doi.org/10.36721/PJPS.2025.38.6.REG.13405.1

Therapeutic targets of *corn silk* polysaccharide on hypoglycemic effect and mechanisms: Experimental validation of network pharmacology analysis

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Abstract: We investigated the hypoglycemic effect and mechanism of corn silk polysaccharide in diabetic mice. Through network pharmacology, we found that corn silk polysaccharides exerted hypoglycemic effects through 104 therapeutic diabetic targets, MAPK and dopaminergic synaptic signaling pathways. Molecular docking experiments showed that the core target SRC had the best binding activity to D-Mannose, with a binding energy of -6.012 KJ/mol. *In-vivo* experiments demonstrated that corn silk polysaccharide reduced blood glucose level, glucose tolerance and improved body weight disorders in T2DM mice ($P<0.01$). In addition, corn silk polysaccharide can promote the recovery of pancreatic islet cell morphology in T2DM mice and the recovery effect was more obvious in large doses of corn silk polysaccharide. This suggests that corn silk polysaccharide can treat type 2 diabetes mellitus through multi-targets and multiple pathways. Meanwhile, corn silk polysaccharide extract had positive effects on blood glucose, body weight disorder and glucose tolerance in T2DM mice, which might be accomplished by restoring the morphology of pancreatic islet cells.

Keywords: *Corn silk* polysaccharide; Hypoglycemic; Network pharmacology

Submitted on 13-09-2024 - Revised on 20-07-2025 - Accepted on 22-07-2025

INTRODUCTION

Diabetes is a common metabolic disease caused by defects in insulin secretion, insulin action, or both. According to the latest data from the International Diabetes Federation (IDF), In 2021, the estimated global number of people aged 20-79 with diabetes is 536.6 million, representing 10.5% of the entire adult population. The most common form of this illness is Type 2 diabetes mellitus (T2DM) which amounts to approximately 90-95% of all the cases around the world. T2DM is recognized as a set of metabolic ailments characterized by hyperglycemia, dyslipidemia and insulin resistance in target metabolic tissues (Sun *et al.,* 2022; Rachdaoui *et al.,* 2020; Horlyck-Romanovsky.2019). T2DM is most often associated with renal failure, blindness, slow wound healing and cardiovascular disease (Zheng *et al.,* 2019). Drugs such as sulfonylureas and glinides stimulate the release of insulin, but have certain side effects that may lead to severe hypoglycemia and elevated mortality from related diseases.

Corn silk is a kind of style and stigma of Zea mays, which is grass family. *corn silk* polysaccharide is the extract of *corn silk*, which has anti-tumor, antibacterial, hypoglycemic, anti-oxidation and immune system diseases (Ding *et al.,*2022; Wang *et al.,*2022; Hamzah *et al.,*2021; Zou *et al.,*2021; Yang *et al.,*2020; Shi *et al.,*2019). However, research on hypoglycemic effect of *corn silk* *polysaccharide* was not found. This study verified the hypoglycemic effect of *corn silk* polysaccharides on diabetic mice induced by high-fat feeding and low-dose STZ treatment through network pharmacology and animal experiments and monitored the recovery of body weight, blood glucose, glucose tolerance and islet cells before and after administration. It laid a theoretical foundation for the discovery of clinical drugs for type 2 diabetes and clarified the experimental basis for the clinical application of *corn silk* polysaccharide to treat diabetes.

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MATERIALS AND METHODS

Materials and methods corn silk was purchased from Dong Ning city Market (HeiLongJiang, China). The Kunming mice of body weight were about 20±2g. The kit for analyzing insulin was bought from Shanghai TW.STZ and HE were acquired from Beijing DingGuo Biotechnology Company. The Blood Glucose Tester and Test Strips were purchased from Roche Diabetes Care CmbH.

Analysis of the effects of corn silk polysaccharide on type 2 diabetes based on network pharmacology and molecular docking

Ten active ingredients including rhamnose, xylose, arabinose, mannose, glucose, galactose, levulose, galacturonic acid, glucosamine and glucuronic acid were obtained after literature search and screening. Pubchem and SwissTarget Prediction databases were utilized to find the target genes of the active ingredients and Genecards were used to search for relevant targets for type 2 diabetes. Intersecting targets of corn silk polysaccharide for diabetes were imported into the STRING database to predict protein interactions. Import the intersecting targets into the Metascape website, set the species as H. sapiens and submit the target information. Select GO Molecular Functions, GO Biological Processes and GO Cellular Components for GO enrichment analysis. Input the intersected targets into the KOBAS website and the species selection was Animals, Vertebrates and Homo spaines (human) to obtain the enrichment information of KEGG-related signaling pathways. The target proteins were obtained according to the PDB database and the active ingredients of *corn silk* polysaccharide were selected as ligands, which were uploaded to Autodock docking software for molecular docking and the docking results were optimized by Pymol.

