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Review article

The potential of corn silk (*Zea mays* L.) in glycemic control and its indirect relevance to diabetic wound healing: A scoping review

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ABSTRACT

Diabetes mellitus is characterized by chronic hyperglycemia, oxidative stress, and persistent inflammation, leading to delayed wound repair. Corn silk (Zea mays L.), a common traditional remedy, exhibits antihyperglycemic, antioxidant, and anti-inflammatory properties, suggesting biological relevance to diabetic tissue homeostasis. This scoping review mapped evidence on corn silk's effects on glycemic control and its indirect relevance to diabetic wound healing. Searches of PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar (2018–2025) yielded nine eligible studies, mainly in vitro and diabetic animal models, with few short-term human trials. Corn silk consistently reduced fasting blood glucose and improved insulin sensitivity, supported by flavonoids, phenolics, polysaccharides, and saponins. Reported mechanisms antioxidant enzyme modulation, inhibition of carbohydrate digesting enzymes, and improved lipid-oxidative profiles address key biological barriers to wound repair, though no study measured wound-specific outcomes. Corn silk shows promise as a complementary approach for glycemic regulation, but targeted wound models and larger controlled clinical trials are needed to confirm its translational applicability in diabetic tissue repair.

Keywords: Corn silk, *Diabetes mellitus*, diabetic wound healing, glycemic control, *Zea mays*

INTRODUCTION

Diabetes mellitus (DM) is a major global public health challenge with a continuously increasing prevalence, contributing substantially to morbidity, mortality, and healthcare costs (Magliano *et al.*, 2021). Chronic hyperglycemia leads to multiple complications, notably impaired wound healing such as diabetic foot ulcers, which frequently result in infection, prolonged hospitalization, and lower-extremity amputation (Boulton *et al.*, 2018). Delayed wound repair in diabetes is multifactorial, involving oxidative stress, chronic inflammation, microvascular dysfunction, impaired angiogenesis, and reduced fibroblast and keratinocyte activity (Guo and DiPietro, 2010). Thus, effective glycemic control remains central to preventing diabetes-related tissue damage.

Despite advances in pharmacological therapy, long-term use of conventional antihyperglycemic agents is often associated with adverse effects and reduced patient adherence (Inzucchi *et al.*, 2015; Davies *et al.*, 2018). This has increased interest in plant-based therapies with multi-target biological activities. Corn silk, the stigmas of *Zea mays* L., is an agricultural by-product traditionally used in Asia, Africa, and Latin

America for metabolic and inflammatory disorders. Phytochemical studies have identified flavonoids, phenolic acids, polysaccharides, saponins, and alkaloids associated with antihyperglycemic and antioxidant activities (Raihan *et al*., 2023). Animal studies suggest that corn silk extracts may reduce fasting blood glucose, improve insulin sensitivity, and attenuate oxidative stress (Zhang *et al*., 2015).

Beyond glycemic regulation, biological effects attributed to corn silk including antioxidant, anti-inflammatory, microcirculatory, and cell-proliferative actions are mechanistically linked to wound healing processes (Eming *et al*., 2014). Although direct evidence on diabetic wound closure remains limited, these mechanisms provide a plausible rationale for its relevance. Current evidence on corn silk and DM is fragmented across *in vitro*, animal, and phytochemical studies with heterogeneous outcomes. No synthesis has systematically mapped its role in glycemic control alongside its relevance to diabetic wound healing. Therefore, a scoping review is appropriate to map existing evidence, identify knowledge gaps, and inform future research (Tricco *et al*., 2018).

STUDY DESIGN

The scoping review was conducted following the framework proposed by many authors (Tricco *et al*., 2018; Arksey and O'Malley, 2005; Levac *et al*., 2010). Eligibility was defined using the Population–Concept–Context (PCC) framework. The population included in vitro studies, animal models, and human subjects with diabetes mellitus. The concept comprised the use of corn silk in any form with outcomes related to glycemic control or biological mechanisms relevant to wound healing. The context included experimental, preclinical, and clinical research settings. Only original research articles were included, while reviews, editorials, conference abstracts, theses, non-peer-reviewed articles, and studies without full text were exclude. Literature searches were conducted in PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar using combinations of MeSH terms and free-text keywords related to corn silk and diabetes mellitus, including corn silk (*Zea mays* L.) and "hyperglycemia." Reference lists of included studies were also screened to identify additional relevant articles. After duplicate removal, titles and abstracts were independently screened by two reviewers, followed by full-text assessment against eligibility criteria. Disagreements were resolved by consensus. The study selection process was documented using a PRISMA-ScR flow diagram (Tricco *et al*., 2018).

Data were extracted using a standardized charting form capturing study characteristics, intervention details, outcomes related to glycemic control, and biological mechanisms relevant to wound healing. Extracted data were synthesized descriptively and thematically. Quality appraisal was not performed, as the aim was to map existing evidence rather than evaluate intervention effectiveness.

