

A Narrative Review on Siddha Dietetics (Pathiyam) and its Pharmacological Relevance in Diabetes Care

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ABSTRACT

Diabetes Mellitus has become a global burden with features of hyperglycemia as a result of insulin resistance, impaired insulin secretion or both. Dietetics plays an important role in both the management and prevention of conditions like Diabetes. Traditional Indian System of medicine like Siddha emphasize Pathiyam or dietetics as a cornerstone in the management of Diabetes. This narrative review on Siddha dietetics was undertaken to explore and interpret the dietary principles prescribed for Mekam as described in the ancient Siddha text Pararasa Sekaram and to correlate these traditional concepts with contemporary scientific evidence related to Diabetes. A comprehensive and systematic literature search was conducted using multiple electronic databases, including PubMed, Web of Science, ScienceDirect, Google Scholar and Scopus, to identify relevant peer-reviewed articles. The search strategy involved combinations of keywords like "diabetes mellitus", dietary patterns, popular diets, plant - based diet etc. Many of the dietary components shows scientifically validated anti-diabetic, anti-oxidant, enzyme inhibition properties. The emphasis on foods with low glycemic index, fiber rich and functional food aligns with current diet strategies like Mediterranean and plant-based diets. In summary, Siddha dietetics and practices for Mekam shows congruence as well as difference with available evidence - based nutritional strategies for Diabetes. These unique insights in traditional medical systems when combined with modern nutritional practices, after receiving ample evidence-based knowledge may help to develop more culturally apt and effective approaches in Diabetes management.

Keywords: Diabetes, Dietetics, Mekam, Pathiyam, Siddha.

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INTRODUCTION

Indian culture represents one of the ancient civilizations which are continuous as well as composite one, enriched with diverse food cultures, ecological variations which jointly influenced its comprehensive view of health and quality of life. Traditional Indian systems strongly recommend unity of diet and medicine aiming to achieve target control of diseases and to achieve overall wellness. In management of conditions like Diabetes Mellitus, dietetics is having an important role. When meticulously modified, traditional Indian dietary practices have demonstrated potential in supporting glycemic regulation and maintaining metabolic equilibrium (Salis *et al.*, 2021).

Diabetes Mellitus (DM) is a heterogeneous group of metabolic disorders characterized by persistent hyperglycemia resulting from insulin resistance, deficiency or both. Among its types, type II DM is the most prevalent and is driven by factors like genetic predisposition and environmental influences (ElSayed *et al.*, 2023).

Globally, DM emerged as a public health issue; it is the ninth leading cause of mortality and accounting for 1.5 million deaths in 2019. The disease burden is raising in low - and middle-income countries. India, in particular, is on a rapid nutritional transition with non - communicable diseases like diabetes contributing over half of the total morbidity burden (Chadwick *et al.*, 2025).

Diabetes is highly influenced by diet; the traditional Indian diet is carbohydrate rich, contributing nearly 60% of total caloric intake, which plays a crucial role in glycaemic control. Recent evidence suggests that low - carbohydrate dietary patterns may improve glycemic outcomes. South Asia population's shows a higher susceptibility to T2DM compared to other ethnic groups,



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attributed to genetic factors such as beta - cell dysfunction and adverse fat distribution, combined with rapid lifestyle transitions (Narayan *et al.*, 2021; Deepa *et al.*, 2015). These factors contribute to earlier onset of disease faster progression, and a higher risk of complications, insisting the requirement of culturally proficient and reliable management approaches.

Siddha system of medicine, one of the ancient medical systems in India has defined Diabetes under the broad heading of *Megam* (WHO, 2022). According to ancient treatise it is considered that *Megam* is caused due to improper dietary habits and lifestyle. Moreover, in those ancient verses it is detailed that strict dietary practices that are to be followed by an individual living with diabetes. This opens a new horizon in management of Diabetes by following the traditional dietetics which helps in providing a more culturally appropriate dietary pattern in management of diabetes. Integrating traditional dietetics with modern evidence will be helping to develop a new management strategy in tackling conditions like diabetes and this review narrates the dietetics mentioned in Siddha literature and their scientific relevance related to management of diabetes.

