Contents

1. Overview

1.1 Objectives of the Council

The Central Council for Research in Siddha (CCRS), an autonomous body under the Department of AYUSH, Union Ministry of Health and Family Welfare is an apex body in India for undertaking, coordinating, formulating, developing and promoting research on scientific lines in Siddha. The activities are being carried out through 5 peripheral Institutes / Units located in Tamil Nadu, Kerala and Union Territory of Puducherry. The research activities of the Council include Preclinical, Clinical Research, Drug Research and Literary Research in Siddha.

The objectives for which the Central Council for Research in Siddha has been established are:

1. The formulation of aims and patterns of research on scientific lines in Siddha.
2. To undertake any research or other programmes in Siddha.
3. The prosecution of and assistance in research, propagation of knowledge and experimental measures generally in connection with the causation, mode of spread and prevention of diseases.
4. To initiate, aid, develop and coordinate scientific research on various aspects, especially fundamental and applied aspects of Siddha and to promote and assist research institutions for the study of diseases their causes, prevention and remedy.
5. To finance enquiries and researches for the furtherance of objectives of the Central Council.
6. To exchange information with other institutions, associations and societies interested in the objects similar to those of the Central Council especially in observation and study of diseases in India.
7. To prepare, print, publish and exhibit papers, posters, pamphlets, periodicals and books for furtherance of the objectives of the Central Council.
8. To issue appeals and make applications for money and funds in furtherance of the objectives of the Central Council and to accept for the aforesaid purpose gifts, donations and subscriptions of cash and securities and of any property whether movable or immovable.
9. To borrow or raise funds with or without security or on security mortgage charge, hypothecation or pledge of all or any of the immovable or movable properties belonging to the Central Council or in any other manner whatsoever.

10. To invest and deal with the funds and monies of the Central Council or entrusted to the Central Council not immediately required in such a manner as may from time to time be determined by the Governing Body of the Central Council.
11. To permit the funds of the Central Council to be held by the Government of India.
12. To acquire and hold, whether temporarily or permanently any movable or immovable property necessary or convenient for the furtherance of the objects of the Central Council.
13. To sell, lease, mortgage and exchange and otherwise transfer any of the properties movable or immovable of the Central Council provided prior approval of the Central Government is obtained for the transfer of immovable property.
14. To purchase, construct, maintain and alter any buildings or works necessary or convenient for the purpose of the Central Council.
15. To undertake and accept the management of any endowment or trust fund for donation, undertaking or acceptance whereof may seem desirable.
16. To offer prizes and grant of scholarships, including travelling scholarships in furtherance of the objects of the Central Council.
17. To create administrative, technical and ministerial and other posts under the Society and to make appointments thereto in accordance with the rules and regulations of the Society.
18. To establish a provident fund and/or pension fund for the benefit of the Council's employees and / or their family members.
19. To do all such lawful things either alone or in conjunction with others as the Central Council may consider necessary or as being incidental or conducive to the attainment of the above objects.
20. To undertake R & D Consultancy projects and transfer of patents on drugs and processes to industries.
21. To undertake R & D projects sponsored by industries in public / private sector.
22. To undertake international and inter-agency collaboration.
23. Utilization of results of research conducted and payment of share of royalties / consultancy fees to those who have contributed towards pursuit of such research.
24. To enter into arrangements with scientific agencies of other Countries for exchange of scientists, study tours, training in specialized areas, conducting joint projects etc.
25. To provide technical assistance to Govt. / Private Agencies in matters consistent with the activities of the Council.
26. To assist Medicinal Plants Board, Government of India in achieving its objectives.

27. To constitute small Management Committees consisting of eminent Scientists / Physicians of local areas to monitor the R & D activities and suggest remedial measures for the improvement of activities of all Central as well as Research Institutes of the Council.

1.2 Scheme-wise Targets and Achievements

The Annual Report of CCRS for the year 2013-14 depicts the activities and achievements of CCRS mainly in the areas of research, IEC activities and health care services.

The Council continued its activities during the reporting period in the areas of Medicinal Plant Research (Medico-ethno botanical Survey, Cultivation and Pharmacognosy), Drug Standardization, Pharmacological Research, Clinical Research and Literary Research & Documentation.

Clinical Research:

Clinical Research is the major mandate which is achieved with the support of Drug and Literary research. In Clinical Research 10 trials are allocated and among them 3 are multicentric. The Clinical trials on Diabetes, Fibroid uterus and Urolithiasis have been completed in this reporting year. All the clinical trials have been being properly initiated after getting approval from IEC/IAEC. Preclinical studies for 4 trials are nearing completion and 3 trials are awaiting approval of IEC. The extended activities comprise health care services through Out–Patient Department (OPD) and In-Patient Departments (IPD), Specialty Clinics for Geriatric Health Care and Flu-like Illness, National Pharmaco-Vigilance Programme for Siddha Drugs, etc.

Drug Research:

Standardization of 43 single drugs and 8 compound formulations has been completed. Safety and toxicity studies have been completed for the coded formulation OA1 Chooranam and Puvarasam Pattai kudineer and the same for another coded formulation HB1 is in progress. In Pharmacognosy 10 Single drugs and 2 formulations have been completed.

