SCIENTIFIC EVALUATION OF SANGAM LITERATURE CONCEPT OF THINAIGAL (LANDSCAPES) IN TERMS OF DISEASE PREVALENCE AND THE PHARMACOLOGICAL ACTION OF THEIR CHIEF FLORA

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ABSTRACT
The classical Tamil literature known as Sangam literature was engraved on palm leaves and dates back to the period between 300BC and 300 AD. These works were written in ancient Tamil and were composed as hymns, ballads, erotic verses and lyrics. They graphically portray the life, health status and civilization under the Chera, Chola and Pandiya dynasties during the early centuries. Presently, the medical research methodology includes epidemiological studies to assess the distribution and determinants of health and disease in defined population. Upon careful analysis of Sangam literature, it is fascinating to explore that the ancient Tamil culture has also provided such epidemiological knowledge of disease prevalence along with the management of diseases through their distinctive concept of Thinaigal (Landscapes). While today’s modern world is globally concerned with improving the moribund health status of the population, the concept of Thinaigal (Landscapes) has provided the terrain, the fauna and flora, health status and medicinal value of their flora of five major landscapes (Iynthinaigal) namely Kurinji, Mullai, Marutham, Neithal and Palai. These landscapes were named after the chief herbs growing in that region. Therefore this review work evaluates the traditional claims of these geographical landscapes, in terms of...
disease prevalence pertaining to the landscapes (Thinaigal) and the geographical herbs for disease management in the light of recent scientific studies. This literature review has been made to highlight the public health approach that existed in ancient Tamil culture as a pioneer for epidemiological studies of modern era and to appraise the contribution of geographical herbs towards improving the health status of the country.

**Keywords:** Landscapes, Kurinji, Mullai, Marutham, Neithal, Palai, Tamil culture

1. INTRODUCTION

The *Sangam* period is considered by many to have been the golden period of Tamil literature. According to Tamil scholars’ poems on Akam (romance) and Puram (external life) which started as an oral tradition were gathered into anthologies and colophons were added some two hundred years later. Commentaries about Sangam period were written around the thirteenth and fourteenth centuries and they went through further revisions and additions during the 19th century. The thinai are not inevitably distinct landscapes but they can also be understood as lively biological environment that has cyclically developed, due to natural forces or human civilization. As a result, the mountain ranges (kurinci) and the hillsides get converted into paddy fields (marutam), and arid plains (palai) revert to woodlands (mullai) with the onset of rains and these landscapes may turn out to dry lands (palai) The language of this poetic collection is formalized and standerized. The entire corpus of this classical poetry is composed in ten volumes of longer poems, Pattuppattu (Ten Idylls) and eight volumes of short poems in Ettuthogai (EightAnthologies)¹.

The Sangam literature of tamil culture categorizes the ancient landscape of Tamil Nadu into five geographical regions called Thinaigal. These are described in Classical Tamil poetries that portray the human experiences, socio-economic order, and occupations, Deities of worship, musical instruments and also romantic connotations of each landscape. According to Siddha system the natural ability of the body known as "Thega vanamai" depends on genetic trait, season, age, sex etc. and the ability of individual changes with the changing seasons (Kala vanmai). Terrain (Thinai) or the ecological area also influences the acquired ability of the body which varies according to the diet, physical activity and thought². Besides these facts, the traditional Siddha literature portrays human life blending with the natural forces (air, water, fire, space and earth) called as Panchabootham. The Siddha concept
"Andathil ullathey pindam" (That which exist in macrocosm-universe, exist in microcosm, human body) provides the association of three humours vatham, pitham and kabam with panchaboothams. Any alterations of these humours in the human body is said to be the cause of human ailments and for the survival of microorganisms in the human body.

2. MATERIALS AND METHODS
This literature review primarily involved various traditional literary search that consisted of Siddha classical literature such as Siddha maruthuvanga surukkam, Siddha maruthuva Noi naadal, Gunapaadam mooligai vaguppu, Agathiyar Gunavagadam along with recent researches and publications using search engines like Google scholar, Pubmed, Elsievier, EMBASE, Scopus and Index Copernicus. This literary search involved careful parallel analysis of both ancient Tamil literature and research publications.

