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Phytochemical profiling of *Moongiluppathi Chooranam* (MC) a traditional polyherbal formulation with special reference in the management of polydipsia in *Mathumegam* (Diabetes mellitus)

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Abstract

Moongiluppathi Chooranam (MC), a classical polyherbal Siddha formulation mentioned in the Siddha literature "*Sikicharatnadeepam"* used in the management of polydipsia in Diabetes Mellitus. As per the siddha literature the Moongiluppathi chooranam is indicated for *sayathil undagum mega allai and* polydipsia in MATHUMEGAM. Out of these two, MC was screened through Preliminary phytochemical profiling for polydipsia in MATHUMEGAM revealed the presence of saponins, tannins, phenols, terpenoids, alkaloids, flavonoids, glycosides, and carbohydrates. High-Performance Thin Layer Chromatography (HPTLC) analysis was performed as per standard guidelines using the solvent system Toluene: Ethyl acetate: Methanol (5:2.5:0.1), and the chromatograms were documented at 254 nm, 366 nm, and 575 nm post-derivatization. Major phytoconstituents identified included gallic acid derivatives, ellagic acid, quercetin, kaempferol glycosides, and coumarin-like terpenoids. The presence of these phytochemicals supports the traditional claims of MC in managing conditions like diabetes, oxidative stress, and liver disorders. The findings establish a scientific basis for the MC formulation's efficacy and provide a reference fingerprint for quality control and standardization.

Keywords: *Sikicharatnadeepam; madhumegam*; phytochemical screening; High Performance Thin Layer Chromatography

1. Introduction

According to the World Health Organization (WHO), the number of people living with diabetes has risen dramatically, from 108 million in 1980 to 422 million in 2014.The figure of 589 million adults with diabetes corresponds to ~11.1% of the global adult population in 2024. Diabetes was responsible for 3.4 million deaths worldwide and is one of the leading causes of mortality due to its long-term complications. In Siddha system of medicine, diabetes is classified under Madhumegam, a subtype of Megam, characterized by excessive urination and sweetness of urine. The formulation *moongiluppathi Choornam* comprises botanicals such as Bambusa bambos, Punica granatum, Tinospora cordifolia, and Elettaria cardamomum, all known for their antidiabetic properties. *Moongiluppathi Chooranam* is one such polyherbal formulation mentioned in the classical Siddha literature *Sikicharathina Deepam*.

The raw drugs used in the preparation of Moongiluppathi Chooranam were authenticated by the Chief Consultant of Walter Siddha Research Centre. The formulation is intended to be prescribed based on the severity of the disease, with a maximum recommended dosage of 1 to 2 grams.

Phytochemicals derived from medicinal plants play a vital role in exerting biological effects such as hypoglycemic, antidiabetic, antioxidant, and immunomodulatory activities.

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Despite its traditional use, *Moongiluppathi Chooranam* lacks scientific validation through modern analytical techniques.Therefore, the present study was undertaken to assess its phytochemical constituents and generate an HPTLC fingerprint, thereby establishing its pharmacological relevance and contributing to its quality standardization.

2. Material and methods

Diabetes mellitus is commonly characterized by the triad of symptoms known as the "three P's": Polyuria (frequent urination), Polydipsia (increased thirst), and Polyphagia (increased appetite). In traditional Siddha medicine, the polyherbal formulation *Moongiluppathi Chooranam*, referenced in the classical text *Sikicharathina Deepam*, has been specifically recommended for alleviating Polydipsia associated with diabetic conditions.

2.1. Ingredients

- The following ingredients were used in the preparation of Moongiluppathi Chooranam:
- Bambusa arundinacea – Moongiluppu
- Elettaria cardamomum – Elarisi
- Punica granatum – Mathulai
- Tinospora cordifolia extract – Senthil Sarkarai.

Figure 1 Ingredients of Moongiluppathi Chooranam.

2.2. Preparation of Chooranam

Each dried ingredient was separately pulverized using a mechanical grinder and passed through sieve to obtain fine powder. The powders were then mixed in specified proportions as per classical Siddha literature [*Sikicharatna deepam*], ensuring uniform blending. The final formulation was stored in clean, dry, airtight containers to maintain stability.

