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A Drug Review of Poly Herbal Siddha Medicine *Elai Erumal Rasayanam*

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Abstract:

India has a primeval traditional medicine history and plentiful traditional methods are followed they are collectively known as AYUSH and played crucial role to provide healthcare facilities and reduced the burden of health sector in so many centuries. *Erumal Rasayanam* is a poly herbal formulation mentioned in a Siddha classical literature, The Pharmacopoeia of Siddha Research Medicines, chapter 2 to 14, page no -199. *Elai Erumal Rasayanam* contains 19 different ingredients and indicates to treat *Kaasam* (Cough), *Kshayam* (Tuberculosis), *Swasam* (Allergic Bronchitis), *Eraippu* (Bronchial Asthma), *Suram* (Fever) and *Vaatha Kutaichal* (Pain in nerves and joints due to vitiated vali humor). This preliminary literature review of Siddha sastric medicine *Elai Erumal Rasayanam* describes the notable scientific validations of the ingredients and highlight the medicine and will also emphasize the research aspects of this drug. As per observations of this review all the ingredients of *Elai Erumal Rasayanam* was herbs and 11 family herbs did have use to prepare the *Elai Erumal Rasayanam*. Out of 19 ingredients, 9 leaves, 4 roots, 2 fruits, 1 rhizome, flower buds, bark, and seed parts were used. 63% of the ingredients has pungent taste and 98 % ingredients have pungent bioavailability and majorly cough was mentioned in 15 ingredients, bronchial asthma and fever mentioned in 10 ingredients. 15 herbs has Anti-inflammatory and Antioxidant properties, 14 herbs has Expectorant pharmacological properties. Literature review of *Elai Erumal Rasayanam* showed, the Siddha Medicinal properties such as Taste, Potency, Bioavailability, Medicinal purposes and Pharmacological activities of ingredients are strongly correlate with the indications and to provide the strong scientific evidences of the therapeutic value of the *Elai Erumal Rasayanam*.

Keywords: Siddha *Elai Erumal Rasayanam*, Polyherbal, Respiratory illness, AYUSH

Introduction:

World Health Organization (WHO) said Traditional medicine has a long history. It is the sum of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health and the prevention, diagnosis, improvement or treatment of physical and mental illness. Herbal medicines include herbs, herbal materials, herbal preparations and finished herbal products, that contain as active ingredients parts of plants, or other plant materials, or combination. Estimated to nearly 80% of global populations are used in traditional medicines [1].

India has a primeval traditional medicine history and plentiful traditional methods are followed they are collectively Known as AYUSH and played crucial role to provide healthcare facilities and reduced the burden of health sector in so many centuries. The “S” letter represents the Siddha system of Medicine. Siddha medicine is primordial medicine system in AYUSH system and expands from 10, 000- 4000 B. C and originated from Tamil Civilization [2]. 96 *thathuvam* is the basic principle of Siddha medicine, it includes 5 *Bootham* (5 Elements), 6 *Suvai* (6 Tastes), *Thasavaayukkal* (10 vital air), *Thasanaadi* (Ten humoral energy channels), *Mukkutram* (Three humor) theories and other basic theories. Eight-fold diagnostic method (*Envagai Thaervu*) is unique diagnostic method in Siddha medicine. According to Siddha literature, the diseases are classified in 4448 types and all classifications are in very elaborated in the literatures. Treatment modalities are divided to 32 internal medicines and 32 External medicines [3].

Siddha Medicines are prepared by using herbs, metals, minerals and substances of animal origin. *Rasayanam* is one of the 32 types of internal medicines and it's described as a type of medicine in semi- solid form which is prepared by adding sugar and ghee to a *chooranam* prepared from curtained raw drugs. *Rasayanam* has a six months shelf-life periods [4]. *Elai Erumal Rasayanam* is a poly herbal formulation mentioned in a Siddha classical literature, The Pharmacopoeia of Siddha Research Medicines, chapter 2 to 14, page no -199. *Elai Erumal Rasayanam* contains 19 different ingredients and indicates to treat *Kaasam* (Cough), *Kshayam* (Tuberculosis), *Swasam* (Allergic Bronchitis), *Eraippu* (Bronchial Asthma), *Suram* (Fever) and *Vaatha Kutaichal* (Pain in nerves and joints due to vitiated vali humor) [5].

