

A REVIEW ON THEENEERAND DRAVAGAM (DISTILLATES) USED IN SIDDHAMEDICINE AND THEIR BIOMEDICAL APPLICATION IN CHEMISTRY AND HEALTHCARE SYSTEM

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Abstract

Theeneer or *Dravagam* (Distillates) are one among the special entities of *Siddha* system used for its considerable therapeutic effectiveness and in practice of medical alchemy since centuries in *Dravidian* land. Different raw materials from nature are processed in a form to be distilled which aims to extract the pure essence from herbs or minerals including salts. The products of simple or advanced distillation are potent to be used in wide range of medical conditions, very easy to administer with rapid therapeutic results as compared with other dosage forms of *Siddha* medicine. Numerous formulations are still unexplored from the ancient *Siddha* literatures for its application in medical field and its contributing factors in applied Pharmaceutical chemistry. We presently believe that these formulations need special attention from the eye of a researcher for its documentation or drug standardization. For this purpose an in-depth survey from all the available classical literatures as ancient as prevedic up to the recent publications has been done with discussions on various types of distillates, apparatus used, methodology and over review of therapeutic effectiveness of selective distillates. After going through this fundamental review any researcher or practitioner can move further to strengthen this unique dosage form of *Siddha* medicine

Keywords: *Theeneer*, *Dravagam*, *Dravaga Valai*, *Distillates*, *Siddha medicine*

Introduction

Every form of medicines representing the vast materia medica available in numerous Traditional systems of medicines are based on the modification of formulations to the stage which it can be used in wide category of health conditions in accordance with the age, body constitution, nature of disease and its influence in digestion and metabolism. Distillation products are far seen as a special dosage form in all these systems of medicine of Indian, Chinese and Persian origin. Experts belonging to each medical system had an immense knowledge of extracting

valuable essences from raw materials primarily using herbal ingredients. The science of distilling materials of herbal origin or non-herbal sources has been elaborately discussed in *Siddha* medicine and the knowledge of chemistry mingling with the medicine preparation is far more superior to any other Traditional systems.

Siddha system of medicine that originated as a part of Dravidian civilization is strictly fundamentalised on laws of nature blended with spiritual principles. Numerous ancient theories of drug selection and manufacture have been mentioned each in significance with each method of drug preparation. *Siva Sakthi Thathvam*¹ (Core Essence and Energy concept) has been much applied with art of distillation followed in *Siddha*. An ideology contributes the facts about the two major energy existences in each material present in nature and how it is classified based on the energy predominance. *Sivam* or Core Essence is the subtle energy part of a material and the *Sakthi* the subtle material energy surrounding it. Equilibrium of both the energies maintains the stability of the material. *Theeneer / Dravaga murai* (Distillation process) is rooted on the concept of separating *Sivam* or the Core extract of a herbal ingredient in case of herbal distillates or separating material energy in the case of mineral or salt distillation thus making the distillate *Siva Veeryam* or *Sakthi Veeryam* or combined *Siva Sakthi Veeryam* distinguished and termed in-respective of their potency.

Theeneer and *Dravagam* more or less similar in conceptology but differs in their process or make (including raw materials used) and its application part. Both are coined as different form of distillates in majority of classical works but the terminologies are commonly used for the same distillates^{2,3}.

1. History of distillation products and its significance:

Distilled alcoholic drinks or distilled spirituous liquor (Country distillates (*sarayam*)⁴ as a beverage source can be traced back to thousands of years in Dravidian culture. The classical text *Agasthyar Pancha Kavya Nigandu*⁵ describes different terminologies for country arrack (*Sarayam*) like *Vasthu panam*, *Naavi balamritham*, *Amar*, *Karuvamam*, *cheenapaal* etc.

Table: 1 Different Varieties of Arrack⁶

S.n	Type of Sarayam (Arrack)	Source
1.	<i>Illuppai Sarayam</i> (Bassia Arrack)	Distilled from fermented juice of flowers of <i>Bassia longifolia</i> .
2.	<i>Velam pattai Sarayam</i> (Puttay Arrack)	Arrack distilled from the solution of jaggery mixed with the decoction of the bark of <i>Acacia leucoplacea</i> .
3.	<i>Vathali Sarayam</i> (Batavia Arrack)	Distilled from malted Rice (<i>Oryza sativum</i>)
4.	<i>Thennam Sarayam</i> (Coconut Arrack)	Distilled from coconut Toddy (<i>Cocus nucifera</i>)
5.	<i>Columbu Sarayam</i> (Columbu Arrack)	Distilled from Palm juices (<i>Borassus flabelifer</i>)
6.	<i>Eeecham Sarayam</i> (Date palm Arrack)	Distilled from the Toddy of Date palm (<i>Phoenix sylvestris</i>)
7.	<i>Vellam Sarayam</i> (Jaggery Arrack)	Distilled from the solution of jaggery derived from the juices of various palms or from that of sugar cane (<i>Saccharum officinarum</i>)
8.	<i>Pavam Sarayam</i> (Palmyra Arrack)	Distilled from the Toddy of Palmyra tree (<i>Borassus flabelifer</i>)

The term *Sarayam* typically denotes *Saram irakkal*⁶ (*Saram* or *sathu* = Extract or Essence) is the processes involved to extract essence of a material. Numerous herbs, fruits, sugarcane, fermented toddy and rice varieties were the prime ingredients. In south India especially *Tamil nadu* it is generally prepared from the bark of several trees like *Vel vel* (*Acacia leucophloea*), *Iluppai* (*Maduca longifolia*), *Panai* (*Borassus flabellifer*), *Thennai* (*Cocus nucifera*), *Eecham* (*Phoenix dactylifera*) besides it can be extracted from jaggery, grapes, rice etc. (Table: 1).

Country arracks prepared from fermented rice (*Chaali Madhu*)⁷ has been commented as alcoholic beverages, which cause ill health to the person. *Saraya Dosham*⁸ (Ill effects due to country arrack addiction) has been widely described in *Siddhars* texts. Despite of its usage as an intoxicating agent and as an illegal practice put out by kings or village ministries, medicated arracks were administered legally for therapeutic purposes among the *Siddha* practitioners. We can see information regarding usage of medicated arracks (*sarayam*) mentioned in ancient classical works compiled by *Siddhar Bohar* in which specific herbs including hypnotic herbs (*Cannabis* root; *Cannabis sativa*) are fermented for a period and distilled with the addition of palm jaggery to obtain potent distillates. These medicated arracks were used as analgesics and hypnotics for war victims, before surgical interventions and in dreadful diseases to alleviate pain and sufferings⁹. *Vaidhyans* use this as an external application in cases of burns, sprains, Palsy, Chronic Rheumatism etc.

