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Review Article

A DRUG REVIEW ON EFFICACY OF '*PEREECHANGAI NEI*' A CLASSICAL SIDDHA DRUG IN THE MANAGEMENT OF *MADHUMEGAM* (TYPE 2 DIABETES MELLITUS)

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ABSTRACT

In Siddha system of medicine, diseases are classified into 4448 types. According to *Yugi Vaithiya Chinthaamani,* a siddha classical text *Meganoi* is classified into 20 types based on three humors *Vatha*, *Pitha*, *Kabha*. *Madhumegam* is one among them, which comes under *Pitha* type called *Thithippu Neer.* The causes, signs and symptoms of *Madhumegam* could be correlated with Diabetes Mellitus in modern system. *Mathumegam* is a clinical condition characterized by frequent and excessive passage of urine with 'sweetness' eventually leading to deterioration of seven body constituents. Its deterioration causes *Avathaigal* which are described as complications of long term poorly controlled hyperglycemia. Diabetes mellitus is one of the major health problems in most developing countries. Being a lifestyle disorder its management is still a challenge for modern system of medicine. Increase in the number of diabetic patients, high cost for medical treatments, unsatisfactory treatment response are the major reasons for people to switch over to traditional medicinal systems. At current scenario, Siddha system among Indian systems of medicine is gaining more attention globally and it serves as a hope in controlling this dreadful disease and preventing its high risk complications. Siddha drugs include herbal, mineral and herbo-mineral drugs. Among which pure herbal medicines serve the purpose in the management of chronic diseases like *Madhumegam* for long term use. This review article focuses on one such polyherbal Siddha formulation '*Pereechangai nei*' as mentioned in text *Therayar Maha Karisal,* specifically indicated for *Madhumegam*.

KEYWORDS: Siddha, Herbal medicine, *Madhumegam*, *Pereechangai nei.*

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder caused by defects in insulin secretion and action, resulting in impaired glucose metabolism.[1] Studies showed that coronary heart disease, cerebrovascular disease, renal failure, neurological complications, and lipid abnormalities are more encountered in diabetic patients[2]. Thus Diabetes mellitus has become epidemic and challenging unresolved health problems of the 21st century. From 1980 to 2014, the number of people affected by diabetes almost quadrupled from 108 million to 422 million worldwide or a growth in diabetes prevalence of 4.7% to 8.5%. Diabetes is also growing in potentially epidemic proportions in India where over 62 million people are affected. For controlling blood sugar levels dietary modification, physical exercise, insulin therapy, and oral medications are advised.[3] However, several allopathic hypoglycemic agents when used for long term therapy, do have adverse effects.[4] Thus the possibility of its management without any side effects has been the subject of concern in recent years.[5] In this way, herbal medicines are now gaining more importance and popularity across the globe. From ancient times all diseases of mankind have been successfully treated with traditional systems of medicine. Siddha, the traditional Indian medicine remains the most ancient yet living traditions.

MATERIALS AND METHODS

Ingredients of *Pereechangai nei:* (Medicated ghee of Date fruit) [6]

"Pereechangai kirutha pereechanthame
pethagum uyir nilaikku perkavasamame
pereechangai viraiai perthavayai maatri
penamathile kazhuvi penavathir nirainer
pedhanagari kondrai pithiran balli
pesiver sariyaga kudineer vittadhilepesu thirikadugu
thudi lavanga madaive
pezhai enaveru kadathagavathaitte
pesu mirupathu kannal perpera verinthe
peravineya moru kaal vaasiadhile
pezhvai kadathilidu pervaga veigam

perigai inoli kuzharupedhe thilayir pei
penuthuraiyana pereechangai nei
pesumiru pakka midhu dhaaniyathil vai
pesatheduthu nugariru pothu migave
pesumadhu mega meri gunma manal vaaivu
perperu magothara palaa thilai vinai maarum
perazhagu muramumigu urirum kuruthi
pethamadha ulathagum veeriazha mulathaam
pethaiyar kinidhana madhana velaalar vaar
pereechangai kirutha peraanmai igdhe"