Literary Research:

21 Types of IEC materials including 10 brochures in different languages have been brought out. Compilation of Clinical trial protocols for life style diseases has been brought out. A booklet on "A-Z Medicinal plants – Know your alphabets through Siddha medicinal plants" has been completed. Monographs on preclinical studies on Diabetes and Fibroid uterus are under compilation. Preparation of Siddha dossier is in progress.

Medicinal Plant Research:

The Siddha Medicinal Plants Garden (SMPG), Mettur is engaged in the maintenance and development of Herbal Garden and cultivation of Medicinal Plants. In the reporting period 4 survey and collection tours were undertaken and recording 243 plants covering 147 species representing 130 genera and 64 families. In addition to the collection of medicinal plants, 21 live plants/seedlings were collected, to be added in the Siddha Medicinal Plants Garden, Mettur dam.2 Medicinal plants have been supplied for SRRI, Trivandrum for standardization and clinical trial purposes.

A Poly greenhouse covering an area of 800Sq.ft houses 323 live potted plants covering 304 species which include 31 RET sp. An Arboretum is being maintained with 443 plants covering 172 species in 3.5 acres supported with drip irrigation. A Nursery with 100 medicinal plants serves the visitors by providing medicinal plants at a nominal rate.

Trial cultivation of *Andrographis paniculata* Nees (Nilavempu), *Alpinia calcarata* Roscoe (Arththai), *Piper longum* L. (Thippili), *Ocimum tenuifolium* L. (Tulsi), *Ocimum basilicum* L. var. *purpurascens* Benth. (KarunThulasi), *Vetiveria zizanioides* (L.) Nash. (Vettiver) and *Aloe vera* L. (Kumari) was carried out and the harvest was supplied to Siddha Central Research Institute, Chennai.

12 Folklore claims were recorded and documented. **66 photographs** which include plants and the development and maintenance works were documented. **240** plant specimens were collected and stored in the Museum.

Siddha Pharmacopoeia:

As suggested by Siddha Pharmacopoeia Committee, modifications are being carried out the "The Siddha Pharmacopoeia of India, Part I, Vol. III" which has reached the stage of

final drafting as per the new format recommended by PCIM. Preparation of the Siddha Pharmacopoeia of India, Part I, Vol. IV has also been initiated during the reporting period. The Siddha Formulary of India, Part II (Tamil) has been published in the reporting period and the Siddha Formulary of India, Part I, 1st revised Edition (Tamil) has been approved by the SPC.

(**Dr. R.S. Ramaswamy**)

Director General

Chennai

Dated: _____

2. Management

2.1. Constitution of Several Bodies

CCRS was bifurcated from CCRAS on 1st September 2010 and the General Body, Executive Committee, Standing Finance Committee and Scientific Advisory Board of the newly established Council were constituted. The details are as following.

General Body:

S.No	Name	Profession / Occupation	Designation
1.	Dr. Harsh Vardhan	Union Minister of Health & Family Welfare	President
2.	Sh.Nilanjan Sanyal	Secretary, Dept. of AYUSH, Ministry of Health & Family Welfare	Member
3.	Dr. Vishwa Mohan Katoch	Secretary / D.G Health Research	Member
4.	Dr.P.S.Ahuja	Director General, CSIR	Member
5.	Sh.Gautam Guha	Additional Secretary & FA, Ministry of Health & Family Welfare	Member
6.	Sh.Bala Prasad	Joint Secretary, Deptt. of AYUSH	Member
7.	Dr.S.Mohan	Director I/c, National Institute of Siddha, Chennai	Member
8.	Dr.K.Ravi	Joint Advisor(Siddha)/Advisor (Siddha)	Member
9.	Dr. Rajeev Kr. Sharma,	Director, PLIM, Ghaziabad	Member
10.	Prof. Dr. P. Jayaprakash Narayanan,	Vice Principal(Retd)	Member
11.	Prof. Dr. A. Kumaravel	Prof.(Retd)	Member
12.	Dr. Vasantha Muthuswamy	Sr. Deputy Director General (Retd)	Member
13.	Prof.Dr.R.S.Ramaswamy	Director General	Member Secretary

Executive Committee:

S.No	Name	Designation	Position
1.	Secretary, Department of AYUSH, Government of India, New Delhi	Ex-officio member	Chairperson
2.	Additional Secretary & FA Ministry of Health & Family Welfare, Government of India	Ex-officio member	Member
3.	Joint Secretary, l/C Siddha, Department of AYUSH, Government of India, New Delhi	Ex-officio member	Member
4.	Prof. Dr. P. Jayaprakash Narayanan	Expert in Siddha Medicine (Nominated member from the General Body)	Non-official Member
5.	Deputy Advisor/Advisor (Siddha)	Ex-officio member	Member
6.	Dr. Vasantha Muthuswamy	Expert in Modern Medicine (Nominated member from the General Body)	Non-official Member
7.	Director General, Central Council for Research in Siddha	Ex-officio member	Member Secretary

Standing Finance Committee:

S.No	Name	Designation	Position
1.	Joint Secretary, l/C Siddha, Department of AYUSH, Government of India, New Delhi	Ex-officio member	Chairman
2.	Deputy Secretary M/o Health and Family Welfare, Nirman Bhawan. Govt. of Inida	Ex-officio member	Member
3.	Prof. Dr. P. Jayaprakash Narayanan	Siddha Expert, Chennai	Member