2.3. Preliminary phytochemical analysis

Preliminary phytochemical analysis of *Moongiluppathi Chooranam* was performed using the alcoholic extract. About 1 g of the powdered sample was extracted with 10 mL ethanol and used for all qualitative tests.

- Saponins were detected by persistent foam formation upon shaking the extract with distilled water.
- Tannins and phenols were confirmed by the development of dark blue to green coloration upon treatment with 5% alcoholic ferric chloride.
- Terpenoids were indicated by a dark brown precipitate in the Salkowski test using chloroform and concentrated H_2SO_4.
- Steroids were tested by the Liebermann–Burchard reaction, producing a green color.
- Quinones were identified by the appearance of a red color with concentrated H_2SO_4.
- Glycosides were confirmed by a green color after heating with anthrone reagent and concentrated H_2SO_4.
- Carbohydrates were detected by a reddish-violet or purple ring in Molisch's test.
- Alkaloids produced orange-red precipitates with Dragendorff's reagent after acid extraction.
- Flavonoids were indicated by a dark yellow coloration upon addition of sodium hydroxide or ammonia.
- Proteins were tested by the Biuret reaction, producing a purple color.

3. HPTLC Analysis:

3.1. Developing Solvent System

A number of solvent systems were tried, and the one providing maximum resolution of constituents was selected as the solvent system for the extract. Optimum separation was achieved using the solvent system:

- Toluene: Ethyl acetate: Formic acid (5:4:1)
- (Replace this with your actual solvent system and ratio)

3.2. Sample Application

The extracts were applied as different tracks of varying concentrations, each of 8 mm width, on silica gel 60 F254 pre-coated aluminium sheets using a CAMAG micro litre syringe through an Automatic TLC Sampler 4 (ATS4).

3.3. Development of Chromatogram

After sample application, the plate was introduced vertically into a CAMAG developing chamber (10 cm × 10 cm), pre-saturated with the selected mobile phase. The development was carried out until the solvent front reached the appropriate height.

3.4. Documentation

The developed chromatogram was air dried to evaporate any remaining solvent. The plate was then visualized using a CAM.

4. Result

Table 1 Phytochemical Screening

Tests	Result
Saponins	+
Tanins	+
Phenols	+
Terpenoids	+
Alkaloids	+
Flavonoids	+
Steroids	–
Glycosides	+
Carbohydrates	+
Quinones	–
Proteins	–

5. Discussion

HPTLC profiling of the alcoholic extract of Moongiluppathi Choornam revealed a diverse range of phytoconstituents across various Rf values and wavelengths. Tannins and phenolics, such as gallic acid and ellagic acid from Punica granatum, were observed at low Rf values (0.01–0.02). Alkaloids and terpenoids like terpenyl esters and piperine-type compounds were detected from Elettaria cardamomum (Rf 0.06, 0.34), while Tinospora cordifolia contributed bitter principles, phenolic acids, flavonoids, and glycosides (Rf 0.08,0.16 -- 0.17,0.58). Major flavonoids including quercetin, kaempferol, and their glycosides appeared between Rf 0.23–0.31. Bambusa bambos showed coumarin-like terpenoids, fatty acids, and non-polar flavones at higher Rf values (0.38–0.87). This chromatographic fingerprint highlights the formulation's phytochemical richness and its potential therapeutic value.From the above analysis and discussion the

preliminary phytochemical analysis revealed the presence of quercetin indicated potential in the management of polydipsia in MATHUMEGAM (Diabetes Mellitus). In the way Moongilupathi chooranam is effective in the Management of the symptoms arising out of MADHUMEGAM (Diabetes Mellitus).

6. Conclusion

From the above analysis, it is concluded that *Moongiluppathi Choornam* possesses a diverse array of bioactive constituents, including alkaloids, flavonoids, tannins, phenols, terpenoids, glycosides, carbohydrates, and saponins. The abundance of phenolic and flavonoid compounds such as quercetin, ellagic acid, gallic acid and kaempferol is noteworthy, as these phytochemicals are well-documented for their potent antioxidant, anti-inflammatory, hepatoprotective, and antidiabetic activities. Alkaloids and terpenoids may further contribute to the formulation's therapeutic potential by modulating enzymatic pathways and exerting antimicrobial effects.To substantiate these findings, future work should include cell line–based studies and preclinical evaluations to determine its efficacy, elucidate molecular mechanisms, and establish safety parameters.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Sun H, Saeedi P, Karuranga S, et al.IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2024 and projections for 2050. Nephrol Dial Transplant. 2024;gfaf177.