3. LITERARY EVIDENCES ON SANGAM CLASSIFICATON OF LANDSCAPES
The ancient Siddhars had lucidly described the diet and lifestyle to be followed in each of the geographical landscapes according to the prevalent humours and predictable diseases. In this article the literature evidences about the humours, diseases and chief flora of each thinai (landscape) mentioned in Sangam literature and Siddha literature are evaluated scientifically so as to obtain a better understanding about the ancient wisdom of Sangam poems in lieu with Siddha medicinal concepts for the purpose of healthy living and also for the prevention and management of diseases. Theriyar karisal an ancient literature describes the humoural alterations in the following poem as follows

"Ulam meeli manuva manthiri
Uthalaridam uravey umbaranidam sonmoovar
Ungula vonnaathathey umaiyidama mathai unchonaathu".

Here ulam denotes Kurinji land and meeli denotes predominant Kabam humour. Manuva denotes neithal (Coastal) Proned for man (Vatha diseases) Manthiri Uthalaridam - Mullai (forest land) prone for Manthiri (Pitham) Umbaranidam sonmuvar ungula vonnaathathey - Marutha nilam (Agricultural land) is not prone for Vatham, pitham and kabam diseases. umaiyidama mathai unchonaathu- Palai (dry land ) is not fit for any growth which denotes derrangement of all the three humours (Table-1).
### Table 1

**Humoural concept of Landscapes and predictable diseases**

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Habitat</th>
<th>Geographical description</th>
<th>Prevalent diseases</th>
<th>Dominant humour</th>
<th>Cheif flower (Tamil Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kurinchi</td>
<td>Mountain land</td>
<td>Respiratory diseases, Allergic skin diseases, Fevers which mainly affect the hematopoietic system(Rathathai urinjum)</td>
<td>Kabam</td>
<td>Kurinchi(Strobilanthes kunthiana)</td>
</tr>
<tr>
<td>2.</td>
<td>Mullai</td>
<td>Forest land</td>
<td>Vatha diseases (diseases affecting joints and nerves)</td>
<td>Pitham</td>
<td>Mullai (Jasminum auriculatum)</td>
</tr>
<tr>
<td>3.</td>
<td>Marutham</td>
<td>Agricultural land</td>
<td>Suitable land for living</td>
<td>All the three humours are in balanced state</td>
<td>Marutham (Terminalia arjuna)</td>
</tr>
<tr>
<td>4.</td>
<td>Neithal</td>
<td>Coastal land</td>
<td>Severe forms of vatha diseases, swelling of liver, intestinal diseases.</td>
<td>Vatham</td>
<td>Neithal (Nymphae stellata)</td>
</tr>
<tr>
<td>5.</td>
<td>Palai</td>
<td>Dry land</td>
<td>All kinds of diseases</td>
<td>All the humours are deranged</td>
<td>Palai (Wrightia tinctoria)</td>
</tr>
</tbody>
</table>

### 3.1 Landscapes and Scientific evaluation of Sangam herbs

#### 3.1.1. Kurinchi - Hills
This tinai is named after the chief flower of the hill region kurinci (Strobilanthes kunthiana). The poems pertaining to this tinai repeatedly invoke the beauty of the mountain region. This is a “glorious hill country”, home to elk, deer, elephants, mountain sheep, monkeys, peacocks, and regrets. The heights of the mountains are described as "soaring high over whose high peaks the clouds meekly crawl", surrounded by "swiftly flowing silver streams which roar down from lofty peaks" and the liveliness of animals fills this landscape with energy and vigor that is not seen in the other tinai. The extreme cold climatic conditions and heavy rainfalls may account for the predominant Kabam humour in these regions resulting in respiratory diseases (Irimal, manthara kasam, elai, swasa kasam), Skin allergies (Karappaan), Anemia (Pandu), edema (sobai), Hepatitits (Kamalai). The specific symptoms of Kurinji landscape is mentioned as follows

"Kurunji varunilathirku kotramundi
ratham urinji varusuramundaam- Arignarai
kaiyamey thangu tharathamai vallaiyun kathikum
Iyamey thangum ari."