4.	Dr.K.Ravi	Joint Advisor(Siddha) /Advisor (Siddha)	Member
5.	Dr. R.S.Ramaswamy	DG, CCRS	Member Secretary

2.2. Representation of Scheduled Caste / Scheduled Tribe in the Council services and Welfare measures for SC/ST

The Council has been following the orders and guidelines issued from time to time by the Government of India in respect of representation of SC/ST in the services of the Council. The recruitments / promotions are done according to the reservation roaster maintained for SC/ST. The number of SC/ST employees in CCRS belonging to various categories has been indicated below:

Table-1: Number of employees in each category

Group	Number of Employees	SC Employees	% of SC Employees	ST Employees	% of ST Employees	Total No. of SC/ST Employees	% of SC/ST Employees
A	26	01	3.85	01	3.85	02	7.70
B	04	01	25.00	-	-	01	25.00
C	76	19	25.00	-	-	19	25.00
D	45	15	33.33	03	6.66	18	39.99
Total	**151**	**36**	**23.84**	**04**	**2.65**	**40**	**26.49**

Besides this, some of the research Institutes / Units are providing medical relief through OPD / IPD services and health benefits have been extended to a large number of SC/ST population. The budget of the Council stipulated specific allocations for welfare of SC/ST under its plans.

2.3 Organizational set-up

The implementation of recommendations of Nityanand Committee was reviewed by Joint Secretary (AYUSH) in a meeting held on 16-11-2009 under his Chairmanship for development of the erstwhile CCRAS and notified on 15th December 2009, which include the

presently functioning CCRS Institutes/Units also. After re-organization the Institutes/Units have been classified into 4 categories, of which the CCRS Institutes/Units fall under 'C' and 'D' categories mentioned as under:

Table-2: Acronyms of Peripheral Institutes / Units

Sl. No.	Institutes / Units	Abbreviations
	Category 'C'	
1.	Siddha Central Research Institute, Chennai.	SCRIC
	Category 'D'	
2.	Siddha Regional Research Institute, Puducherry.	SRRIP
3.	Siddha Regional Research Institute, Thiruvananthapuram.	SRRIT
4.	Siddha Clinical Research Unit, Palayamkottai.	SCRUP
5.	Siddha Medicinal Plants Garden, Mettur.	SMPGM

Table-3: State-wise distribution of Peripheral Institutes / Units

Sl. No.	Name of the State	Name of the Institutes / Units
1.	Tamil Nadu	1. Siddha Central Research Institute, Chennai.
		2. Siddha Clinical Research Unit, Palayamkottai.
		3. Siddha Medicinal Plants Garden, Mettur.
2.	Kerala	1. Siddha Regional Research Institute, Thiruvananthapuram.
3.	Puducherry (U.T.)	1. Siddha Regional Research Institute, Puducherry.