Establishment of type 2 diabetes mouse model and study on hypoglycemic effect

Forty-eight 8-weeks old male Chinese Kunming mice with a weight ranging between 18-22 g were exposed to the ambient temperature of 22 °C-25 °C and a 12:12 h light/dark cycle, following housing them in a cage (five animals each). 12 mice, placed in the normal group, were given ordinary chow as feed. A high-fat diet was given to the other 36 mice for 2 weeks. These mice were then made to fast for 8 h, however, they were allowed liberal access to water. Intraperitoneal injections of STZ (35 mg/kg in 0.1 mol/L citrate-buffered salines, pH 4.4; injection given daily for 3 days) were then given to these mice for inducing T2DM. Free access to water and high-fat food was given to the STZ-treated group. These mice manifested fasting blood glucose (FBG) readings of 11.1 mmol/L after a passage of 1 week. Three groups (12 mice per group) of the T2DM mice were made, including a low-dose group with 100mg/kg *corn silk* polysaccharide, a high-dose group that was dosed with 200mg/kg *corn silk* polysaccharide, a diabetes model group received 0.9% saline (vehicle) and the normal group received 0.9% saline (vehicle). Saline (0.9%) was used to dilute all drug stock solutions, which were administered once per day through oral gavage for 6 weeks (*corn silk* polysaccharide were obtained from the optimized extraction of *corn silk*).

Correlation index detection

During treatment, the blood glucose and body weight of 8 hours fasted were estimated weekly. A One Touch Ultra Easy glucose reader was used to estimate Fasting Blood Sugar (FBG).

Islet cell morphology observation

At the end of the 6th week, the mice were sacrificed after treatment. Observation of islet cell morphology in the mouse pancreas will be done based on post-dissected paraffin sections and HE staining morphology.

Statistical analysis

Data were presented as mean ± SD. Using GraphPad Prism 5 software, statistical analysis was conducted using Student's t-test or one-way ANOVA. A probability value of $P<0.05$ was considered statistically significant.

RESULTS

Network pharmacological analysis of corn silk polysaccharide for hypoglycemic

Targets acquisition and protein interaction network

Preliminary experiments and literature search revealed that the main active components of *corn silk* polysaccharides are rhamnose, xylose, arabinose, mannose, glucose, galactose, lyxose, galacturonic acid, glucosamine and glucuronic acid. According to Pubchem and Swiss Target Prediction databases, there are 209 drug targets corresponding to corn silk polysaccharides and 1496 targets corresponding to diabetes mellitus and 104 intersecting targets were obtained after taking the intersection of the two, which are the targets for the treatment of diabetes mellitus with corn silk polysaccharides (Fig.1A).

PPI network analysis of corn silk polysaccharides and diabetic cross-targets

A target-active ingredient-zearal polysaccharide PPI network interactions map was established using the String database and Cytoscape software for standard targets of zearal polysaccharide and diabetes. Network nodes represent proteins and edges represent protein-protein associations. From the String database, this network includes 104 nodes and 165 interrelationships, with an average node degree value of 3.17 and a PPI enrichment p-value of <1.0e-16. The network was imported into Cytoscape version 3.9.0 graphing tool for beautification (Fig. 1B). The larger circle and darker color represent the larger value of degree and the more important its target, as shown in Fig. 1C, it can be seen that SRC, STAT3, PIK3CD, EGFR and other targets play an important role in the treatment of diabetes by corn silk polysaccharides.

Searching for corn silk polysaccharides and core diabetes targets

The 104 intersecting targets were analyzed by Degree's algorithm and the top five core targets were SRC, STAT3, PIK3CD, PIK3CA and EGFR (see Fig. 1D). Degree's algorithm was able to indicate the degree centrality of the node and the larger the degree centrality, the more important the node was, from which these five targets were selected for subsequent molecular docking.

GO enrichment analysis

The intersecting targets were entered using Metascape mapping tool and the results showed that corn silk polysaccharides were mainly involved in biological process (BP) with 4487 entries, cellular component (CC) with 375 entries and molecular function (MF) with 771 entries. Based on the microbiological letter platform, GO chord plotting was carried out and corn silk polysaccharides were mainly detected through the response to nitrogen compound (cellular response to nitrogen compound), the response to organic cyclic compound (cellular response to organic cyclic compound) and the response to lipopolysaccharide (lipopolysaccharide). The role of corn silk polysaccharides in influencing diabetes is mainly through cellular response to nitrogen compound, cellular response to organic cyclic compound and cellular response to lipid polysaccharide (see Fig. 1E).

