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Pharmacological Evaluation of the Antihyperlipidemic of *Zea mays* L. (Corn Silk) in High-Fat-Diet-Induced Hyperlipidemic Rats

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Abstract

Background: Hyperlipidemia is a major risk factor for atherosclerosis and cardiovascular diseases. Although synthetic antihyperlipidemic drugs are widely used, the search for plant-derived bioactive compounds continues to receive attention. Corn silk, the stigma of *Zea mays* L., contains several phytoconstituents that may contribute to antioxidant and lipid-modulating activities.The present study aimed to investigate the phytochemical composition, in-vitro antioxidant activity, and antihyperlipidemic potential of *Zea mays* corn silk extract in high-fat-diet-induced hyperlipidemic rats. Method: Corn silk was collected, dried, powdered, and subjected to Soxhlet extraction using petroleum ether, ethyl acetate, and methanol. The extracts were evaluated for extraction yield and qualitative phytochemical constituents. The in-vivo study included five groups of rats: normal control, high-fat-diet disease control, atorvastatin-treated standard group (10 mg/kg), and two test groups receiving the extract at 100 and 200 mg/kg. Serum total cholesterol (TC), high-density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), triglycerides (TG), and very-low-density lipoprotein (VLDL) were evaluated. Methanolic extraction produced a reported yield of 0.748%, compared with 0.046% for the ethyl acetate extract. In the animal study, the 200 mg/kg test group exhibited lower total cholesterol (152.03 ± 3.54) and triglycerides (153.32 ± 1.90) than the 100 mg/kg group. HDL was higher in the 200 mg/kg group (110.24 ± 1.87) than in the 100 mg/kg group (95.66 ± 4.02). The corresponding LDL values were 143.43 ± 2.41 and 150.10 ± 4.08, respectively. The reported findings indicate that *Zea mays* corn silk extract possesses in-vitro antioxidant activity and may have antihyperlipidemic potential in high-fat-diet-induced rats. The 200 mg/kg test group showed a more favourable overall lipid profile than the 100 mg/kg group for several parameters.

Keywords: *Zea mays*; corn silk; stigma maydis; hyperlipidemia; antioxidant activity; DPPH assay; lipid profile; atorvastatin; phytochemical screening.

I. Introduction

Hyperlipidemia is a metabolic disorder characterized by elevated concentrations of circulating lipids and lipoproteins, including total cholesterol, triglycerides, and low-density lipoprotein cholesterol, and may be accompanied by reduced high-density lipoprotein cholesterol. Persistent abnormalities in lipid metabolism contribute to the development of atherosclerosis and increase the risk of cardiovascular complications. Dietary habits, physical inactivity, obesity, diabetes mellitus, genetic predisposition, and other metabolic abnormalities may contribute to the development of dyslipidemia.

The management of hyperlipidemia generally involves lifestyle modification and pharmacological treatment. Statins, fibrates, cholesterol-absorption inhibitors, and other lipid-modifying agents are used according to the patient's lipid profile and cardiovascular risk.

Medicinal plants have received considerable scientific attention because they contain diverse secondary metabolites, including flavonoids, phenolic compounds, alkaloids, terpenoids, and tannins. These compounds may exhibit antioxidant, anti-inflammatory, and metabolic effects.

Zea mays L., commonly known as maize or corn, belongs to the family Poaceae. Corn silk, also referred to as stigma maydis, consists of the elongated stigmas associated with the female flowers of the maize plant. Although commonly treated as an agricultural by-product, corn silk has a history of use in traditional medicine and has been investigated for various pharmacological properties. Deng et al. (2019) investigated the antihyperlipidemic properties

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of a polysaccharide isolated from stigma maydis and reported favorable changes in lipid-related parameters in experimental models. Hasanudin et al. (2012) reviewed the phytochemical and pharmacological properties of corn silk, highlighting its potential as a source of biologically active compounds.

