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The Study on Siddha Herbal Formulation *Keezhanelli Chooranam* for the Treatment of Type 2 Diabetic (*Madhumegam*): A Review

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Abstract

Diabetes Mellitus (DM) is a common metabolic disorder characterized by high blood glucose levels and symptoms such as polyuria, polydipsia, and polyphagia. Type 2 Diabetes Mellitus (T2DM) is the most prevalent form worldwide and is associated with serious complications including cardiovascular disease, neuropathy, nephropathy, and retinopathy. In Siddha medicine, T2DM can be correlated with *Madhumegam*. *Keezhanelli Chooranam* (KNC), prepared from *Phyllanthus amarus*, is traditionally used in Siddha practice for the management of *Madhumegam*. This review aims to collect classical Siddha literature evidence and scientific research findings related to KNC, especially its antidiabetic property. Literature from authentic Siddha texts, pharmacopoeias, research articles, and electronic databases were reviewed. Phytochemical studies show that *Phyllanthus amarus* contains lignans, flavonoids, tannins, alkaloids, and triterpenes, which possess antioxidant, anti-inflammatory, antidiabetic, and anticancer properties. Animal studies suggest significant antidiabetic effects, although human studies show mixed results. Overall, *Keezhanelli Chooranam* has promising therapeutic potential, but more well-designed clinical trials are required to confirm its safety and effectiveness in humans.

Keywords: Diabetes Mellitus, *Keezhanelli Chooranam*, *Madhumegam*, *Phyllanthus amarus* and Siddha medicine.

Introduction

Diabetes mellitus (DM) refers to a group of common metabolic disorders ^[1] characterized by Polyuria, Polydipsia, Polyphagia and hyperglycemia ^[2]. The presence of DM shows increased risk of many complications such as cardiovascular diseases, peripheral vascular diseases, stroke, neuropathy, renal failure, retinopathy, blindness, amputations etc ^[3]. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. Depending on the etiology of the DM factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production ^[1]. The two broad categories of DM are designated Type 1 and Type 2 ^[2]. Both types of diabetes are preceded by a phase of abnormal glucose homeostasis as the pathogenic processes progress. Type 1 DM is the result of complete or near-total insulin deficiency. Type 2 DM is a heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production ^[4]. Globally, around 422 million people have diabetes, and 1.5 million deaths are directly attributed to diabetes every year ^[5]. In 2021, Diabetes prevalence in Sri Lanka was reported at 11.3% among the population aged from 20 to 79, according to the World Bank ^[6].

The siddha system, one of the ancient systems among the

North and East of Sri Lanka and also southern India, has numerous treatment methods for Diabetes mellitus described in authentic Siddha text books and manuscripts. According to the *Noi naadal noi muthal naadal* and *Yugi muni vathiya sinthamani*, "*Madhumegam*" can be correlated with Diabetes mellitus type 2, in allopathic medicine. It is characterized by an inordinate discharge of urine containing grape sugar accompanied by thirst together with loss of flesh and strength ^[7]. In Siddha hospitals commonly utilize herbal compound medicines for the management of DM, including *Triphala chooranam* ^[8], *Seenthil chooranam* ^[9], *Madhumega chooranam* ^[10], *Avarai kudineer* ^[11], and *Nilavembu kudineer* ^[9]. Among them, *Keezhanelli (Phyllanthus amarus)* is mentioned for the management of *Madhumegam in Agathiyar Kunavaakadam*" (Murugesha Muthaliyar, 1936) ^[11].

While clinical efficacy has been demonstrated for these medicines in various studies, further research is necessary to establish their comprehensive safety and effectiveness. Therefore, here is increasing interest in traditional herbal medicines that are affordable and culturally accepted. KNC, mentioned in classical Siddha texts for *Madhumegam*, is widely used in Siddha hospitals. However, scientific validation of its efficacy and safety is still limited. Hence, this review aims to systematically collect and analyze both traditional and modern scientific evidence related to

Keezhanelli Chooranam.

Objectives

- To collect the literature evidence of *Keezhanelli Chooranam* indicated for *Madhumegam*
- To collect the scientific evidence for anti-cancer properties of *Keezhanelli Chooranam*

Study Methodology

Literatures from authentic siddha and traditional text books, dissertations, theses, original articles and research papers from electronic databases such as Science direct, Pub Med, Google-Scholar and recent advancements in anti-diabetic evaluation of *Keezhanelli Chooranam* taken into this study for review.