Chart No. 1

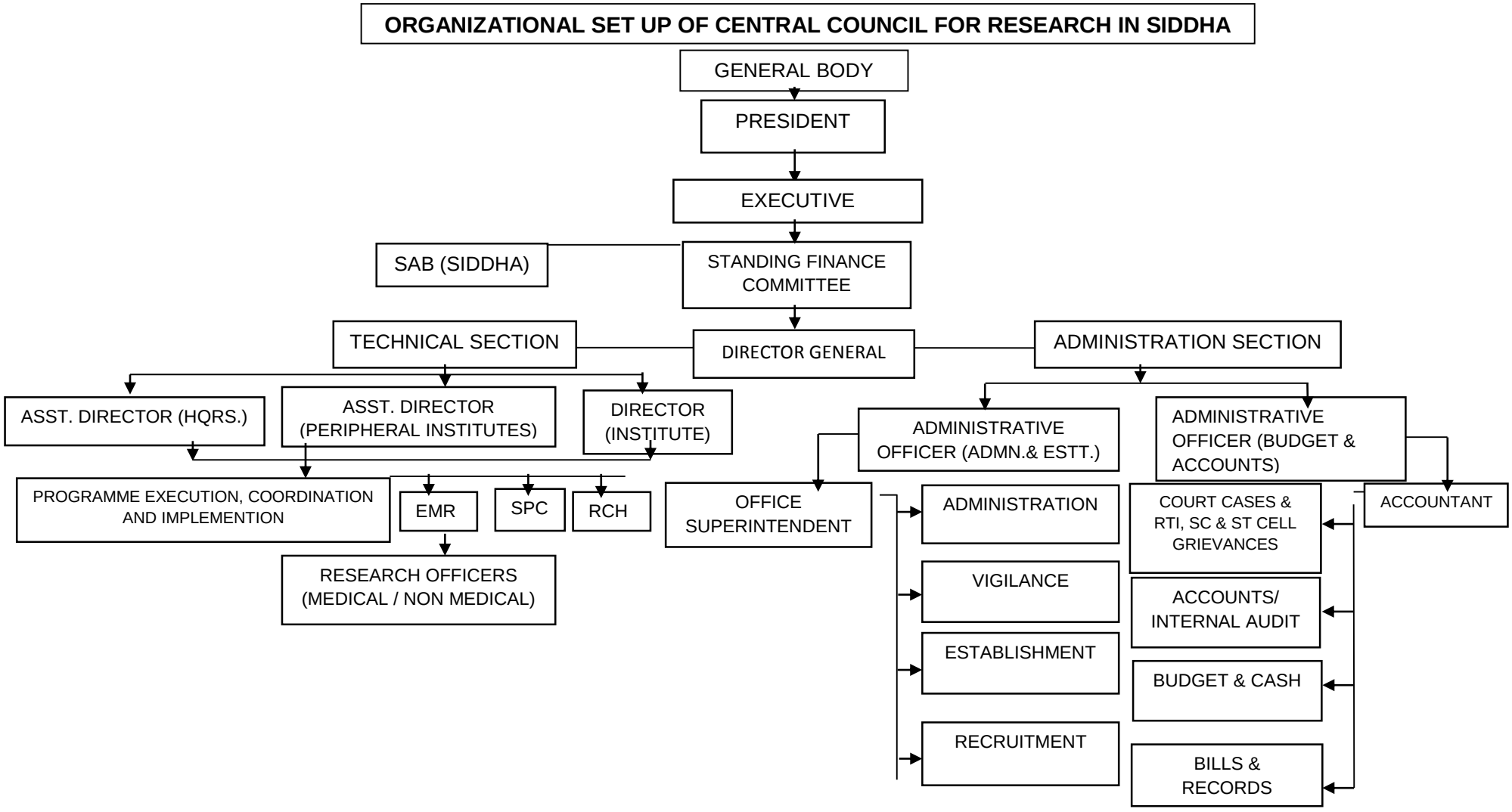
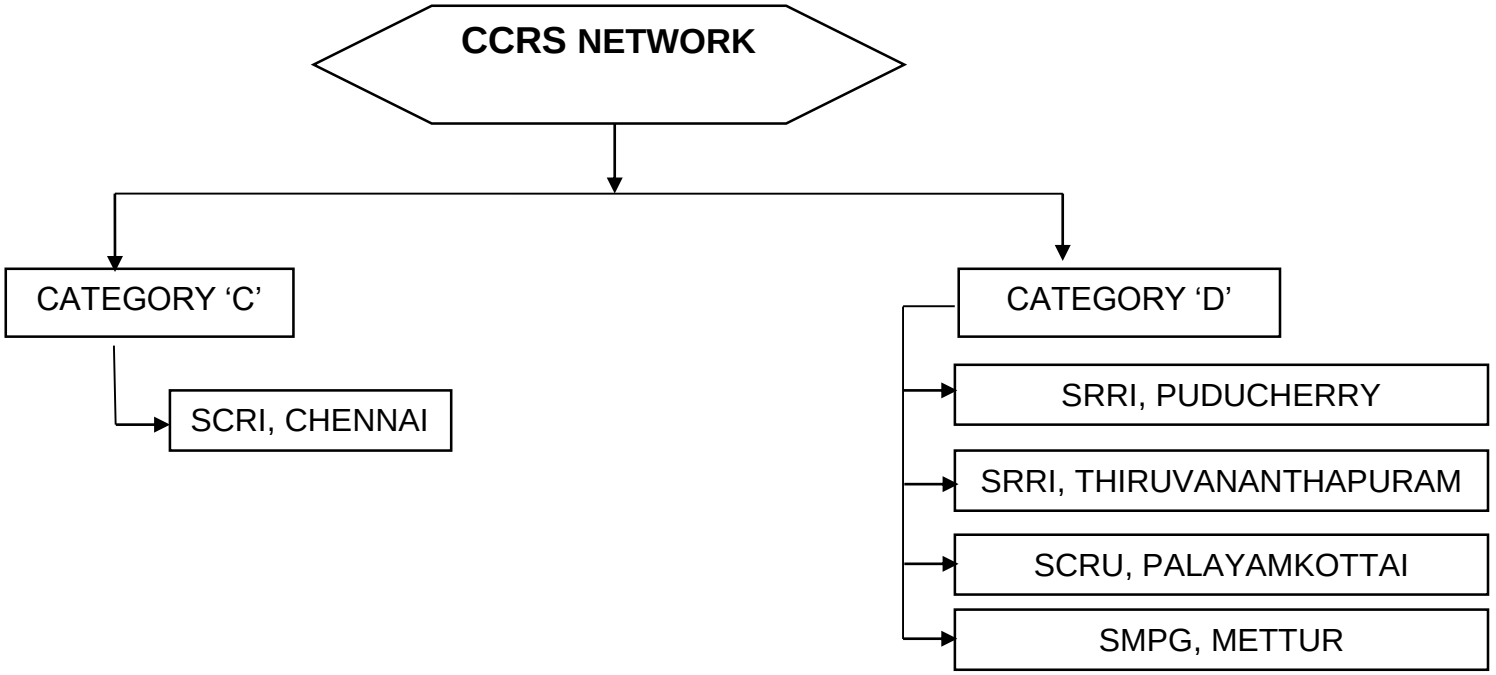

ORGANIZATIONAL SET UP OF CENTRAL COUNCIL FOR RESEARCH IN SIDDHA
GENERAL BODY
PRESIDENT
EXECUTIVE
SAB (SIDDHA)
STANDING FINANCE COMMITTEE
TECHNICAL SECTION
DIRECTOR GENERAL
ADMINISTRATION SECTION
ASST. DIRECTOR (HQRS.)
ASST. DIRECTOR (PERIPHERAL INSTITUTES)
DIRECTOR (INSTITUTE)
PROGRAMME EXECUTION, COORDINATION AND IMPLEMENTION
EMR
SPC
RCH
RESEARCH OFFICERS (MEDICAL / NON MEDICAL)
ADMINISTRATIVE OFFICER (ADMN.& ESTT.)
ADMINISTRATIVE OFFICER (BUDGET & ACCOUNTS)
OFFICE SUPERINTENDENT
ADMINISTRATION
VIGILANCE
ESTABLISHMENT
RECRUITMENT
COURT CASES & RTI, SC & ST CELL GRIEVANCES
ACCOUNTS/ INTERNAL AUDIT
BUDGET & CASH
BILLS & RECORDS
ACCOUNTANT