Theeneer (Distilled medicines) on the other hand falls under the category of 34 common medications (*Makkal Urai*) and as the first choice in Divine treatment ie, 12 supreme classes of medications called *Deva maruthvam*¹⁰. *Theeneer* thus may be considered as the base medicine or an entity for advanced chemistry attributed towards the art of manufacture of higher order medications. Vast commentations on *Theeneer/Dravagam* are attributed to *Siddhars* like *Agasthyar*, *Nandidevar*, *Thirumoolar*, *Pulasthyar*, *Bohar*, *Theraiyyar*, *Konganavar*, *Yacobe*, *Ramadevar*, *Yugimuni* etc.

2. Classification of distillation products used in Siddha system

Based on the nature of the distillate or its complexity in its manufacture, Distillation products can be broadly classified into two types namely *Theeneer* and *Dravagam* (Table no: 2)

Table no: 2 Classification of Distilled products used in Siddha system

Based on Methodology ^{11, 12}	Based on Formulation
1. <i>Theeneer</i> 2. <i>Dravagam</i> <ol style="list-style-type: none"> a. <i>Kadum kara dravagam</i> b. <i>Kadum sara dravagam</i> c. <i>Madukku dravagam</i> <ol style="list-style-type: none"> 1. <i>Kattu vakai dravagam</i> 2. <i>Chendoora vakai dravagam</i> 3. <i>Mezhugu vakai dravagam</i>	<ol style="list-style-type: none"> 1. <i>Thani sarakku Theeneer/Dravagam</i> 2. <i>Pala sarakku Theeneer/Dravagam</i>

THEENEER

*Theeneer*⁴ (*Thee* = Fire, *Neer* = Water) known by various names like *Vatru marunthu*, *vaattu*^{13, 14}, *Aaavi Neer*, *Valai Neer* literally denotes distilled water or essence. The aqueous form, which is collected through the application of heat via distillation of raw drugs.

These are the common distillation products obtained mainly from plant resources that may be simple or compound formulations with or without adding minerals. The procedures for manufacture are accessible or uncomplicated, and resulting distillates are mainly used as medicines or as neutraceuticals. Herbal distillates are the most commonly practiced form among traditional *siddha* practitioners and as a health supplement among the dravidian peoples truly blended with their culture. These are milder forms of distillates with less concentration, potency and shelf life. The herbal parts after purification, soaking or fermentation in suitable media is charged inside a traditional distillation

apparatus (*Vaalai iyanthram*) and subjected to distillation. The steam generated due to boiling of the contents rises up, condensed and released out as purest form of distillates. Essential oils from the herb parts usually escape much faster before the boiling and are collected in the container. These may float as a supernatant layer in the distillates and are termed as *Theeneer ennai*, which are separated and used ⁹.

THEENEER ENNAI: (Essential oil obtained from herbal distillation) ^{9, 12}

These are the volatile oils collected during the first phase of distillation of herbs. *Theeneer ennai* is widely used internally, externally and as an aromatic additive for oils, topical linaments and lotions. Some of the important *Theeneer Ennai* used in *Siddha* medicine has been detailed in (Table No: 3)

Table: 3 Theeneer Ennai (Essential oils) mentioned in Siddha literature⁷

S.no	Name of the Theeneer Ennai	Herbs / Part used	Dose	Therapeutic Use
1	<i>Ilavanga Thailam</i>	Flower bud of <i>Syzygium aromaticum</i>	1-3 Drops with Jaggery	Internally used as Carminative, Stomachic, Anti-spasmodic and Anti-diarrhoeal agent. Externally used as Local anesthetic in dental caries
2	<i>Ilavanga Pattai Thailam</i>	Bark of <i>Cinnamomum verum</i>	2-5 Drops	Used in body pain and headache.
3	<i>Lavanga pathri Thailam</i>	Leaves of <i>Cinnamomum tamala</i>	2-5 Drops	Used in body pain and head ache
4	<i>Kattu Karuvapattai Thailam</i>	Bark of <i>Cinnamomum iners</i>		Used as an aromatic
5	<i>Kavattam pul Ennai</i>	Leaves of <i>Cymbopogon martinii</i>	3-6 Drops with jaggery	Used for vomiting, colic and cholera Externally used for relieving body pain.
6	<i>Oma Thailam</i>	Dried fruits of <i>Carum copticum</i>	1-3 Drops	Used in dyspepsia, cholera and diarrhoeal diseases.
7				
8	<i>Kichili pazha Ennai</i>	Outer skin / flowers of <i>Citrus aurantium</i>	1-2 Drops with jaggery	Internally used as an appetizer. Externally it is used for relieving body pain. It is also used as an aromatic additive in medicines.
9	<i>Pudina Thailam</i>	Whole plant of <i>Mentha arvensis</i>	-----	Internally given for abdominal pain after dilution with water. Acts as a good appetizer Externally can be used in painful condition like headache.
10.	<i>Sathakuppai Ennai</i>	Dried fruits of <i>Anethum graveolens</i>	-----	It is used for headache, rheumatic ailments, rhinorrhea with associated sinusitis and indigestion in children.
11.	<i>Chandana Thailam</i>	Hard wood of <i>Santalum album</i>	5-10 Drops	It is used for Leucorrhoea and increased body heat.
12.	<i>Jathikkai Thailam</i>	Fruits of <i>Myristica fragrans</i>	1-5 Drops	It is used for wheezing, cough, and dyspepsia and diarrhoeal diseases.
13.	<i>Shamanti Poo Thailam</i>	Flowers of <i>Chrysanthemum</i>	1-5 Drops with	It is used internally in conditions of fever with chillness, amenorrhea, flatulence, indigestion,

		<i>coronarium</i>	jaggery	and body pain. Externally it is applied for arthritis and joint swelling.
14.	<i>Kavattam pul Ennai</i>	Leaves of <i>Cymbopogon martinii</i>	3-6 Drops with jaggery	Internally given for abdominal pain, emesis, and cholera. Mixed with coconut oil and used externally for painful affections.
15	<i>Karinjeeraga Thailam</i>	Seeds of <i>Nigella sativa</i>	1-2 Drops	The drops are smeared in betel leaf (Piper bettle) and are taken to improve libido for male. Externally the oil is applied for nerve spasms, head ache due to phlegm lumbago and erectile dysfunctions.
16	<i>Seemai Sombu Ennai</i>	Seeds of <i>Carum carvi</i>	½-3 Drops	Used for dyspepsia.
17	<i>Sombu Thailam</i>	Seeds of <i>Pimpinella anisum</i>	½-3 Drops	Used for uterine diseases, colic, fever, dyspepsia, cough, wheezing and rhinorrhea.