Observance the indications of *Elai Erumal Rasayanam* collectively mentioned to treat the respiratory diseases. Global warming, Environmental Changes, Air pollution, Climate Changes and Life style modifications are affecting the health conditions of every individual in the world

and particularly increases the risk of respiratory diseases [6]. In India traditional medicines are significant support to the health sector in many decades. In Covid 19 pandemic, between the periods of 2020-2021 Central Council for Research in Siddha were carried out by 4 literature reviews, 5 In-Silico docking studies, 3 preclinical studies, 6 clinical studies, 01 case study and 08 Covid 19 related studies [7]. Literature reviews gives the basic scientific addition on each medicine and open the new gateway of the research aspects. This preliminary literature review of Siddha sastric medicine *Elai Erumal Rasayanam* describes the notable scientific validations of the ingredients and highlight the medicine and will also emphasize the research aspects of this drug.

Aim and objective:

To analysis the Siddha medicinal properties, Medicinal uses, and Pharmacological actions of the medicinal ingredients of the *Elai Erumal Rasayanam*.

Materials and methods:

It is a literature review study and it took three months from January 2024 to March 2024. Literatures are collected from the Siddha literature Pharmacopoeia of Siddha Research Medicines, chapter 2 to 14, page no -199 and Siddha Medicinal properties (Taste, Potency, Bioavailability, Medicinal uses) of the medicinal ingredients are collected from Siddha traditional books from library at Siddha Clinical Research Unit, Safdarjung Hospital, New Delhi. Siddha diseases terminologies are correlated with English terminology as per World Health Organisation International Standard terminologies on Siddha Medicine book published by World Health Organisation [8].

Scientific and selected vernacular names (Tamil, English, Hindi and Sanskrit) names, habit, distribution, family and parts used details are obtained from Foundation for Revitalization of Local Health Traditions (FRLHT) – ENVIS website. Phytochemical contents and pharmacological actions of each medicinal ingredients are collected from Published Siddha books, bibliographic citations, abstracts, and/or full text from PubMed, Scopus, Web of Science and other indexed journals articles and books.

Statistical analysis:

The collected data are entered, processed and statistically analysed using a simple statistical method using Microsoft Excel 2010.

Medicinal Ingredients of Elai Erumal Rasayanam

1. *Aadathodai ilai chooranam (Justicia adhatoda leaf powder)* - 225 grams
2. *Kandankathiri ilai Chooranam (Solanum virginianum leaf powder)* - 225 grams
3. *Musumusukkai ilai Chooranam (Mukia maderaspatana leaf powder)* - 225 grams
4. *Thoothuvalai ilai Chooranam (Solanum trilobatum leaf powder)* - 225 grams
5. *Kanjankorai ilai Chooranam (Ocimum basilicum leaf powder)* - 225 grams
6. *Potri laikaiyan ilai Chooranam (Wedelia chinensis leaf powder)* - 225 grams
7. *Kuppaimeni ilai Chooranam (Acalypha indica leaf powder)* - 225 grams
8. *Thulasi ilai Chooranam (Ocimum tenuiflorum leaf powder)* - 225 grams
9. *Chukku Chooranam (Zingiber officinale powder)* - 36 grams
10. *Milagu Chooranam (Piper nigrum powder)* - 36 grams
11. *Thippili Chooranam (Piper longum dried fruit powder)* - 36 grams
12. *Thippilimoolam Chooranam (Piper longum whole plant powder)* - 36 grams
13. *Thalisapathiri Chooranam (Abies spectabilis powder)* - 36 grams
14. *Akkarakaaram Chooranam (Anacyclus pyrethrum powder)* - 36 grams
15. *Sittraraththai Chooranam (Alpinia galanga powder)* - 36 grams
16. *Sevviyam Chooranam (Piper nigrum root powder)* - 36 grams
17. *Ilavangam Chooranam (Syzygium aromaticum powder)* - 36 grams
18. *Ilavangapattai Chooranam (Cinnamomum verum powder)* - 36 grams
19. *Aelakkai arisi Chooranam (Elettaria cardamomum powder)* - 36 grams
20. White Sugar - 1.4 Kilograms
21. Cow's Ghee - 460 grams
22. Honey - 2.3 kilograms

Standard Operative Procedure: All the above ingredients are mixed together in a vessel, sugar is also mixed with them, ghee and honey are added and bottled up with air tight container. This preparation is no need to be heated.

Dose: 5-6 grams, morning and night, After food.

Observations:

Categorization of the Medicinal Ingredients

As per observations of this review all the ingredients of *Elai Erumal Rasayanam* was herbs and no metals and minerals were used to prepare *Elai Erumal Rasayanam*.