Results

Keezhanelli Chooranam

Many drugs are mentioned in the manuscripts for the management of Diabetes mellitus. Among them, *Keezhanelli Chooranam* (KNC) according to the guidelines outlined in The Siddha Pharmacopoeia of India, Part I, Volume I, First Edition (17). The prescribed dosage is 2 grams, administered twice daily, before meals. KNC is a traditional Siddha formulation prepared from *Keezhanelli (Phyllanthus amarus)*. *Keezhanelli* is mentioned for the management of *Madhumegam in Agathiyar Kunavaakadam*" (Murugesha Muthaliyar, 1936) [11].

*Kīlānel likkuṇantān kēlāy matumēkan
tālākkā mālaikaḷaic caṇṇuntā - tēḷaṇalun
tokkiṇaṇa luntolaikkun tonmēkam pōkkiviṭun
takkavira ṇaṇketukkun tān*

(*Agathiyar Kunavaakadam*)

The verse indicates that *Keezhanelli* possesses medicinal properties capable of curing the *Madhumegam* (Diabetes Mellitus), *Kannoikal* (Eye Diseases), *Mega noi* (Sexually Transmitted Diseases and *Mega Pun* (Wounds from Sexually Transmitted Diseases).

Preparation methods of *Keezhanelli Chooranam*:

The whole plant of *Phyllanthus amarus* will be collected, cleaned (purified and washed), and then dried under sunlight for several weeks. The dried raw material will be weighed, finely powdered, and sieved through a fine mesh (80-100 mesh). Finally store in air tight container.

Botanical Profile of *Phyllanthus amarus*

Phyllanthus amarus Schumach. & Thonn., commonly known as *Keezhanelli* or *Pitawakka*, belongs to family Phyllanthaceae. It has broad spectrum of medicinal properties.

Description of plant, a glabrous annual herb growing 1–5 dm high and monoecious, with leaves on the main stems reduced to scales. Deciduous branchlets are 4-12 cm long and bear about 15–30 leaves; stipules are lanceolate, 0.8-1.3 mm long, and the leaf lamina measures mostly 5-11 × 3-6 mm. Inflorescences form glomerules on the deciduous branches. Fruits are oblate capsules 1.9-2.1 mm in diameter, containing trigonous seeds 0.9-1 mm long [12]. *Phyllanthus amarus* is indigenous to the Amazon rainforest and various tropical regions, including India, China, the Philippines, the Bahamas, and Sri Lanka [13, 14, 15]. As a prolific pantropical weed, the species exhibits significant ecological adaptability, thriving in

environments ranging from moist, shaded understories to exposed, sunny habitats [16].



Fig 1: *Phyllanthus amarus* Schumach. & Thonn

Phytochemical Constituents and Pharmacological Actions of *Phyllanthus amarus*

Table 1: Pharmacological actions with phytochemical Constituents and of *Phyllanthus amarus*

Class	Phytochemical Compounds	Pharmacological Effects	Citations
Lignans	Hypophyllanthin, Phyllanthin, Nirtetralin, Isonirtetralin, Hinokinin	Anti-tumor, anti-inflammatory, hepatoprotective, antiviral	(Asaduzzaman <i>et al.</i> , 2026; Ahmad & Alam, 2003, Borgad <i>et al.</i> , 2025)
Tannins	Amariin, Corilagin, Phyllanthusin D, Geraniin, Ellagic acid	Antioxidant, Radioprotective, Antiviral Antimutagenic	(Asaduzzaman <i>et al.</i> , 2026; Ueno <i>et al.</i> , 1988, Borgad <i>et al.</i> , 2025)
Flavonoids	Astragaln, Kaempferol, Quercetin, Rutin	Antioxidant, Antimicrobial, Anticancer	(Asaduzzaman <i>et al.</i> , 2026, Borgad <i>et al.</i> , 2025)
Alkaloids	Norsecurinine, 4-methoxy-norsecurinine, Epibubbialinc, Isobubbialinie	Antifungal, Antidiabetic Neuroprotective	(Asaduzzaman <i>et al.</i> , 2026, Borgad <i>et al.</i> , 2025)
Triterpenes	Lupeol, Oleanolic acid, Ursolic acid, Friedelin	Antifungal, Antidiabetic, Anti-inflammatory, Immunomodulatory	(Asaduzzaman <i>et al.</i> , 2026, Borgad <i>et al.</i> , 2025)
Volatile Oils	Linalool, Phytol	Antimicrobial	(Moronkola <i>et al.</i> , 2009)
Specific Lignans	Niranthin	Anti-inflammatory, anti-allodynic	(Kassuya <i>et al.</i> , 2006)

