

Comparative Drug Review on Siddha Drug “*thaazhankaai ennai*” for *vaatha noi* (Rheumatism)

S. R. Pholtan Rajeev*

Junior Resident, Department of Siddha Toxicology, Govt. Siddha Medical College, Tirunelveli, The Tamil Nadu Dr. M. G. R. Medical University, Chennai, India

*Address for Correspondence: Dr. S. R. Pholtan Rajeev, Junior Resident, Department of Siddha Toxicology, Govt. Siddha Medical College, Tirunelveli, The Tamil Nadu Dr. M. G. R. Medical University, Chennai, India

E-mail: drsprajeev@gmail.com

Received: 25 July 2020/ Revised: 30 Sep 2020/ Accepted: 16 Dec 2020

ABSTRACT

Background: Thaalankai Oil (~Thaazhankaai Oil) is the oldest and most effective formula in Siddha Medicine and it acts principally by strengthening the immune system. Arthritis is most common problem world-wide, but it has so many causes and different pathogenesis but whatever it is, Thaalankai oil was successfully curing the disease in practically. The traditional physicians' special formula of Thaalankai oil is containing 22 drugs as *thaila dravyas* and total ingredients are 27 in number (Constituents of Thaalankai Oil).

Methods: Each drug has been taken according to the physician's Siddha Poly Herbal formula. The main ingredient is unripe fruit juice of the Thalai (*Pandanus odoratissimus*). It is prescribed from Traditional Siddha Physician Dr. R. Ponniah. This research was an analysis of the ingredients of oil.

Results: Explained as, Sweet-22.22%, Pungent-25.9%, Bitter-33.33% in tastes; Cool-33.33%, Hot-62.96% in potency; and Sweet-33.33%, Pungent-62.96% in the bioavailability of ingredients. According to the actions of each one ingredient, total 11 actions were identifying in raw materials and 3.7% of diuretic, 3.7% of laxative, 7.4% of blood purifier, 7.4% of febrifuge, etc. These actions are good effective for joint diseases (*Vata* diseases).

Conclusion: According to result, this research oil- Thaalankaai Oil has a good collection of anti *Vata* properties in action wise and it can use internally also. Siddha poly herbal formula Thalankaai Ennai is good for *vata rogam*- joint diseases in scientifically.

Key-words: Pharmacological Actions, Potency, Thaalankai, Thailadravyas, Vata diseases

INTRODUCTION

Siddha is one of the oldest medical systems in the world. Siddha physician preferably likes to dispense drugs prepared by their own hands, they do not rely upon the products manufactured by pharmaceutical industries^[1,2]. Rapid civilization, the explosive growth rate of population, massive deforestation has made the physicians handicap and to depend upon pharmaceutical industries. Due to commercial orientation and increasing demand for natural products few pharmacies are preparing unethical products which result in to an embarrassing position for physicians and patients.

In order to overcome the enigma, there is every need to fix certain standards for these natural products, which are easily adaptable and implementable to overcome the crisis^[3].

Oil is the branch of Siddha Medicine that concerned with maintaining bodily functions, including those of the brain, at the optimum, preventing illness and delaying the debility of aging^[4].

Thaalankai Oil is the oldest and most successful formula in oil, and it acts principally by strengthening the immune system^[5]. Keeping its immense qualities in view many drug industries are manufacturing the formulation, but are not similar to each other in respect of quality and efficacy even if the formula is same. This variation is probably due to the change in its constituents^[6-8].

The traditional physicians' special formula of Thaalankai oil is containing 22 drugs as *thaila dravyas* (Constituents of Thaalankai Oil). Each drug has been taken according to

How to cite this article

Rajeev SRP. Comparative Drug Review on Siddha Drug “*thaazhankaai ennai*” for *vaatha noi* (Rheumatism). SSR Inst. Int. J. Life Sci., 2021; 7(1): 2734-2741.



Access this article online
<https://ijls.com/>



the physician's formula. The main ingredient is the unripe fruit juice of the Thalai (*P. odoratissimus*)^[9].

Arthritis is the most common problem in worldwide, but it has so many causes and different pathogenesis but whatever it is, Thaalankai oil was successfully curing the disease in practically. Thaalankai oil is a pure Siddha poly herbal formula which prepared and prescribed from Traditional Siddha physician Dr. R. Ponniah therefore this drug research is good as thinking but this is not completed final research however other researchers also take this and do feather clinical or other research of this poly herbal formula.