Ratham urinji varum suram means fevers affecting the hemopoetic system. It is also mentioned to provoke abdominal mass (Aamai katti) which may be due to the complications of vector borne fevers resulting in hepatomegaly or splenomegaly. Respiratory infections, Arthropod born infections - Rickettsia pox, Rocky mountain spotted fever, Indian tick typhus, scrub typhus. The Nilgiri hills provides favourable ecological conditions for the propagation of haematophagous arthropods due to its richness in vegetation and animal fauna. Abdominal mass may also be due to latent amoebiasis is common at high altitude causing liver abscess. The last line mentions the presence of long standing respiratory illnesses (Iyam thangum). Upon analysing the texts the flora of Kurinji landscape not only beautifies the environment but is also found to alleviate the kurinji related ailments that are caused due to increased Kabam humour. Recent research analysis of high altitude diseases surveys revealed that though the same pathogens are prevalent in the surrounding lowlands, but various factors such as Immunomodulation, hypoxia, physiological adaptation, and harsh environmental stressors enhance the susceptibility to these pathogens.

3.1.2. Kurinchi (Strobilanthes kunthiana) flower general characteristics

Ullathor kurinji thannaal odumey kiranthi vaayvu
Mellavey karapaan vangu miguvisa paagam kunnam
According to this poem Kurinji is indicated for skin diseases like scabies, eczema, urticaria, (vangu, karapaan, sori), hemolytic anemia (Visapandu), Ulcer and pain (Kunmam, vayu), Kirumi noigal (Microbial infections), Piosonous bites (visam), perumbadu (menorrhagia), irumal, singu noi (respiratory diseases like cough and asthma).

3.1.3. Pharmacological aspects of Kurinji

*Strobilanthes kunthiana* is a shrub found in the western ghats of South India. The genus strobilanthes belongs to Acanthacea and consist of 350 species of which 150 belong to Indian subcontinent. It mass blooms once every 12 years, covering the hillsides with its blue blossoms, thus the name “Nil-giri” (Blue Mountains)\(^8,9\). Preliminary Phytochemical screening of successive extracts indicated the presence of Flavanoids, Saponins, Tannins, Carbohydrates, Terpenoids and Steroids in *Strobilanthes kunthiana* leaves\(^10\). These secondary metabolites have been important source of natural antioxidants that have been shown to reduce the risk and progression of certain acute and chronic diseases such as cancer, heart diseases by scavenging free radicals which are implicated in the pathogenesis of many diseases. Another species of Strobilanthes called S.ciliatus has been found to have anti-inflammatory, analgesic, antimicrobial, antidiabetic and hepatoprotective action due to the presence of major phytoconstituent called Lupeol, besides stigmasterol, betulin etc.\(^11\). *In-vitro* anti-inflammatory and anti-osteoarthritic effects of ethanolic extracts of *Strobilantheskunthianus* and *Strobilanthes cuspidatus* was studied using ‘Human RBC membrane stabilizationmethod’ and ‘Rabbit cartilage explants culture method’ respectively. Shallaki (50 \(\mu\)g/ml), Diclofenac (50 \(\mu\)g/ml) and Celecoxib (50 \(\mu\)g/ml) were used as reference drugs for comparison. The resultsrevealed that both SKE and SCE have anti-inflammatory and anti-osteoarthritic activity. Moreover, the extracts showed equipotent activity to Diclofenac and higher activity than Shallaki\(^12\).

