

Siddha Formulation *Kadikara Chendooram*: A Drug Review

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ABSTRACT

Traditional system of healing that originated in South India and considered to be one of Indian's oldest systems of medicine. The Siddha system of medicine described about 32 forms of internal medicines in Siddha text. Among these forms, *Chendooram* is the one form of internal medicine. The aim of this drug review is to validate the Siddha meto- mineral formulation *Kadikara chendooram* with scientific evidences. The medicinal uses and therapeutic actions of the part of each ingredient used in this formulation matched with current research findings from various research publications. Through this extensive review on Siddha and recent research reports minimal scientific validation has been carried out on various pharmacological actions and therapeutic benefits of each ingredient of *Kadikara chendooram*. The ingredients present in this formulation have effective in the treatment of Hemiplegia and diarrhea / dysentery. Based on this evidence of Siddha literature and the modern scientific research studies also provide keyhole which result are Anti-Platelet aggregation, Thrombolytic, Anti-diarrhoeal, Antimicrobial activities most presents in ingredient of *Kadikara chendooram* as evident from the current review.

Key Words: *Kadikara chendooram*, Hemiplegia, Siddha system

INTRODUCTION

Traditional system of healing that originated in South India and considered to be one of Indian's oldest systems of medicine. It is one the traditional medical system in the world and deals with physical, psychological, social and spiritual well-being of an individual. The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently uses herbal medicine for health care. Herbal medicines as the major remedy in traditional system of medicine have been used in medical practices since antiquity. The Siddha system is contains roughly 300,000 verses covering diverse aspects of medicine. This work includes herbal, mineral and metallic compositions used as medicine.^[3]

The Siddha system of medicine described about 32 forms of internal medicines in Siddha text. Among these forms, *Chendooram* is the one form of internal medicine in which metallic substances as arsenical compounds are made in to red coloured powders by the process of burning, frying, insulating or by incineration process or by grinding them with decoctions, ceyaneer, juices etc.^[4] *Kadikara chendooram* is a meto- mineral formulation contains three ingredients which is mentioned in Siddha Literature of *Siddha Vaiththiya Thiraddu* Pg.No.157. This drug use for *Paarisa Vaatham* (Hemiplegia), *Vatha rogankal*, *Oozhi*, *Pethy*.

The drug review of '*Kadikara Chendooram*' is a meto- mineral formulation gives evidence for its therapeutic action mentioned in literatures.

The ingredients of this drug are *Kadikaram* (Nitrate of Silver), *Ilingam* (Red Sulphide of Mercury - Natural), *Rasa Chendhooram* (Red Sulphide of mercury). This review describes the chemical properties, therapeutic actions and medicinal uses of the part of each ingredient used in this formulation. Ingredients of the formulation and their pharmacological action in various research studies are discussed in this review.

MATERIALS AND METHODS

Research Design: Drug Review on Literature

Research Type: Literature Review

Research Period: 03 Months

Literature collected from:

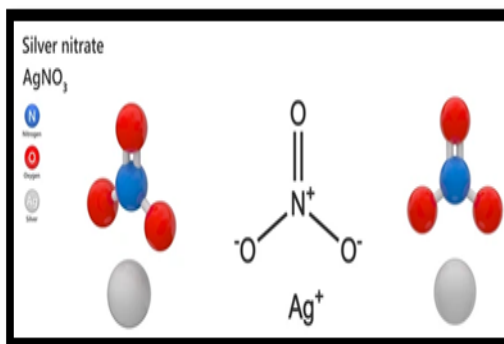
Siddha Literature of Dr. Kuppusaamy Muthaliyar, K.N, Dr. Uththamarayan, K.S, 2016, *Siddha Vaiththiya Thiraddu*, Department of Indian Medicine and Homeopathy, Pg.No.157 and by literature searching in electronic databases such as Science Direct, Pub Med, Pub Med Cochrane and Google-Scholar for publications.

Ingredients of drug:

1. *Kadikaram* (Nitrate of Silver) - 01 *Palam* (35 grams)
2. *Ilingam* (Red Sulphide of Mercury - Natural) - 01 *Palam* (35 grams)
3. *Rasa Chendhooram* (Red Sulphide of mercury) - 01 *Palam* (35 grams)

METHOD OF PREPARATION

1. *Kadikaram* (Nitrate of Silver)



Take above three purified ingredients in mentioned amount and make as powder separately. Then take a glass – corked air tight glass container (*Kal kaarkkup puddi*) and put half amount of powder of Purified *Rasa Chendhooram*, then place half amount of powder of Purified *Ilingam* above it. Then put whole part of powdered *Kadikaram*. After that again put rest half part of the *Rasa Chendhooram* powder above the powder of *Kaadikkaaram*. Finally lay the rest half part of the *Ilingam* on top of whole layer of powders.