KEGG enrichment analysis

The 104 intersecting targets were subjected to KEGG enrichment analysis and the results showed that there were 276 signaling pathways involved in these 104 targets, among which the targets of SLC6A3, CLOCK, GRIA2, GNAO1, MAPK10 and GNAI1 were able to regulate the Dopaminergic synapse signaling pathway and GRIA2, GNAO1, GNAO1, GNAI1, CALM2 and MAPK3 can regulate Circadian entrainment signaling pathway and JUN, HSPA8, HSPA1B, MAP2K1 and MAPK10 can regulate MAPK signaling pathway signaling pathway. Corn silk polysaccharide targets are distributed in different metabolic pathways and can play a role in the treatment of diabetes by regulating different signaling pathways (Fig. 1F).

Molecular docking results

The core targets SRC and STAT3 screened by Degree were selected as receptors and the screened components Rhamnose monohydrate, Xylose, Arabinose, D-Mannose, glucose, D-Galactose, D-Lyxose, D-Glucuronic Acid, D-Galacturonic Acid, D-Glucosamine as ligands, respectively, molecular docking (Table 1, Fig. 2). The binding energy of the receptor and ligand ≤ 0KJ/mol, proving that the two are able to bind to each other. The smaller the binding energy, the stronger the ligand-receptor binding ability. Among them, the core target SRC had the best binding energy with D-Mannose and its binding energy was -6.012KJ/mol, which indicated that the screened active ingredients had a stronger binding ability and better binding activity with the selected core target.

Optimization of extracted corn silk polysaccharide

Orthogonal experiments were conducted using orthogonal test table L9 (34) and the factors and levels are shown in Table 2.

The optimal extraction process of corn silk polysaccharides was determined by orthogonal test. The results of orthogonal experiments showed that the factors affecting the extraction amount of corn silk polysaccharides were in the following order: A > B > D > C, i.e., the extraction time and the material-liquid ratio had a relatively large influence on the extraction effect of corn silk polysaccharides, i.e., the extraction amount of corn silk polysaccharides was the largest at the optimal extraction time and material-liquid ratio, which reached a significant level ($p<0.05$), followed by the influence of the ethanol concentration and the extraction rate. Combining the above conditions, the optimal extraction conditions for corn silk polysaccharides were: A2B3C3D3, i.e., extraction at 50°C for 2.5 h at a material-liquid ratio of 1:20 and an ethanol concentration of 80% for the determination of polysaccharide content (Table 3).

Corn silk polysaccharide ameliorates body weight disorder in T2DM mice

In T2DM mice, *corn silk* influences physical characteristics and causes a significant improvement in body weight disorder. When the study began, a T2DM mouse model was created using high-fat feeding and simultaneous low-dose STZ therapy. For the mice involved, the FBG approached a value of 11.1 mmol/L. The outcome suggested the successful creation of the T2DM model: the mice showed polyuria and polydipsia, subsequently losing body weight. The model group exhibited extremely dull hair, higher water consumption and listless spirit in comparison to the normal group. The *corn silk* polysaccharide group had a notably better condition than the model group.

Whereas a stable increase in the body weight was observed in the normal mice, a decline was observed in the mouse model (Fig. 3A). During the early treatment, the value of body weight in the *corn silk* polysaccharide-treated mice decreased, then underwent a gradual increase and hardly demonstrated any difference in comparison to that in the normal group. The mice in the *corn silk* polysaccharide group showed a higher weight compared to the members of the low-dose group and the weight shift was more or less dose-dependent. These results suggest that *corn silk* polysaccharide can ameliorate body weight disorder in T2DM mice.

Corn silk polysaccharide reduces the blood glucose levels and glucose tolerance of T2DM mice

The mice in the administration group were given *corn silk* polysaccharide (100mg/kg and 200mg/kg) for 6 weeks respectively. After 6 weeks, compared with the model group mice, the blood glucose levels of the mice treated with high-dose and low-dose *corn silk* polysaccharide were significantly decreased ($P<0.01$). The decreasing effect was more obvious in the high-dose *corn silk* polysaccharide group (Fig. 3B). These results suggest that *corn silk* polysaccharide is an effective hypoglycemic agent, but further *in-vivo* experiments, especially at various doses, are needed to better estimate its therapeutic potential. The glucose tolerance test (OGTT) showed that compared with the model group, the blood glucose concentration in the treatment group decreased significantly (Fig. 3C).