-Ref *Therayar Maha Karisal.*

1. *Pereechangai* (*Phonex dactilifera* Linn)
2. *Peraamutti* (*Pavonia odorata* Willd)
3. *Kodiveli* (*Plumbago zeylanica* Linn)
4. *Peipudal* (*Trichosanthus cucumerina* Linn)
5. *Nannari* (*Hemidesmus indicus* R.Br)
6. *Sirupeelai* (*Aerva lanata* Linn)
7. *Kondrai* (*Cassia fistula* Linn)
8. Senbagam (*Michelia champaca* Linn)
9. *Balli poondu* (*Strigus lutea* Linn)
10. *Chukku* (*Zingiber officinale* Rosc)
11. *Milagu* (*Piper nigrum* Linn)
12. *Thippili* (*Piper longum* Linn)
13. *Yelam* (*Elettaria cardamomum* Maton)
14. *Lavangam (Syzygium aromaticum* Linn)
15. *Pasu Nei* (Cow's ghee).

(II)Method of Purification [7]

(i) The roots of *Pavonia odorata,*. Wild, *Trichosanthus cucumerina,* Linn*, Hemidesmus indicus,* R.Br, *Aerva lanata,* Linn*, Cassia fistula*, Linn, *Michelia champaca,* Linn*, Strigus lutea*, Linn are washed and dried in shade.

(ii) The roots of *Plumbago zeylanica,* Linn. are cleaned in water to separate the root bark from the root then made it into powder. Then poured milk in a mud vessel, the root bark powder is placed over it and the vessel is covered with another mud vessel and allowed steaming process for three hours (1 *Saamam*). Then dried and powdered it.

(iii) *Phonex dactilifera,* Linn - Wash, dry and remove seeds from it.

(iv) *Zingiber officinale,* Rosc- Scrape the outer layer from it.

(v) Piper *nigrum*, Linn - Soak in butter milk and dry.

(vi) Piper *longum*, Linn - Remove dust particles and fry.

(vii) Elettaria *cardamomum* Linn- Remove dust particles and dry.

(viii) Syzygium *aromaticum* Linn- Remove dust particles and bud portion on top.

(III) Method of Preparation[6]

Pereechangai (Date fruit)- 13 parts, other herbs- each 1 part, Cow's ghee- sufficient quantity.

- **Step1:** Prepare decoction by adding drugs listed from number 1 to 9.
- **Step2:** Then number 10 to 14 drugs are powdered and added to decoction and boiled for 8 hours. Then filter it.
- **Step3:** To the filtrate now add ¼th quantity of cow's ghee and boil it in a wide mouthed vessel. The ghee is filtered when it reaches the *Kadugu Thiral* (the sediment should turn hard and dry like mustard seeds) consistency and is collected in an air tight glass container.
- **Step4:** Now the container with the prepared medicine is kept in the heap of grains for one month undisturbed.
- **Step5:** After a month, the container with medicine is removed and it is stored separately.

(IV) Drug Storage: The study drug *Pereechangai nei* is stored in a clean and dry wide mouthed glass bottles.

(V) Treatment [6]

- Dose: 5ml (twice a day) before food with warm water.
- Duration: 3 months.

1. *Pereechangai*

Botanical Name: *Phonex dactilifera* Linn

English Name: Date palm

Family: Arecaceae

Part used: Raw fruit

Taste: Sweet

Quality: Coolant

Division: Pungent

Action: Tonic, Aphrodisiac, Nutritive, Laxative, Demulcent.

Character:

"*Vaayilundaam ootralai maatrum pasi illai*
aayilundaa lundaam madhumega – noyul
peruneer marukku minum pengalai koodil
tharuneermai soorakkai dhaan".

–Ref *Agasthiar gunavagadam*

Medicinal Uses: Date fruit used as medicine for *Madhumegam* (Diabetes), polydypsea.

Chemical constituents: Flavonoids like Luteolin, Quercetin, Apigenin.

Activity: Antidiabetic, Antioxidant, Hepatoprotective activity.

Scientific review: Native date fruit variety Aseel oral suspension was evaluated using normo glycemic and hyperglycemic Sprague dawley rats with two doses

(300 and 600mg/kg) against control, disease control and standard drug (Glibenclamide 2.5mg/kg). The study revealed significant anti-hyperglycemic effects of Aseel dates.[13]

2. *Peramutti*

Botanical Name: Pavonia *odorata* Willd

Family: Malvaceae

Synonym: *Mahabala, Sugandaval*

Part used: Root

Taste: Sweet

Quality: Hot

Division: Sweet

Actions: Cooling, Carminative, Diuretic, Diaphoretic.