DRAVAGAM

It is known by various name like *Pugai Neer*¹⁵, *Dravaga Neer*⁴ literally denotes the collection of distillates accompanied by fumes primarily from distillation of salts.

Complex distillery products obtained mainly from salts or mineral resources that may be simple or compound formulations with or without adding herbals. The procedures for manufacture are laborious and complicated. The resulting distillates are mainly used in alchemical practices as a catalytic agent for higher order medicine manufacture, synthetic elemental preparation or as a potent medicine for specific diseases. The term *Pugai Neer* is attributed to the fume emanating by the heating of non-herbal sources that may include salts or higher minerals. As considering the nature of *Pugai neer* acidic natured distillates (*Kadum kara dravagam*¹⁶) and alkali natured distillates (*Kadum sara dravagam*¹⁶) are also commented. The difference in nature is the usage of different salts of high acidic property or high alkaline property.

MADAKKU DRAVAGAM (Super concentrated Re-Distillates)¹⁵

In order to prepare highly concentrated distillates, repeated distillations are carried out using the primary distillates (Distillates obtained by first process). The same ingredients are either grinded or soaked in the primary distillates for a specific period, then the entire contents are charged and subjected to redistillation. The process may further be repeated depending on the concentration needed, sometimes upto 2, 3, 4, 5, 7 times¹⁷ which yield super concentrated distillates with high potency known as *Kadum kara Madakku Dravagam*¹⁸. Superior quality apparatus specific for the process are used and are termed as *Madakku Dravaga Valai*¹⁵. These forms of distillates are highly appreciated as a medicine or in practicing alchemy. *Madakku Dravagam* is highly beneficial for acute and chronic ailments.

IMPORTANCE OF DRAVAGAM IN ALCHEMICAL PRACTICES

Dravidian alchemical practices are an integral part of *siddha* system. Such medications have immense medical opportunities in the field of critical care management and in chronic /dreadfull ailments or contagious diseases. These are medicines used in minimal dosage forms, with high potency and extended shelf life.

Madakku dravagam holds an upper hand in *Siddha* alchemy as it reduces the elaborate and exhausting part of the higher medicinal preparations (Table:4).

Table: 4 Madakku dravagam used in alchemy^{15, 17, 19, 20}

S.L	Dravagam	Uses
1	<i>Anda Dravagam</i>	To induce color to precious metals like gold and silver
2	<i>Padikara Dravagam</i>	Drug purification, Higher medicine preparations.
3	<i>Pooneer Dravagam</i>	Higher medicine preparations, elemental consolidations
4	<i>Sara Dravagam</i>	Elemental consolidations.
5	<i>Sworna sara Dravagam</i>	Higher medicine preparations.
6	<i>Karasara Dravagam</i>	Higher medicine preparations.
7	<i>Kalluppu Dravagam</i>	Elemental consolidations.
8	<i>Annabedhi Dravagam</i>	Metallic copper purification.
9	<i>Chunna Dravagam</i>	Elemental consolidations.
10	<i>Thotti Dravagam</i>	Mercurial consolidation (<i>Rasa Kattu</i>).
11	<i>Sootha bandhana Dravagam</i>	Mercurial consolidation (<i>Rasa Kattu</i>).
12	<i>Singha mugha Dravagam</i>	Higher medicine preparations.
13	<i>Raja mugha Dravagam</i>	Elemental consolidations.
14	<i>Thrimoorthi Dravagam</i>	Elemental consolidations, higher medicine preparations.
15	<i>Thiruvarul Dravagam</i>	<i>Navaloha parpam</i> ..
16	<i>Devi Dravagam</i>	<i>Sanghu parpam, Thurisu parpam</i> preparations.
17	<i>Narasingamugha Dravagam</i>	Calcination of all metals.
18	<i>Marthanda Dravagam</i>	Elemental consolidations.
19	<i>Sangha Dravagam</i>	Elemental consolidations, higher medicine preparations.
20	<i>Ayasangha Dravagam</i>	Alchemical practices.
21	<i>Kalakanda sangha Dravagam</i>	<i>Kalamegha narayana chenduram</i> preparation.
22	<i>Bhoopathi sangha Dravagam</i>	<i>Chanda Rasa Parpam, Rasa parpam</i> preparations.
23	<i>Ubayamughaguru Dravagam</i>	Higher medicine preparations.
24	<i>Pancha mugha guru Dravagam</i>	<i>Aya parpam, kalakanda meghanarayana chenduram</i> .
25	<i>Sapthamugha Guru Dravagam</i>	Elemental consolidations, calcination of all metals.
26	<i>Mahaguru Dravagam</i>	Elemental consolidations.
27	<i>Ekadasamugha Dravagam</i>	Higher medicine preparations.
28	<i>Mezhugu Dravagam</i>	Alchemical practices.
29	<i>Kattu Dravagam</i>	Elemental consolidations.
30	<i>Mahacheena Dravagam</i>	Elemental consolidations.
31	<i>Indrajala Dravagam</i>	Higher medicine preparations.
32	<i>Naga Kattu Dravagam.</i>	Zinc consolidation (<i>Naga kattu</i>).
33	<i>Lavana Dravagam</i>	Calcination of all metals.
34	<i>Loha Dravagam</i>	Metallic purifications.
35	<i>Maha loha Dravagam</i>	Metallic purifications and calcinations
36	<i>Vediuppu Dravagam</i>	Elemental consolidations and calcinations
37	<i>Vanna Dravagam</i>	To induce color in silver preparations

Owing to its high concentration grade it is used to purify metallo mineral compounds in a much faster way. Heavy metals like iron are easily dissolved in this *dravagam* (eg. *Sangha dravagam*¹⁷, *Aya Dravagam*¹⁸). As a catalyst or potency enhancer, higher elements (Metals, mercurial drugs) are grinded with this distillate media and subjected to calcination for preparation of *Parpam* and *Chenduram*. So many higher order medicine preparations in *siddha* like *Rasa chenduram*, *Thurisu chenduram*, *Rasa parpam*, *Chanda rasa parpam* uses various re-distillates for rapid

conversion of the elements used in it into oxide form in which the element loses its physical form or toxic entities. However, while preparing *madakku dravagam* and during its collection or its usages in alchemy, one has to follow strict safety measures to prevent its exposure on skin or eyes¹⁷. *Madaku dravagam* is used in the following higher order *Siddha* medicine preparation.