[2] Kannusamy Pillai, C. Sikicharathana Deepam (Vaithiya Naal), Part-I. Chennai: B. Rathina Nayakar & Sons; 1922. p. 123–124.

[3] Murugesa Mudaliar KS. Siddha Materia Medica (Gunapadam) – Mooligai Vaguppu. Chennai: Department of Indian Medicine and Homeopathy; 2010.

[4] Kamble SS, Patil SV. Phytochemical and pharmacological review of Bambusa arundinacea. Indian Journal of Natural Products and Resources. 2010;1(4):481–486.

[5] Kumar V, Kumar S, Singh S. Antidiabetic potential of Tinospora cordifolia extract: An experimental study. Indian Journal of Experimental Biology. 2012;50:837–841.

[6] Madhuri S, Pandey G. Pharmacological activities of Punica granatum: A review. Asian J Pharm Clin Res. 2013;6(3):23–28.

[7] Suresh D, Srinivasan K. Studies on the antidiabetic and antioxidant effects of cardamom (Elettaria cardamomum) in experimental diabetes. Indian J Biochem Biophys. 2010;47:210–215.

[8] Khandelwal KR. Practical Pharmacognosy Techniques and Experiments. 23rd ed. Pune: Nirali Prakashan; 2013. p. 149–161.

[9] Kumar S, Pandey AK. Chemistry and biological activities of flavonoids from Indian medicinal plants. Journal of Pharmacognosy and Phytochemistry. 2013;2(4):118–125.

[10] Walli, S. M., & Murugananthan, G. (2016). Phytochemical and pharmacological review of antidiabetic medicinal plants used in Indian traditional medicine. Indian Journal of Traditional Knowledge, 15(1), 124–132.

[11] Rao, A. S., & Ahmed, M. F. (2013). Simultaneous estimation of quercetin and rutin in ethanolic extract of Melia azedarach. Linn leaves by HPTLC method. Asian Journal of Biomedicine and Pharmaceutical Sciences, 3(21), 56-69.

[12] The antidiabetic potential of quercetin: underlying mechanisms Hoda M Eid, Pierre S Haddad Current medicinal chemistry 24 (4), 355-364, 2017.

[13] Potential application of quercetin as an anti-diabetic treatment: From molecular mechanism to delivery system design LIU Fang, ZHAO Binbin, WANG Qi, LEI Zihan, WANG Suqing, CHEN Shuai Phytomedicine, 157036, 2025.

[14] Antidiabetic effect of quercetin: A systematic review and meta-analysis of animal studiesMohammed Bule, Ahmed Abdurahman, Shekoufeh Nikfar, Mohammad Abdollahi, Mohsen AminiFood and chemical toxicology 125, 494-502, 2019

[15] An insight into anticancer, antioxidant, antimicrobial, antidiabetic and anti-inflammatory effects of quercetin: A reviewMuhammad Azeem, Muhammad Hanif, Khalid Mahmood, Nabeela Ameer, Fazal Rahman Sajid Chughtai, Usman Abid

[16] Confirmatory studies on the antioxidant and antidiabetic effect of quercetin in ratsMohamed Ahmed Abdelmoaty, MA Ibrahim, NS Ahmed, MA AbdelazizIndian Journal of Clinical Biochemistry 25 (2), 188-192, 2010

[17] Quercetin in anti-diabetic research and strategies for improved quercetin bioavailability using polymer-based carriers–a reviewPiyasi Mukhopadhyay, AK Prajapati

[18] The molecular basis of the antidiabetic action of quercetin in cultured skeletal muscle cells and hepatocytesHoda M Eid, Abir Nachar, Farah Thong, Gary Sweeney, Pierre S Haddad

[19] Antidiabetic and antioxidative effects of Annona squamosa leaves are possibly mediated through quercetin-3-O-glucosideSunanda Panda, Anand Kar

[20] Quercetin: Potential antidiabetic effects through enzyme inhibition and starch digestibilityDeniz Günal-Köroğlu, Gizem Catalkaya, Büşra Yusufoğlu, Gizem Kezer, Tuba Esatbeyoglu, AM Abd El-Aty, Esra Capanoglu