Scientific and Selected Vernacular names of the medicinal ingredients

The scientific and selected vernacular names (Tamil, English, Hindi and Sanskrit) of the medicinal ingredients of *Elai Erumal Rasayanam* was summarized and represents the table no 1.

Table 1: Scientific and Selected Vernacular names of the medicinal ingredients

| Ingredients- Botanical Name | Tamil Name | English Name | Hindi Name | Sanskrit Name |
|--|------------------------|----------------------|--------------------|----------------------------|
| Justicia adhatoda L. | <i>Aadathodai</i> | Malabar-nut | <i>Arusha</i> | <i>Vasika</i> |
| Solanum virginianum L. | <i>Kandankathiri</i> | Wild eggs pland | <i>Kateli</i> | <i>Kantalika</i> |
| Mukia maderaspatana (L.) M. ROEMER | <i>Musumusukkai</i> | Rough bryony | <i>Bilari</i> | <i>Ahilaykhan</i> |
| Solanum trilobatum L. | <i>Thoothuvalai</i> | Climbing brinjal | | <i>Alarka</i> |
| Ocimum basilicum L. | <i>Kanjankorai</i> | Common basil | <i>Bahari</i> | <i>Gandhapatra</i> |
| Wedelia chinensis MERR. | <i>Potrialaikaiyan</i> | Trailing eclipta | <i>Bhangra</i> | <i>Bhringaraja</i> |
| Acalypha indica L. | <i>Kuppaimeni</i> | Indian acalypha | <i>Kuppi</i> | <i>Arittamanjarie</i> |
| Ocimum tenuiflorum L. | <i>Thulasi</i> | Holy basil | <i>Tulsi</i> | <i>Surasah, tulasi</i> |
| Zingiber officinale ROSC. | <i>Chukku</i> | Ginger | <i>Adarak</i> | <i>Adraka, nagaram</i> |
| Piper nigrum L. | <i>Milagu</i> | Black pepper | <i>Kali-mirch</i> | <i>Maricha</i> |
| Piper longum L. | <i>Thippili</i> | Long pepper | <i>Pipli</i> | <i>Pippali</i> |
| Piper longum | <i>Thippilimoolam</i> | Long pepper- Root | <i>Pipli-mool</i> | <i>Pippali- moola</i> |
| Abies spectabilis (D.DON) G.DON | <i>Thalisapathiri</i> | Flaurtia calaphracta | <i>Talispatri</i> | <i>Talisapatra</i> |
| Anacyclus pyrethrum DC. | <i>Akkarakaaram</i> | Pyrethri root | <i>Akarkara</i> | <i>Akarakarabha</i> |
| Alpinia galanga (L.) WILLD. | <i>Sitraraththai</i> | Siamese ginger | <i>Gandhamoola</i> | <i>Rasna</i> |
| Piper nigrum | <i>Sevviyam</i> | Black pepper root | <i>Kali-mirch</i> | <i>Maricha</i> |
| Syzygium aromaticum (L.) MERRILL & PERRY | <i>Ilavangam</i> | Cloves | <i>Long</i> | <i>Lavangam, devapuspa</i> |
| Cinnamomum verum PRESL | <i>Ilavangapattai</i> | Bark of Chinnamon | <i>Dar-chini</i> | <i>Twak</i> |

| | | | | |
|-------------------------------|-----------------------|---------------|--------------|------------|
| Elettaria cardamomum MATON | <i>Aelakkai arisi</i> | Cardamom seed | <i>elaci</i> | <i>Ela</i> |
|-------------------------------|-----------------------|---------------|--------------|------------|

Family distribution of the medicinal ingredients

Among the 19 medicinal ingredients, total 11 family herbs did have use to prepare the *Elai Erumal Rasayanam*. They are Piperaceae 4 herbs, Zingiberaceae 3 herbs, Solanaceae- 2 herbs, Lamiaceae- 2 herbs, Asteraceae- 2 herbs, Acanthaceae -1 Herb, Cucurbitaceae -1 Herb, Euphorbiaceae -1 Herb, Pinaceae -1 Herb, Myrtaceae -1 Herbs and Lauraceae -1 Herb were used. It represents the Appendix 1.

Morphology distribution of the medicinal ingredients:

As per the literature review of these 19 ingredients, 9 medicinal ingredients are herbs, 3 are shrub and climber habits, 2 are tree habits, and 1 is trailer and un-shrub habits. It represents the Appendix 1.