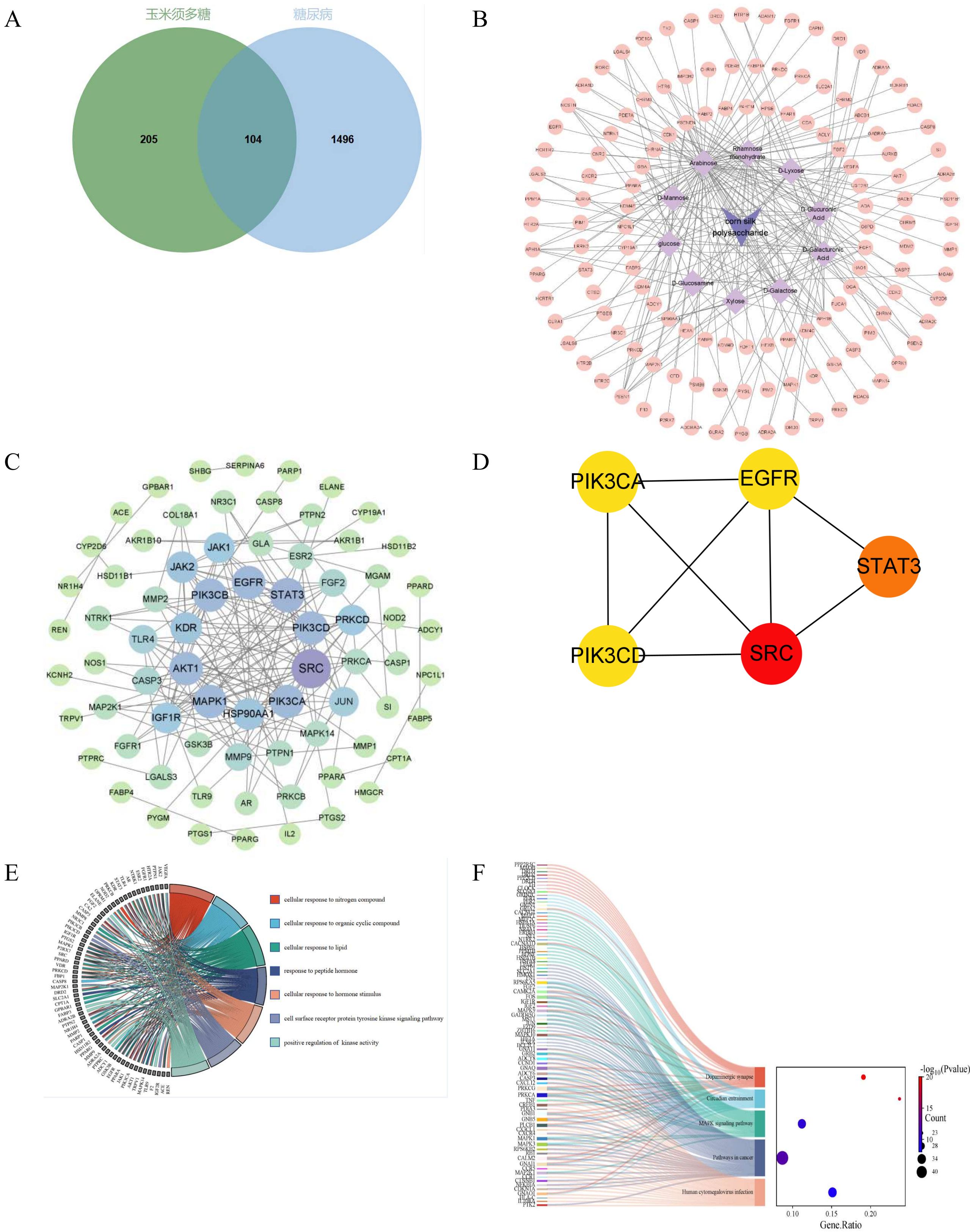

Fig. 1: Analysis of network pharmacological results.
(A)Corn silk polysaccharides and diabetes intersection targets Wayne's diagrams (B)Target-Active Ingredient-corn silk polysaccharide PPI network diagram (C)Protein Interaction Network of corn silk Polysaccharides with Diabetes Mellitus(D) Degree Algorithm Core Targets(E) GO enrichment analysis of intersecting targets (F) KEGG enrichment analysis of intersecting targets.