After that close the bottle by a glass cork very tightly and cover the bottle by a piece of leather, tie with a thread all-round the bottle. Immerse the bottle in the middle part of the heap of fresh boiled paddy (*Nel*) and keep it until become cool. Finally take the medicine out, powdered well by using stone mortar (*Kalvam*) and store in a clean container.^[1]

Shelf life: 75 years.

Dosage: ½ to 1 *Arisi Pramanam* (32.5 to 65mg)

Adjuvant: Honey, Ginger juice, Basil leave juice

Indication: *Paarisa Vaatham* (Hemiplegia)

Vatha rogankal

Oozhi

Pethy

RESULTS AND OBSERVATION

Ingredients of the drug:

Tamil name	Chemical name
<i>Kadikaram</i>	Nitrate of Silver
<i>Ilingam</i>	Red Sulphide of Mercury - Natural
<i>Rasa Chendhooram</i>	Red Sulphide of Mercury

Therapeutic actions-

Astringent

Antiseptic

Caustic

Kadikaram can be cures the dysentery, eye diseases, throat diseases, poisonous bites, wound, skin diseases.^[2]

Scientific validation:

Effects of functionalized silver nanoparticles on aggregation of human blood platelets

Purpose: We studied the effects of silver nanoparticles (AgNPs) on human blood platelet function. We hypothesized that AgNPs, a known antimicrobial agent, can be used as blood-compatible, “ideal material” in medical devices or as a drug delivery system. Therefore, the aim of the current study was to investigate if functionalized AgNPs affect platelet function and platelets as well as endothelial cell viability in vitro. AgNPs, functionalized with reduced glutathione (GSH), polyethylene glycol (PEG) and lipoic acid (LA) were synthesized. Quartz crystal microbalance with dissipation was used to measure the effect of AgNPs on platelet aggregation. Platelet aggregation was measured by changes in frequency and dissipation, and the presence of platelets on the sensor surface was confirmed and imaged by phase contrast microscopy. Flow cytometry was used to detect surface abundance of platelet receptors. Lactate dehydrogenase test was used to assess the potential cytotoxicity of AgNPs on human blood platelets, endothelial cells, and fibroblasts. Commercially available ELISA tests were used to measure the levels of thromboxane B₂ and metalloproteinases (MMP-1, MMP-2) released by platelets as markers of platelet activation. 2 nm AgNPs-GSH, 3.7 nm AgNPs-PEG both at 50 and 100 µg/mL, and 2.5 nm AgNPs-LA at 100 µg/mL reduced platelet aggregation, inhibited collagen-mediated increase in total P-selectin and GPIIb/IIIa, TXB₂ formation, MMP-1, and MMP-2 release. The tested AgNPs concentrations

were not cytotoxic as they did not affect, platelet, endothelial cell, or fibroblast viability.

All tested functionalized AgNPs inhibited platelet aggregation at nontoxic concentrations. Therefore, functionalized AgNPs can be used as an antiplatelet agent or in design and manufacturing of blood-facing medical devices, such as vascular grafts, stents, heart valves, and catheters.^[5]

Evaluation of Some Biosynthesized Silver Nanoparticles for Biomedical

Applications: Hydrogen Peroxide Scavenging, Anticoagulant and Thrombolytic Activities

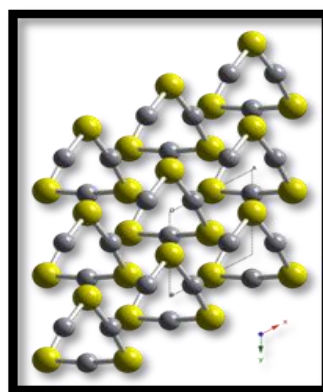
The present study examines the hydrogen peroxide scavenging, anticoagulant and thrombolytic activities of silver nanoparticles (AgNPs) that were biosynthesized using extracts obtained from spider cobweb (CB), pod (KP), seed (KS) and seed shell (KSS) of kolanut (*Cola nitida*). The nearly spherical shaped AgNPs, with surface plasmon resonance of 431.5–457.5 nm, were polydispersed having sizes of 3–50, 12–80, 8–50, and 5–40 nm for CB, KP, KS and KSS-AgNPs respectively. Hydrogen peroxide scavenging activities of 77–99.8% were obtained using 1–20 lg/ml of AgNPs. The particles prevented the coagulation of blood, and also showed thrombolytic activities of 55.76–89.83%, with KSS-AgNPs having the highest activity. Microscopic examination of the lyzed blood clot supported the thrombolytic activities. On the other hand, silver nitrate solution showed negligible activity of 1.92%, while thrombolysis of 7.55, 8.70, 8.93 and 30.19% were obtained for the extracts of KSS, CB, KS and KP respectively. The results herein presented showed potential biomedical applications of the biosynthesized AgNPs to scavenge free radicals and for the management of blood coagulation disorders and thrombotic diseases.^[6]