Parts used of the medicinal ingredients:

Out of 19 ingredients, 9 leaves, 4 roots, 2 fruits, 1 rhizome, flower buds, bark, and seed parts were used to prepare the *Elai Erumal Rasayanam*. It represents the Appendix 1.

Siddha Medicinal properties (Taste, Potency, Bioavailability, Medicinal uses) of the medicinal ingredients:

Based on the review of Siddha literatures, 63% of the ingredients has pungent taste, 16% has bitter and pungent, 11% has bitter, 5% has Astringent, pungent and Pungent, Sweet tastes. All 19 ingredients have hot (100%) potency and 98 % ingredients have pungent bioavailability and 2% has pungent and sweet bioavailability. It represents table 2. According to Siddha literature Siddha Materia Medica- Medicinal plants division, the medicinal uses of the above 19 ingredients are mentioned in the appendix 1. As per this, majorly cough was mentioned in 15 ingredients, bronchial asthma and fever mentioned in 10 ingredients, diarrhoea mentioned in 7 ingredients and tuberculosis mentioned in 5 ingredients. Rhinitis, Headache, Vomiting and acid peptic diseases are mentioned in 3 ingredients. And sinusitis, hiccoughs, ear blister, loss of appetite, jaundice, anaemia, urogenital diseases were also mentioned in medicinal ingredients. It represents the table 3 and figure 1.

Table 2: Siddha Medicinal properties (Taste, Potency, Bioavailability) of the medicinal ingredients:

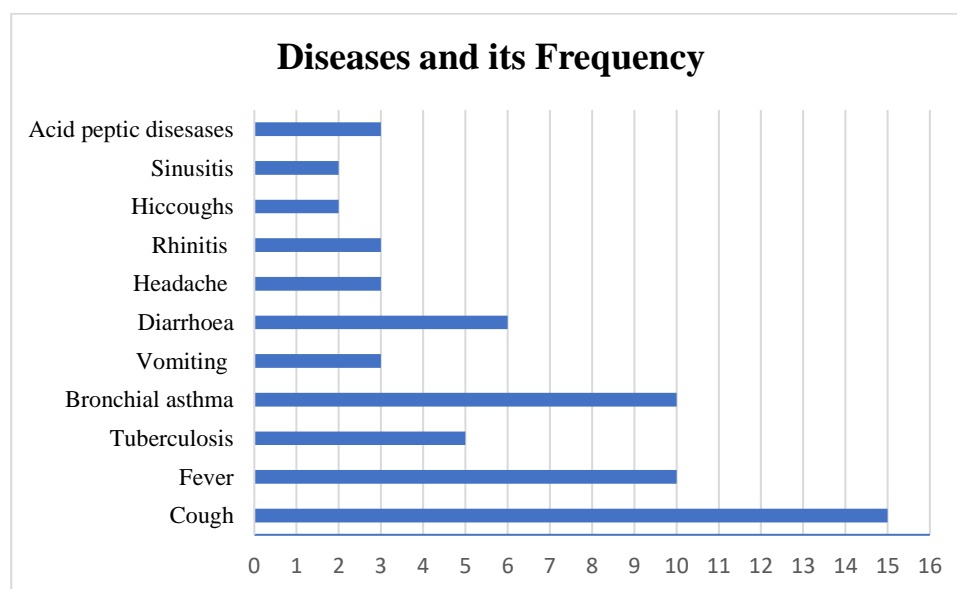
| Taste | Frequency | Percentage | Potency | Frequency | Percentage | Bioavailability | Frequency | Percentage |
|------------------------|-----------|------------|---------|-----------|------------|-------------------|-----------|------------|
| Bitter | 2 | 11% | Hot | 19 | 100% | Pungent | 18 | 98% |
| Pungent | 12 | 63% | | | | Pungent, Sweet | 1 | 2% |
| Astringent, pungent | 1 | 5% | | | | | | |
| Bitter, pungent | 3 | 16% | | | | | | |
| Pungent, Sweet | 1 | 5% | | | | | | |