Character:

"Vatha suram thaagam madhalai ganamaantham seetha suram pitham ena seppanangum odhunambar seraamuttikku egum seyya madamayilai peraamutti thurai pesu".

Ref- *Agasthiar gunavagadam, Gunapadam Mooligai* pg no 448

Medicinal uses: Its root decoction used for polydypsea, burning micturition and *Pitha* diseases, *Vatha* and *Kabha* fevers.

Chemical constituents: Volatile oils like Beta eudesmol, Beta caryophyllene oxide.

Activity: Antidiabetic effect, Antioxidant activity.

Scientific review: The plant extracts evaluated for antidiabetic activity at a dose level of 100 mg/kg of $CHCl_3$, 100mg/kg of EtOAc and 200mg/kg of MeOH in Alloxan induced diabetic rats. The results, indicated that Pavonia *odorata* root extracts have Antidiabetic activity.[14]

3. *Kodiveli*

Botanical Name: *Plumbago zeylanica* Linn

English Name: Ceylon lead wort

Family: Plumbaginaceae

Synonyms: *Ven chitramoolam, Ven kodiveli*

Part used: Root

Taste: Pungent

Quality: Hot

Division: Pungent

Action: Anti-periodic, Diaphoretic

Character:

"*Kattiye soolaikattu karuthidu kuripun kiranthi ottumega ranathodu murum arayaaou mandri vittidaa nerichuram pin viyanvidama suramdhaan pottena paranthu pogum pugazh kodiveli kandaal*".

Ref- *Agasthiyar gunavagadam*

Medicinal uses: It is used in treating *Meganoi*, carbuncles, tumors and all ulcers.

Chemical constituents: Plumbagic acid, β-sitosterol

Activity: Anti diabetic, Anti oxidant, Anti tumor activity.

Scientific review: The antidiabetic effects of plumbagin isolated from *P. zeylanica* L. root and its effect on GLUT4 translocation in STZ-induced diabetic rats were studied. Plumbagin (15 and 30mg/kg body wt) was orally administered to STZ-induced diabetic rats for 28 days. An oral glucose tolerance test was performed on 21st day. The results, established *Plumbago zeylanica* L root extracts have Antidiabetic activity[15].

4. *Pei Pudal*

Botanical Name: *Trichosanthus cucumerina*,Linn

Family: Cucurbitaceae

English Name: Snake gourd, cucumber

Synonyms: *Sodhani, Pudaval.*

Part used: Root

Taste: Sweet

Quality: Coolant

Division: Sweet

Action: Refrigerant, Aphrodisiac

Character:

"Bogum vilayum porundhi valarumayam aagamathir pitham anukkungan – mega pudalan kavialaga paavai kenalum pudalangal kulla pugal".

Ref- *Gunapadam Mooligai vaguppu* pg. no. 432.

Medicinal uses: It is added in preparations of medicines *Pitha* diseases and fevers.

Chemical constituents: Bryonolic acid, Cucurbitacin B, Cucurbitcin E, Isocucurbitacin B.

Activity: Antidiabetic, Hepatoprotective.

Scientific review: In STZ- induced diabetic rats, with continuous administration; there was a gradual reduction in FBS (by 56.8% on day 14 and by 64.4% on day 28). It concluded that *Trichosanthus cucumerina*. Linn exert significant antidiabetic activity, involving pancreatic and extra pancreatic mechanisms.[16]

5. *Nannari*

Botanical Name: *Hemidesmus indicus* R.Br

English Name: Indian sarasaparilla

Family: Periplocaceae

Synonyms: *Angaala Mooli, Paathala Mooli, Krishnavalli*.

Part used: Root

Taste: Sweet

Quality: Coolant

Division: Sweet

Action: Alterative, Tonic, Demulcent, Diuretic, Diaphoretic.

Character:

"*Salathodam pitham adhidhagam uzhalai salameru seethaminnar thanchoodulagamadhil sonna madhu megam pun suramivai elamozhikkum menmadhura nannari ver".*

-Ref: *Theran Gunavagadam.*

"Kaama valli enadikari unna pithamaa Nema megapini nilaikulaindhu agalume".