RESULTS OF SCOPING REVIEW

Effects of corn silk on glycemic control

This scoping review highlights corn silk (*Zea mays* L.) as a promising complementary agent for glycemic control. Preclinical studies consistently demonstrate reductions in fasting blood glucose, improved glucose tolerance, and decreased insulin resistance (Guo *et al*., 2009; Hamzah *et al*., 2023; Nkono *et al*., 2022; Sheng *et al*., 2021), while limited human trials suggest similar benefits in fasting glucose and HbA1c(Cheng *et al*., 2024; Hidayah *et al*., 2018; Shahzad *et al*., 2022).

Mechanistically, corn silk exerts antioxidant and anti-inflammatory effects, reducing lipid peroxidation, enhancing SOD, CAT, and GSH-Px activity, and modulating metabolic and inflammatory pathways relevant to tissue repair (Hamzah *et al*., 2023; Sheng *et al*., 2021; Cheng *et al*., 2024; Eming *et al*., 2014). Bioactive compounds such as flavonoids, phenolics, polysaccharides, and saponins provide a plausible basis for these effects (Tian *et al*., 2021).

Corn silk shows reliable antihyperglycemic effects in animal models and adults with type 2 diabetes. Extracts significantly lower fasting blood glucose and reduce insulin resistance versus untreated diabetic controls (Hamzah *et al.*, 2023; Nkono *et al.*, 2022; Sheng *et al.*, 2021). Human interventions including aqueous extracts, powders, and teas also decrease fasting glucose and HbA1c after treatment (Hidayah *et al.*, 2018; Shahzad *et al.*, 2022; Sheng *et al.*, 2021).These benefits are linked to digestive enzyme inhibition (α-glucosidase/α-amylase), improved insulin sensitivity, β-cell support, increased glucose uptake (GLUT-4), and hepatic glucose modulation with flavonoids, phenolics, polysaccharides, and saponins identified as key bioactive compounds (Tian *et al.*, 2021; Zhao *et al.*, 2012). Evidence for wound healing remains indirect, as no study reports wound-specific outcomes.

Biological echanisms indirectly relevant to diabetic wound healing

No included study directly measured wound-healing outcomes. However, corn silk showed consistent antioxidant activity, reflected by lower lipid-peroxidation markers and increased SOD, CAT, and GSH-Px activity (Tian *et al.*, 2021; Hamzah *et al.*, 2023; Sheng *et al.*, 2021), mechanisms relevant to oxidative-stress-driven healing delays in diabetes. Anti-inflammatory effects, including modulation of inflammatory mediators, were also reported (Sheng *et al.*, 2021; Sun *et al.*, 2025). Additional evidence suggests potential support for cellular proliferation and pathways linked to angiogenesis and re-epithelialization, though derived from metabolic or mechanistic findings, not wound-specific models (Zhang *et al.*, 2015). The overall link to tissue repair is biologically plausible but indirect, highlighting the need for wound-focused experimental and clinical research.

Despite these promising mechanisms, direct evidence on diabetic wound healing is lacking, as no studies assessed wound-specific outcomes such as closure rate, angiogenesis, or tissue regeneration. Thus, current conclusions remain indirect, and improved glycemic control or reduced oxidative stress alone cannot confirm therapeutic efficacy in wound repair.

Distribution of evidence and knowledge gaps

The evidence base is mostly preclinical, with few human studies and no clinical trials directly evaluating diabetic wound healing. Heterogeneous methods, small samples, and varied intervention protocols limit cross-study comparison (Guo *et al.*, 2009; Hamzah *et al.*, 2023; Kazakova *et al.*, 2024; Nkono *et al.*, 2022). Current literature supports corn silk's antihyperglycemic effects and modulation of oxidative stress and inflammation, pathways mechanistically relevant to diabetic tissue repair (Cheng *et al.*, 2024;Tian *et al.*, 2021; Sheng *et al.*, 2021). However, direct wound-healing evidence is absent, underscoring the need for well-controlled wound models and clinical trials that explicitly measure healing outcomes in people with diabetes.

FUTURE STRATEGY

Future research should focus on standardized preclinical wound models and well-designed clinical trials integrating wound-specific endpoints, with consistent extraction methods, doses, and intervention durations. Clinically, corn silk may serve as a supportive intervention for metabolic modulation and tissue health in diabetes, but its wound-healing efficacy remains to be directly established. This review's strength lies in its integrated synthesis across *in vitro*, animal, and human studies, mapping glycemic, oxidative, and inflammatory pathways, and highlighting diabetic wound healing as an underexplored research area.

CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest, including financial interests, personal relationships, or affiliations, that could have influenced the work reported in this paper.

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