Table 3: Medicinal uses of the medicinal ingredients:

| Ingredients - Tamil Name | Medicinal Uses |
|--------------------------|--|
| <i>Aadathodai</i> | <i>Irumal</i> (Cough), <i>Suram</i> (Fever), <i>Ilaippu</i> (Tuberculosis), <i>Iraippu</i> (Bronchial asthma), <i>Vaathanhoi</i> , <i>Vaanthi</i> (Vomiting), <i>Kazhichal</i> (Diarrhoea), <i>Kuruthi Azhal nhoi</i> (Pitha diseases associated with purpura) |
| <i>Kandankathiri</i> | <i>Kaasaswasam</i> (Bronchial asthma), <i>Kshayam</i> (Tuberculosis), <i>Suram</i> (Fever), <i>Thalaivali</i> (Headache) |
| <i>Musumusuk kai</i> | <i>Irumal</i> (Cough), <i>Iraippu</i> (Bronchial asthma), <i>Mookil neer vatithal</i> (Rhinitis) |
| <i>Thoothuvali</i> | <i>Suram</i> (Fever), <i>Irumal</i> (Cough), <i>Kaathueluchi</i> (ear blister), <i>Namaichal</i> (pruritis), <i>Iraippu</i> (Bronchial asthma) |
| <i>Kanjankorai</i> | <i>Suram</i> (Fever), <i>Irumal</i> (Cough), <i>Kazhichal</i> (Diarrhoea), <i>Kaasam</i> (Tuberculosis), <i>Vikkali</i> (hiccoughs), <i>Pasiyinmai</i> (loss of appetite) |
| <i>Potrilaiyaiyan</i> | <i>Irumal</i> (Cough), <i>Kaathu nhoi</i> (ear diseases), <i>Kankaasam</i> (cataract), <i>Kaamalai</i> (Jaundice), <i>Paandu</i> (Anaemia) |
| <i>Kuppaimeni</i> | <i>Irumal</i> (Cough), <i>Iraippu</i> (Bronchial asthma), <i>Mookil neer vatithal</i> (Rhinitis), <i>Vayiru vali</i> (Abdominal pain) |
| <i>Thulasi</i> | <i>Mookil neer vatithal</i> (Rhinitis), <i>Suram</i> (Fever), <i>Peenisam</i> (Sinusitis), <i>Suvaiyinmai</i> (Ageusia), <i>Maantham</i> (Digestive disorder of children), <i>Neervetkai</i> (excessive thirst) |
| <i>Chukku</i> | <i>Seriyamai</i> (Indigestion), <i>Puliyepam</i> (Regurgitation), <i>Iraippu</i> (Bronchial asthma), <i>Irumal</i> (Cough), <i>Kunmam</i> (Acid peptic disorders), <i>Paandu</i> (Anemia) |

| | |
|------------------------|---|
| <i>Milagu</i> | <i>Kulirsuram</i> (periodic fever), <i>Paandu</i> (Anemia), <i>kazhichal</i> (Diarrhea), <i>Kunmam</i> (Acid peptic diseases), <i>Seriyamai</i> (Indigestion), <i>Irumal</i> (Cough) |
| <i>Thippili</i> | <i>Irumal</i> (Cough), <i>Iraippu</i> (Bronchial asthma), <i>Eezhai</i> (Tuberculosis), <i>Paandu</i> (Anemia), <i>Thalai vali</i> (Headache), <i>Mayakkam</i> (unconsciousness), <i>Porumal</i> (borborygmi) |
| <i>Thippilimoolam</i> | <i>Irumal</i> (Cough), <i>Kurarkammal</i> (hoarseness of voice), <i>Nirvetkai</i> (thirst), <i>Mayakkam</i> (unconsciousness), <i>Megam</i> (urogenital disorders) |
| <i>Thalisapathiri</i> | <i>Kazhichal</i> (Diarrhoea), <i>Suram</i> (Fever), <i>Naalpatta Irumal</i> (Chronic Cough), <i>Iraippu</i> (Bronchial asthma), <i>Aseeranam</i> (Indigestion), <i>Vaanthi</i> (vomiting), <i>Pasiyinmai</i> (loss of appetite) |
| <i>Akkarakaaram</i> | <i>Nirvetkai</i> (thirst), <i>Thaaga Suram</i> (fever with intense thirst), <i>Vikkal</i> (hiccoughs), |
| <i>Sitraraththai</i> | <i>Kozhai</i> (Sputum), <i>Irumal</i> (Cough), <i>Iraippu</i> (Bronchial asthma), <i>Eezhai</i> (Tuberculosis), <i>Karappan</i> (Eczema), <i>Suram</i> (Fever) |
| <i>Sevviyam</i> | <i>Suram</i> (Fever), <i>Irumal</i> (Cough), <i>Soolai</i> (lancinating pain), <i>Suvaiyinmai</i> (Ageusia), <i>Kurarkammal</i> (hoarseness of voice), <i>Thondai noi</i> (diseases of larynx) |
| <i>Ilavangam</i> | <i>Mayakkam</i> (Unconsciousness), <i>Kalichal</i> (Diaeohoea), <i>Vaanthi</i> (Vomiting), <i>Kuruthikalichal</i> (Bloody Diarrhoea), <i>Sevinoi</i> (Ear diseases), <i>Thalaivali</i> (Headache) |
| <i>Ilavangapat tai</i> | <i>Irumal</i> (Cough), <i>Iraippu</i> (Bronchial asthma), <i>Kazhichal</i> (Diarrhoea), <i>Perumpaadu</i> (menorrhagia) |
| <i>Aelakkai arisi</i> | <i>Irumal</i> (Cough), <i>Kazhichal</i> (Diarrhoea), <i>Peenisam</i> (Sinusitis), <i>Vayiru vali</i> (Abdominal pain), <i>Nirvetkai</i> (thirst), <i>Kunmam</i> (Acid peptic disorders), |

