL cholesterol, while increasing HDL cholesterol. This contributes to its potential in managing conditions like angina pectoris (Shi et al., 2019).

2.6 Nephroprotective Effects

Corn silk's antioxidant, anti-inflammatory, and diuretic properties protect kidney function by reducing oxidative stress and improving urine flow. It is also effective in lowering uric acid levels, benefiting kidney health (Ying-ping, 2004) (Singh et al., 2023).

2.7Antimicrobial and Anticancer Properties

The presence of flavonoids and phenolic acids in corn silk contributes to its antimicrobial activity. Additionally, maysin, a flavonoid, exhibits anticancer properties by inducing apoptosis in cancer cells (Pradhan & Dhrangdhariya, 2024) (Zhang et al., 2023).

2.8 Traditional Uses

Traditionally, corn silk has been used to treat urinary disorders, hypertension, and diabetes. It is consumed as a decoction or tea, leveraging its diuretic and anti-inflammatory properties (Hasanudin et al., 2012) (Apampa & Adedapo, 2024) (Patel et al., 2023).

2.9 Safety and Toxicological Studies

While corn silk is generally safe, limited studies on its toxicological profile exist. Moderate consumption is recommended, as excessive use may cause allergic reactions or interact with medications (Hasanudin et al., 2012) (Nikiforova et al., 2022).

2.10 Pharmacological Activities of Ethanolic Extract

The pharmacological profile of corn silk's ethanolic extract is extensive, encompassing:

Antioxidant Activity: Neutralizes free radicals, protecting against oxidative stress (Nawaz et al., 2018) (Azevedo et al., 2022).Anti-inflammatory and Analgesic Effects: Reduces inflammation and alleviates pain, beneficial for conditions like arthritis (Bhatia et al., 2024) (Rahmawati et al., 2022).Antimicrobial Properties: Effective against Gram-positive bacteria and fungi, useful in treating infections (Naeem, 2022) (Abirami et al., 2021).

Antidiabetic Effects: Enhances insulin sensitivity and regulates blood sugar levels (Arya et al., 2023) (Zhang et al., 2024).Hepatoprotective and Nephroprotective Effects: Protects liver and kidney functions, countering toxicity (Naeem, 2022) (Singh et al., 2023)

2.11 Potential Health Benefits

The ethanolic extract offers numerous health benefits, supported by its bioactive components:

Diabetes Management: Helps regulate blood glucose and improve insulin function (Zhang et al., 2024) (Rahmawati et al., 2022).

Cardiovascular Health: Lowers blood pressure and lipid levels, reducing cardiovascular risks (Wang et al., 2024) ("Corn Silk and Health Benefits", 2022).

Urinary Tract Health: Exhibits diuretic properties, aiding in urinary issues and kidney stone prevention (Apampa & Adedapo, 2024) (Singh et al., 2023).

Cancer Prevention: Antiproliferative effects inhibit cancer cell growth (Nawaz et al., 2018) (Zhang et al., 2023).

Neuroprotection: Shows potential in neurodegenerative disease management (Nikiforova et al., 2022) (Zhang et al., 2023).

Table: 1 Key Pharmacological Activities of Corn Silk Extract

Pharmacological Activity	Mechanism of Action	Citation
Antioxidant	Scavenges free radicals, reducing oxidative stress	(Hasanudin et al., 2012) (Pradhan & Dhrangdhariya, 2024) (Zhang et al., 2024)
Anti-inflammatory	Inhibits inflammatory pathways and biopeptides	(Bhatia et al., 2024) (Rahmawati et al., 2022)
Antidiabetic	Inhibits xanthine oxidase, stimulates insulin activation	(Apampa & Adedapo, 2024) (Rahmawati et al., 2022) (Dika et al., 2018)

Pharmacological Activity	Mechanism of Action	Citation
Anti-obesity	Suppresses adipogenesis and lipid metabolism	(Arya et al., 2023) (Rahmawati et al., 2022)
Cardiovascular Health	Improves blood lipid profiles by reducing cholesterol and triglycerides	(Shi et al., 2019)
Nephroprotective	Reduces oxidative stress and inflammation in the kidneys	(Ying-ping, 2004) (Singh et al., 2023)
Antimicrobial and Anticancer	Exhibits antimicrobial activity and induces apoptosis in cancer cells	(Pradhan & Dhrangdhariya, 2024) (Zhang et al., 2023)

This table summarizes the key pharmacological activities of corn silk extract, highlighting their mechanisms and supporting citations.

3.0 Comparative Analysis of Ethanolic Extracts

The following table compares key aspects of corn silk Ethanolic extracts:

Table: 2 Comparative Analyses of Ethanolic Extracts

Extract Type	Key Components	Pharmacological Activities	Citation
Ethanolic Extract	Flavonoids, Phenolic Acids, Polysaccharides	Antioxidant, Anti-inflammatory, Antidiabetic	(Pradhan & Dhrangdhariya, 2024) (Nikiforova et al., 2022)
Ethyl Acetate Fraction	Apigenin, Luteolin	Antioxidant, Anti-glycation, Protective on β-cells	(Chang et al., 2016)
Aqueous Extract	Polysaccharides, Flavonoids	Diuretic, Antilithiasic, Antimicrobial	(Apampa & Adedapo, 2024) (Singh et al., 2023)

The above table gives significant information on three extract..

4.0 Future Directions

Future research should focus on optimizing extraction methods and exploring the extract's therapeutic applications. The ethnolic extract of Zea Mays corn silk presents a promising natural remedy for various health conditions, supported by its rich chemical composition and diverse pharmacological activities.

Future research should focus on isolating bioactive compounds, standardizing extraction methods, and conducting clinical trials to confirm efficacy and safety. This will enhance the development of corn silk-based pharmaceuticals and nutraceuticals (Zhang et al., 2024) (Ying-ping, 2004).

5.0 Applications in Health and Cosmetics

The extract's antioxidant properties were confirmed through various assays, indicating its potential in cosmetic formulations (Yucharoen et al., 2023).

While the studies highlight the promising applications of corn silk extract, further research is necessary to explore its full potential and safety in various formulations. The traditional use of corn silk in folk medicine also suggests a broader scope for its application beyond antifungal treatments.

6.0 Conclusion

Corn silk is a valuable source of bioactive compounds with diverse pharmacological activities. Its potential in managing chronic diseases, coupled with its traditional uses, highlights its importance in modern medicine. Further research is essential to fully harness its therapeutic potential.

Corn silk is a medicinal plant that grows upto 4-6 inches inthe cob of corn plant. It contains many therapeutic and nutritional values. The present study shows that corn silk is rich in minerals like sodium and potassium. It possess high amount of antioxidant and phenolic content, so it can be used in the treatment of several ailments. Corn silk is a natural herb that can be taken for a longer period of time.

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