Chart No. 2


CCRS NETWORK
CATEGORY 'C'
SCRI, CHENNAI
CATEGORY 'D'
SRRI, PUDUCHERRY
SRRI, THIRUVANANTHAPURAM
SCRU, PALAYAMKOTTAI
SMPG, METTUR

2.4. Budget

Table-4: Budget Provision at a Glance

Scheme	B .E. 2012-13 (in Lakhs)	Funds released in 2012-13 (in Lakhs)	Actual Expenditure 2012-13 (in Lakhs)
PLAN	109	109	161
NON – PLAN	1091	1091	1066
TOTAL	1200.2	1200.2	1226.8

Table-5: Head–wise Actual Expenditure

Sl. no.	Particulars	Total Expenditure for 2013-14 (in Lakhs)		
		Non - Plan	Plan	Total
1	Pay & Allowances	710.34	0.87	711.21
2	Pension	36.01	0	36.01
3	Payment of Gratuity - DCRG	31.92	0	31.92
4	Payment of Commutation	33.75	0	33.75
5	New Pension Scheme Contribution (Employer)	16.67	0	16.67
6	Leave Travel Concession (LTC)	5.52	0	5.52
7	Re-imbursement of Medical Expenses	0	0	0
8	Travelling Allowances	4.25	11.4	15.65
9	Office Expenses - Contingencies	15.52	33.42	48.94
10	Other Administrative Expenses	211.95	9.51	221.46
11	Research Activities	0	77.88	77.88
12	Seminar, Workshop and AROGYA	0	16.67	16.67
13	Advertisement and Publicity	0	11.36	11.36
	Grand total	1065.93	161.11	1227.04
14	Machinery and Equipments	1.1	124.41	125.51
15	Capital Works (Major Works)	0	375	375

Table-6: Centre–wise Actual Expenditure

Particulars	Total Expenditure for 2013-14 (in Lakhs)		
	Non - Plan	Plan	Total
De-Centralized Units			
SCRI , Chennai	475.99	90.28	566.27
SRRI , Pondicherry	121.28	18.57	139.85
SRRI , Trivandrum	70.81	6.75	77.56
SMPG , Mettur Dam	27.68	11	38.68
SCRI , Palayamkottai	15.99	2.85	18.84
Centralized Unit			
CCRS , Headquarters	354.18	31.63	385.81
Grand Total	1065.93	161.08	1227.01

3. Technical Report

3.1 Centre-wise Activities

The following table depicts the involvement of peripheral Institutes/Units of the Council in the research activities in broad areas viz. Clinical Research, Drug Research, Literary Research, etc.

Table-7: Centre-wise allocation of Research Projects / Activities

Sl. No.	Name of Institute	Project / Activities
1.	Siddha Central Research Institute, Chennai.	**1. Clinical Research** **2. Drug Standardization** **3. Literary Research & Documentation Programme** **4. Miscellaneous Activities** a. National Pharmaco-vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs b. Health care services through Out – Patient Department (OPD) and In-Patient Departments (IPDs) c. Specialty Clinics for Geriatric Health Care d. Specialty Clinics for Flu-like Illness

		e. Specialty Clinics for Varmam, Thokkanam and Bone setting f. Pharmacy
2.	Siddha Regional Research Institute, Puducherry.	**1. Clinical Research** **2. Miscellaneous Activities** a. National Pharmaco - vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs b. Health care services through Out–Patient Department (OPD) and In-Patient Departments (IPDs) c. Specialty Clinics for Geriatric Health Care d. Specialty Clinics for Flu-like Illness e. Specialty Clinics for Varmam and Thokkanam
3.	Siddha Regional Research Institute, Thiruvananthapuram.	**1. Clinical Research** **2. Drug Standardization** **3. Miscellaneous Activities** a. National Pharmaco - vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs b. Health care services through Out–Patient Department (OPD) c. Specialty Clinics for Geriatric Health Care
4.	Siddha Clinical Research Unit, Palayamkottai.	**1. Clinical Research** **2. Miscellaneous Activities** a. National Pharmaco-vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs b. Health care services through Out–Patient Department. c. Specialty Clinics for Geriatric Health Care
5.	Siddha Medicinal Plants Garden, Mettur.	**1. Medico-Ethno Botanical Survey** **2. Cultivation of Medicinal Plants** **3. Maintenance and Development of medicinal plants garden.**

3.2 Medicinal Plants Research

3.2.1. Medico-Ethno Botanical Survey

Survey and Collection

The Siddha Medicinal Plants Garden (SMPG), Mettur is engaged in the maintenance and development of Herbal Garden and cultivation of Medicinal Plants. In the reporting period 4 survey and collection tours were undertaken and recording 243 plants covering 147 species representing 130 genera and 64 families. In addition to the collection of medicinal plants, 21 live plants/seedlings were collected, to be added in the Siddha Medicinal Plants Garden, Mettur dam.2 Medicinal plants have been supplied for SRRI, Trivandrum for standardization and clinical trial purposes.