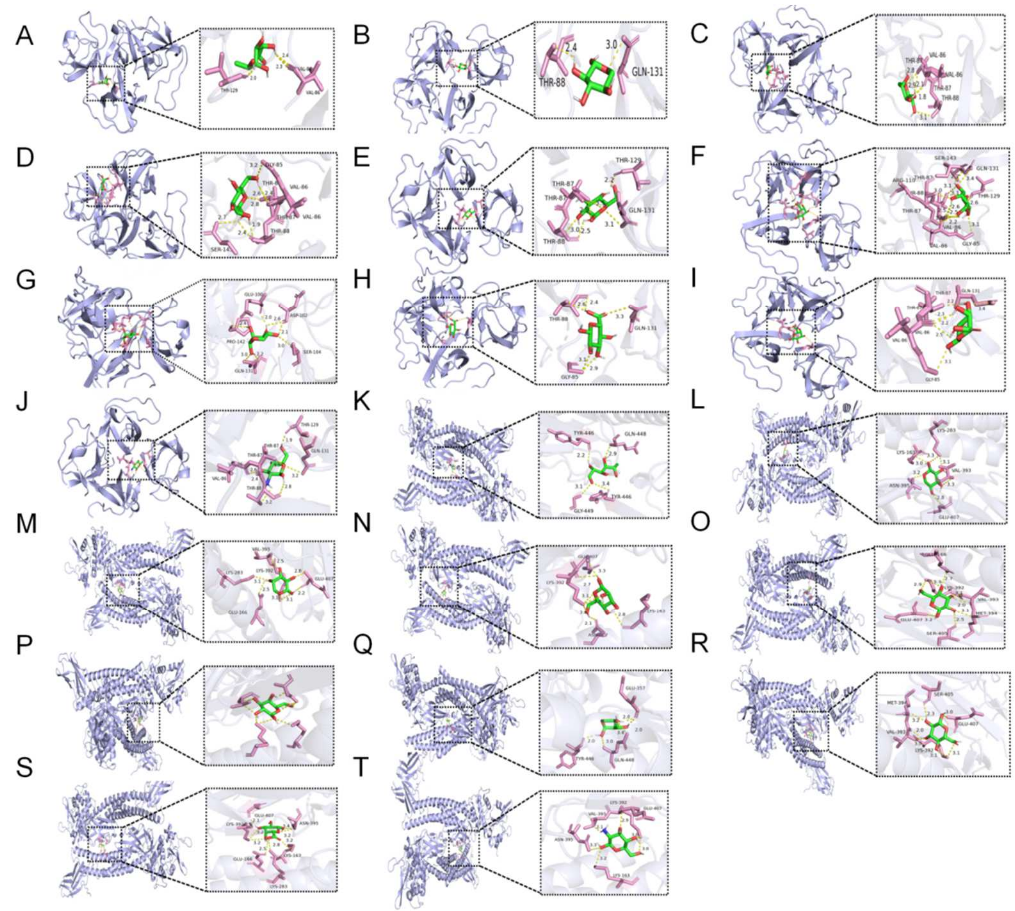

Fig. 2: Molecular docking results.

(A) SRC with Rhamnose monohydrate; (B) SRC with Xylose; (C) SRC with Arabinose; (D) SRC with D-Mannose; € SRC with glucose; (F) SRC with D-Galactose; (G) SRC with D-Lyxose; (H) SRC with D-Glucuronic Acid; (I) SRC with D-Galacturonic Acid; (J) SRC with D-Glucosamine; (K) STAT3 with Rhamnose monohydrate; (L) STAT3 with Xylose; (M) STAT3 with Arabinose; (N) STAT3 with D-Mannose; (O) STAT3 with glucose; (P) STAT3 with D-Galactose; (Q) STAT3 with D-Lyxose; (R) STAT3 with D-Glucuronic Acid; (S) STAT3 with D-Galacturonic Acid; (T) STAT3 with D-Glucosamine

Table 1: Potential therapeutic targets and compound docking results

Targets	Active ingredient	Affinity(KJ/mol)
	Rhamnose monohydrate	-4.827
	Xylose	-5.226
	Arabinose	-5.627
	D-Mannose	-6.012
SRC	glucose	-5.424
	D-Galactose	-5.599
	D-Lyxose	-5.553
	D-Glucuronic Acid	-5.969
	D-Galacturonic Acid	-5.880
	D-Glucosamine	-5.572
	Rhamnose monohydrate	-4.333
	Xylose	-5.261
	Arabinose	-4.720
STAT3	D-Mannose	-5.374
	glucose	-5.559
	D-Galactose	-5.350
	D-Lyxose	-4.846
	D-Glucuronic Acid	-5.586
	D-Galacturonic Acid	-5.665
	D-Glucosamine	-5.352