METHODOLOGY

This narrative review on Siddha dietetics was undertaken to explore and interpret the dietary principles prescribed for *Mekam* (WHO, 2022) as described in the ancient Siddha text *Pararasa Sekaram* (Ponnaiah *et al.*, 2016), and to correlate these traditional concepts with contemporary scientific evidence related to DM. A comprehensive and systematic literature search was carried out using multiple electronic data bases, including PubMed, Web of Science, Science Direct, Google Scholar and Scopus, to identify relevant peer reviewed articles. The search strategy involved combinations of keywords like “diabetes mellitus”, dietary patterns, popular diets, plant - based diet etc.

In parallel, classical Siddha literature was reviewed to extract relevant verses pertaining to dietary inclusions, restrictions, lifestyle modifications associated with *Mekam*. The data was systematically organized after collection into different domains like food categories, mechanism - mode of action and anti-diabetic property, nutritional correlations etc. This process helped in comparatively analysing the integration of traditional Siddha dietetics with present-day evidence based nutritional science in the metabolic diseases like diabetes.

RESULTS

Pararasa Sekaram an ancient Siddha treatise belonged to 16th century comprises of around 12000 Tamil verses which details different ailments, their etiology, clinical features, treatment methods and dietetics to be followed (Ponnaiah *et al.*, 2016). *Mekam* - a group of diseases which includes the equivalent for Diabetes is detailed in the 5th volume of *Pararasa Sekaram*. In this review we examined the dietary regulations detailed in the

book for the condition of *Mekam* and we have tried to correlate its scientific relevance. The present review unfolds the diet strategies like recommended food, restrictions and practices to improve quality of life as well as to restore humoral balance and control disease progression. Through detailed analyses this review pursues to interpret traditional dietetics for *Mekam* through scientific lens. The dietary strategy for *Mekam* outlines an organized approach conjoining appropriate food selection with stringent lifestyle practices. It is advised to use fruits and vegetables like cooked gooseberry (*Emblica officinalis*), Tender raw banana (*Musa paradisiaca*), tender fig fruit (*Ficus racemosa*), and certain green varieties like *Amaranthus spp.* In contrast bitter gourd, pumpkin (*Cucurbita maxima*), *Lablab purpureus*, *Amaranthus dubius* are to be avoided. Brinjal (*Solanum melongena*) is generally restricted, although small varieties may be taken occasionally in moderation (Tables 1-3).

Cereal - based foods such as red rice and long-grained rice varieties are advised, along with preparations using black rice and finger millet (*Eleusine coracana*). Pulses including red gram (*Cajanus cajan*) and black gram (*Vigna mungo*) are permitted. Lean and dry meat such as goat meat (*Capra hircus*) and country chicken (*Gallus domesticus*) are recommended. Certain fish varieties, including Anchovy, *Stolephoru indicus* and Shark (*Carcharhinus spp.*), may be taken in moderation. However, dried fish, pork (*Scrofa domesticus*) and meat from wild animals should be avoided. Sesame products are recommended as a part of daily regimen, whereas alcoholic preparations like palm toddy are contra indicated (Tables 1-3).

Table 1: Division of food categories with food substances to be included.

Category	Can be Taken (Do's)
Fruits	Gooseberry (<i>Emblica officinalis</i>), Tender fig (<i>Ficus racemosa</i>)
Taste	Astringent foods
Sweeteners	Honey
Vegetables	Tender raw banana (<i>Musa paradisiaca</i>), Small greens (<i>Amaranthus spp.</i>)
Cereals	Red rice, long-grained rice (<i>Oryza sativa</i>)
Meat	Quail, Goat (<i>Capra hircus</i>), Country chicken (<i>Gallus gallus domesticus</i>)
Fish	Neitholi (<i>Stolephorus indicus</i>), Neer sura (<i>Carcharhinus spp.</i>)
Oils & Seeds	Sesame (<i>Sesamum indicum</i>), sesame oil, oil-cake
Tubers	Palm tuber (<i>Borassus flabellifer</i>), Elephant foot yam (<i>Amorphophallus paeoniifolius</i>)
Pulses	Red gram (<i>Cajanus cajan</i>), Black gram (<i>Vigna mungo</i>)
Special Note	Occasional intake of sparrow (<i>Passer domesticus</i>) mentioned