MATERIALS AND METHODS

Research Methods- This study proceeded in Ponniah Medical Centre, Kalviyankadu, Jaffna, Sri Lanka on 15 April 2012 to 24 July 2012.

Research Drug- Thaalankaai Oil.

Data collection- Data collected from authenticated Tamil books and materials prepared by oil samples, authenticated Siddha books and with different places like Ponniah Medical Hall, Kalviyankadu, Jaffna and Library, Unit of Siddha medicine, University of Jaffna, Sri Lanka.

Data analysis and Interpretation- According to the Siddha terminology, interpretation with modern pharmacological view, literature search was identified and authenticated the drug materials from the traditional physician including in the selected formula in his Tamil manuscript and compared with other literature also and identified the treatment in the Traditional Siddha Physician's manuscript. Selected formulas were making as a sample then, check the quality for chemicals and standardization. This research was done as study about the treatment plan and line of treatment for joint disorders of the traditional physician. Finally, this research was making the research Siddha drug (oil).

Preparation of Research drug- Selected the genuine ingredients of research drug formula and prepared the herbal powder ingredients of the research drug and extracted from the main ingredient of the research drug in a proper way and prepared the research oil with base oil and all other ingredients with a suitable stage.

Mode of administration- External and Internal use only.

Dosage of drug- The amount of drug was 30 ml in each container (giving the amount according by patients).

Drug indication- Joint swelling, joint pain and tenderness, unable to movements.

Drug Reference- Siddha Traditional Physician's Manuscript.

Literature survey

Ponnaiyah I, "Sekarasasekara Vaiththiyam" Provincial Department of Indigenous Medicine, North-East Province, Sri Lanka, 2000, pp. 115, 116, 217.

Ramanathan P, MD(s), 'Siddha Pharmacopoeia', All Sri Lankan Siddha Ayurveda Medical Officers' Union, Sri Lanka, 1st Edition-2000, pp. 118.

Ponnaiyah I, "Irupalai Seddiyar Vaiththiya Vilakam" Provincial Department of Indigenous Medicine, North-East Province, Sri Lanka, 2000, pp. 93,94.

Drug preparation

Ingredients: Traditional Method (in Tamil Manuscript of the Traditional Siddha Physician)-

- | | |
|--------------------|-----------------------------------|
| 1. Nannari | <i>Hemidesmus indicus</i> |
| 2. Koraikizhalanku | <i>Cyperus rotundus</i> |
| 3. Illamichai | <i>Andropogon muricatus</i> |
| 4. Veddiver | <i>Vetiveria zizanioides</i> |
| 5. Sittamati | <i>Sida cordifolia</i> |
| 6. Peramatti | <i>Pavonia odorata</i> |
| 7. Santanam | <i>Santalum album</i> Per 1/8 lb |
| 8. Sittarathai | <i>Alpinia officinarum</i> L |
| 9. Perarathai | <i>Alpinia galangal</i> (Greater) |
| 1. Devadaru | <i>Cedrusdeodara</i> L |
| 2. Pachai | <i>Pogostemon heyneanus</i> |
| 3. Katcholam | <i>Kaempferia galanga</i> |
| 4. Jatamanjil | <i>Nardostachys jatamansi</i> |
| 5. Maramanjil | <i>Coscinium fenestratum</i> L |
| 6. Manjesti | <i>Rubia cordifolia</i> |
| 7. Iruveli | <i>Elettaria cardamum</i> |
| 8. Sittelam | <i>Cinnamomum zeylanicum</i> |
| 9. Illavangam | <i>Syzygium aromaticum</i> |
| 10. Velluthal | Gum Resin |

11. Kottam	<i>Saussurea lappa</i>	
12. Sen santhanam	<i>Pterocarpus santalinus</i>	
13. Sathakuppai	<i>Anethum graveolens</i>	Per 05
	Kalangu (25g)	
14. Inthuppu	– 01 lb Rock Salt	
15. Thaalankaai saru	– 05 Padi. <i>Pandanus</i>	
	<i>odoratissimus</i>	
16. Cow's milk	15 Bottles	
17. Sesame Oil	48 Bottles <i>Sesamum indicum</i>	

prepared oil with stage (wax stage of the precipitated materials). A suitable stage (after the boiled of the gingili oil) mixed with powder of the rock salt ^[5-7]. After that oil became cool slowly that hot filtered with a cloth, which cloth contained flower of the *Thaalankaai* (Screw pine). After these all procedures, we got final research drug- Thaalankaai Oil.