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*Thallumey uthirakattu thaguvisam paandu rogam*

*villumey megasudu villavidan odum thaney*

*Kolkodi kurinji thannaal kooriya gunathai kelu*

*vil visabaagam sogai kirumi noi kiranthi vangu*

*Alliya sorikarappaan agandridum uthira kotti*

*Thelliya irumal singu noyathum agalum andrey*
3.2. Mullai – Forests

The Mullai, is usually portrayed as a landscape of renewal and rejuvenation with green, calm and serene undertones and speaks of quiet hope and grace. In other sense, Mullai is the antithesis of the palai. Unlike the energetic and animated kurinji, the Mullai, with its calm and its trees are in their full glory, bursting with flowers. Though it is a blooming land with fragrant flowers, the crowning glory among them is the Mullai or jasmin after which the region is named. Its fragrant starry flowers is the “mirror the beauty of the rudy evening sky”1

"Mullai nilathayamey moorinirai meninumav
Vellai nilaihapitha mengurungan -vallai yenin
Vathamozhi yathathanun mannu mavaivazhinoi
Pethamozhi yaatharaiya pinbu"2

The above poem describes the associated animal life in the land with Pitham related diseases, vallai noi (Liver disorders) and also vatham related diseases such as Asthi suram (fever with bone pain), jaundice(kamalai), Anemia (Pandu), edema (Oothal) and arthritis and inflammations( Peruvaatham)2 The Crowding and the assimilation of inhabitants of forest, domestic animals and wildlife, along with a warm humid climate, were as superlative for evolution, survival and transmission of pathogen several millennia ago as they are now. The most prominent forest-associated diseases are viral diseases such as (Dengue, Chickunguinea,ebola, yellow fever), Protozoal infections such as malaria, filariasis, Bacterial diseases such as Lymes disease and leptosporosis.13 The predominance of pitha humour in this landscape favours the nsurvival of these organisms resulting in vector borne diseases.

3.2.1. Pharmacological aspects of Mullai (Jasminum Sambac )

Boga miga vundagum pongukabangat bramai
Aagavanal sooniyamum andumo-paaganaiyai
mannu thiruvasiyam vaiykum soodendevarum
panni malligai poovaar paar13
The poem describes the characteristic of flower as aphrodisiac as mullai is the land renowned for romantic union. It also reveals the coolent properties to pacify the aggravated pitham. Also the Siddha materia medica describes the suvai (taste) of this plant as Kaippu (Bitter) which pacifies Pitham.

*Jasminum Sambac* Linn. (Family-Oleaceae) commonly known as jasmine is a sub-erect shrub with young pubescent branches, white, very fragrant flowers cultivated nearly throughout the tropical and subtropical parts of the world. The presence of saponins, flavonoids such as quercetin are the chief chemical constituent justifying the antioxidant, antidiabetic, anticancer and antilipidemic therapeutic potential. It also possess significant hepatoprotective effect. Traditionally, the leaves and roots of the plant are used towards the treatment of inflammation, fever and pain. The leaves of the plant have been reported to possess significant anti-inflammatory and analgesic activities. Different species of *Jasminum* like *Jasminum grandiflorum*, *Jasminum aungustifolium*, *Jasminum sambac* wild variety, *Jasminum auriculatum*, *Jasminum humile* and *Jasminum officinale* were found to have antibacterial activity against selected human pathogens viz., *E.coli*, *Bacillus* sp., *Streptococcus* sp., *Salmonella* sp., *Pseudomonas* sp., *Serratia marcescens*, *Klebsiella pneumonia* and *Staphylococcus aureus*. The study confirms the anti-inflammatory, analgesic and antipyretic activity of EJS which may be attributed to the presence of various phytoconstituents quantified especially hesperidin which have already been reported for its significant role in the treatment of inflammation and associated problems.

### 3.3. Marutham- Pastoral/Agricultural land

Marutham is a renowned for agriculture which is identified with the presence of Marutham tree (*Terminalia arjuna*) commonly known as Indian Laurel. The Sangam texts illustrates that this region is invariably surrounded by green fields, minor dams (sirai), fresh water ponds (urinir) indicating the availability of plenty of water in this region. as indicatd in the poem as. ...