Classical verses also describe specific therapeutic dietary preparations. Sprouts of *Malai Thaangi* and *Cassia auriculata* are to be consumed along with steam cakes made with rice flour. Additionally, finely cut sprouts mixed with tuber flour of *Cyperus rotundus*, puffed grain and roasted rice flour may be taken similarly. A medicinal formulation consisting of black rice, *Vigna mungo* and powdered root of *Cassia auriculata*, mixed with sesame oil, is advised for regular consumption and is said to alleviate symptoms such as diarrhoea, excessive thirst, dryness of tongue, fatigue, body heat and gastric irritation. Food preparations which are mentioned in literature includes: *Pittu* (steamed cakes) of Rice flour with tender sprouts of *Malai thaangi* and *Aavarai*

mixed along with buffalo curd, Flour of black rice along with *Eleusine coracana* sprouts steamed into cakes and eaten along sesame oil and buffalo curd, Flour of *Cyperus rotundus* tuber, puffed grains and roasted rice flour, steamed into cakes, Sesame products: Butter, oil cakes and oil, Black gram and powdered root of *Cassia auriculata* grounded with flour and mixed with sesame oil (Tables 1-3). All these dietary recommendations possess anti-diabetic activity and the items which are contra indicated are having either diabetogenic potential or are found to be toxic (Tables 1-3)

Table 2: Division of food categories with food substances that should be avoided.

Category	Should Not be Taken (Don'ts)
Taste	Pungent (mustard - <i>Brassica nigra</i>), Bitter substances, Excess sour forms
Sweeteners	Alcoholic preparations
Vegetables	Brinjal (<i>Solanum melongena</i> - large varieties), Avarai (<i>Lablab purpureus</i>), Arai keerai (<i>Amaranthus dubius</i>), Pumpkin (<i>Cucurbita maxima</i>), Bottle gourd (<i>Lagenaria siceraria</i>), Bitter gourd (<i>Momordica charantia</i>)
Meat	Wild animal meat, Pork (<i>Sus scrofa domesticus</i>)
Fish	Dried fish (Karuvadu)
Pulses	Horse gram
Others	Onion (<i>Allium cepa</i>), Fresh tender shoots/leaves
Lifestyle	Excessive sexual activity, indulgence in sensual stimuli

Table 3: Dietary recommendation and lifestyle modification according to traditional indication along its scientific correlation.

Siddha Concept	Traditional Indication	Modern Scientific Correlation	References
To be Taken			
Gooseberry (Amla)	Strengthens body, balances deranged humors	Antioxidant, antidiabetic, reduces oxidative stress. In vitro and in vivo studies have confirmed the efficacy of <i>Embilica officinalis</i> in managing diabetes and its complications.	Majeed et al., 2023
Astringent foods	Helps control excessive urination	Tannins improve gut integrity and reduce fluid loss, tannins and tannin-rich crud extracts possess glucose lowering effect according to pharmacological studies	Chung et al., 1998; Ajebli et al., 2019
Honey can be taken	Therapeutic sweetener	Antioxidant, improves glycemic control and inflammation. Consumption of honey has been shown to significantly reduce blood glucose levels or HbA _{1c} , as reported in seven clinical trials.	Erejuwa et al., 2012; Maryam et al., 2020
Tender banana	Easily digestible nourishment	Resistant starch improves insulin sensitivity Modulation of the gut-microbiota-brain axis is proposed as a potential mechanism through which a banana starch-based diet may exert therapeutic effects in diabetes-associated mood disorders.	Zhang et al., 2005; Bai et al., 2022
Lean meats	Provides strength	High-quality protein improves metabolic control	Layman et al., 2005
Fish	Nourishing	Omega-3 fatty acids improve metabolic health.	Calder, 2012
Red rice and Long-grained rice	Anti - diabetic	α -amylase inhibitory, antihyperglycemic, antioxidant and antiglycation activities.	Haldipur et al., 2021
Fig	Anti - diabetic	Antidiabetic activity by reduces blood glucose concentration due to β -sitosterol, antioxidant, anti-inflammatory, hypolipidemic and hepatoprotective.	Yadav et al., 2015