RESULTS

The results showed as list of all ingredients of Thaalankaai oil then compared of selected five recipes of Thaalankaai Oil. The modern qualitative parameter analysis of Thaalankaai oil- research samples such as; Taste, Colour and Light transparent test results of three samples in tabulated way of data presentation. Table 1 result showed List of 31 ingredients of Thaalankaai Oil, in this table mentioned as; Family, which belongs of the plants, Vernacular Names such as, Sinhala, Sanskrit and English and Taxonomy of the plants.

Method of drug preparation- Made the powdered and prepared decoction of above 01 to 22 herbal ingredients in normal method and filtered also then after this decoction mixed with an extract from the main ingredient *thaalankaai* (Screw Pine), cow's milk and sesame oil (Gingili oil) then heated and made final

Table 1: List of ingredients of Thaalankaai Oil with their family, Vernacular Names and Taxonomy

S.No	Botanical Name	Family	Sinhala	Sanskrit	English	Taxonomy
1	<i>Hemidesmus indicus</i>	Periplocaceae	Iramusu	Sariva	Sarasaparilla	Climber
2	<i>Cyperus rotundus</i>	Cyperaceae	Kalanduru	Mustaka	Nut grass	Herb
3	<i>Andropogon muricatus</i>	Poaceae	Savanthara	Usirah	Khus-khus	Herb
4	<i>Vetiveria zizanioides</i>	Lamiaceae	Vetiveriya	Suganthimulah	Vetiver	Herb
5	<i>Sida cordifolia</i>	Malvaceae	Sulububabila	Bala	Country Malow	Herb
6	<i>Pavonia odorata</i>	Malvaceae	Suwndabebila	Hribera	Great Malow	Herb
7	<i>Alpinia officinarum</i> L	Zingiberaceae	Heen Aratha	Rasana	Lesser Galanga	Herb
8	<i>Alpinia galanga</i> (Greater)	Zingiberaceae	Aratha	Maha Rasana	Greater Galanga	Herb
9	<i>Cedrus deodara</i> L	Coniferae	Devadara	Devadaru	Deodar	Tree
10	<i>Pogostemon heyneanus</i>	Lamiaceae	Kollankola	Thamalpatra	Pacholai	Herb
11	<i>Kaempferia galanga</i>	Zingiberaceae	Ingurupiyali	Chandramula	Candramula	Herb
12	<i>Curcuma longa</i> L	Zingiberaceae	Kaha	Haridra	Tumeric	Herb
13	<i>Saussurea lappa</i>	Asteraceae	Suwandakotang	Kustha	Coctus	Herb
14	<i>Santalum album</i>	Santalaceae	Suduhandun	Chandana	Sandal	Tree
15	<i>Anethum</i>	Apiaceae	Sathakuppa	Satapuspa	Dill	Herb

