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Review Article

A REVIEW ON *KARIVEPPILAI VADAGAM* - SIDDHA MEDICINE FOR DIARRHOEA

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ABSTRACT

The word "Siddha" comes from the root word "*Citti*," which denotes accomplishment, attainment of perfection, and eternal bliss. A scientific and comprehensive approach is used by the Siddha system of medicine, a traditional medical system, to provide preventive, promotional, curative, rejuvenating, and rehabilitative healthcare. At least three loose, liquid, or watery bowel motions per day-also spelt diarrhea- is the definition of diarrhoea. It frequently lasts a few days and can lead to dehydration from fluid loss. The aim of this review article is to explore the scientific literary evidence for the therapeutic usage of *Kariveppilai vadagam* for *Kazhichal*/Diarrhoea as mentioned in *Citta Vaittiya Tirattu* and to concentrate on the Pharmacological activity for the drug's therapeutic properties. The majority of the raw ingredients used to make *Kariveppilai vadagam* contain anti-diarrheal activity, which supports its use in diarrhoea.

INTRODUCTION

The Siddha system of medicine was developed based on 96 tools, also known as *Tattuvam,* which include the physical, physiological, psychological, and intellectual components of every human being. The five elements (*Panchaboodham*), which make up 96 tools, serve as the building blocks for the universe and the human body. Good health is a result of three essential life elements. Even during intrauterine life, the right ingredients are combined to generate the three essential life factors. The components of air and space come together to make *Vazhi* (*Vaatam*). The elements of *Azhal* (*Pittam*) and *Aiyam* (*Kapam*) are created by the union of soil and water. Our body is made up of seven physical components that are comparable to tissues; the physiological and pathological characteristics of these tissues have been extensively described in Siddha literature and are used in practice. There are 32 forms of medicines administered orally to treat diseases [1].

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Vadagam (Lozenges)

Raw drugs purified and pounded separately, sieved in a cloth. This *Choornam* is then added to jaggery and mixed well. It is then processed by *Pittaviyal* process. Then the *Pittu* is taken, pounded when it is hot and rolled into small pills.

Eg: *Thaleesathi vadagam*

Life Span: 3 months [2].

Kazhichal (Diarrhoea)

Kazhichal is an acute specific disease due to the indigestion/infection/inflammation of the intestine, characterized by frequent watery mucus stools (more than 5 times) with gripping pain in the abdomen.

Synonyms: *Migukazhichal, Athisaaram, Neerbethi, Mikubethi, Perun kazhichal*

Causes and Influencing Factors

Acute diarrhoea: Bacterial infections (*Salmonella sp.*)/ Viral infections (*Rota virus or Noro virus*)/ parasitic infection (*Giardia sp.)* of the bowel.

Chronic diarrhoea: Gluten intolerance (celiac disease), lactose intolerance (inability to properly digest lactose in dairy products), irritable bowel syndrome, chronic bowel infection, irritable bowel disease such as Crohn's disease and ulcerative colitis, hyperthyroidism, chronic pancreatitis, bowel cancer.

Premonitory Signs and Symptoms: Indigestion, nausea, belching, anorexia, abdominal distension, rumbling of the intestine.

Common Signs and Symptoms: Watery stools, hiccough, bowel irritation, spastic pain present in the abdomen, fatigue, excessive thirst, excessive salivation, dryness of the skin, chillness of the extremities, skin elasticity and sunken eyes [3].

This review article explores the therapeutic impact of each *Kariveppilai vadagam* ingredients in the treatment of diarrhoea by describing the pharmacological activity of each constituent.

MATERIALS AND METHOD

It is prepared based on the formula mentioned in the textbook of *Citta Vaittiya Tirattu.* The raw drugs of *Kariveppilai vadagam* (*Milagu, Kariveppilai, Jathipathri, Kichilikizhangu, Kothumalli,* salt) of all drugs taken in equal quantity are purified and made into powered form. Then sufficient quantity of water is poured and grinded well. Make it in to *Ilandai Pramanam* (pills), and dried well.

Therapeutic Usage: *Pasiyinmai/*Anorexia*, Vaayilaippu, Kazhichal/*Diarrhoea*, Serana pinigal*.