A Poly greenhouse covering an area of 800Sq.ft houses 323 live potted plants covering 304 species which include 31 RET sp. An Arboretum is being maintained with 443 plants covering 172 species in 3.5 acres supported with drip irrigation. A Nursery with 100 medicinal plants serves the visitors by providing medicinal plants at a nominal rate.

Trial cultivation of *Andrographis paniculata* Nees (Nilavempu), *Alpinia calcarata* Roscoe (Arththai), *Piper longum* L. (Thippili), *Ocimum tenuifolium* L. (Tulsi), *Ocimum basilicum* L. var. *purpurascens* Benth. (KarunThulasi), *Vetiveria zizanioides* (L.) Nash. (Vettiver) and *Aloe vera* L. (Kumari) was carried out and the harvest was supplied to Siddha Central Research Institute, Chennai.

12 Folklore claims were recorded and documented. **66 photographs** which include plants and the development and maintenance works were documented. **240** plant specimens were collected and stored in the Museum.

Table-8: Survey of Medicinal Plants and Areas Covered

Sl.No	Name of the programme	New programme		Remarks
		Annual Target	Target achieved	

1.	**Survey & Collection**	Eight Survey and collection tours	Four Survey and collection tours in and around Mettur dam was executed to meet the target and to execute collection of drugs for standardization purposes and to collect seedlings/seed to be added/introduced in the Siddha Medicinal Plants Garden at Mettur dam.	Medico ethno botanical research programme submitted to the Hqs, CCRS, Chennai submitted vide this office letter no.12-1/2013-14/SMPG/Act.Plan- dt.16-05-2013 was not carried out for want of Council's sanction and approval of funds. Local Survey and collection tours were undertaken to execute drug supply for drug standardization and Clinical trial.
2.	**Maintenance and Development of Siddha Medicinal Plants Garden**	Management and development of medicinal Plants garden is being carried out continuously. (detail report enclosed separately)	Management and development of medicinal Plants garden is being carried out continuously. (detail report enclosed separately)	Provision of fencing and enhancement of labour including field collector is necessary for the maintenance and development of Siddha Medicinal Plants garden.
3..	**Cultivation**,	Cultivation of Five medicinal plants	Cultivation of Seven medicinal plants are in progress. Detailed report is herewith enclosed.	Provision of fencing and enhancement of labour including R.O (Hort.) and field collector is necessary to undertake large scale cultivation.

4.	**National Medicinal Plants Board Project:**	**Construction of Pond with fountain and Establishment of Model Herbal garden Phase - II**	Construction of petaloid pond with fountain was carried out. Establishment of Model garden Phase II is in progress with 105 medicinal plants.A detailed report is herewith enclosed.	Awaiting for II and III instalment of sanctioned funds to carry out further work in the Project.

Table-9: Raw Drugs collected for supply

Drug Supply							
S.No	**Request received from Institutes/Units/ SPC/Pharmacy**	**Dried/Raw /Fresh**	**List of Plants/Drugs**	**Part**	**Quantity requested**	**Quantity supplied**	**Approximated market value(Varies according to their availability) ₹**
1.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	20 Kgs	20 Kgs	Rs.100/Per kg
2.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	39 Kgs	39 Kgs	Rs.100/Per kg
3.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers.	Leaves	11 Kgs	11 Kgs	Rs.100/Per kg
4.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	24 Kgs	24 Kgs	Rs.100/Per kg
5.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers.	Leaves	28 Kgs	28 Kgs	Rs.100/Per kg
6.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	55 Kgs	55 Kgs	Rs.100/Per kg
7.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	20 Kgs	37 Kgs	Rs.100/Per kg

8.	SCRI, Chennai-Pharmacy	Fresh	*Ocimum basilicum* L.*var.* *purpurascens* Benth.	Leaves	15 Kgs	15Kgs	Rs.100/Per kg
9.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	30 Kgs	45 Kgs	Rs.100/Per kg
10.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	33 Kgs	Rs.100/-Per kg
11.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	31 Kg	Rs.100/-Per kg
12.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers	Whole plant	30 Kgs	32 Kg	Rs.50/-Per kg
13.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	50 Kgs	67 Kg	Rs.100/-Per kg
14.	SRRI, Trivandrum-SPC	Dried	*Ceiba pentandra* (L.) Gaertn	Resin	250 gms	250 gms	Rs.1000/-Per kg
15.	SRRI, Trivandrum-SPC	Dried	*Acacia catechu* (L.f.) Willd.	Resin	250 gms	250 gms	Rs.1000/-Per kg
16.	SCRI, Chennai-Pharmacy	Fresh	*Ocimum basilicum var.purpurascens* L.	Leaves	20 kgs	22 kgs	Rs.100/-Per kg