<i>graveolens</i>						
16	<i>Elettaria cardamum</i>	Zingiberaceae	Enasal	Ela	Cardamom	Herb
17	<i>Glycyrrhiza glabra</i>	Fabaceae	Welmee	Yashtimadhu	Liquorice	Herb
18	<i>Coleus vetiverioides</i>	Lamiaceae	Iriveriya	Valakan	Wild lavender	Herb
19	<i>Rubia cordifolia</i>	Rubiaceae	Welmadata	Manjistha	Indian Madder	Herb
20	Narumpisin – <i>Gardenia crameri</i>	Rubiaceae	Kola langada	Galis	Galis resin	Tree
21	<i>Cinnamomum zeylanicum</i>	Lauraceae	Kurundu	Tvaka	Cinnamom	Tree
22	Rock Salt	Mineral	Sayanthalunu	Sayandalavana	Rock Salt	Salt
23	<i>Nardostachys jatamansi</i>	Valerianaceae	Jatamansa	Jatamansi	Spikenard	Herb
24	<i>Coscinium fenestratum</i> L	Menispermaceae	Weniwel	Daruharidra	Tree Turmeric	Wooden Climber
25	Karuda Pachchai	Mineral	Krom mica	Vissudha	Fuchsite	Mineral
26	<i>Pandanus odoratissimus</i>	Pandanaceae	Mudukeiya	Ketaki	Screw-pine	Shrub
27	<i>Solanum trilobatum</i>	Solanaceae	Wel Thibbatu	Alarka	Climbing Brinjal	Shrub
28	<i>Holaria antidysentrica</i>	Apocynaceae	Idda	Kutaja	Milk wart	Tree
29	<i>Cleodentrum seratum</i>	Verbanaceae	Kanhenda	Bharngi	Bharangi	Tree
30	Cow's Milk	Animal Product	Elakiri	Sheera	Cow's Milk	Animal product
31	<i>Sesamum indicum</i>	Pedaliaceae	Thala	Tila	Gingelly	Herb

Table 2 result shows as compared of selected each recipes of Thaalankai Oil, the recipes are mention as follows; Sample 1- Traditional Physician's method. (Dr. P. Ponniah), 2-Siddha Pharmacopoeia by Dr. P. Ramanathan, 3- Eddu Vaithiyam, 4- Irupalai Seddiyar

Vaithiya Vilakam, 5-Sekarasasekara Vaithiyam. Total ingredients of thazhankkaai oil in order to Sample 2–26 ingredients, Sample 4–24 ingredients, Sample 1–23 ingredients, Sample 5–22 ingredients and Sample 3–21 ingredients.

Table 2: Compare of each recipes of Thaalankai Oil (highlighted column is Research Drug)

S.No	Ingredients – Botanical Names ^[20]	Recipe 1	Recipe 2	Recipe 3	Recipe 4	Recipe 5
1	<i>Hemidesmus indicus</i>	√	√	√	√	√
2	<i>Cyperus rotundus</i>	√	√	√	√	√
3	<i>Andropogon muricatus</i>	√	√	√	√	√
4	<i>Vetiveria zizanioides</i>	√	√	√	-	√
5	<i>Sida cordifolia</i>	√	√	√	√	√
6	<i>Pavonia odorata</i>	√	√	√	√	√
7	<i>Alpinia officinarum</i> L	√	√	-	-	√
8	<i>Alpinia galanga</i> (Greater)	√	√	-	-	√

9	<i>Cedrus deodara</i> L	√	√	√	√	√
10	<i>Pogostemon heyneanus</i>	√	√	√	-	√
11	<i>Kaempferia galanga</i>	√	√	√	√	√
12	<i>Curcuma longa</i> L	√	-	-	√	-
13	<i>Saussurea lappa</i>	√	√	√	-	√
14	<i>Santalum album</i>	√	√	√	√	√
15	<i>Anethum graveolens</i>	√	√	√	√	√
16	<i>Elettaria cardamum</i>	√	√	√	-	√
17	<i>Glycyrrhiza glabra</i>	√	-	√	√	√
18	<i>Coleus vetiverioides</i>	-	√	-	√	-
19	<i>Rubia cordifolia</i>	-	√	-	-	-
20	Narumpisin - Galis	-	√	√	√	√
21	<i>Cinnamomum zeylanicum</i>	-	√	-	√	-
22	Rock Salt	√	√	√	√	√
23	<i>Nardostachys jatamansi</i>	√	√	√	√	√
24	<i>Coscinium fenestratum</i> L	√	√	√	-	-
25	<i>Psterocarpus santalinus</i>	-	√	-	-	-
26	<i>Pandanus odoratissimus</i>	√	√	√	√	√
27	Animal Product	√	√	√	√	√
28	<i>Sesamum indicum</i>	√	√	√	√	√
29	<i>Solanam trilobatum</i>	-	-	-	√	-
30	<i>Holaria antidysentrica</i>	-	-	-	√	-
31	<i>Cleodentrum seratum</i>	-	-	-	√	-
	Total	23	26	21	24	22

Above recipes are mentioned as follows- 1- Traditional Physician’s method. (Dr. P. Ponniah), 2- Siddha Pharmacopoeia by Dr. P. Ramanathan, 3- Eddu Vaithiyam, 4- Irupalai Seddiyar Vaithiya Vilakam, 5- Sekarasasekara Vaithiyam

Comparison of the Thaalankaai Oil Samples, which are available in Jaffna district, Sri Lanka

Sample No: I- Traditional Physician’s Sample.
 Sample No: II- Prepared by Municipal Council product.
 Sample No: III- Prepared by Drug Manufacturing Unit of Provincial Department of Indigenous Medicine, Northern Province.