***KATTU VAKAI DRAVAGAM*¹⁷:**

Kattu or otherwise called *marunthu kattu*¹² as its name denoting binded. These are special dosage forms, which are solid, inorganic and binded (consolidated) modified forms of metallo mineral compounds, used in *Siddha* medicine. The elements which are easily vaporizable, melted up with heat or either easily dissolute in water or which easily brittles or break with mechanical pressure are binded into a solid mass or converting them to complex materials impervious to water, resistant to high heat and breakage. Binding ensures longer shelf life of the medicine, potent enough to be indicated in acute and chronic ailments. *Kattu* medicines are administered by rubbing with suitable adjuvants like honey, breast milk or specific herbal juices or decoctions and the dosages are fixed in extent and number of rubbings in accordance with age, severity of the disease. These forms of medications are unique to *Siddha* system and the chemistry of such consolidated elements is still unknown to the modern world. The required elements to be binded are purified and subjected to processing with *Madakku dravagam* or either macerated with the same while constantly roasting up to a specified period (eg. *Siva Dravagam*¹⁷). For metallic consolidation of purified zinc, the metal is melted at high temperatures in a mud plate and during the melting stage *madakku dravagam* is added drop by drop till the molten metal is solidified (eg: *Naga kattu Dravagam*¹⁷)

***MEZHUGU VAKAI DRAVAGAM*¹⁷:**

Mezhugu includes special medicines in *Siddha* system with waxy consistency. These are high order medicines of herbo metallo mineral in origin capable of curing dreadful diseases in minimal dosage forms. The raw materials after undergoing so many stages of preprocedures are finally processed with *madakku dravagam* until it attains a waxy consistency (ref: *Sakthi Dravagam*¹⁸)

***CHENTHOORA VAKAI DRAVAGAM*¹⁷:**

Chenduram includes minute powdery form of medicines with reddish color, dark color or its variants as mentioned in the *Siddha* texts prepared mainly from raw materials of metallo mineral origin. The raw materials after continuous processing and grinding with herbal juices is subjected to calcination or the raw materials are roasted /grinded until it attains the fineness, subtleness or the form as referred in the literatures. *Chendooram* is used as healing hand for broad spectrum of diseases. *Madakku Dravagam* is used primarily as a mediator in above processes as it substitutes the herbal usages, reduces time consumption for each process moreover the finished products will be superior in quality.(eg: *Siva sakthi Dravagam*¹⁷.)

The processes mentioned for *Madakku Dravagam* are extremely difficult but will yield fruitful results in both chemistry and medicine.

Classifications based on formulations

Siddha system describes the usage of wide range of raw materials (plant, animal or mineral resources) to obtain the distillates and its nature, yield and properties is dependent on the ingredient used. Distillation products can be classified in reference with the type of formulations into:

THANI SARAKKU THEENEER/DRAVAGAM

Single compound distillery formulations were only single plant resources or mineral is used. Egs: *Senkottai Dravagam*², *Vasambu dravagam*³, *Valayaluppu dravagam*³, *Pudina theeneer*²¹, *Sombu theeneer*, *Oma theeneer*²², *Sanghu Dravagam*.

PALA SARAKKU THEENEER/DRAVAGAM

Poly compound distillates were a mixture of several herbs, animal products or minerals are used. Egs: *Oma Dravagam*², *Mahaguru Dravagam*¹⁷, *Sootha bhandhana dravagam*¹⁷, *Navaloka dravagam*²³

Methodology**1. Apparatus**

The apparatus used for distillation is termed as *Valai iyanthram*²⁴ *Valai* is defined as the apparatus with provisions or outlet tube to collect the distillates.

2. Types of Distillation apparatus¹⁷

Different types of distillation apparatus has been mentioned depending on the making or material used for the distillation.

1. *Munn valai* (Traditional *valai iyanthram* made with clay).
2. *Uloga valai* (Apparatus made with metals).
 - a. *Irumbu valai* (Iron apparatus).
 - b. *Thambira valai* (Copper apparatus).
 - c. *Velli Valai* (Silver Apparatus).
3. *Spadika valai* or *Kannadi Valai* (Glass made).
4. *Peenkana Valai* (Porcelain made)

The types will be selected based on raw materials used suited for various distillation methods. Each made has its own peculiarity and it includes the heat tolerability, yield and quality of the distillates. Metallic apparatus are indeed used for specific preparations. As the raw materials to be distilled should not react with the metal used, it is chosen only for herbal distillate production.

Spadika valai (glass made) fails in heat tolerability. With much safety issues, it is not chosen for salt, caustic, concentrated distillates in which the apparatus has to bear extreme heat and pressure¹⁷. A sustained heat more or less than the boiling point of water can be maintained within a glass made apparatus and is optive for distilling herbal parts. High yield of volatile oils and clarity distillates can be obtained by it. The usage of porcelain made is uncommon in practice and needs further studies.

Among all the apparatus, the traditionally made apparatus stands unique with its high heat tolerability, unreactive to raw drugs, higher alkalies or salts with assured quality and purity of the distillates. There will be mild to moderate yield loss depending on the quality of the clay apparatus.

3. Parts of a Traditional distillation apparatus or stills (Fig 1 to 4)

The apparatus consist of many components, which are equipped in such a way to form a single unit, which are collectively termed as *Valai Iyanthram*¹¹ or *Dravaga valai*¹⁸. So many models of various sizes were used depending on the yield required¹⁵. Clay made apparatus (*Munn valai*⁹) that in vertical installations are most commonly used. The different components of an apparatus serve each purpose and are specific in its make.