Table 2: The levels and factors of orthogonal test

Level	Factor			
	Ultrasonic time (h)	Solid-liquid ratio	Ethanol concentration (%)	Ultrasonic temperature (℃)
1	2	1: 10	70	70
2	2.5	1: 15	75	75
3	3	1: 20	80	80

Table 3: The results of orthogonal test (n=3)

Factor	Time (h)	Solid-liquid ratio	Temperature (℃)	Ethanol concentration	Extraction ratio
1	2	1:10	70	70	0.42
2	2	1:15	75	75	0.63
3	2	1:20	80	80	0.85
4	2.5	1:15	70	70	0.62
5	2.5	1:20	75	75	0.83
6	2.5	1:10	80	75	0.42
7	3	1:20	70	75	0.42
8	3	1:10	75	80	0.64
9	3	1:15	80	70	0.89
K_1	0.318	0.487	0.504	0.056	
K_2	0.817	0.441	0.651	0.063	
K_3	0.650	0.856	0.629	0.829	
range	0.499	0. 415	0.147	0.391	

Primary and secondary order A>B> D > C Optimal levels A2B3C3D3

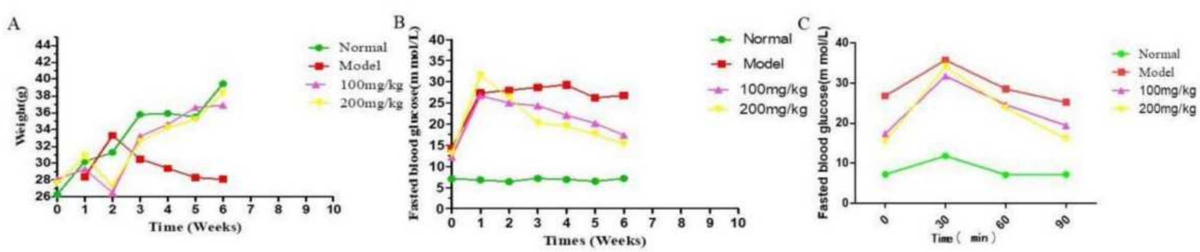

Fig. 3: Effect of *Corn Silk* polysaccharide on body weight, blood glucose and OGTT levels in T2DM mice

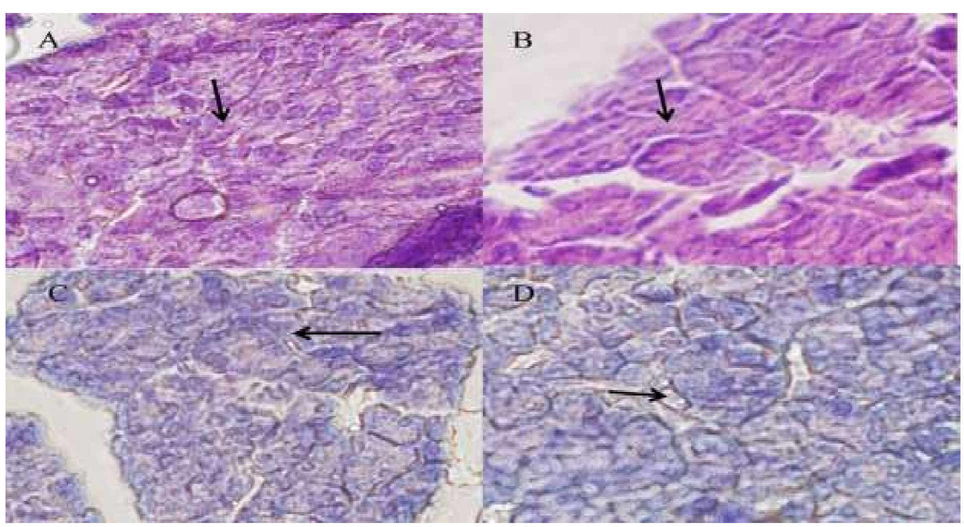

Fig. 4: Compared with mice islet cells morphology
(A: normal group; B: model group; C: 100mg/mL of *Corn Silk* polysaccharide group; D: 200mg/mL of *Corn Silk* polysaccharide group)

Table 4: Four-tier grading system

Level (numeric)	Kind	Clarification
0	Within normal limits	In the study situation, the tissues were considered normal, taking into account factors such as age, sex and strain of the animals.
1	light	Changes occurring just above the normal range
2	marginal	Lesions can be observed but are not yet serious
3	moderate	Lesions are visible and likely to be more severe
4	severity	Very severe lesions (lesions that have taken over entire tissues and organs)