Modern Qualitative parameter test

Result of Table 3 shows as modern qualitative parameter test of research samples such as; Taste, Colour and Light transparent test [19] results of three samples. Taste of 3 samples was Sweet. Colour of 3 samples was Dark Brown. Light transparent test showed as sample-I was Red, sample-II was yellow and sample-III was dark yellow respectively.

Table 3: Modern qualitative parameter test of research samples

Samples	Taste	Colour	Light transparent
Samples I	Sweet	Dark Brown	Red
Samples II	Sweet	Dark Brown	Yellow
Samples III	Sweet	Dark Brown	Dark yellow

Light Transparent test of three Samples to compare with research drug shows in Fig. 1 Sample No: I- Traditional Physician’s Sample. Sample No: II - Prepared by Municipal Council product. Sample No: III- Prepared by Drug Manufacturing Unit of Provincial Department of Indigenous Medicine, Northern Province.

Light transparent test of selected oils

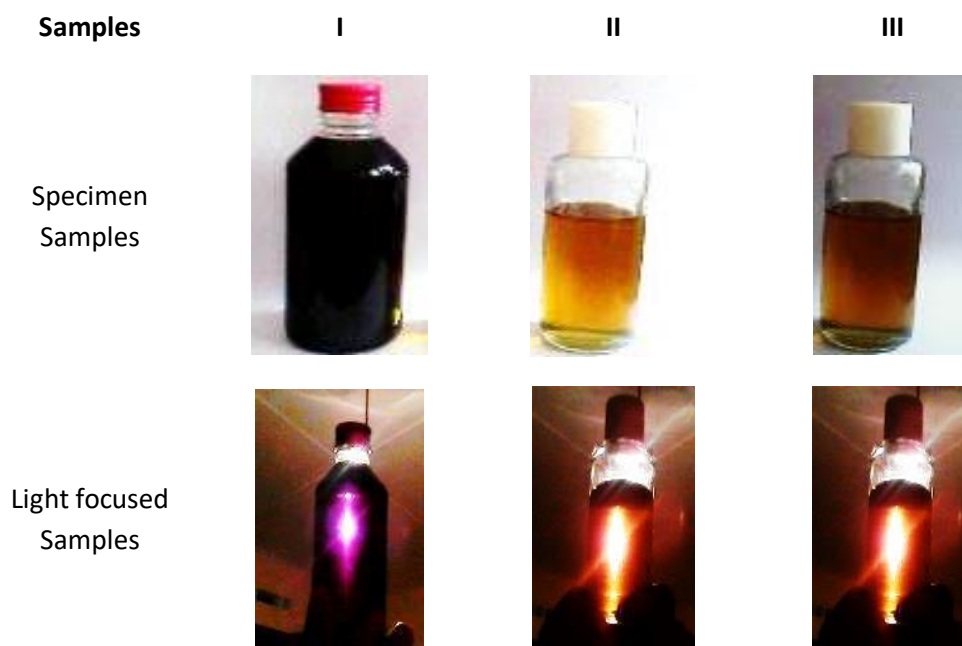


Fig. 1: Light Transparent test of Samples

DISCUSSION

According to the results, this study was clearly explained that the comparative study of the research drug- Thaalankaai Oil. There were 05 types of thaalankaai oil such as Traditional Physician's method. (Dr. P. Ponniah), Siddha Pharmacopoeia by Dr. P. Ramanathan [6] Eddu Vaithiyam [8] Irupalai Seddiyar Vaithiya Vilakam [4] and Sekarasasekara Vaithiyam [5], which are available in Jaffna District, Sri Lanka which, ingredients compare with simple statistical way.