Fig 1: Mel Valai (Upper Still)



Fig 2: Mel Valai (Upper Still)



Fig 3: Condenser -Upper View



Fig 4: Theeneer Valai Iyantharam (Full View)

Lower vessel (*kalayam*) is used to charge the raw materials with the medium for distillation. Suitable capacity of lower vessel is selected to accommodate the medicine to be distilled. The length of the neck portion should not be less than three finger breadth with narrow mouth region that has to be tightly fit with the upper vessel (*vaalai*). The junction between the *kalayam* and *vaalai* is sealed with clay paste, and after drying of the plaster the entire setup is subjected to heating process.

The upper vessel (*vaalai*) consists of a condenser part to provide a continuous water flow above the vessel. Provisions of water inlet on one side and outlet¹⁵ on the other side are long enough to release the heated water away from the apparatus. The openings of the inlet and outlet within the condenser is at different height levels, and the water current is maintained in such a way that the cool water flowing in is proportional to the heated water going out. From inside an outlet is connected to collect the condensed distillates. The outlet tube (*valai iyanthra mookku, keezh*

*kuzhai*¹⁷) that is slightly curved as a nose¹⁶ is facing downwards in the opposite side of the water outlet with the tip of the outlet called receiver (*Thamar vai*³, *Kathir vai*³) kept inside the collecting bottle.

To collect the distillates tightly stoppered thick glass bottles (eg: *Vediyuppu dravagam*²¹, Porcelain bottles (*Peenkan kuppi*¹¹, *Peenakana Kinnam*) with tight lid or stone cork /wooden cork will be used. For collection and storage of *kadunkara Dravagam* (super concentrated distillates), specially made thick collecting bottles (*Arakku Kuppi*)²⁵ were used.

4. Pre procedures

Before each distillation, preprocedures are done with the aim to make the drug ready for distillation. The extracts of the materials will be easily released into the medium, also it maintains an environment needed for the conversion of the raw material to the stage easier to distillate, or either it purifies or improve its potency of the material used. So many traditional preprocedures that is mentioned before one distillation depending on the processes or raw material nature.

5. Raw material purification

Pounding, powdering or grinding:

The materials become finer, solubility of the raw drugs in the media will be fastened and the essence or compounds will become easily available in the media. Grinding in suitable media ensures proper mixing. For herbal distillation, the purified herbal parts are pounded well before soaking or fermenting for better extraction of essence. For salt distillation the salts are powdered well spreaded uniformly in porcelain plates kept exposed with night dew for specific number of days and distilled¹⁸. In certain preparations, powdered salts are directly distilled until complete yield.

Soaking in Specific media or to enable Fermentation.

Most of the raw drugs before subjecting to distillation are soaked in suitable media for specific periods. Soaking dissolutes the raw material in the the media and its period may depend on the hardness of the raw material. The main purpose is to soften the material and to enable faster extraction while distillation.

Role of fermentation in distillation

Fermentation has a notable role in the art of distillation. During the process, it induces natural alcohol formation and a pH, which favors good solubility of the raw material. Simultaneous extraction of wide range of phyto constituents from the herbal parts, detoxification of contaminants or any toxic components from the herbal part also occurs during fermentation. Literary reviews of various *siddha* classical reveals that the fundamentals of fermentation are similar to those ancient practices available in *Ayurvedic* and *Unani* medical system upto the present day modern procedures. Only there are slight differences in the nature of raw drugs, equipment used and procedures adopted. Two methods are adopted for fermentation with respect to distillation in *Siddha* system. one is by inducing basic fermentation by adding natural fermenters another by using synthetic acidic distillates² prepared from *omam* (*Carum copticum*), *padikaram* (*Alumen alum*) and *vediyuppu* (*Potassium nitrate*). For fermentation suitable media like water, plant juices are mixed with coarse or fine powdered raw drugs along with addition of natural fermenters or synthetic acidic distillates in properly sealed vessels preferably wooden or porcelain vessels to maintain a controlled and sterile environment. The process of fermentation is considered to improve the power of the mixture²⁶ (*Siddhi*) before undergoing distillation. Each *Theeneer* formulations specifies different fermenters and fermentation periods depending on the raw material used (Table No: 5)

Table: 5 Details of Fermenters used in siddha distillate forms with fermentation period ²

S.no	Theeneer	Fermenters	Fermentation Period
1.	<i>Ulli Dravagam</i>	Tender coconut water	3 1/2 Days
2.	<i>Thennankal Dravagam</i>	Palm toddy	6days
3.	<i>Perunkaya Dravagam</i>	Palm jaggery	6 1/2 days
4.	<i>Senkottai Dravagam</i>	Palm jaggery	Required time
4.	<i>Sanjeevi Theeneer</i>	Palm candy	7days
5.	<i>Chundai Vatrak Dravagam</i>	Buffalo curd	3 days
6.	<i>Kambu kanji Dravagam</i>	Millet rice washed water	Required time
7.	<i>Milagu Dravagam</i>	Synthetic acidic distillate	3 days
8.	<i>Inji Dravagam</i>	Synthetic acidic distillate	3 days
9.	<i>Thippili Dravagam</i>	Synthetic acidic distillate	3 days
10	<i>Yanai Thippili Dravagam</i>	Synthetic acidic distillate	3 days
11	<i>Poondur Dravagam</i>	Synthetic acidic distillate	3 days

The raw drugs exposed directly or indirectly to various environments

Some raw drugs of salt varieties are kept and sealed in a mud vessel and kept inside sand or mud upto a prescribed depth present in specific localities for a period (*Bhoomi pudam*)¹⁸. Powdered raw drugs are mixed with suitable media kept in sunlight (*Soorya pudam*) until complete dehydration (eg: *kadukkai dravagam*²) or upto specific periods (eg: *Kavattam pul dravagam*²) and finally distilled. In some preparations, powdered raw drugs are kept exposed to night dew or moon light (*Pani Pudam*, *Chandra pudam*¹⁷) prior to distillation.