Siddha Concept	Traditional Indication	Modern Scientific Correlation	References
Sesame seeds (<i>Sesamum indicum</i>)	Anti - diabetic	Reduces the total plasma cholesterol level and blood glucose level, improves insulin, secretion activity and cell vitality. Sesamin has hypolipidemic action, calming action and increases immunity.	Saleem <i>et al.</i> , 2021
Tender country chicken (<i>Gallus gallus domesticus</i>)	Anti - diabetic	Primary source of protein, reduces microalbuminuria. Higher consumption of chicken, a rich source of histidine-containing dipeptides, is associated with reduced insulin resistance in non-diabetic adult men, as evidenced by a stepwise decrease in serum insulin levels and HOMA-IR from 'rarely' to 'monthly' to 'weekly' intake.	Gross <i>et al.</i> , 2002; Yeum <i>et al.</i> , 2020
Palm tuber (<i>Borassus flabellifer</i>)	Anti - diabetic	Antihyperglycemic, reduces fasting blood glucose level significantly, high in phytochemicals, fiber, sodium, potassium, copper and zinc.	Shaikh <i>et al.</i> , 2020
Elephant foot yam (<i>Amorphophallus paeoniifolius</i>)	Anti - diabetic	Reduces fasting blood glucose, rich in complex carbohydrates, fiber, minerals and phytochemicals that helps in regeneration of β -cells of pancreas and facilitate glucose uptake by the tissues.	Rahman <i>et al.</i> , 2021
Red gram (<i>Cajanus cajan</i>)	Anti - diabetic, Hypolipidemic	Hypolipidemic effects, prebiotic, reduces serum glucose levels and triglycerides levels.	Shakappa <i>et al.</i> , 2018
Black gram (<i>Vigna mungo</i>)	Antioxidant	Antioxidant, α -glucosidase inhibitory and free scavenging properties.	Girish <i>et al.</i> , 2012
Finger millet (<i>Eleusine coracana</i>)	Anti-diabetic	High in calcium, soluble fiber, low fat and low glycemic index, effective in controlling blood glucose levels.	Pradhan <i>et al.</i> , 2010
Aavaram ver (powdered root of <i>Cassia auriculata</i>)	Anti-diabetic	High antioxidant and antidiabetic activities, α -amylase and α -glucosidase inhibitory action.	Salma <i>et al.</i> , 2020
To be Avoided			
Bitter substances	leads aggravation of blood glucose level	Bitter compounds influence glucose metabolism variably.	Habicht <i>et al.</i> , 2011
Alcohol	Leads to worsening of Diabetes	Impairs glucose metabolism and kidney function.	Baliunas <i>et al.</i> , 2009
Bitter gourd	Avoid in this condition	<i>Momordica charantia</i> has shown potential reproductive toxicity in animal studies, including reduced fertility in females, decreased spermatogenesis in males, and uterine bleeding during pregnancy. Certain plant compounds may exert estrogen-like effects, contributing to these outcomes. Developmental toxicity has also been observed, particularly with seed extracts, which showed lethality and cardiac toxicity in embryo models. In humans, serious adverse effects are rare, but cases of hypoglycemic coma have been reported in young children after consuming leaf preparations on an empty stomach. The seeds contain mildly toxic lectins, and the presence of vicine may trigger favism in individuals with glucose-6-phosphate dehydrogenase deficiency. Therefore, the use of seeds and certain plant parts should be approached with caution, especially in vulnerable populations.	Çiçek (2022)
Mature bottle gourd (<i>Lagenaria siceraria</i>)	Toxic effects	As a member of the Cucurbitaceae family, bottle gourd contains toxic tetracyclic triterpenoid compounds called cucurbitacins which are responsible for the bitter taste and toxicity.	
Pork	Impairs glucose metabolism	High-oxidative injury pork intake causes glucose metabolism disorders by impairing insulin secretion and increasing hepatic glucose output in mice	Yueting <i>et al.</i> ,