Theraiyar Maha Karisal [10] Theraiyar seharappa [11] Theraiyar Vaidhya Kaviyam [12] were notified as tastes related treatment concepts for vata diseases, which is matching with this research drug's ingredients proportion of taste as organoleptic characters [13,17]. All Thaalankaai Oil Samples were codes as; Sample No: I- Traditional Physician's Sample. Sample No: II- Prepared by Municipal Council product. Sample No: III- Prepared by Drug Manufacturing Unit of Provincial Department of Indigenous Medicine, Northern Province.

Results explained as, Sweet 22.22%, Salt- 03.7%, Pungent- 25.9%, Bitter- 33.33%, Astringent- 14.8% in tastes; Cool- 33.33%, Hot- 62.96% in potency; and Sweet- 33.33%, pungent- 62.96% in bioavailability of ingredients.

These samples included Organoleptic tests such as taste, naked eye colour and colour in Light transparent test. In this simple qualitative analysis showed as; all samples

were Sweet in taste and Dark Brown in colour on naked-eye observation. But differed in colour in Light transparent test such as; Samples I was Red, Samples II was Yellow and Samples III was Dark yellow appears in Fig. 1. These type of qualitative compares also used as standardization of the poly herbal drugs. [14,16]

According to the compare of Physical Characters and ingredients of selected thaalankai oils revealed as sample I was better than other samples therefore, this research identified the traditional physician's sample was better than other preparations to effective of management to vata diseases by the text references of Agasthiyar Addavanai Vaagadam [15] and Sikhitcha Rathna Deepam [18].

This research oil- Thaalankaai Oil had good collection of anti vata properties in action wise [7,21,22]. According to the pharmacological action of the ingredients' of research Oil, the total number of ingredients are; Antispasmodic- 04, Carminative-04 Refrigerant- 04, Stimulant- 03 Stomachic- 03, Blood purifier- 02, Febrifuge- 02, Demulcent- 01, Diuretic- 01, Laxative- 01 and Alterative- 01 [23-27]. In finally conclude for traditionally prepared thalankaai ennai is good for vata rogam in scientifically identified best Siddha poly herbal formula thalankaai oil is most effective to joint diseases.

CONCLUSIONS

This research Results explained as, Bitter (33.33%) was higher than other tastes; Hot (62.96%) was in potency; and Pungent (62.96%) was in bioavailability of ingredients. Vata is control and equilibrium with other doshas. But considered as taste; sweet, salt as same with pungent but the amount of ingredients also effects into the efficacy therefore Sweet taste become high in the amount of the final oil so, this is a good effect to Vata diseases. In finally concluded for Thaalankaai oil is good for Vata rogam in scientifically identified best Siddha poly herbal formula.

In this manner, siddha medical system mentioned preparations are very effective for particular indications therefore, suggested future expectation of this research as; modern research on characterizations and clinical trials are very essential to world health care system This host response medical system revealed by modern scientific techniques in future.

ACKNOWLEDGMENTS

This research Results explained as, Bitter (33.33%) was higher than other tastes; Hot (62.96%) was in potency; and Pungent (62.96%) was in bioavailability of ingredients. Vata is control and equilibrium with other doshas. But considered as taste; sweet, salt as same with pungent but the amount of ingredients also effects into the efficacy therefore Sweet taste become high in the amount of the final oil so, this is a good effect to Vata diseases. In finally concluded for Thaalankaai oil is good for Vata rogam in scientifically identified best Siddha poly herbal formula.

In this manner, siddha medical system mentioned preparations are very effective for particular indications therefore, suggested future expectation of this research as; modern research on characterizations and clinical trials are very essential to world health care system This host response medical system revealed by modern scientific techniques in future.

CONTRIBUTION OF AUTHORS

One author is only contributed in this article.

REFERENCES

- [1] Anonymous. Indian Siddha Pharmacopoea, Ministry of AYUSH, Part-II, Vol.1, 2010; pp. 146.
- [2] Anonymous. Protocol for Testing: Ayurvedic, Siddha & Unani Medicines. Pharmaceutical Laboratory for

Indian Medicine (PLIM), Ghaziabad, 2007; pp. 98-101, 109,137-45.