17.	SCRI, Chennai-Pharmacy	Fresh	*Justicia adhatoda* L.	Leaves	20 kgs	20 kgs	Rs.100/-Per kg
18.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers	Leaves	30 kgs	32 kgs	Rs.100/-Per kg
19.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	40 kgs	45 kgs	Rs.100/-Per kg
20.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	37 Kgs	Rs.50/-Per kg
21.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers.	Leaves	25 Kgs	35 Kgs	Rs.100/-Per kg
22.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	50 Kgs	67 Kgs	Rs.100/-Per kg
23.	SCRI, Chennai-Pharmacy	Dried	*Andrographis paniculata* Nees	W/Plant	10 kgs	6 Kgs	Rs.400/-Per kg
24.	SCRI, Chennai-Pharmacy	Fresh	*Justicia adhatoda* L.	Leaves	20 kgs	17 kgs	Rs.100/-Per kg
25.	SCRI, Chennai-Pharmacy	Fresh	*Vitex negundo* L.	Leaves	20 kgs.	21 kgs	Rs.50/-Per kg
26.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	50 Kgs	54 Kgs	Rs.100/-Per kg
27.	SCRI, Chennai-Pharmacy	Dried	*Andrographis paniculata* Nees	W/Plant	--	6 Kgs	Rs.400/-Per kg

28.	PLIM,Ghaziabad	Dried	*Erythrina indica* Lam.	St.Bark	250 gms	250 gms	Rs.400/-Per kg
29.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers.	Leaves	25 Kgs	33 Kgs	Rs.100/-Per kg
30.	SCRI, Chennai-Pharmacy	Fresh	*Ocimum basilicum var.purpurascens* L.	Leaves	20 kgs	21 kgs	Rs.100/-Per kg
31.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	35 Kgs	Rs.50/-Per kg
32.	SCRI, Chennai-Pharmacy	Fresh	*Vitex negundo* L.	Leaves	20 kgs.	21 kgs	Rs.50/-Per kg
33.	SCRI, Chennai-Pharmacy	Fresh	*Datura innoxia* Mill.	Leaves	50 Kgs	67 Kgs	Rs.100/-Per kg
34.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	31 Kgs	Rs.50/-Per kg
35.	SRRI, Trivandrum-SPC	Dried	*Alangium salvifolium* (L.f.)Wang	Root bark	500gms	500 gms	Rs.1000/-Per kg
36.	SRRI, Trivandrum-SPC	Dried	*Desmodium triflorum* (L.) DC.	Root	500gms	400 gms	Rs.1000/-Per kg
37.	SRRI, Trivandrum-SPC	Dried	*Launea coromandelica* (Houtt.) Merr.	Stem bark	500gms	400 gms	Rs.1000/-Per kg

38.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	31 Kgs	Rs.50/-Per kg
39.	SCRI, Chennai-Pharmacy	Fresh	*Aloe vera* L.	Leaves	50 kgs	57 kgs	Rs.100/-Per kg
40.	SCRI, Chennai-Pharmacy	Fresh	*Ocimum basilicum* *var.purpurascens* L.	Leaves	20 kgs.	21 kgs	Rs.100/-Per kg
41.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 kgs	31 Kgs	Rs.100/-Per kg
42.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 kgs	52 Kgs	Rs.100/-Per kg
43.	SCRI, Chennai-Pharmacy	Dried	*Andrographis paniculata* Nees	W.plant	--	6 kgs	Rs.1000/-Per kg
44.	SCRI, Chennai-Pharmacy	Fresh	*Cynodon dactylon* Pers	Leaves	30 kgs	43 Kgs	Rs.100/-Per kg
45.	SRRI, Trivandrum-SPC	Dried	*Albizia procera* Benth.	Root	500gms	500 gms	Rs.1000/-Per kg
46.	SRRI, Trivandrum-SPC	Dried	*Calotropis gigantea* (L.) Roxb.	Flowers (white)	500gms	300 gms	Rs.1000/-Per kg

47.	SRRI, Trivandrum-SPC	Dried	*Pavetta indica* L. *var.* *indica*	Root	500gms	400 gms	Rs.1000/- Per kg
48.	SRRI, Trivandrum-SPC	Dried	*Caesalpinia bonduc* (L.) Roxb.	Stem bark	500gms	450 gms	Rs.1000/- Per kg
49.	SCRI, Chennai-Pharmacy	Fresh	*Aerva lanata* L.	W.Plant	8 kgs.	6 kgs	Rs.200/-Per kg
50.	SCRI, Chennai-Pharmacy	Fresh	*Wrightia tinctoria* R.Br.	Leaves	30 Kgs	35 Kg	Rs.100/-Per kg

The following Plant materials were collected during the Survey and Collection tours to execute drug supply for Clinical trial and drug standardization as per the indent from Siddha Regional Research Institute, Trivandrum.

Sl.No.	Botanical Name	Tamil name	Part	Weight (fresh)
1.	*Alangium salvifolium* (L.) Wang	Alingil	Root	3 Kgs.
2.	*Desmodium triflorum* (L.) DC.	*Sirupulladi*	*Root*	1 kg

For Plant Saplings

The following plant Saplings/ Stem cuttings/ Seeds were collected during the survey and collection tours, to be introduced / added in the Siddha Medicinal Plants garden at Mettur dam.