Procedures employed after distillation ¹⁵

After herbal distillations, the mud apparatus (both upper still and lower vessel) are carefully dismantled and soaked in water not less than one *samam* (3 hours) washed thoroughly and sundried. This method prevents crack formation in mud vessels due to constant heat, cross contamination of medicines and makes its ready for the next preparations. In case of salt distillations the lower vessels are not reused as the salt contents used tightly plasters with the inner surface of the mud vessel in presence of immense heat generated inside. It is almost impossible to clean without breakage of the vessel. The upper still after salt distillations can follow the measures as mentioned in herbal distillation.

6. Factors determining quality of Theeneer

The factors that determine the quality and yield of *Theeneer* include:

Quality of the raw material used :

Raw materials of superior quality, devoid of pest or rodent contamination and which followed strict purification (if applicable) has to be selected. Expired herbs yield inferior quality distillates.

Apparatus used for distillation :

For traditional mud vessels or apparatus quality of the clay used, thickness of the vessel, and its method of making has an impact in the yield obtained directly proportional to the wastage of medicines. Good yield denotes collection of more than 70% of the quantity of the batch volume used. Mud vessels showing cracks after heating indicates less heat resistance due to usage of inferior quality clay. Clay pots that have been fired to a point and glazed make them more heat resistant. Mud vessels with high porosity will absorb the liquid medicines when kept for a long time this may be due to improper baking in traditional oven or its preprocessing as mentioned below. Pretreated mud vessels

are used in all distillation process, which include soaking the mud vessel for at least 2 hours to a full overnight in water, pouring rice washed water into the mud vessel, which is kept for a day or upto 4 days. For other types of apparatus as mentioned, materials that hinder the quality is avoided. For Distillation the contents are filled upto half of the vessel ²⁵.

Medium for distillation :

Media acts as an effective solvent for most of the raw drugs and as a carrier for the medicine principles of the raw drug, that is undergone distillation, and some were used due to its therapeutic value. In majority of distillations, pure water is used ² as the medium for distillation. Apart from this dew water (eg: *Pooneerdravagam*¹⁷), rice washed water (eg: *Pooneerpugai neer*¹⁷), herbal juices (eg: *Injidravagam*²), honey (eg: *Then dravagam*¹⁷) cow's milk (eg: *Moongiluppathi Theeneer*²¹) animal urine (eg: *kadukkai dravagam*²) are also used in special formulations.

7. Quantity used

As a general rule the quantity of water in which the raw drugs completely soaks or two parts of the total raw material weight (eg: *oma dravagam*²), four parts of the total raw material weight taken(eg: *chunna dravagam*¹⁷), 12 parts of the raw material weight (eg: *Sanjeevi theeneer*²¹). With experience one can ascertain that quantity of the water added which varies with nature of the raw drugs, yield or concentration needed.

Plastering

The junction of the two vessels will be properly plastered and dried. This will prevent steam loss and ensure heat retainibility within the vessel for proper boiling of the contents or its condensation. Higher temperatures are insisted for distilling salt varieties. Therefore, for maintaining heat retention and for considerable distillate yield, proper plastering is crucial ¹⁶.

Fuels

Firewood ³⁰ that does not hinder the quality of *Theeneer* should be used. *Varatti* (cow dung cakes) are also mentioned in special preparations.

Mode of heat application ³

The heating procedures should commence from low flame called *deepakni*; then mid flame (*kamalakni*) and final high flame *kaadakni* (eg: *Loha dravagam*¹⁹). First two flames are best applicable in simple herbal distillates and last for *dravagam* of salt origin or *madakku dravagam* made with superior elements. The control of heat is very crucial in distillation, as it maintains a slow, steady and maximum extraction or release of phyto compounds and volatile oils in case of herbal distillation and ionic release in case salt/mineral distillation, which needs higher heat over a long duration. The herbs should not come in direct contact with heat. It means the distillation should not start with high heat or *kadakni*, which causes charring of the herbal parts, rapid dissolution of volatile contents and alkaloids. This not only reduces the yield, the distillate becomes unpleasant in taste or odour and is considered as inferior quality.

Storage of distillates and expiry

Bottles should not be kept open after usage. This will prevent the escape of valuable essential oils in case of herbal distillates and reactions due to oxidation in case of *dravagam*. Shelf life period of *Theeneer* is limited to one year ³⁸

8. Traditional quality parameters of distillates

With reference to traditional experience and literature review, *Theeneer* should have the peculiar color, taste, odor and medicinal property of that of the raw drugs used. Otherwise is considered as inferior quality.

It is by experience one can know the time for distillation and the quality of the distillates. For herbal distillates occurrence of fine aromatic steam marks the initial part of distillation followed by collection of condensed distillates. The aroma, color is unchanged until the end of the middle stage. The final stage of distillation is noticed by

reduction of fumes, aroma, color and quantity of the distillates. This is the point at which the distillation has to be arrested, heating beyond this stage causes charring of the herbal contents or raw materials marked by appearance of dark fumes with smoky odor. The distillate collected in this stage is least inferior quality and should be discarded¹⁵.

For mineral or salt distillation (*Dravagam*) color gradient of the fumes or distillates are taken into consideration. Appearance of white fumes indicates the starting point (first stage) followed by collection of distillates called *Venneer* (white and clear distillate). In second stage the color of the distillate may change to yellow then called *KadaiNeer*, *Manjal neer* or *paani*¹⁸. Both the distillates are collected and stored separately. Depending on the nature of the ingredients or chemical reactions that happens during each process color of the fumes or distillates may vary, reddish fumes in the first stage of distillation then whitish fumes in later stages of distillation is mentioned in preparation like *Sangha Dravagam*¹⁷. Reddish distillates are also reported in *Andadravagam* and *Thendravagam*¹⁷. It is also stated in several siddha literatures that the distillates collected in the last stages are superior to the first one¹⁵. For salt distillation, the end stages are marked by crumbling sounds that indicate absence of water content or complete dehydration of the salts with this the process has to be stopped immediately.

9. Mode of Usage

Theeneer /*Dravagam* are purposed for internal usage but some are intended for external application also (eg: *AndaDravagam*⁶).

Dose

For *Theeneer* as the concentration is mild it can be taken in the dosage of 1 *karandi* (1 teaspoon) 1/2, 1 ounce, 2 ounces, 1/4th of *azhaku* (1 *azhaku* = 168ml) per servings, before or after food diluted with prescribed quantity of water or taken as such. The dosage of potent and concentrated distillates starts in very minimal doses expressed in drop levels (eg: *Sooda Dravagam*², *sangha dravagam*, *vediyuppu dravagam*²³) diluted and used preferably after food.