Table:1 Ingredients of *Kariveppilai vadagam* [4]

S.No.	Tamil name	Botanical name
1	Milagu	*Piper nigrum*
2	Kariveppilai	*Murraya koenigii*
3	Jathipathri	*Myristica fragrans*
4	Kichili kizhangu	*Curcuma zedoaria*
5	Kothumalli	*Coriandrum sativum*
6	Salt	*Sodium chloride*

Chemical composition of *Piper nigrum*

Black pepper has a moisture content of 13.2%, protein at 11.5%, carbohydrates at 49.2%, mineral matter at 4.4%, fat at 6.8%, fibre at 14.9%, phosphorus at 198mg per 100g, calcium at 460mg per 100g, phytin phosphorus at 5mg per 100g, vitamin A value of 1800 IU per 100g, and iron at 16.8mg per 100g. Oxalic acid was found in the samples (0.4–3.4%). Black pepper has 34.1% starch, making it the most common ingredient. One of the main ingredients thought to be in charge of the black pepper's bitter flavour is the alkaloid piperine ($C_{17}H_{19}O_3N_1$). Chavicine, piper dines, and piperettine are other potent alkaloids that are present in pepper in lesser amounts. The essential liquid known as "pepper oil" has a distinctive pepper and phellandrene scent. It is colourless to slightly greenish[5].

Chemical composition of *Murraya koenigii*

The plant extract made from *Murraya koenigii* contains a variety of organic compounds with varied chemical compositions, including alkaloids, flavonoids, carbohydrates, and sterol. These substances are present in petroleum ether, ethyl acetate, ethanol, chloroform, water. The fresh leaves of *Murraya koenigii* range in moisture content from 61.77 to 66.2%, protein content from 2.1 to 12.5%, total sugar from 14.6 to 18.97%, total ash from 9.7 to 13.06%, acid insoluble ash from 1.35 to 1.82%, alcohol soluble extractive from 1.35 to 1.82%, and water extractive value from 27.33 to 33.45%. Alkaloids, flavonoids, and sterols have been extracted using solvents such as ethyl acetate, ethanol, petroleum ether, water, and chloroform during the manufacture of the extract. Koenigine, koenine, koenidine, and (-) mahanine were extracted from leaf extracts using acetone. Mahanimbine, isomahanimbine, koenimbidine, and murrayacine were separated from the hexane. Petroleum ether contained the isolated isomahanimbicine [6].

Chemical Composition of *Myristica fragrans*-Mace

The aromatic component in mace oil is the same as in seed oil, although it is present in a slightly different quantity and flavour. p-dimethylstyrene has also been linked to seven esters, eight sesquiterpene hydrocarbons, and two unsaturated aliphatic compounds, 3-methyl-4-decanol and its acetate, in addition to monoterpene hydrocarbons (Schenk & Lamparsky 1981). According to Gopalakrishnan (1979), aroma and a 25–40% fixed oil content. Trimyristin, oleic acid, linoleic acid, and resinous substances are all present in nutmeg butter lycopene is responsible for the mace's red colour. Neolignans, fragnasol C and D, and myristicanol A and D have also been documented (Rastogi & Mehrotra 1995; Miyasawa et al. 1996) [7].

Chemical Composition of *Coriandrum sativum*

kcal, protein 21.93 and 12.37g, total lipid (fat) 4.78 and 17.77g, carbohydrate 52.10 and 54.99g, fibre 10.40 and 41.9g, calcium 1246 and 709mg, iron 42.46 and 16.32mg, phosphorus 481 and 409mg, magnesium 694 and 330mg, potassium 4466 and 1267mg, sodium 211 and 35mg, zinc 4.72 and 4.70mg, vitamin C 566.7 and 21mg, thiamine 1.252 and 0.239mg, riboflavin 1.500 and 0.290mg, niacin 10.707 and 2.130mg, vitamin B-120.00 and 0.00µg, vitamin A, RAE 293 and 0.00µg, vitamin A, IU 5850 IU and 0 IU and vitamin D (D2 + D3) 0.00 and 0.00µg, respectively. The essential oil and fatty oil were the coriander fruit's most important components. Dried coriander fruits have a range of essential oil content of 0.03 to 2.6% and a range of fatty oil content of 9.9 to 27%.

Included were the compounds that were isolated from coriander essential oil: Monoterpene hydrocarbons (p-cymene, camphene, Δ-3-carene, limonene (dipentene), myrcene, cis-and trans-ocimene, α-phellandrene, β-phellandrene, α-pinene, β-pinene, sabinene, α-terpinene, γ-terpinene, terpinolene, α-thujene); Carbonyls and monoterpene oxides (camphor, 1,8-cineole, linalol oxide, carvone, and

geranium); Monoterpene alcohols (Borneol, citronellol, geraniol, linalool, nerol, α-terpineol, 4-terpinenol); Esters of monoterpenes (bornyl, geranyl, linalyl, and α-terpinyl); Sesquiterpenes (β -Caryophyllene, elemol, nerolidol, caryophellene oxide); Phenols (Anethole, myristicin, thymol); Hydrocarbons aliphatic (Heptadecane, Octadecane); Alcohols with an aliphatic group (such as decanol and dodecanol); Aliphatic aldehydes (octanal, nonanal, decanal, undecanal, dodecanal, tridecanal, tetradecanal, 3-octenal, 2-decenal, 5-decenal, 8-methyl-2-nonenal, 8-methyl-5-nonenal, 6-undecenal, 2-dodecenal, 7-dodecenal, 2-tridecenal, α -pdimethyl styrene, acetic acid [8].