Siddha Concept	Traditional Indication	Modern Scientific Correlation	References
Palm toddy (<i>Borassus flabellifer</i>)	Toxic effects	Regarding amoebic liver abscess, multiple studies from India Ramesh Kumar <i>et al.</i> , 2019 & 1 others report strong epidemiological associations between toddy consumption and disease incidence, though one microscopy study Ashish Kumar Jha <i>et al.</i> , 2019 found no <i>Entamoeba histolytica</i> in toddy samples examined ($n=43$).	Ramesh <i>et al.</i> , 2019
Regulation of sexual activity	Conserves energy	Excessive activity may worsen fatigue/metabolic stress.	Hackney <i>et al.</i> , 2001

DISCUSSION

The *Siddha* dietary regimen for *Mekam* described in *Pararasa Sekaram* shows both conceptual similarities and notable differences when compared with contemporary dietary strategies used in management of DM. This review gives a relevant insight to strength, potential and applicability of traditional dietetics in modern day clinical practice. While reviewing this, we went through the closest parallels like low - carbohydrate and ketogenic diets recommended for conditions like DM.

Food with low glycemic index is preferable for conditions like diabetes, and evidence suggests that carbohydrate restriction will help to improve glycemic control, lower components of lipid profile like, triglyceride and increase HDL level (Chadwick *et al.*, 2025; Narayan *et al.*, 2021). But the problem is regarding long term adherence of this approach, more moderate approaches which is seen in traditional systems may improve the adherence which may offer better sustainability (Alluwiyam *et al.*, 2024).

Siddha dietetics is showing similarities with Mediterranean and plant based dietary patterns, especially the emphasis on intake of fibre - rich and antioxidant rich food. Ingredients like gooseberry, pulses and sesame are found to be good in treating conditions like DM, Cardiovascular diseases and is having anti - inflammatory properties (Salis *et al.*, 2021; Gardner *et al.*, 2022). Clinical trials further prove that both Mediterranean and low carbohydrate diets are effective in reducing HbA_{1c} levels, emphasizing the importance of dietary quality and composition in diabetes management (Gardner *et al.*, 2022; Esposito *et al.*, 2014).

Siddha dietary recommendations show partial alignment in inclusion of animal source food items like mutton, country chicken and quail when compared with high protein diets. High protein diet will help in achieving glycemic control by increased satiety, but the major issue is with the ones with diabetic complications. People with Diabetic Nephropathy may present risks while increasing the intake of high protein diet (Layman *et al.*, 2008).

Siddha adopts a selective strategy rather than complete elimination of entire food groups like Paleolithic and gluten free diets. Likewise, modern nutrition suggests intake of certain food like bitter melon for its anti-diabetic properties, *Siddha*

recommends restriction of the same under specific conditions, possibly due to its potential systemic effects like uterine bleeding associated with overconsumption which was evident in animal models (Çiçek *et al.*, 2022).

Moreover, *Siddha* system emphasizes the use of functional and medicinal food preparations including sesame, *Cassia auriculata*, millets and various other herbal combinations which are having anti- diabetic properties, anti-oxidant and enzyme - inhibitory properties which helps in improving glycemic control (Saleem *et al.*, 2021; Prasad *et al.*, 2017).

So far, no single dietary approach is found to be universally superior as per the recent umbrella review on different dietary patterns like low - carbohydrate, plant based, Mediterranean and low glycemic index (Schwingshackl *et al.*, 2017). Moreover, long term adherence and cultural stability and personalization are the key factors of the success. In this view *Siddha* dietetics is having a scope in improving the context due to its culturally grounded and adaptable framework of Indian population.

Generally, while present-day dietary strategies tend to emphasis primarily on macronutrient composition and caloric restriction, the *Siddha* approach involves broader aspects such as dietary quality, lifestyle practices and individual digestive capacity. However, a key limitation remains the lack of standardization through meticulous clinical trials.

CONCLUSION

In summary, *Siddha* dietetics and practices for *Mekam* shows congruence as well as difference with available evidence - based nutritional strategies for DM. These unique insights in traditional medical systems when combined with modern nutritional practices, after receiving ample evidence-based knowledge may help to develop more culturally apt and effective approaches in DM management.

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ABBREVIATIONS

DM: Diabetes Mellitus; **HbA_{1c}:** Glycated Haemoglobin; **HDL:** High-Density Lipoprotein; **T2DM:** Type 2 Diabetes Mellitus; **WHO:** World Health Organization.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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