Considering these observations, the present study was designed to evaluate corn silk extracts through preliminary phytochemical screening, total phenolic and flavonoid estimation, DPPH radical-scavenging activity, and an experimental model of high-fat-diet-induced hyperlipidemia in rats. The lipid-modifying effects of the test preparation at 100 and 200 mg/kg were compared descriptively with those of atorvastatin.

II. Materials and Methods

2.1. Collection and authentication of plant material

Corn silk (*Zea mays* L., stigma maydis) was obtained from a local vendor. The supplied synopsis reports collection of 200 g of plant material. The material was air-dried and powdered before extraction.

2.2. Preparation of extracts

The powdered plant material was subjected to Soxhlet extraction using petroleum ether, ethyl acetate, and methanol. The extraction procedure was reported to involve heating for approximately 8–10 hours, with the heating mantle temperature adjusted to 40–60°C. Following extraction, the extracts were filtered and concentrated to dryness. The dried extracts were stored in airtight containers.

2.3. Qualitative phytochemical screening

The ethyl acetate and methanolic extracts were screened using preliminary qualitative tests for carbohydrates, alkaloids, terpenoids, flavonoids, tannins, phenolic compounds, saponins, proteins, amino acids, and glycosides.

The reported tests included Mayer's, Hager's, Wagner's, and Dragendorff's tests for alkaloids; Salkowski and Liebermann–Burchard tests for terpenoids; lead acetate, alkaline reagent, and Shinoda tests for flavonoids; and ferric chloride, lead acetate, and gelatin tests for tannins and phenolic compounds.

The results were recorded as positive (+) or negative (−).

2.7. Experimental animals and housing

The supplied synopsis describes the use of Wistar rats weighing approximately 180–200 g. Animals were housed in hygienic polypropylene cages under controlled environmental conditions, including a temperature of 22 ± 2°C and a 12-hour light/dark cycle. Standard pellet diet and water were provided ad libitum, as reported.

The final manuscript must specify the animal sex, strain details, source of procurement, institutional animal ethics committee approval number, and applicable animal-welfare guidelines. These details should be taken from the original experimental records rather than assumed.

2.8. Experimental design

The study described five groups, with six animals per group.

Group	Experimental treatment
I	Normal control
II	High-fat-diet disease control
III	Atorvastatin, 10 mg/kg
IV	Test preparation, 100 mg/kg
V	Test preparation, 200 mg/kg

The high-fat-diet-induced hyperlipidemia model and a treatment period extending to the final observation on day 21.

2.9. Body-weight monitoring

Body weight was recorded at the beginning of the study and at subsequent observation points. The reported schedule included days 0, 4, 10, 16, and 21.

2.10. Serum collection and biochemical estimations

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Blood samples were collected for serum biochemical analysis. The synopsis describes serum separation by centrifugation at 7,000 rpm for 15 minutes at 4°C. Serum lipid parameters were measured using commercially available reagent kits according to the manufacturers' instructions.

The evaluated parameters included:

- Total cholesterol (TC)
- High-density lipoprotein cholesterol (HDL)
- Low-density lipoprotein cholesterol (LDL)
- Triglycerides (TG)
- Very-low-density lipoprotein (VLDL)

The units and specific analytical methods for the reported lipid values were not consistently stated in the available results tables and should be verified before publication.

2.11. Statistical analysis

The synopsis specifies presentation of data as mean ± standard deviation (SD), with six animals per group, and proposes one-way analysis of variance (ANOVA) followed by Bonferroni's multiple-comparison test.

III. Results

3.1. Extraction yield

The reported extraction yields are summarized in Table 1.

Table 1. Extraction yield of *Zea mays* corn silk

Solvent	Reported extract colour	Reported yield (g)	Reported yield (%)
Petroleum ether	Yellow	No yield reported	Not reported
Ethyl acetate	Brown	0.134	0.046
Methanol	Brown	1.96	0.748

The methanolic extract produced the highest reported yield, followed by the ethyl acetate extract. No extract yield was reported for petroleum ether. The starting-material and theoretical-weight entries are inconsistent in the source table and should be checked against the original laboratory records.