Table 5: Organizational scoring

	Islet cell integrity	Ducts	Degree of islet cell swelling
Normal	0: cell integrity	0: clearly visible	0: no
Model	3: Damaged cell structure, poorly defined margins, atrophy now severe	3: Blurred	3: Significant swelling
100mg/kg	2: Cellular structure more intact, slight atrophy	2: a little fuzzy	2: a little swollen
200mg/kg	1: Cell structure is more complete with clear margins	1: Clearer	2: Slightly swollen

The high-dose *corn silk* polysaccharide treatment group could significantly antagonize the increase in blood glucose induced by exogenous glucose and the low-dose *corn silk* polysaccharide could also lower blood glucose. The study found that the Calculation of insulin resistance was different in different administration groups. The Calculation of insulin resistance in the low-dose administration group was 4.16. The Calculation of insulin resistance in the high-dose administration group was 3.92; There was a significant difference compared with the model group (P<0.01).Therefore, our study highlights the regulatory effect of *corn silk* polysaccharide on blood glucose in diabetic mice.

Effects of corn silk polysaccharide treatment on islet cell morphology by HE

Observation of mouse islet cells by HE staining morphology showed that there were many full islet cells in the normal group and the glandular tube was very clear. In contrast, the cell structure of the model group was obviously damaged, the cell edge was unclear and shrinkage was observed. Compared with the model group, the histopathological sections of the pancreatic islets were restored to enlargement in the *corn silk* polysaccharide administration group and the cell morphology was completed, especially in high dose group, in which the islet cells recovered to the level of the normal group (Table 4, Table 5 and Fig. 4).

DISCUSSION

T2DM is characterized by elevated levels of glucose circulating in the blood as a consequence of compromised insulin sensitivity of cells (insulin resistance) (Guo *et al.,* 2022). Diet therapy is recommended as one of the first-line therapies for controlling blood sugar in T2DM. It is also recommended as co-therapy for patients requiring hypoglycemic drugs. According to Chinese tradition, *corn silk* is not only a food material but also a traditional Chinese medicinal material, which can be safe and reliable while exerting its effectiveness. Yu liping found that corn starch polysaccharide had a protective effect on diabetic mice induced by alloxan and glucose (*Zhang et al.,* 2015). However, to our knowledge, the results of *corn silk* polysaccharide improving hyperglycemia in high-fat diets and STZ-induced T2DM mice were demonstrated for the first time in this study. Oral gavage treatment with various *corn silk* polysaccharide concentrations led to a profound decrease in hyperglycemia.

In this experiment, the hypoglycemic effect of *corn silk* polysaccharide was studied based on network pharmacology. Previous studies have shown that oral administration of black tea polysaccharide (BTPS) can significantly control blood sugar and improve insulin resistance in type 2 diabetic mice (Xiang *et al.,* 2022). Panax notoginseng polysaccharide, astragalus membrane polysaccharide and red kidney bean polysaccharide also have similar effects. Corn silk polysaccharide, like these polysaccharides, are composed of various monosaccharides in different proportions (Li *et al.,* 2022; Song *et al.,* 2022; Bai *et al,* 2023). As biomacromolecules of natural origin, polysaccharides usually have the function of lowering blood sugar and are used to develop functional foods to prevent diabetes. In this study, 104 related targets were predicted based on several monosaccharides that make up *corn silk* polysaccharide, 17 of which can be used to treat type 2 diabetes. The results of the protein interaction network showed that the three targets of SRC, STAT3 and PIK3CD had larger degree values and had stronger relationships with other targets. It also suggests that they could combine well with other targets to intervene in diabetes. The auto-docking demonstrated SRC has potential binds to ingredients of JTW. *In-vivo*, JTW can reduce blood glucose and blood lipid levels and HOMA-IR and increase HOMA-ISI levels in T2DM mice with reduced ALT, AST, MDA levels and increased SOD levels. Meanwhile, decreased phosphorylation of SRC, along with increased levels of phosphorylated PI3K, PI3K and phosphorylated AKT, were observed. (*Ye C et al.*, 2025)Meanwhile, the core target c-Src trans-activates the FGFR1 kinase domain and it has been found that elevated levels of phosphorylated fibroblast growth factor receptor 1 (p-FGFR1) in cardiomyocytes can induce diabetes mellitus (Chen X, *et al.,* 2024). Many studies have shown that STAT has an important relationship with the pathogenesis of diabetes mellitus and the negative regulation of JAK/STAT plays an important role in inhibiting hyperglycemia-induced renal injury and improving renal function and lowering the expression level of p-STAT3 ($p < 0.001$) can effectively ameliorate diabetic nephropathy. (Sarah M Al-Qabbaa *et al.,* 2023).