-Ref: *Theran Kaapiyam, Gunapadam mooligai* Pg 562.

Medicinal uses: It is used for polydypsea, *Pitha* disorders, Diabetes, tongue dryness.

Chemical constituents: Alpha amyrin, beta amyrin, sitosterol

Activity: Anti-inflammatory, Anti-oxidant, Anti-diabetic, Hypo lipidemic.

Scientific review: The aqueous extract of the roots of H. *indicus* at a dosage of 500mg/kg/day exhibits significant antidiabetic activity. It restores glucose metabolizing enzymes, hepatic microsomal protein and hepatic cytochrome P-450-dependent mono-oxygenase enzyme systems to near normal level and also corrects the related metabolic alterations in experimentally induced diabetic rats.[17]

6. *Sirupeelai*

Botanical Name: *Aerva lanata* Linn

English Name: Common wayside weed

Family: Amaranthaceae

Synonyms: *Sirukanpeelai, Karbedhi, Paashanabedhi.*

Part used: Root

Taste: Sour

Quality: Hot

Division: Pungent

Action: Diuretic, Lithoutriptic.

Character:

"Paandu perumpaadu pagar moothira kiricharam poonda thirithoda mivai pogunkaaan– thaandi pariavelai thurathum paarvai inkan thaandi siriyapeelaikku sidhaindhu".

-Ref *Gunapadam Mooligai vaguppu* pg no-686.

Medicinal uses: Its decoction uses in anemia, menorrhagia, urinary disorders, *Thridosha* diseases.

Chemical constituents: Alkaloids like Ervine, methylervine, ervoside, ervolanine.

Activity: Anti-diabetic, Hepatoprotective, and Hypolipidemic activity.

Scientific review: The effect of alcoholic extract of *Aerva lanata* in alloxan-induced diabetic rats was found to reduce the increased blood sugar (42% at 375mg/kg and 48% at 500mg/kg body weight). Chronic administration of AAL significantly ($P<0.001$) reduced the blood sugar of alloxan induced diabetic rats for 2 weeks.[18]

7. *Kondrai*

Botanical Name: *Cassia fistula*, Linn

English Name: Pipe tree

Family: Cesalpineaceae

Synonyms*: Daamam, Aakuvatham, Madhalai, Kadukkai.*

Part used: Root

Taste: Astringent

Quality: Hot

Division: Pungent

Action: Purgative, Tonic, Febrifuge.

Character:

"Paandarangar poonai parakkadithu megathai yaandaanga kakul vasamaakume – kaandar kulavisila seidhudalai yombumidhu neebar idhazhai enum kondrai puviyil".

-Ref *Gunapadam Mooligai vaguppu* pg no-398.

Medicinal uses: It cures *Mega* diseases and gives stamina.

Chemical constituents: Anthraquinones, flavon-3-ol derivatives.

Activity: Anti oxidant, Antidiabetic activity.

Scientific review: The antidiabetic activity using invitro assays such as alpha amylase inhibition assay and glucose diffusion assay suggest that the ethanolic root extract of the *Cassia fistula* L. was significant in inhibiting the activity of alpha amylase with the value of 1200µg/ml glucose diffusion assay. It proved that the ethanolic root extract of Cassia *fistula* L. has Antidiabetic potential.[19]

8. *Senbagam*

Botanical Name: *Michelia champaca* Linn.

English Name: Champak

Family: Magnoliaceae

Part used: Root

Taste: Bitter

Quality: Hot

Division: Pungent

Action: Purgative.

Character:

"Theeradha utinathai theerkum suram pokkum nere pasi ezhuppum nichchayame – orunkaal panburu kandhoshathai patru arukkum vaasamulla sanbaga marathon ver dhaan".

-Ref *Gunapadam Mooligai vaguppu* pg no- 419

Medicinal uses: It is used for chronic *Pitha* diseases, fever, improves appetite and eye diseases.

Chemical constituents: β-sitosterol, sesquiterpenes, parthenolide, dihydroparthenolide.

Activity: Antidiabetic, Antioxidant.