Antibacterial Activity of Silver and Its Application in Dentistry, Cardiology and Dermatology

The problem of antimicrobial resistance is increasingly present and requires the discovery of new antimicrobial agents. Although the healing features of silver have been recognized since ancient times, silver has not been used due to newly discovered antibiotics. Thanks to technology development, a significant step forward has been made in silver nanoparticles research. Nowadays, silver nanoparticles are a frequent target of researchers to find new and better drugs.

Namely, there is a need for silver nanoparticles as alternative antibacterial nanobiotics. Silver nanoparticles (AgNPs), depending on their size and shape, also have different antimicrobial activity. In addition to their apparent antibacterial activity, AgNPs can serve as drug delivery systems and have anti-thrombogenic, anti-platelet, and anti-hypertensive properties. Today they are increasingly used in clinical medicine and dental medicine. This paper presents silver antimicrobial activity and its use in dentistry, cardiology, and dermatology, where it has an extensive range of effects.

2. Ilingam (Red Sulphide of Mercury – Natural)



Therapeutic actions –

“Pethisuranch sanni peruvirana neerodutha
Kaathakadi kaasang karappanpun – noatha
Vuruvilinka sangathamaa yoorukaddi
yumpong Kuruvilinga sankamaththaik kol”

“Aathi yirathavuruk kaathalaat saathilinga
Mothi lirathakuna mutrudalit – reethupuri
Kuttang kiranthy kodunchoolai
vaathamutha Luttangku noykalaiyod dum”

“Nilaththi lelunthapini neenkaak kiranthi
Salaththudane soolaivedi thaanakatrum –
palaththathaam Saathilinkath
thinkunaththaichsattrinensannimuthal
Oathusuram pome ozhinthu”

Saathilingam cures the dysentery, fever, chronic wounds, excessive

micturition, poisonous bites, cough, skin diseases, pain and joint diseases.

3. Rasa Chendhooram (Red Sulphide of Mercury)



Scientific validation:

Cinnabar or quicksilver is the naturally occurring mineral with mercury in

combination with sulfur, and is red in color. Cinnabar ores are the major source for metallic mercury production and contains more than 95% mercury sulfide (HgS). Cinnabar is insoluble and stable, and cinnabar powder has been used as an important ingredient in traditional Chinese medicines, and in Indian system of medicines.^[12] Cinnabar has been used as a boost toward reduce the occurrence of palpitations, restlessness as well as insomnia. Cinnabar (HgS) is a constituent of outmoded mineral medicine, which has been widely used through a memory-enhancing medication for an era of thousands of years.^[15]

Mercury which is considered as a deadly poison is converted into a lifesaving medicine for treating intractable diseases using various processes in Siddha medicine. When properly purified and processed, mercury is not only used to cure innumerable diseases, but also to rejuvenate the body and promote longevity. Rasa sindura (Cinnabar) is primarily composed of mercuric sulfide (HgS) and has been used in Indian system of medicines for treatment of chronic ailments, such as syphilis, high fever, pneumonia, insomnia, nervous disorders, and paralysis of the tongue. In Tibetan medicines, mercury sulfides are frequently included in the herbo-metallic preparations for the treatment of stroke, brain trauma, neuroinflammation, and chronic ailments.

In a pre-clinical study conducted on *Padiga linga Chenduram* in which lingam is one of the key ingredients, anti – diarrhoeal activity is carried out in rats by using charcoal meal method. The test drug *Padiga linga chenduram* has significant anti-diarrhoeal activity, which reveals the effectiveness of *Padiga linga chenduram* in treating diarrhoea. Anti-pyretic activity of test drug *Padiga linga chenduram* carried out by using yeast-induced method. The drug *Padiga linga chenduram* showed potent antipyretic activity. Also when compared with a standard anti-spasmodic agent (atropine), it was found that *Padiga*

linga chenduram has comparatively less potent spasmolytic activity than atropine. Anti-microbial study of the test drug *Padiga linga chenduram* carried out by disc diffusion method and it was observed that the drug was sensitive to *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Klebsiella pneumoniae*, *E.coli*. These *Padiga linga chenduram* has significant anti-bacterial activity. Hence the presence of Ligam (Cinnabar) was responsible for anti-diarrhoeal, anti-pyretic, antispasmodic and antimicrobial action of the tested Siddha formulation.