Overall, the study showed that *corn silk* can play a role in hypoglycemia through multiple pathways and multiple targets. The molecular docking results showed that compared with the molecular docking results of the positive control metformin and the potential key targets in this study, the active ingredients of *corn silk* polysaccharide had better binding properties to potential key targets, indicating that *corn silk* polysaccharide can be stably combined with the receptor to exert the effect of lowering blood sugar. The prediction results provide further evidence that the active ingredients of *corn silk* polysaccharide act on specific targets (Jin *et al.,* 2022; Peng *et al.,* 2022; Galigniana *et al.,* 2022).

The method of intraperitoneal injection of STZ is a commonly used method of constructing diabetes models in animals, but it may lead to nonspecific tissue damage when used in high doses, which affects the experimental results, so the method of constructing diabetes models by using a concentration of 35 mg/kg of STZ while culturing a high-fat, high-sugar diet was used in this study, which resulted in a comparatively high rate of modeling and a low rate of mortality.Patients with type 2 diabetes, while having high blood sugar, are accompanied by phenomena such as insulin resistance and weight disorder. Therefore, we further verified the therapeutic effect of *corn silk* extract and *corn silk* polysaccharide on high-fat diet and STZ-induced hyperglycemia in T2DM mice. Experimental studies on mice have shown that *corn silk* polysaccharide can improve abnormal fasting blood sugar and insulin levels in plasma and reduce weight disorders. Different concentrations of *corn silk* polysaccharide can significantly reduce blood sugar through oral or stomach. It is worth noting that this study also found that *corn silk* polysaccharide has a dose-dependent effect on lowering blood sugar and improving body weight disorders. The blood glucose and body weight of the mice in the low and high-dose groups did not differ significantly during the same time of administration. This may mean that very small amounts of *corn silk* polysaccharide can play a stable role in the treatment of type 2 diabetes (Mohammad *et al.,* 2022).The islet cells of treated mice had an obvious phenomenon of gland swelling, which may be due to STZ damage to part of the islet cells. Studies showed that the islet cells of diabetic mice damage were mediated by T cells *In-vivo* and related to their immune response (*Akoonjee et al.,* 2023). When the drug was given to stimulate insulin secretion, the islet cells secreted insulin and the gland of parts of islet cells was swelling and in a state of filling. Our findings are consistent with these results. We found that *corn silk* polysaccharide groups islet cells in *corn silk* polysaccharide groups glandular tubes inflated with those of the model group, in particular, the treatment of the high-dose group can restore the islet cells to the level of the normal group.

This study found that oral administration of *corn silk* polysaccharide could significantly reduce hyperglycemia in diabetic mice. It may regulate the expression of VEGFA,SRC,STAT3, CYP2D6and other genes in the development of type 2 diabetes and intervene through multiple related signaling pathways (Wang *et al.,*2022; Giuseppe *et al.,* 2021; Pan *et al.,* 2017; Kirrella *et al.,* 2021). Therefore, if applying the *corn silk* polysaccharide to clinical therapy, the mechanism of *corn silk* polysaccharide must be investigated in future studies.

Limitation of study

However, the toxicological and pharmacokinetic aspects of corn silk polysaccharides need to be further investigated.

CONCLUSION

Corn silk Polysaccharide, significantly reduced blood glucose level, glucose tolerance and improved body weight disorders in T2DM mice in a dose-dependent manner and also had a significant restorative effect on pancreatic islet cell morphology in T2DM mice. Bioinformatics mechanism study showed that *corn silk* polysaccharide can lower glucose by regulating SRC, STAT3, PIK3CD, PIK3CA and other targets and acting on Dopaminergic synapse signaling pathway, Circadian entrainment signaling pathway and MAPK signaling pathway pathway.

Acknowledgement

Not applicable.

Authors' contributions

ZL designed the study and managed the whole study procedures. LT and JZM performed in network pharmacology analysis, PMY and YY optimizing the extraction of *corn silk* polysaccharides. ZL first edition of the manuscript and reviewed the manuscript. LXY, LY, LJL, MJ and SQL jointly conducted *In-vivo* experiments and related measurements. All authors have read and approved the final manuscript.

Funding statement
This work was supported by Basic scientific research operating expenses of provincial universities in Heilongjiang Province [grant no.1453PT004].

Data availability statement
All supporting data are included within the main article.

Ethical approval
230736211100001224, the study was approved from the Laboratory Animals of Heilongjiang Province, Ethical Review Approval No. 20211015-1.

Conflicts of interest
The authors declare that there is no conflict of interest regarding the publication of this paper.

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