Figure 1: Medicinal uses of Medicinal Ingredients

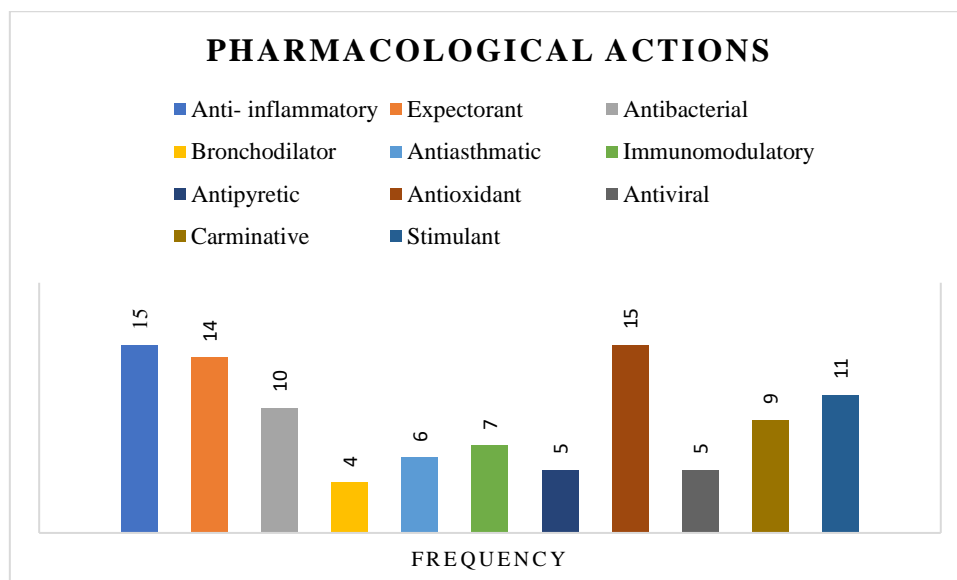


Pharmacological actions of the medicinal ingredients

Based on the literatures and research articles of each medicinal ingredients, 15 herbs has Anti- inflammatory and Antioxidant properties, 14 herbs has Expectorant, 11 herbs has Stimulant, 10 herbs has Antibacterial, 9 herbs has Carminative, 7 herbs has Immunomodulatory, 6 herbs has

Antiasthmatic and 5 herbs has Antipyretic and Antiviral pharmacological properties. It represents figure 2.

Figure 2: Pharmacological actions of the Medicinal Ingredients



Discussion:

Categorization of the Medicinal Ingredients

Herbs, metals, minerals and substances of animal origins are used to prepare the Siddha medicines and it's called *Thathu, Thaavara, Jeeva porulkal*. It is classified to Internal and External medicines. According to Siddha literature, treat the diseases first will prescribe the herbs-based medicines. Then based upon the conditions of the patient, prescribe the metals, minerals and animal origin medicines. It mentioned the following quote in Siddha literature. “*Veru paaru thalai paaru minjinakkal mella mella parpam Chendooram paaru*” [27]. Based on this review, only herbs ingredients are used to prepare the *Elai Erumal Rasayanam*.

Scientific and Selected Vernacular names of the medicinal ingredients

Botanical names are the scientific names of specific plant species. It must conform to the system of botanical nomenclature prescribed by the International Code of Nomenclature of Algae, Fungi and Plants (ICN). It is essential that a botanical name is sufficiently recognized to support a specific name for a plant species, so that a particular name is accepted worldwide. The name of a species in the locality would be varied by several different names (or common names). So, a botanical name might inhibit the plausible misunderstandings and misidentification of a plant species when using common names [28]. Plants are commonly

known by their local names in every part of the world. The local names are playing a crucial role in ethnobotanical researches of a particular tribe or region [29]. In this review, scientific name and Tamil, English, Hindi and Sanskrit vernacular names of ingredients of each ingredient are represented in table 1. It helps to identify the correct plant in each region and reduce the misidentification of the herbs.