3.2. Qualitative phytochemical screening

Preliminary phytochemical screening indicated the presence of several classes of constituents in both ethyl acetate and methanolic extracts.

Table 2. Summary of qualitative phytochemical screening

Phytochemical class	Ethyl acetate extract	Methanolic extract
Carbohydrates	Negative	Negative
Alkaloids	Positive	Positive
Terpenoids	Positive	Positive
Flavonoids	Positive	Positive
Tannins and phenolic compounds	Positive	Positive
Saponins	Negative	Positive
Proteins and amino acids	Negative	Negative
Glycosides	Negative	Positive

The results suggest that both extracts contained alkaloids, terpenoids, flavonoids, and phenolic constituents. Saponins and the tested glycosides were detected in the methanolic extract but not in the ethyl acetate extract. These are preliminary qualitative findings and do not establish the identity or concentration of individual compounds.

3.3. Effect on body weight

The study recorded body weight on days 0, 4, 10, 16, and 21. The disease-control group showed an increase in mean body weight from 210.0 g at baseline to 251.8 g on day 21. The normal-control group showed comparatively little variation, with reported values of 205.3 g at baseline and 205.0 g on day 21.

3.4. Effect on serum lipid profile

The serum lipid-profile values reported in the synopsis are presented in Table 3

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Table 3. Serum lipid profile following treatment in high-fat-diet-induced hyperlipidemic rats

Parameter	Normal control	Disease control	Atorvastatin (10 mg/kg)	Test (100 mg/kg)	Test (200 mg/kg)
Total cholesterol	92.03 ± 8.75	235.39 ± 9.49	185.16 ± 14.46	181.49 ± 18.31	152.03 ± 3.54
HDL	116.35 ± 1.03	81.93 ± 1.65	113.41 ± 2.65	95.66 ± 4.02	110.24 ± 1.87
LDL	116.32 ± 2.31	179.08 ± 2.56	133.88 ± 3.94	150.10 ± 4.08	143.43 ± 2.41
Triglycerides	71.02 ± 3.02	209.53 ± 3.09	132.82 ± 3.63	201.58 ± 3.23	153.32 ± 1.90
VLDL	32.62 ± 1.03	41.74 ± 1.23	34.18 ± 1.36	40.16 ± 2.15	38.21 ± 2.14

The disease-control group showed higher reported total cholesterol, LDL, and triglycerides than the normal-control group. HDL was lower in the disease-control group.

The 100 mg/kg test group showed a lower total cholesterol value than the disease control but only a small difference in triglycerides. The 200 mg/kg test group showed lower total cholesterol, LDL, and triglycerides than the 100 mg/kg test group, together with a higher HDL value.

The 200 mg/kg group also had lower reported total cholesterol and triglycerides than the atorvastatin group in the supplied dataset. However, the reported LDL and VLDL values in this test group were higher than those in the atorvastatin group.

IV. Discussion

The present study investigated the phytochemical composition, antioxidant activity, and antihyperlipidemic potential of *Zea mays* corn silk extract. The methanolic extract showed the highest reported extraction yield among the preparations for which yields were available. Qualitative screening also indicated the presence of several classes of phytoconstituents, including alkaloids, terpenoids, flavonoids, and phenolic compounds.

The higher reported total phenolic and flavonoid contents of the methanolic extract suggest that the extraction solvent influenced the recovery of these constituents. The polarity of methanol may facilitate extraction of a range of polar and moderately polar plant compounds. Nevertheless, qualitative tests and total-content assays do not identify individual active molecules.

HDL was reduced in the disease-control group relative to the normal-control group. Treatment with the test preparation was associated with higher reported HDL values, particularly at 200 mg/kg.

The 200 mg/kg group also showed a lower LDL value than the disease-control group. However, its reported LDL value remained higher than that of the atorvastatin group. These findings indicate that the test preparation may influence different lipid fractions to different extents.