Chemical composition of *Curcuma zedoaria*

Primary and secondary metabolites of various kinds have been identified in white turmeric. The fundamental parts of plant are starch, curcumin, medicinal ointment and Arabic gums. Curcumin, ethyl p-methoxycinnamate, β -turmerone, β -eudesmol, zingiberene, dihydrocurcumin, furanodiene, α-phellandrene, 1,8 cineole, β -elemene, and germacrone are among the more than ten sesquiterpenes found in the plant's rhizome. [9].

Properties of *Sodium chloride – NaCl*

Salt is also known as *Sodium chloride*. The ionic compound sodium chloride has the chemical formula NaCl. It occurs in seawater and oceans. It is additionally found as rock salt. NaCl makes up about 1% to 5% of seawater. It is a white, crystalline solid. A saline solution is the name given to its aqueous form. Sodium cation and chloride anion make up this water-soluble compound. The proportion of sodium and chloride ions in the solution is one to one. It is well known as table salt and is generally utilized in the food industry for safeguarding and seasoning. Chloride of sodium has a pH of 7. Molecular Weight/ Molar Mass of sodium chloride-58.44 g/mo. Density of sodium chloride-2.165 g/cm3.Boiling Point of sodium chloride-1.413°C. Melting Point of sodium chloride-801°C [10]. *Sodium chloride* is used to cure or prevent sodium loss brought on by dehydration, excessive perspiration, or other conditions [11]. Oral salt and potassium chloride supplements are used as part of the treatment. Proton pump inhibitors may lessen the parietal cells' release of chloride and relieve the diarrhoea. When NaCl and KCl are taken on a daily basis, the long-term results are favourable [12].

Anti-diarrhoeal activity of *Curcuma zedoaria*

Male albino mice, weighing 20 to 25g on average, kept in a room with good cross ventilation. They had unlimited access to commercial mouse pellet food and water. There were four groups of five animals each made up of a total of 20 animals. Groups II (positive controls) received the conventional medication loperamide at a dose of 2mg/kg body weight, whereas Group I (the control) received distilled water. *Curcuma zedoaria* extract suspension was administered orally to Groups III, IV, and V (test groups) at doses of 250, 500, and 750mg/kg, respectively. All the animals that had been fasting the previous night were given 1 ml of castor oil orally to cause diarrhoea after one hour of treatment with distilled water, a conventional medication, or a plant extract. Each mouse was housed separately and monitored for episodes of diarrhoea. *Curcuma zedoaria* has antidiarrheal effects, supporting its traditional use in diarrhoea [13].

Anti-diarrhoeal activity of *Murraya koenigii*

Ramasamy et. al, assess the anti-diarrheal activity of *Murraya koenigii* leaf hydro-alcoholic extracts and to look into its impacts on intestinal transits in an experimental rat model. Using the Soxhlet extraction method, *Murraya koenigii* leaf hydro-alcoholic extract was produced. Animals were separated into four groups (n=6) and given a vehicle, the conventional medication atropine (3mg/kg, i.p.), and leaf extracts at 200 and 400mg/kg, respectively, every day for three days in a row. Castor oil-induced diarrhoea was utilised to test the effects of leaf extract on stool frequency and consistency after the effects of the medications were observed on normal defecation. Finally, the effect of the extract on intestinal transit was assessed using the charcoal meal test. $P< 0.001$ was taken into consideration as significant while performing a one-way ANOVA followed by a Dunnett's t-test using SPSS version 17. *Murraya koenigii* leaf extracts at doses of 200 and 400mg/kg enhanced small intestine transit time while decreasing stool frequency and consistency. Due to its inhibition of gastrointestinal motility, *Murraya koenigii* leaf hydro-alcoholic extract has strong anti-diarrheal activity and is therefore beneficial for a variety of gastrointestinal illnesses [14].

Anti-diarrhoeal activity of *Piper nigrum*

Prashant B.et al, assess the antidiarrheal, antimotility, and anti-secretory effects of aqueous black pepper extract (75, 150, and 300mg/kg, po). For testing antidiarrheal action, the castor oil and magnesium sulphate procedures were utilised, whereas the charcoal meal test and castor oil induced intestinal secretions were used for testing antimotility and antisecretory activity in mice. The antidiarrheal, antimotility, and antisecretory effects of aqueous black pepper extract (ABPE) were notable and dose dependent. Alkaloids and sugars were discovered during an initial phytochemical screening of ABPE. The antimotility and antisecretory effects of ABPE may be the cause of its antidiarrheal effects. The antisecretory and antimotility properties of black pepper may be brought on by the presence of alkaloids and carbohydrates [15].