*where hill paddy, planted on cloud-veiled slopes, is nurtured by mountain streams.*

The Marutham tree (Terminalia arjuna) is depicted to grow chiefly along the river banks. Also "Marutham" that is mentioned in sangam literature seem to signify *Lagerstroemia flos-reginae* as the blooming beauty of flowers have been described in literature rather than *Terminalia arjuna* flower which is unlike that which is mentioned in literature.
3.3.1. General characteristics of Marutham

Maruthanilam naneer valamondrai kondey
Pouthanil maathiya noi pokkum- Karuthanila
Thaariratham soozha arunthuvarendrar piniyel
lerirathan choozhpuvikku

The above poem says that the good source of water (Nanner valam) in this region provides a healthy environment and solely owes in the prevention of vatham, pitham and kabam related diseases. Recent researches also reveal that water resources constitute one of the chief sources for healthy living. There are numerous diseases relating to unsafe water sources and agricultural methods involving disease vectors. Inadequacies in water supply affect health adversely both directly and indirectly. An inadequate water supply also prevents good sanitation and hygiene. Consequently, improvements in various aspects of water supply represent important opportunities to enhance public health.

Water is a basic nutrient of the human body and is critical to human life. It supports the digestion of food, adsorption, transportation and use of nutrients and the elimination of toxins and wastes from the body. Poor water facility and low socioeconomic conditions have been associated with Infectious skin diseases and for incidence of transmissible skin disease. Calcium and magnesium content present in hard water is found to be associated with nephrolithiasis. The true epidemiologic significance of the relationship between water hardness and cardiovascular diseases has yet to be assessed. Worm infestations and parasitic infections are caused by aquatic organisms that spend part of their lifecycle in water and another part in animals. Water based infections increases on stagnant water. Water scarce disease such as leprosy, tuberculosis, whooping cough, trachoma, tetanus, diphtheria thrives in conditions where there is scarcity of fresh water and sanitation is poor. Hence adequate fresh and clean water play an important role in disease prevention and promoting good health.

3.3.2. Pharmacological aspects of Marutham (Terminalia arjuna)

The species is commonly found and planted along the banks of rivers, streams, old irrigation channels, edges of tank bunds and alluvial bars in seasonally dry water courses, helping to reduce soil erosion on the banks through its root-mass. It is usually used in agro and social forestry for reclamation of saline, alkaline soils and deep ravines. It is also planted near wells as roots of T. arjuna are believed to purify and cool the water in the wells. The bark has been described as an astringent, demulcent, expectorant, cardiotonic, styptic,
antidysenteric, urinary astringent, and has shown to be useful in fracture, ulcers, leukorrhea, diabetes, anemia, cardiopathy, and cirrhosis\textsuperscript{25}.

\textit{Lagerstroemia speciosa}

\textit{Lagerstroemia speciosa} (L.) Pers. (Lythraceae) has common names such as queen’s flower, queen of flowers, crepe myrtle and pride of India, which reflect its attractive and colourfull\textsuperscript{26} flowers. Triterpenes, tannins, ellagic acids, glycosides and flavones have been isolated from the leaves. Pharmacological properties of the species include antioxidant, antibacterial, antiviral, anti-inflammatory, antinociceptive, antidiarrhoeal, cytotoxic, xanthine oxidase inhibition, anti-obesity and anti-fibrotic activities. Several research studies have confirmed its antidiabetic activity\textsuperscript{27}.