Family distribution of the medicinal ingredients

Based on the common external characteristics of plants, such as visible leaves, fruits and other parts, these plants can be grouped into families [30]. Total 11 family herbs are used to prepare the *Elai Erumal Rasayanam*. In Piperaceae family 4 herbs are used to this formulation. **Piperaceae** is commonly known as the pepper family. These days, the most well-known member of the family is *Piper nigrum*, the source of the spices black and white pepper. **Piperaceae family has lot of medicinal plants [31]. In Zingiberaceae family**, *Alpinia galanga* (L.) WILLD, *Elettaria cardamomum* MATON, *Zingiber officinale* ROSC herbs are used to *Elai Erumal Rasayanam*. Solanaceae, Lamiaceae, Asteraceae, Acanthaceae, Cucurbitaceae, Euphorbiaceae, Pinaceae, Myrtaceae and Lauraceae family herbs also used to *Elai Erumal Rasayanam*.

Morphology distribution of the medicinal ingredients

Morphology of the plants explained about the physical and external features of the plants and it helps to easily identify the plants. Morphology of the plants are categorized by the size, nature of the stem and life span, and growth habit. Based upon this, plants are majorly classified into three groups such as herbs, shrubs and trees. In addition to these, two more types need some support to grow. They are specifically called climbers and creepers [32]. Based on this review 9 medicinal ingredients are herbs, 3 are shrub and climber habits, 2 are tree habits, and 1 is trailer and un-shrub habits.

Parts used of the medicinal ingredients

In medical purposes many parts of a plant can be used to prepare the medicines. Different parts of a plant has different bioactive components and different medicinal uses [33]. In *Elai Erumal Rasayanam* 9 leaves, 4 roots, 2 fruits, 1 rhizome, flower buds, bark, and seed parts were used.

Siddha Medicinal properties (Taste, Potency, Bioavailability, Medicinal uses) of the medicinal ingredients

As per Siddha literature, every *Thathu*, *Thaavara*, *Jeeva porulkal* are identified in their uses through taste (*Suvai*), character (*Kunam*), potency (*Veeriyam*), efficacy (bioavailability) (*Vibagam*) and action (*Pirivu*). In *Suvai* (taste) classified in six types and each taste made from two *Poothams* (two basic elements). They are sweet (air and space), sour (earth and fire), salty (water and fire), pungent (spicy) (air and fire), bitter (air and space) and astringent (earth and air). Tastes are playing crucial role to regulate the vitiated humors in disease conditions. Based on the results, 63% of the ingredients has pungent taste, 16% has bitter and pungent, 11% has bitter, 5% has Astringent, pungent and Pungent, Sweet tastes. In taste most of the ingredients are Pungent and Bitter taste. In siddha literature described bitter taste is made up *Vayu and Agayam pootham*. Pungent taste made up *Thee and Vayu pootham* [34]. *Elai Erumal Rasayanam* indicates to treat *Kaasam* (Cough), *Kshayam* (Tuberculosis), *Swasam* (Allergic Bronchitis), *Eraippu* (Bronchial Asthma), *Suram* (Fever) and *Vaatha Kutaichal* (Pain in nerves and joints due to vitiated vali humor). As per siddha literature, Cough, Chronic bronchitis, Bronchial Asthma, other respiratory illness is caused by vitiation of *Iyam*. According to the siddha basic principles Bitter and Pungent tastes are regulate the vitiated *Iyam*.

Potency is defined as an active constituent of the siddha drug. This constituent is responsible for the pharmacological activity of the medicinal plant. Commonly the siddha drugs have cold and hot potency based on the presence of Fire or Water element in them. Hot potency neutralizes the affected the vital humors of *Vaatham* and *kabham* while cold potency neutralizes the affected humor of *pitham* [30]. Based on the results all 19 ingredients have hot (100%) potency. Hot potency regulates the vitiated *Kabham* and reduced the disease prognosis.

Bio availability is referred to be the post absorptive taste (efficacy), which is also considered being an important aspect. It is a concept explaining the assimilation of six tastes in the digestive tract into three primary tastes namely Sweet, Sour and Pungent. Mostly Sweet and Salt becomes Sweet, Sour remains Sour, Bitter, Pungent and Astringent becomes Pungent [35]. Based on these results 98 % ingredients have pungent bioavailability and 2% has pungent and sweet bioavailability.