Lingam has been proved to be anti-inflammatory, Analgesic and anti-Pyretic. It is considered to be the highly efficacious drug in combating peptic ulcer and disease of Vettai megam. Linga chendooram are used to treat fevers, skin diseases and also venereal diseases. It was observed that both Linga chendooram-1 and Linga chendooram-2 were found to have strong antibacterial activity against *E.coli*, *S.aureus*, *K.pneumoniae* and moderate antibacterial activity against *S.typhi* and *V.cholerae* at 3 and 4mg concentration. A study on Karpooora Rasa an ayurvedic drug for the antidiarrhoeal activity in which Hingula(lingam) is a key ingredient proves as a good anti diarrhoeal drug which is established through castor oil induced diarrhoeal experimental model. Karpooora rasa and Lopermide were found to be equally effective in diarrhoeal episodes of 0-8hrs and 8-24 hrs observation. It is stated that cinnabar has antibacterial and anti parasitic property that helps to eradicate bacteria and parasites and helps in controlling diarrhea. Cinnabar helps to harmonize and strengthen the relationship between breathing and circulation. It is an effective remedy against chronic recurrent inflammatory diseases. It is a great blood healer, encourages formation of blood corpuscles and detoxifies the body, aids the immune system, helps to avoid infections. Cinnabar has the characteristics of insolubility in water and other solvent. The concentration of solubility is very less for

Cinnabar and it shall not be used as therapeutic agent because of poor bioavailability. After oxidation of Cinnabar by the traditional Siddha procedure as Chendhuram form, Lingam has high efficacy due to increased bio availability.

In a study conducted on Siddhanantha birava mathirai in which lingam is one of the ingredient it was observed, that oral dose of Cinnabar at 50 and 100 mg/kg/d for 10 days significantly improved the performance in the elevated maze test. In mice low dose of cinnabar (10 mg/kg/d) administered for 11 weeks showed that locomotor activity was reduced and pentobarbital sleeping time was increased, suggesting sedative or hypnotic effects. Hence it may have analgesic and anti-inflammatory properties.

A study on anti-inflammatory action of Linga chenduram the dose of (6mg/kg) against Carrageenan induced paw oedema in rats. Showed inflammatory activity after 90 and 120 minutes of Linga Chenduram administration, it showed significant ($P < 0.05$ and $P < 0.001$, respectively against carrageenan induced inflammation in rats. Cinnabar has the capacity to reduce the hyperhidration by controlling the abnormal nerve transmission, as it is having the indication to treat the medical condition delirium on the evaluation of the drug Sathi linga Nabi Mathirai which contains lingam as one of the ingredient it was coated as Red sulphide of Mercury is interact with Bovine Serum Albumin (BSA) with an association constant of $9.76 \pm 0.56 \times 10^3 \text{ M}$ and behaves as a protease inhibitor by inhibiting the proteolysis of BSA by trypsin. Also, the Red sulphide of mercury was subjected to the screening of free radical scavenging activity in rat's liver homogenate with four parameters like lipid peroxidation (LPO), super oxide dismutase (SOD), catalase (CAT) and reduced glutathione (GSH). The study confirms the anxiolytic activity Antimicrobial Activity, Anti Oxidant Activity, Anti inflammatory Activity, Anthelmintic Activity and Anti Pyretic

Activity of the study drug Sathi linga Nabi Mathirai.

CONCLUSION

Through this extensive review on Siddha and recent research reports minimal scientific validation has been carried out on various pharmacological actions and therapeutic benefits of each ingredient of *Kadikara chendooram*. The ingredients present in this formulation have effective in the treatment of Hemiplegia and diarrhea / dysentery. Based on this evidence of Siddha literature and the modern scientific research studies also provide keyhole which result are Anti-Platelet aggregation, Thrombolytic, Anti-diarrhoeal, Antimicrobial activities most presents in ingredient of *Kadikara chendooram* as evident from the current review. Thus further research publications on preclinical and clinical evaluation is the need of the hour for their wide spread acceptance among public and scientific community.

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