Additionally, *P. amarus* contain essential nutrients and compounds such as magnesium (Mg), calcium (Ca), potassium (K), phosphate (PO), ascorbic acid (vitamin C), iron (Fe), zinc (Zn), thiamine (vitamin B1), niacin (vitamin B3), and riboflavin (vitamin B2) [20].

The Scientific Reviews of *Phyllanthus amarus* and its Antidiabetic Effects

Phyllanthus amarus is used in the treatment of kidney stones, gallbladder stones, liver diseases (including cancer and jaundice), diarrhea, dysentery, dropsy, intermittent fevers, gonorrhoea, diabetes, chronic infections, and skin lesions. In addition to these, it also exhibits anti-inflammatory, anti-tumor, anti-nociceptive, and antioxidant properties [18, 19].

Studies on the antidiabetic potential of *Phyllanthus amarus* show mixed results between human and animal models. In a clinical study by Moshi MJ *et al.*, 21 non-insulin dependent diabetic (NIDDM) patients were given an aqueous extract of the plant for one week, but no significant reduction in fasting or postprandial blood glucose was observed, indicating that the extract did not produce a hypoglycaemic effect in humans. However, animal studies demonstrate more promising outcomes [21].

In alloxan-induced diabetic mice, Shetti AA *et al.* found that oral administration of an ethanolic leaf extract for 45 days significantly reduced blood glucose levels, improved body weight, and normalized key liver enzymes involved in glucose metabolism [22]. Similarly, Adeneye AA's, reported that leaf and seed aqueous extracts effectively improved insulin resistance in rats with sucrose-induced metabolic disturbances, producing significant reductions in blood glucose, lipid levels, and atherogenic indices. Overall, while human data remain inconclusive, evidence from animal studies suggests that *Phyllanthus amarus* possesses notable antidiabetic and metabolic benefits, possibly influenced by extract type, dosage, and treatment duration [23].

Discussion

KNC is a classical Siddha formulation prepared from *Phyllanthus amarus*, which is described in traditional texts for the treatment of *Madhumegam*. According to Siddha theory, *Madhumegam* is caused by derangement of humors (particularly *Kabam* and *Pitham*), leading to excessive urination and loss of body strength. *Keezhanelli* is believed to correct these imbalances and improve body metabolism.

Modern phytochemical studies reveal that *Phyllanthus amarus* contains active compounds such as phyllanthin, hypophyllanthin, quercetin, rutin, and oleanolic acid. These compounds possess antioxidant and anti-inflammatory activities, which may help reduce oxidative stress and insulin resistance—two important factors in the development of Type 2 Diabetes.

Animal studies have shown significant reduction in blood glucose levels and improvement in lipid profile after administration of plant extracts. However, clinical evidence in human subjects is limited and shows inconsistent results. This difference may be due to variations in extract preparation, dosage, duration of treatment, and sample size.

In addition to its antidiabetic effect, *Phyllanthus amarus* also demonstrates anticancer and hepatoprotective properties. These additional pharmacological effects may provide supportive benefits in diabetic patients who are at increased risk of liver and metabolic complications.

Overall, while traditional knowledge strongly supports its use, more controlled human clinical trials are necessary to

establish standardized dosage, safety profile, and long-term effectiveness.

Conclusion

Keezhanelli Chooranam is a traditionally important Siddha herbal formulation used for the management of *Madhumegam* (Type 2 Diabetes Mellitus). Classical Siddha literature and pharmacological studies indicate that *Phyllanthus amarus* has significant antidiabetic, antioxidant, and anticancer properties. Animal studies provide supportive evidence for its blood glucose-lowering effect, but human clinical evidence remains limited. Therefore, further well-designed clinical trials are essential to confirm its safety, efficacy, and therapeutic potential.

Keezhanelli Chooranam may serve as a promising complementary therapy for Type 2 Diabetes Mellitus when supported by scientific validation.

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