\section*{3.4. \textit{Neithal} - Coastal land}

The \textit{Neythal} landscape derives its name from the water lily (\textit{Nymphae stellata}). Though \textit{Nymphae stellata} has different shades of blue and also reddish purple colour flowers, \textit{Neytal} is repeated in \textit{Kurinjipattu} as the poet wants to specifically denote the specific variety of \textit{Nymphae} that is pale blue in colour to denote the colour of the landscape. The seashore affords many examples of the compelling charm of Sangam poetry and the extraordinary freshness of its realism. The ancient texts vividly describes a picture of the life of the fisherfolk the nets and the odour of drying fish, cut into thick slices, which attracts the birds, beautiful village girls peering through the hedges of Pandanus, and the wind blowing through the cracks in the roughly constructed straw huts at night. The \textit{Neythal} is a landscape defined by the ocean, backwaters, mangroves, salt marshes and sand dunes, into coastal towns and fishing villages. This tinai is a recognition of the fact that most of the Tamil country resides “on the great ocean’s margin”\textsuperscript{1}.

\subsection*{3.4.1. General Characteristics of \textit{Neithal} land}

\textit{Neithanila meluppai neenga thurinum}

\textit{Veithanila methangu veedagum-Neithal}

\textit{Marungudalai mikaakum valluruppi veekum}

\textit{Karungudalai keezhirakkum kaan}\textsuperscript{2}

The above poem explains that the alkaline nature of the Neithal landscape due to salty water is the reason for vatha diseases like swelling of body (fluid retention), distension of liver and intestines. Recent studies suggest that direct exposure to beach sands is a risk factor for infectious disease, particularly in children. An epidemiological study found that
gastrointestinal (GI) illness in beach users was associated with exposure to water and intertidal sand. A separate epidemiological study found that digging in the sand was positively associated with GI illness and was associated with levels of faecal indicator organisms (FIO), enterococci. Public health risks from various pathogens bacteria, fungi, viruses, protozoa, helminths in beach sand, can transmit diseases by various exposure routes such as contact, ingestion, and inhalation. GI pathogens residing at these environments are recognized to be Salmonella, Shigella, verotoxin-producing E. coli, Campylobacter, Cryptosporidium, Cyclospora, Vibrio, Giardia, hepatitis A and Listeria. Cyanobacterial (blue green algal) toxins have been associated with gastrointestinal, neurotoxic, and hepatotoxic effects in animals and humans after skin contact with or consumption of contaminated water. Cyanobacteria are tumor-promoting and can induce kidney damage. The salinity level in drinking water was found to be higher in coastal areas and high blood pressure (prehypertension and hypertension) was found significantly associated with drinking water salinity. High salt intake has been associated with Helicobacter pylori infection, as promoter of damage of gastric mucosa, hypergastrinemia, and cell proliferation and stomach cancer. Salt is one of the major substrates contributing to total body fluid balance. High salt intake induces thirst and increased fluid intake that is then retained in the intravascular compartment. Dysregulations of renin–angiotensin–aldosterone axis and atrial natriuretic peptide leading to fluid retention.

3.4.2. Pharmacological aspects of Neithal (*Nymphae stellata*).

*Kannung kulirum akki kanaathu kanthupitham*

*Vayitru kaduppu ratham maarum neithalukku...*

According to the above poem, it can be clearly understood that the Chief Neithal flora *Nymphae stellata* alleviates dysentery and pitha diseases which can provoke infections and inflammations. This herb is also said to reduce the excessive thirst which is prevalent in Neithal land due to high salt intake. Recent researches on *Nymphae stellata* has been reported to possess Alkaloids, monoterpenes, sesquiterpenes, diterpenes, triterpenes, and rarely flavanones, acyl phloroglucides and steroids and it is proven to have Anti-diabetic, tumour inhibition, anti-hepatotoxic effect. The extract prevented necrosis of the liver and promoted to
some extent liver generation. Nymphayol, a steroid that is isolated from Nymphae species is found to reverse the damaged endocrine tissue and stimulates secretion of insulin in β-cells.\textsuperscript{34}

3.5. \textit{Palai - Dry land}

The desert is not a landscape type natural to Tamil Nadu. This is a temporary, seasonal landscape that occurs when one of the other regions suffers from extreme heat or drought. The 
\textit{palai} is portrayed as a lonely place, fraught with danger. The sun bears down incessantly, the land is parched, and the winds are hot and drying. Water is in the form of muddied puddles and dried-up pools that look like termite holes. Bare mountain tops shimmer in the scorching sun. The trees are withered or stunted. Any of the other four regions could be described as \textit{palai}: it is defined only by a lack of water. \textit{Palai} can occur within the mountains or within the forests.