- [3] Anonymous. Indian pharmacopoeia (IP). Govt. of India, Ministry of Health and Family Welfare. The Controller of Publications, New Delhi, 1996; A-47, A-53, 54.
- [4] Ponnaiyah I. "Irupalai Seddiyar Vaiththiya Vilakam" Provincial Department of Indigenous Medicine, North-East Province, Sri Lanka, 2000; pp. 93-94.
- [5] Ponnaiyah I. "Sekarasasekara vaiththiyam" Provincial Department of Indigenous Medicine, North-East Province, Sri Lanka, 2000; pp. 115, 116, 217.
- [6] Ramanathan P. 'Siddha Pharmacopoeia', All Sri Lankan Siddha Ayurveda Medical Officers' Union, Sri Lanka, 1st Edition-2000; pp. 102.
- [7] Srikantha A. "Treatise on Ayurveda", Vijitha Yapa publication, Sri Lanka, 1st edition- July, 2004.
- [8] Anonymous. *Edduvaidyam*, Department of Ayurveda, Sri Lanka, First Edition, 1993.
- [9] Anonymous. Check list of Medicinal Plants in Sri Lanka, Department of Ayurveda, 2008.
- [10] Anonymous. Theraiyar Maha Karisal, Department of Indian Medicine & Homeopathy, Chennai, 2012; pp. 600.
- [11] Anonymous. Theraiyar seharappa, 2nd edition, Siddha Maruthuva Maiya Aaraichi Niruvanam, New Delhi, 2003.
- [12] Anonymous. Theraiyar Vaidhya Kaviyam, Department of Indian Medicine & Homeopathy, Chennai, 2012; pp. 600.
- [13] Anonymous. WHO Country Cooperation Strategy 2006-2011- Supplement on Traditional Medicine. New Delhi 2007; pp. 1-137.
- [14] Ansari SH. Essentials of Pharmacognosy, 1st edition, Birla publications, New Delhi, 2007; pp. 357-359, 588-90.
- [15] Arangarasan, Agasthiyar Addavanai Vaagadam, Saraswathi Mahal Noolakam, Thanjavur, Publication No: 323, First edition- 1991.
- [16] Aulton ME. Pharmaceutics, the Science of dosage forms design. Ed.2, Churchill Livingston, New Delhi, 2002; pp. 205-21.
- [17] Chapman JB, Hill JB. Phytochemical Methods, London 1973, Chennai-600 106, 2012.
- [18] Kannuswamy P. Sikhitcha RD, Ratna N & Sons, Chennai-79.



- [19] Khandelwal KR. Practical Pharmacognosy: Techniques and Experiments. Ed 14, Nirali Prakashan Pune, 2005, pp. 21-25, 149-55.
- [20] Kirtikar KR, Basu BD. Indian Medicinal Plants, volume III by Lalit Mohan Basu Publishers, Alahabad, 1993. Kokate CK. Practical Pharmacognosy, 4th Edition, Vallabh Prakashan, New Delhi, 1994.
- [21] Kuppusamy MKN, Uthammarayan KS, *Siddha Vaithiya thirattu*, Indian Medicine and Homeopathy, 3rd edition, 2006.
- [22] Kuppuswamy CN. Siddha Maruthuva Kalangiyam, Madras Government Oriental Series, no. LXXI, 1951.
- [23] Murugesamuthaliyar KS. "Gunapadam- Mooligai thokuppu" (1st Part), University of Indian Medicine, Madras- 600 106, 3rd Edition- 1936, pp. 09, 10, 36, 37, 383, 384, 385, and 386.
- [24] Quality Control Methods for Medicinal Plants Materials. Geneva. World Health Organization, 1998; pp. 1-115.
- [25] Shanmukavelu M. "Siddha maruthuva Noinadal NoimuthalInadal thirattu" part-I, Department of Indian Medicine-Homeopathy Section, Chennai-600 106, pp. 252-54.
- [26] Thiyagarajan R. "Gunapadam- Thadu Jeeva Vakuppu" (2nd& 3rd Part), Indian Medicine, Department of Homeopathy, Madras- 600 106, 2nd Edition, 2003; pp. 743.

Open Access Policy:

Authors/Contributors are responsible for originality, contents, correct references, and ethical issues. SSR-IJLS publishes all articles under Creative Commons Attribution- Non-Commercial 4.0 International License (CC BY-NC). <https://creativecommons.org/licenses/by-nc/4.0/legalcode>