Dilution

The measurement of dilution of such super concentrated distillates is fundamentalised on the nature of the distillate and its concentration. As medications for specific ailments *madakku dravagam* is used cautiously because of its high alkalinity or acidic nature, with the safety issues of gastric erosions and other adversities, the concentration is declined by much dilution preferably with water. As a common rule in siddha practice *dravagam*'s are diluted with 60 parts of water calculated from its normal dosage in drops (eg: *Sangha dravagam*, *Gandhaga dravagam*¹⁵), 180 parts of water dilution (eg: *Maha dravagam*¹⁵) or further more depending on the formulations. Apart from safety and static potency of the distillate rapid absorption, activity and excretion are the other merits of dilution.

Adjuvant

Most distillates of internal usage are diluted with prescribed quantity of water or Luke warm water. Adjuvants like ghee, flour (eg: *pooneer dravagam*¹¹), *Thrikadugu choornam*²¹, mothers milk, honey, jaggery (eg: *Mantha dravagam*²⁷) are specially recommended adjuvants.

Course:

Herbal Distillates can be taken on long term basis as a rejuvenate supplement or as medicine. For salt/super concentrated distillates short courses are advised (eg: *Navauppu dravagam*, *Maha sanga dravagam*).

Diet Restrictions

Most of the *Theeneer* indicates mild restrictions as which concerns with the disease. Some salt distillates advices avoidance of sour diet. To reduce medicine heat induced by potent distillates, ghee, milk depending on ones digestive fire is advised²⁷.

Indications

The therapeutic outcome of important distillates used in *siddha* medicine is detailed in Table: 6

Table: 6 Overall Therapeutic values of important Theeneer/Dravagam Preparations

Sl	Name of the Theeneer/Dravagam	Indications
1	<i>Arunelli Dravagam</i> ²	Respiratory ailments like <i>Kshayam</i> (Tuberculosis), <i>kasam</i> (cough)
2	<i>Anda Dravagam</i> ¹⁷ (<i>Madakku Dravagam</i>)	<i>Ilam pillai vatham</i> (polio myelitis) as an external application
3	<i>Chundai Vatrall Dravagam</i> ²	<i>Vatha Diseases</i> , <i>Kshayam</i> (tuberculosis), <i>grahani</i> (dysentery) and is an appetizer.
4	<i>Chandana Theeneer</i> ⁷	<i>Marbu thudippu</i> (palpitation), <i>suram</i> (febrile conditions)
5	<i>Gandhaga Dravagam</i> ¹⁵	<i>Ajeernam</i> (Indigestion), <i>vayitru noi</i> (abdominal pain), <i>uppisam</i> (Bloating of abdomen), <i>athisara bedhi</i> (diarrheal diseases), <i>vanthi</i> (emesis), <i>kudal murukkal</i> (colon spasm)
6	<i>Inji Dravagam</i> ²	<i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer)
7	<i>Kadukkai Dravagam</i> ²	<i>Peruvayiru</i> (Ascitis, organomegalies), <i>visha rogam</i> (Toxic conditions)
8	<i>Kadi Dravagam</i> ²	<i>Sanni noikal</i> (delirial conditions), gaseous disorders.
9	<i>Kavattam pul Dravagam</i> ²	<i>Vatha Diseases</i> , <i>Kshayam</i> (tuberculosis), <i>grahani</i> (dysentery) and is an appetizer
10	<i>Kalluppu Dravagam</i> ²	<i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer).
11	<i>Karpooradi Theeneer</i> ²¹	<i>Ajeernam</i> (Indigestion), belching, <i>uppisam</i> (Bloating of abdomen), <i>vanthi bedhi</i> (cholera),
12	<i>Kambukanji Dravagam</i> ²	Retention of urine and stool, dyspepsia.
13	<i>Kichilipoo (Bhojana kasthoori poo)Theeneer</i> ⁷	Coolant; relieves excessive body heat, body pain.
14	<i>Maha Dravagam</i> ¹⁵	<i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer), <i>pleeham</i> (spleno megaly), <i>mahodaram</i> (organomegalies), <i>vayuthiratchi</i> (gaseous disorders)
15	<i>Maha Guru Dravagam</i> ¹⁷ (<i>Madakku Dravagam</i>)	<i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer).
16	<i>Maha Sangha Dravagam</i> ¹⁵	<i>Ajeernam</i> (Indigestion, <i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer),
17	<i>Mantha Dravagam</i> ²⁷	All types of digestive disorders of children, diarrheal diseases, <i>Gunmam</i> (Gastro intestinal ailments including peptic ulcer), <i>visha bedhi</i> (cholera).
18	<i>Mezhugu Dravagam</i> ²	<i>Vatha diseases</i> , <i>sori sirangu</i> (prurtis, scabies), non healing ulcers.
19	(a) <i>Milagu Dravagam</i> ²	<i>Vatha pitha kshayam</i> (tuberculosis)
20	(b) <i>Milagu Dravagam</i> ⁴	<i>Kshayam</i> (Tuberculosis), <i>kasam</i> (cough), <i>eelai</i> (phlegm).
21	<i>Moongil Uppathi Theeneer</i> ²¹	<i>Utkaychal</i> (pyrexia), <i>naavaratchi</i> (dryness of tongue), <i>neerpralayam</i> (polyuria), <i>neerpaichoodu</i> (cystitis)
22	<i>Nava Uppu Dravagam</i>	<i>Pakka soolai</i> (pain in the thoracic region), <i>maradaippu</i> (cardiac arrest), <i>marbu noi</i> (chest pain), <i>vayitru noi</i> (abdominal pain), <i>iduppu vali</i> (hip ache), <i>vanthi</i> (emesis), <i>ajeernam</i> (indigestion)
23	<i>Oma theeneer</i> ⁹	<i>Oozhi</i> (cholera), dyspepsia, <i>vayitruvali</i> (abdominal pain), (diarrhea due to indigestion)
24	<i>Oma Dravagam</i> ²	<i>Kanna vippuruthi</i> (cheek cancer), <i>soolai</i> (painful conditions), <i>mugha</i>