Scientific review: Plant extracts of *Michelia champaka* L, were tested for antihyperglycemic activity in glucose overloaded hyperglycemic rats. The effective antihyperglycemic extract was tested for its hypoglycemic activity at two-dose levels, 200 and 400mg/kg respectively. The results were significant.[20]

9. *Balli Poondu*

Botanical Name: *Strigus lutea* Linn

Family: Scropularaceae

Synonyms: *Kollai balli*

Part used: Root

Taste: Astringent.

Quality: Hot

Division: Pungent

Action: Antidote

Character:

"Vallida thoda suram vayu pithangalodu
palvaliyum panjaai parakkum kaan - nallorpaal
sollipaar paadana thaalagamum suthiyadaam
ballipoondu undar paar".

-Ref *Gunapadam Mooligai vaguppu*- pg no- 647

Medicinal uses: It is used in treating fevers, *Vatha* and *Pitha* diseases, tooth ache problems.

Chemical constituents: Flavanoids, Cardiac glycosides, Coumarins, Saponins.[21]

10. *Chukku*

Botanical Name: *Zingiber officinale* Linn.

English Name: Ginger

Family: Zingiberaceae

Synonyms: *Allam, Aarthragam, Ilakottai, Narumaruppu madhil.*

Part used: Rhizome

Taste: Pungent.

Quality: Hot

Division: Pungent

Action: Carminative, Stomachic, Sialogogue, Digestive, Rubefacient.

Character:

"Injiyin guname thendri iyalbudanuraikka keleer
Anjidu sanni ellam agandridum pitha thodam
senjinil irumal kozhai negizhndhidum kabangal
thannai minjini varumo vendru vilambidum deva noole".

-Ref- *Gunapadam Mooligai vaguppu* Pg no- 99

Medicinal uses: Its fresh juice or dried powder is used in *Pitha* diseases, increases appetite, cures indigestion and diarrhea.

Chemical constituents: Gingerol, Zingerine, Zingeberine.

Activity: Immuno- modulatory, Antihyperglycemic, Antilipidemic.

Scientific review: Oral administration of an ethanolic extract of ginger (800 mg/kg) significantly decreases fasting blood glucose level after 1 hour treatment in an STZ-type 1 diabetic rat model. The effect peaked after 4 hours, with ginger producing a 24% to 53% reduction in blood glucose at doses ranging from 100 to 800 mg/kg.[22,23]

11. *Milagu*

Botanical Name: *Piper nigrum* Linn

English Name: Pepper

Family: Piperaceae

Synonyms: *Kari, Kaayam, Kolam, Malayali*

Part used: Fruit

Taste: Acrid, Pungent

Quality: Hot

Division: Pungent

Action: Acrid, Carminative, Stimulant, Antivata, Antidote

Character:

"Seetha suram paandu seedhalam grani gunmam
vatham arusi pitham maamoolam-oothusani
yaasama basmaaram adan megam kaasamivai
naasan kari milaginal".

Ref: *Gunapadam Mooligai vaguppu*- pg no- 760.

Medicinal uses: It cures cold, cough, ear pain, piles, jaundice, anemia, peptic ulcers, indigestion, *Pitha* diseases.

Chemical constituents: Piperine, piptigrine, dipiperamide D, dipiperamide E.

Activity: Antidiabetic, Antihyperlipidemic, Immuno-modulatory, Anti-oxidant, Bioavailability enhancing activity.

Scientific review: Different mechanisms for the Bioenhancer activity of piperine have been proposed including DNA receptor binding, modulation of cell signal transduction and inhibition of drug efflux pump[24].

12. *Thippili*

Botanical Name: *Piper longum* Linn

English Name: Long pepper

Family: Piperaceae

Synonyms: *Pippali, Hippili, Ganam, Baanam, Vaithegi, Ambu, Aadhi marundhu.*

Part used: Fruit

Taste: Sweet

Quality: Coolant

Division: Sweet

Action: Stimulant, Carminative

Character:

"Katti ethirninru kadunoyellam paniyum
thitti vinayagalum degametha-puttiyam
mamanukku maamanena matravanukku matravana
kaamamenu thippilikkum kai".

-Ref: *Theran Gunavagadam.*

"Thippiliyin randulan sethumathai pokkividum
ubbisathai megathai ottum kaan- thappamal
vaatha suram thanikkum maakabarogam thanikkum
thaathuvai valarpikkum saatru".

-Ref: *Gunapadam Mooligai vaguppu* pg no- 514.