Anti-bacterial activity of *Myristica fragrans*

Methanol and ethyl acetate used to extract the mace, and GC-MS used to determine its chemical composition. The extracts assessed for their antioxidant activities using the DPPH radical scavenging assay, their α-glucosidase inhibitory activities in vitro, and their antibacterial activities against seven different bacteria. The agar- well diffusion method used to measure antibacterial activity. Staphylococcus aureus ATCC 25923, Staphylococcus epidermidis FNCC 0048, Staphylococcus epidermidis ATCC 12228, Escherichia coli ATCC 25922, Pseudomonas aeruginosa PAO I, Staphylococcus aureus COWAN I, and Streptococcus mutans ATCC 14721 were the seven strains utilized in this test. As the medium for growth, Mueller-Hinton Agar (OXOID CM0337) was utilized. On the agar plate, a 100ml bacterial suspension (McFarland 0.5) was distributed. The 20µl of extracts were poured into the well, which had a diameter of 0.5cm. The hatching was finished at 37°C for 24h. The inhibition zone was noticed and recorded. From both extracts, sabinene, methoxyeugenol, myristicin, and elemicin were found to be the four main constituents. Methoxyeugenol, myristicin, and elimisin levels were higher in the methanol extract (ME) compared to the ethyl acetate extract (EAE), where sabinene predominated. Only against S. aureus did both extracts exhibit good antibacterial activity. According to the findings, M. fragrans' ME and EAE exhibit biological activities that have a significant potential for pharmaceutical applications [16].

***Coriandrum sativum* uses in gastrointestinal issues**

Coriander seed is well-known for its numerous health benefits. In people medication, the seeds track down use against digestive parasites. Its effectiveness as a fungicide, bactericide, and larvicidal has been demonstrated by numerous studies. It is typically used to treat gastrointestinal issues like anorexia, dyspepsia, flatulence, griping pain, vomiting, sub-acid gastritis, and diarrhoea, as well as conditions like anorexia and indigestion caused by delayed gastrointestinal transit (Tatsuta & Iishi, 1993) [17].

Coriander could animate the stomach and increment the development of stomach corrosive. People who suffer from indigestion, constipation, or gas in their intestines might benefit from this. Additionally, coriander may lessen gut muscle spasms. This might be helpful for treating stomach problems like diarrhoea [18].

Anti- microbial activity of *Karuveppilai vadagam*:

According to *Basavizhi.B, et al*., anti-microbial studies of *Karuveppilai vadagam* revealed that it is sensitive against *Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus, Pseudomonas aeruginosa, and Salmonella typhi* when compared to the standard drug (Gentamycin), which was evident from the zone inhibition. At a dose of 100mg/ml for the organism, the Herbo-mineral medication *Karuveppilai vadagam* demonstrated suppression of the development of the bacterium. Results Confirmed that the traditional use of *Karuveppilai vadagam* has anti-microbial action [19].

DISCUSSION

A bland food will be gentle on your stomach and might lessen the symptoms of diarrhoea. Foods that are soft, not spicy, and poor in fibre make up a bland diet. Additionally, you ought to stay away from raw, fried, and alcoholic or caffeinated beverages. It's critical to replenish the fluids your body is losing from diarrhoea since dehydration can result from it. When you have diarrhoea, you should drink a lot of water. Water alone, however, is frequently insufficient since it lacks the salts, electrolytes, and minerals (such as sodium and potassium) that your body also requires for recovery. Over-the-counter drugs- Anti-diarrheal agents can usually help reduce the discomfort associated with diarrhoea. When diarrhoea is brought on by bacteria or parasites, a course of antibiotics can assist. However, medications won't help if the virus that's causing your diarrhoea. According to studies, ingesting probiotics may be beneficial for treating some types of diarrhoea. The medication you're taking to treat another medical condition may occasionally cause diarrhoea as a side effect. If so, your Physicians could change the dosage or switch you to a different drug. Most of the ingredients of *Kariveppilai Vadagam (Milagu, Kariveppilai*, *Jathipathri, Kichili kizhangu, Kothumalli, Salt)* have anti-diarrheal activities, hence therefore legitimizing its usage in Diarrhoea.

CONCLUSION

This review of the literature makes it evident that the majority of the constituents in *Kariveppilai Vadagam* have anti-diarrheal activities. Reviews of the pharmacological literature will provide helpful information that will aid Physicians in learning more about the biological effects of drug components. More clinical research needs to be done in order to build the scientific case for the effectiveness of *Kariveppilai Vadagam* in treating the conditions stated**.**

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