Pharmacological actions of the medicinal ingredients

Pharmacological activity of drugs is mainly dependent on the interaction between the drugs with proteins, enzymes, receptors, nucleic acid or bio membranes. The pharmacological actions of a drug are the characteristics or properties of the drug which enable it to be effective in the medical context. [36]. Anti-inflammatory, expectorant, bronchodilator, immunomodulatory and antioxidant drugs are used to treat respiratory diseases [37]. Based on

the results 15 herbs has Anti- inflammatory and Antioxidant properties, 14 herbs has Expectorant, 11 herbs has Stimulant, 10 herbs has Antibacterial, 9 herbs has Carminative, 7 herbs has Immunomodulatory, 6 herbs has Antiasthmatic and 5 herbs has Antipyretic and Antiviral pharmacological properties.

Based on the results of medicinal uses of ingredients as per Siddha literature, it showed 15 ingredients are noted in cough, 10 ingredients are noted in bronchial asthma and fever, 7 ingredients are noted in tuberculosis. Medicinal uses of the ingredients are correlated to the indications of the *Elai Erumal Rasayanam*.

Conclusion:

Literature review of *Elai Erumal Rasayanam* showed, the Siddha Medicinal properties such as Taste, Potency, Bioavailability, Medicinal purposes and Pharmacological activities of ingredients are strongly correlate with the indications and to provide the strong scientific evidences of the therapeutic value of the *Elai Erumal Rasayanam*. In recent years Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy medicines are tremendous response in all over the world and various therapeutic uses are scientifically proven in numerous ways. Standardisation, preclinical and clinical research should be carried out to further evaluate the *Elai Erumal Rasayanam* in future.

Appendix 1: Family Distribution, Morphology, Parts used and Siddha medicinal properties of the Medicinal ingredients:

| Ingredients- Tamil Name | Family Name | Habit | Part used | Siddha Properties | | |
|----------------------------|---------------|---------|-----------|------------------------|---------|------------------|
| | | | | Taste | Potency | Bio Availability |
| <i>Aadathodai</i> | Acanthaceae | Shrub | leaves | Bitter | Hot | Pungent |
| <i>Kandankathiri</i> | Solanaceae | Herb | leaves | Pungent | Hot | Pungent |
| <i>Musumusukkai</i> | Cucurbitaceae | Climber | leaves | Astringent, pungent | Hot | Pungent |
| <i>Thoothuvali</i> | Solanaceae | Trailer | leaves | Bitter, pungent | Hot | Pungent |
| <i>Kanjankorai</i> | Lamiaceae | Herb | Leaves | Pungent | Hot | Pungent |
| <i>Potrilakaiyan</i> | Asteraceae | Herb | Leaves | Bitter | Hot | Pungent |

| | | | | | | |
|-----------------------|---------------|--------------|-------------|--------------------|-----|----------------|
| <i>Kuppaimeni</i> | Euphorbiaceae | Herb | Leaves | Bitter, pungent | Hot | Pungent |
| <i>Thulasi</i> | Lamiaceae | Un- shrub | Leaves | Pungent | Hot | Pungent |
| <i>Chukku</i> | Zingiberaceae | Herb | Rhizome | Pungent | Hot | Pungent |
| <i>Milagu</i> | Piperaceae | Climber | Fruits | Bitter, pungent | Hot | Pungent |
| <i>Thippili</i> | Piperaceae | Shrub | Fruits | Pungent | Hot | Pungent |
| <i>Thippilimoolam</i> | Piperaceae | Shrub | Root | Pungent | Hot | Pungent |
| <i>Thalisapathiri</i> | Pinaceae | Herb | leaves | Pungent | Hot | Pungent |
| <i>Akkarakaaram</i> | Asteraceae | Herb | Root | Pungent | Hot | Pungent |
| <i>Sitraraththai</i> | Zingiberaceae | Herb | Root | Pungent | Hot | Pungent |
| <i>Sevviyam</i> | Piperaceae | Climber | Root | Pungent | Hot | Pungent |
| <i>Ilavangam</i> | Myrtaceae | Tree | flower buds | Pungent | Hot | Pungent |
| <i>Ilavangapattai</i> | Lauraceae | Tree | Bark | Pungent, Sweet | Hot | Pungent, Sweet |
| <i>Aelakkai arisi</i> | Zingiberaceae | Herb | Seeds | Pungent | Hot | Pungent |

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