Medicinal uses: It is useful in treating ailments like *Meganoi*, fevers, flatulence and gives stamina.

Chemical constituents: Piperine, β-caryophyllene, pentadecane.

Activity: Antidiabetic, Antihyperlipidemic activities.

Scientific review: The antihyperglycemic and antilipid peroxidative effects of ethanolic extract of *Piper longum* dried fruits (PLEFet) in alloxan induced diabetic rats. Oral administration of PLEFet has shown significant antihyperglycemic, antilipid peroxidative and antioxidant effects in diabetic rats[25].

13. *Lavangam*

Botanical Name: *Syzygium aromaticum* Linn.

English Name: Cloves

Family: Myrtaceae

Synonyms: *Anjugam, urkadam, karuvai kirambu, sosam, thirali, varangam.*

Part used: Flowerbud

Taste: Pungent.

Quality: Hot

Division: Pungent

Action: Carminative, Anti spasmodic, Stomachic.

Character

"Pitha mayakkam bedhiodu vaanthiyum pom
sutha viratha kaduppu thondrumo meththa
lavangam kondavarukke sugamagum
malamange kattumena vaazhthu".

-Ref: Agasthiar Gunavagadam

Medicinal used: Cloves are used in medicines of all *Pitha* related diseases, nausea, vomiting.

Chemical constituents: Caryophyllane, Eugenol, Naphthaene, Eugenine.

Activity: Anti diabetic activity.

Scientific review: *Syzygium aromaticum* flower buds EtOH extract significantly suppressed an increase in blood glucose level in type 2 diabetic KK-A(y) mice. The results indicate that clove has potential as a functional food ingredient for the prevention of type 2 diabetes and contribute to its hypoglycemic effects via PPAR-γ activation.[26]

14. *Yelam*

Botanical Name: *Elettaria cardamomum*. Maton.

English Name: Cardamomum seeds

Family: Zingiberaceae

Synonyms: *Aanji, korangam, thudi*

Part used: Fruit

Taste: Pungent

Quality: Hot

Division: Pungent

Action: Stimulant, Carminative, Stomachic

Character:

"Thondai vaikkavul thaalukudhangalil
thondrum noi adhisaaram pan megathaal
undaipol ezhum katti kiricharam
uzhalai vaanthi silanthi vishasuram
pandai vetkai vidhaaga noi kaasamum
paazhu somapini vindhu nattamum
andai eelai van pitham ivaikkelam
aala maangazhal yela marundhe".

-Ref: Theran Gunavagadam

Medicinal uses: Cardamom powder of 2-4g given for *Pitha* diseases*, Meganoi*, tongue dryness, excess thirst, urinary problems.

Chemical constituents: α- Pinene, β- Pinene, myrcene, D-Limonene, 1, 8 Cineole.

Activity: Anti cancer, Immuno modulatory activity, Antihypercholesteremia.

Scientific review: The anti-hypercholesterolemic effect of cardamom was evaluated in Wistar rats by inducing hypercholesterolemia with a high-cholesterol diet for 8 weeks. A significant reduction in blood total cholesterol (31%) and low-density lipoprotein cholesterol (44%) was observed by oral administration of cardamom oil in hyper cholesterolemic rats, accompanied by a marked decrease in serum triglycerides by 42%.[27]

15. *Pasu Nei*

Name: Cow's ghee

Actions: Anti inflammatory, Anti viral, Antioxidant, Tonic.

Character:

"Thaagam uzhalai sutkam vaanthi piyham vaayupira
megam vayitru erivu vikkal azhal – maakasang
gunmam varatchi kudal purattal asthi sutkam
son moolam pokku nira thuppu"

-Ref: *Gunapadam thathu jeeva vaguppu*-pg no-702

Uses: Cow's ghee is used for excess thirst, *Pitha diseases*, Vomiting, Poisons, Ulcer, Sexually

transmitted diseases, Hiccough, cough, Burning sensation of stomach, Bone diseases, Piles.

Chemical constituents of Ghee: It contains approximately 8% saturated fatty acids which make it easily digestible. The digestibility coefficient or the rate of absorption is 96% which is better than any other animal or vegetable fat. It contains triglycerides, di-glycerides, mono-glycerides, phospholipids, beta carotene 600IU and vitamin E which are known anti-oxidants.