3.5.1. General Characteristics of \textit{Paalai}

\textit{Paalai nilam pol padarai pirapikka}
\textit{Melainila miyathu viritharku- velai nila}
\textit{Muppinikum millam muraiye yavatrakalam}
\textit{Yeppinikum illam akthen}

The above poem says that Paalai nilam is the most contagious landscape for the origin of Vatham, pitham and kabam diseases.

The phenomenon known as desertification has received widespread attention recently with the diminution or destruction of the biological potential of the land, (which) can lead ultimately to desert-like conditions.\textsuperscript{35} Habitat fragmentation, whether caused by forest destruction, desertification, or land-use conversion, affects human and wildlife health and ecosystem processes. Evidence is mounting that deforestation and ecosystem changes have implications for the distribution of many other microorganisms and the health of human, domestic animal, and wildlife populations.\textsuperscript{36} High air temperatures can cause heat stroke and dehydration and affect people’s cardiovascular and nervous systems.

The ecology, development, behaviour, and survival of arthropod vectors and hosts such as plague, typhus, malaria, yellow fever, and dengue fever and the transmission dynamics of the diseases they transmit are strongly influenced by climatic factors.\textsuperscript{37} Extreme weather and
increased air pollutants are likely to aggravate chronic respiratory diseases. Heat-induced eczema breakout can result in the formation of puss-filled blisters on the skin as well as the reddening of the skin. Heat can also trigger inflammation and itching. Dry skin and sweating are two known triggers of eczema. When the skin gets dry, it cracks and wrinkles. These effects of heat on the skin are caused by water loss in skin cells as well as in the deep tissues of the skin. Dryness damages the skin and creates the ideal environment for pathogens and toxins to cause further damage to the skin.

3.5.2. Pharmacological aspects of Palai (Wrightia tinctoria)

Akkiniyai vaihirukkum maanthar vatham pokkum
Thikku thirithodam pokkividum...

The above poem describes the curative potential of Wrightia tinctoria in alleviating Vatham, Pitham and Kabam. Moreover Vetpalai seeds have been indicated in Siddha literature Gunapaadam to reduce Pitham, Vatham, Karappan (Eczema) and thirst. This flora has also been indicated for the treatment of Ushna noi (Diseases pertaining to high temperatures) such as fever, Kudal Noigal (Intestinal diseases). Researches on Wrightia tinctoria has found that it contains phytoconstituents such as lupeol, stigmasterol, campetosterol, indigotin, indirubin, tryptanthrin, isatin, cyclortenone, Cycloeucalenol, alpha amyrin, 14alpha-methylzymosterol which are responsible for Antioxidant, anti inflammatory properties, antifungal, antimicrobial, antiparasitic, antiarrhaloe, anxiolytic, rubifacient, antipyretic and antiarthritic properties. Oil prepared out of the fresh leaves of the plant has been proved to have analgesic, Anti-inflammatory and antipyretic activities and to be effective in the treatment of psoriasis.

4. CONCLUSION

Plants and ecosystems must be continued to be studied in order to save and sustain the earth in the context of population explosion. In this article the ancient Sangam literature on Thinaigal (Geographical landscapes) and the curative potential of its flora has been analyzed in the light of scientific researches. Through this review it is clearly evident that the chief flora of Kurinji, Mullai, Maratham, Neithal and Palai are concerned with balancing the altered humours Vatham, Pitham and Kabam in their respective regions thereby
facilitated the disease management. The epidemiological approach that prevailed in ancient Tamil culture emphasizes the need for the conservation of extinguishing Sangam flora for the prevention and management of diseases pertaining to its habitat.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to this article.

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