		<i>vatham</i> (facial palsy), <i>andavatham</i> (orchitis), <i>sanni</i> (delirium), <i>bedhi</i> (diarrhea), <i>vanthi</i> (emesis)
25	Oma Dravagam²(Madakku Dravagam)	<i>Vatha diseases</i> (rheumatic ailments), <i>kapha diseases</i> (phlegmatic disorders), <i>grahani</i> (dysentery), <i>ushna soolai</i> (pain associated with heat disorders)
26	Perunkaya Dravagam²	All types of <i>Grahani</i> (dysenteries)
27	Perunjeeraga Poo Theeneer⁷	Useful in diarrhea, dyspepsia, especially for children, acts as a vermifuge.
28	Pooneer Dravagam¹¹	<i>Paandu</i> , <i>sokai</i> , <i>peuvairu</i> (anaemia,dropsy,ascites)
29	Poondur Dravagam²	<i>Sanni juram</i> (delirial fever), <i>moolam</i> (hemorrhoids), <i>athisaram</i> (diarrheal diseases)
30	Pudina Theeneer²¹	<i>Ajeernam</i> (indigestion), <i>juram</i> (pyrexia), <i>pitha aathikkam</i> (Vitiated <i>pitha dosham</i>)
31	Pudina Dravagam²	Digestive, Appetizer , good for <i>vatha diseases</i>
32	Sandana Dravagam²	Coolant, Spermatogenic, Tonic
33	Sanjeevi Theeneer²¹	<i>Manjal noi</i> (jaundice), <i>peruvayiru</i> (Ascites and organo megalies), <i>moola noikal</i> (hemorrhoids), <i>venkushttam</i> (leucoderma), <i>irumal</i> (cough), <i>sori sirangu</i> (pruritis,scabies), <i>ilappirumal</i> (primary complex), <i>marbunoi</i> (cardiac diseases)
34	Sangha Dravagam⁹	<i>Vayu gunnam</i> , <i>megham</i> (sexually transmitted diseases)
36	(2) Sangha Dravagam	<i>Marbu vali</i> (chest pain), <i>vayu gunnam</i> , <i>megha</i> diseases.
37	Senkottai Dravagam²	<i>Dhanurvatham</i> (tetanic convulsions), <i>soolai</i> (painful conditions), <i>gunnam</i> , non healing ulcers.
38	Sombu Theeneer⁹	<i>Vayitru vali</i> (abdominal pain), <i>neererichal</i> (burning micturition), <i>kaychal</i> (fever).
39	Sooda Dravagam²(Madakku Dravagam)	Cures all types of diseases with proper adjuvant.
41	Thriphaladi Dravagam²	<i>Sleshma kasam</i> (cough associated with phlegm)
42	Trikadugu Dravagam	<i>Ushnavayu</i> , <i>kshayam</i> (tuberculosis), <i>irumal</i> (cough)
43	Thennam kallu Dravagam²	<i>Kshayam</i> (tuberculosis)
44	Thazhampoo Theeneer²¹	<i>Ammal noikal</i> (pox varieties), <i>veppa noikal</i> (heat disorders)
45	Ulli Dravagam²	<i>Grahani</i> (dysentery), <i>raktha grahani</i> (bloody dysentery), <i>kazhichil</i> (diarrhoeal diseases)
46	Vasambu Dravagam²	Diseases due to <i>vatham</i> , <i>pitham</i> and <i>kapham</i> .
47	Vediyuppu Dravagam¹⁷ (Madakku Dravagam)	<i>Madhumegham</i> (diabetes), <i>neerkattu</i> (anuria), <i>neeradaippu</i> (urinary obstruction), <i>mahodaram</i> (Ascites and organo megalies), <i>vayitruvali</i> (abdominal pain), <i>gunnam</i> , <i>marbu vali</i> (chest pain).
48	Vediyuppu Dravagam²	<i>Gunnam</i> , <i>mahodaram</i> .
49	Vediyuppu-Cheena-Oma Dravagam²(Madakku Dravagam)	<i>Soolai rogam</i> (painful conditions), phlegm, good appetizer and tonic.

Discussion

Both the distillate forms(*Theeneer* and *Dravagam*) has the basic difference in the raw material used, procedures involved , nature of the distillates (Potency and concentration) mode of usage and its application in alchemy or medicines. Any raw material source from the nature can be distilled after undergoing preprocedures. Traditional stills made with clay (*Munn Valai iyanthram*) meet all specificities for the manufacture of *Theeneer* or *Dravagam*. Majority of herbo mineral distillates or redistillates (*Madakku Dravagam*) involves complex procedures of making

and the effectiveness are graded according with their stage and extend of complexity. Most of the *Dravagam* as a highly concentrated alkaline or acidic liquid.

Vast knowledge of alchemy deals with the usage of *Dravagam* as a catalyst or a medium to reduce the time, process and effort taken in basic material purifications, processing and higher medicine preparations like *Mezhugu*, *kattu*, *Chendooram*. There are so many factors, which determine the quality of distillates and the traditional quality parameters are followed wisely for obtaining a high yield or quality.

Theeneer are simple herbal or herbo mineral distillates meant for therapeutic purposes and can be taken on long term basis as a curative, preventive or palliative therapy²⁸. Daily consumption of herbal distillates at indicative doses is the safest among all therapies and is nonhazardous even on accidental consumption or over dosage. Medicines under the category of *Dravagam* or *Madakku dravagam* are potent enough to be administered in acute (eg: *Navuppu Dravagam*¹¹) as well chronic ailments. Prime salt distillates or distillates appear to be hazardous due to inexperienced handling, over dosage or drug exposure. Precautionary measures are thoroughly followed in the preparation or its administration. Overall view of therapeutic usage of *siddha* distillates indicates its application in broad spectrum aspects as a medicine, apart from this they act as good appetisers and tonics.

Conclusion

A humble initiative has taken to reveal and document the unexplored part of *siddha* medicine, which has a good scope for research from view, alchemy and medicine. Through the knowledge of these supreme distillates many mysteries, secrecy and chemistry behind the marvelous *Siddhamedicine* can be unfolded. Further standardization and scientific validation in the field may help researchers, physicians or pharmaceuticals for their contributions towards the health seekers. This may resolve many issues pertaining to health care sector in future practice of medicine through *Siddha* System..

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