Scientific review: Researches on models of Sprague-Dawley outbred rats, showed that no effect of 5-10% ghee supplemented diets on Serum cholesterol and triglycerides.[28] The lipophilic action of cow's ghee facilitates transportation of drug to a target organ and final delivery inside the cell since the cell membrane also contains lipid.

The cholesterol problem does not arise in the administration of ghee as it is found that absorption of Cow ghee increases only the 'good' (HDL) and not the 'bad' cholesterol (LDL) level. This is because Cow ghee is capable of increasing the range of vitamins soluble in fat, like Vitamin E and thereby prevents the oxidation of LDL. Hence there is no conceivable change in the lipid profile.[29]

DISCUSSION AND CONCLUSION

Based on various Siddha texts review, the herbal ingredients of *Pereechangai Nei* are common drugs used in treating *Mega noi* and *Pitha* diseases. In view of the above mentioned pharmacological activities, most ingredients are found to possess antidiabetic activity along with antioxidant, antihyper lipidemic and hepatoprotective activities which can indirectly act upon glucose metabolism thereby aiding in controlling blood sugar levels and by preventing its long term complications. The bioavailability enhancing activity of *Piperine* enhances further targeted delivery of the drug for action. The ghee acts as a carrier of nutrients to be absorbed across the cell membrane. Thus the potency and efficiency of a drug is further enhanced. With this proven efficacy, the drug is easily available to prepare cost efficacy and safer treatment. *Pereechangai nei* serves as a promising antidiabetic drug for future research in the treatment of Diabetes mellitus. Further clinical studies and statistical data analysis help in exploring this herbal Siddha formulation.

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REFERENCES

1. Barar FS. Essentials of Pharmaco therapeutics. 3rd ed. New Delhi: S Chand and Company Ltd; 2004.
2. Prajapati DD, Patel NM, Savadi RV, Akki KS, Mruthunjaya K. Alleviation of alloxan-induced diabetes and its complications in rats by Actinodaphne hookeri leaf extract. Bangladesh Journal of Pharmacology. 2008;3: 102–106.
3. Wild SG, Roglic A, Green R, King H. Global prevalence of diabetes. Estimates for the year 2000 and projections for 2030. Diabetes Care. 2004;27:1047–1053.
4. Sona PS. Nanoparticulate drug delivery system for the treatment of diabetes. Digest Journal of Nanomaterials and Biostructures. 2010;5:411–418.
5. Bailey CJ. New pharmacological agents for diabetes. Current Diabetes Reports. June 2001; volume 1, Issue 2, pp 119-126.
6. Dr.R.Thiyagarajan, Therayar Maha Karisal-1st Edition 2009, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg.no. 146, 147.
7. Purificatication of raw drugs"-Kannusami pillai - Sigichaa rathnadeepam, part-1, 2007, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, pg no:33.
8. Yogi Munivar, Yugi Vaithiya Chinthamani, 2nd Edition, 2005, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg.no: 145,149,155,156.
9. K.N.Kuppuswamy mudaliyar, Siddha Maruthuvam Pothu, 6th Edition, 2004, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg. no:509-521.
10. Dr.M.Shanmugavelu, Noi Naadal Noi Mudhal Naadal Thiratu, paagam 1, 1st edition, 1967, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg.no-269,282.
11. K.N Murugesa mudhaliyar, Gunapadam, volume 1,2nd edition, 2002, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg.no. 111,127,165,381,398,419,514,760.
12. Dr.R.Thiyagarajan, Gunapadam volume 2&3, 2nd edition, 1968, Chennai, Department of Indian Medicine and Homeopathy, Chennai-106, Pg.no. 702,703.
13. Ahmed S, Khan RA, Jamil S, Afroz S. Report-Antidiabetic effects of native date fruit Aseel (Phoenix dactylifera L.) in normal and hyperglycemic rats. Pakistan Journal of Pharmaceutical Sciences. 2017 Sep;30 (5):1797-1802.
14. A.Rayar R. Manivannan Evaluation of Antidiabetic Activity From the Root Extracts of Pavonia odorata