Because HDL and LDL values require consistent units and validated measurement methods, their absolute magnitudes should be verified against the original biochemical records before interpretation or publication.

Previous investigations have explored the pharmacological properties of corn silk and its constituents. Hasanudin et al. (2012) reviewed its phytochemical composition and reported pharmacological potential across multiple biological applications.

Deng et al. (2019) investigated a polysaccharide isolated from stigma maydis and reported favorable changes in serum lipid parameters in an experimental hyperlipidemia model. Such research provides a scientific rationale for investigating corn silk preparations as potential sources of lipid-modulating compounds.

However, findings from isolated polysaccharides, different extracts, or distinct animal models cannot be directly equated with the effects of the preparation used in the present study. Differences in extraction solvent, chemical composition, dose, animal model, and experimental design may substantially influence the observed response.

V. Conclusion

The present study evaluated the phytochemical composition, antioxidant activity, and antihyperlipidemic potential of *Zea mays* corn silk extract. Preliminary phytochemical screening indicated the presence of alkaloids, terpenoids, flavonoids, and phenolic compounds in the examined extracts. The methanolic extract exhibited higher reported total phenolic and flavonoid contents than the ethyl acetate extract and demonstrated concentration-dependent DPPH radical-scavenging activity.

In the high-fat-diet-induced rat model, the 200 mg/kg test group showed more favorable reported total cholesterol, triglyceride, HDL, and LDL values than the 100 mg/kg group. Nevertheless, not all lipid parameters were as favorable as those in

the atorvastatin group, and statistical significance has not been established from the available results.

Overall, *Zea mays* corn silk extract may represent a promising subject for further preclinical investigation of antihyperlipidemic activity.

References

[1]. Hasanudin, K., Hashim, P., & Mustafa, S. (2012). Corn silk (*Stigma maydis*) in healthcare: A phytochemical and pharmacological review. *Molecules, 17*(8), 9697–9715.

[2]. Deng, X., and colleagues. (2019). Study of the structural characteristics and antihyperlipidemic properties of stigma maydis polysaccharide SMP-1.

[3]. Habtemariam, S. (1998). Extract of corn silk (stigma of *Zea mays*) inhibits tumour necrosis factor-α- and bacterial lipopolysaccharide-induced cell adhesion and ICAM-1 expression. *Planta Medica, 64*(4), 314–318.

[4]. Akbarzadeh, I., Keramati, M., Azadi, A., Afzali, E., Shahbazi, R., Norouzian, D., & Bakhshandeh, H. (2021). Optimization, physicochemical characterization, and antimicrobial activity of a novel simvastatin nano-niosomal gel against *E. coli* and *S. aureus*. *Chemistry and Physics of Lipids, 234*, 105019.

[5]. Albawi, F. H. K. (2020). Efficacy Of Corn Silk Extract In Vitro And In Vivo To Protect Aganist Expermatally Chicks Infected With Escherichia Coli. Biochemical & Cellular Archives, 20(2).

[6]. Alnaim, A. S., Shah, H., Nair, A. B., Mewada, V., Patel, S., Jacob, S., ... & Shah, J. (2023). Qbd-based approach to optimize niosomal gel of levosulpiride for transdermal drug delivery. Gels, 9(3), 213.

[7]. Alsaidan, O. A., Zafar, A., Al-Ruwaili, R. H., Yasir, M., Alzarea, S. I., Alsaidan, A. A., ... & Khalid, M. (2023). Niosomes gel of apigenin to improve the topical delivery: development, optimization, ex vivo permeation, antioxidant study, and in vivo evaluation. Artificial Cells, Nanomedicine, and Biotechnology, 51(1), 604-617.

[8]. Amit, G., Vandana, S., & Sidharth, M. (2011). Hyperlipidemia: An updated review. Inter J of Biopharma & Toxicol Res, 1(1), 81-89