Wild in Alloxan Induced Diabetic Rates International Journal of Pharmaceutical Science Invention, Volume 4 Issue 5,May 2015, PP 46-52.
15. Christudas sunil, Veeramuthu, Duraipandian, Paul Agustian, Antidiabetic effect of plumbagin isolated from Plumbago zeylanica L. root and its effect on GLUT4 translocation in streptozotocin-induced diabetic rats, Food and chemical toxicology, December 2012, Vol 50,Issue 12, Pages 4356-4363.
16. M Arawwawala, I Thabrew, L Arambewela, Antidiabetic activity of Trichosanthes cucumerina in normal and streptozotocin–induced diabetic rats, International Journal of Biological and Chemical Sciences, Vol 3,No.2, 2009, 287-296.
17. Mahalingam Gayathri, Krishnan Kannabiran Hypoglycemic activity of Hemidesmus indicus R. Br. on streptozotocin-induced diabetic rats International Journal of Diabetes in Developing Countries2008 Jan-Mar; 28(1): 6–10.
18. Vetrichelvan T, Jegadeesan M. Anti-diabetic activity of alcoholic extract of Aerva lanata (L.) Juss Juss. ex Schultes in rats. J Ethno-pharmacol. 2002;80: 103–7.
19. Soundiramani Balraj, R. Indumathy, Dr. N. Jayshree & M. Sakthi Abirami. Evaluation of Invitro Anti-diabetic Activity of Various Root Extract of Cassia fistula L.Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-6, 2016. pp.758-761.
20. E.Edwin Jarald, S.B.Joshi, D.C.Jain, Antidiabetic activity of flower buds of Michelia champaca Linn., Indian Journal of Pharmacology, January25, 2001,IP:164.100.31.85.
21. Kakpure M.R and Rothe S.P, Qualitative phytochemical screening of Indian witchweed: Striga asciatica.L OKtze-an unexplored medicinal parasitic plant, Journal of Experimental Sciences 2012, 3(3):28-31.
22. J.A.O.Ojewole, Analgesic, anti-inflammatory and hypoglycaemic effects of ethanol extract of Zingiber officinale (Roscoe) rhizomes (Zingiberaceae) in mice and rats, Phytotherapy Research, 2006, vol. 20, no. 9, pp. 764–772.
23. M.P.Rani, M.S.Krishna, K.P.Padmakumari, K.G. Raghu, and A.Sundaresan, "Zingiber officinale extract exhibits antidiabetic potential via modulating glucose uptake, protein glycation and inhibiting adipocyte differentiation: an in vitro study," Journal of the Science of Food and Agriculture, 2012, vol. 92, no. 9, pp. 1948–1955.
24. Atal CK, Dubey RK, Singh J. Biochemical basis of enhanced drug bioavailability by piperine: evidence that piperine is a potent inhibitor of drug metabolism. Journal of Pharmacology and Experimental Therapeutics. 1985;232:258-262.
25. Shanmugam Manoharan, Simon Silvan, Krishnamoorthy Vasudevan, and Subramanian Balakrishnan Antihyperglycemic and Antilipid peroxidative Effects of Piper longum (Linn.) Dried Fruits in Alloxan Induced Diabetic Rat, Journal of Biological Sciences, Volume 7 (1):2007, 161-168.
26. Kuroda M, Mimaki Y, Ohtomo T, Yamada J, Nishiyama T, Mae T, Kishida H, Kawada T. Hypoglycemic effects of clove (Syzygium aromaticumL, flower buds) on genetically diabetic KK-Ay mice and identification of the active ingredients. J Nat Med. 2012 Apr; 66(2):394-9.
27. Nagashree S, Archana KK, Srinivas P, Srinivasan K, Sowbhagya HB, Anti-hypercholesterolemic influence of the spice cardamom (Elettaria cardamomum L) in experimental rats. J Sci Food Agric. 2017 Aug; 97(10):3204-3210.
28. Sharma, Hari; Zhang, Xiaoying; Dwivedi, Chandradhar, The effect of ghee (clarified butter) on serum lipid levels and microsomal lipid peroxidation. Ayu. 2010 Apr-Jun; 31(2): 134–140.
29. Ankita Mahakalkar, Pranita Kashyap, Ram Bawankar & Bhushan Hatwar, The Versatility of Cow Ghee- An Ayurveda Perspective, American Journal of Drug Delivery and Therapeutics, 2014,1:1, 028-034.

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