Table-10: Plant Saplings / Stem Cutting / Seeds collected

Plant saplings/stem cutting collected/Added			
S.No	**Botanical Name**	**Tamil Name**	

1.	*Agave cantula* Roxb.	Rail kartalai	Seedlings
2.	*Alangium salvifolium* Wang.	Azhinjil	Seedlings
3.	Blepharis repens (Vahl.) Roth.	Nethirapoondu	Seedlings
4.	*Chomelia asiatica* O.Kze.	*Thirani*	Seedlings
5.	*Chomelia asiatica* O.Kze.	*Thirani*	Seedlings
6.	*Cissus vitiginea* L.	*Panadaiappan*	Seedlings
7.	*Cissus vitiginea* L.	Panadaiappan	Seedlings
8.	*Cleistanthus collinus* Benth	Oduvan	Fruits
9.	*Corallocarpus epigaeus* Hk.f.	Kollankovai	Root tuber
10.	*Curcuma sp*	Kattu manjal	Seedlings
11.	*Dioscorea oppositifolia L.*	Iruvalli	Seedlings
12.	*Erythroxylon monogynum* Roxb.	Sempulichan	Seedlings
13.	*Eulopia epidendrea* (Retz.) Fischer	--	Seedlings
14.	*Glycosmis mauritiana* Tanaka	Kurunthu	Seedlings
15.	*Grangea maderaspatana* (L.) Poir .	--	Seedlings
16.	*Kleinia grandiflora* (DC.) N.Rani	Muyalkathilai	*Seedlings*
17.	*Lagenaria siceraria* (Molina) Standley	Peysurai	Fruits
18.	*Orthosiphon glabaratus* Benth	Malaithulasi	Seedlings
19.	*Pavetta canescens* DC.	Malampavattai	Seedlings
20.	*Phoenix farnifera* Roxb.	Sitreechu	Seedlings
21.	*Vanda tessalata* Hook	Maravazhai	Seedlings

For Museum

10 specimens were collected during the survey and collection tours and preserved for Museum.

Table-11: Specimens collected and stored in the museum

Specimens have been collected and deposited in the Museum			
S.No	**Botanical Name**	**Tamil Name**	**Part Used**
1.	*Momordica charantia* L.	Pagal	Root
2.	*Lagenaria siceraria* (Molina) Standley	Peysurai	Fruit
3.	*Cleistanthus collinus* Benth	Oduvan	Leaves
4.	*Cleistanthus collinus* Benth	Oduvan	Fruit
5.	*Terminalia chebula* Retz.	Kadukai	Fruit
6.	*Spathoglobus parviflorus* Kuntze	*Aanaipichan*	Flowers
7.	*Alangium salvifolium* Wang.	*Azhinjil*	Root bark
8.	*Cocholospermum gossypium* DC.	*Kongilavu*	Stem bark
9.	*Holarrhena antidysentrica* Wall.	Karuppalai	Root
10.	*Albizia odoratissima* Benth	Sitrilaivagari	Root

Folklore claims

During the reporting period 15 folklore claims have been recorded and documented.

i. Botanical Name : *Cleistanthus collinus* Roxb.
Tamil Name : Oduvan
Part used : Leaves/Leaf paste/decoction
Dose:10-20 gms of leaf paste or 60ml of decoction
Leaf paste/decoction is consumed in an attempt for suicide. It is also said that persons who intake leaf decoction cannot be recovered from death.

Remedy:
Tamarind juice is given as an emetic, Clearing the juice/decoction from the stomach is said to be the only remedy. It is said that in

certain cases though the person was saved immediately the death occurs even after 6 months.
Information given by
Smt.Packiam, Sheppard, Siddhar koil.
Sh.Sathya murthy, Ranger (Retd.) Nursery plantation, Siddhar koil.

ii. Botanical Name : Achyranthes aspera L.
Tamil Name : Nayuruvi
Part used : Leaves/Leaf paste/decoction
Disease: Emmenagogue
Dose:5 gms of leaf paste
Mode of administration: Leaf paste is given internally as an emmenagogue to expel the dirt after delivery.
Information given by: Mr.Natarajan, Peon colony, Mettur dam.

iii. Botanical Name : Achyranthes aspera L.
Tamil Name : Nayuruvi
Part used : Leaves/Leaf paste/decoction
Disease: Hydrophobia
Dose:5 gms of leaf paste
Mode of administration: 5 gms of leaf paste is given internally. Leaf paste is applied externally in the place of dog bite
Information given by Mr.Natarajan, Peon colony, Mettur dam.

iv. Botanical Name : *Ageratina conyzoides* L.
Tamil Name **:** Sunnamputhazhai
Part used : Leaves
Disease: Cuts and wounds
Mode of administration: The grounded fresh leaf paste is applied over the cuts and wounds.
Information given by: Mr.Natarajan, Peon colony, Mettur dam.

v. Bot. Name : *Cadapa fruticosa* Druce
Tamil name: Vizhuthi
Part used: Leaves
Disease: Knee joint pain
Mode of administration: Fresh leaves are boiled in the Sesame oil. The prepared oil is applied over the knee joints to get relief from knee joint pain.
Information given by Sh.S.Ravi, Thimmampatti

vi. Bot. Name: *Cadapa fruticosa* Druce

Tamil name: Vizhuthi
Part used: Leaves
Disease: Body pain
Mode of administration: Leaves are boiled in the water. The warm water is taken as bath to get relief from body pain.
Information given by Sh.Neelavarnam, Vettaikaranpatti

vii. Bot. Name: Canthium parviflorum Lam.
Tamil name: Karai
Part used: Leaves
Disease: Broken/Cracked horn of the cows
Mode of administration: Leaves are grounded into a paste and bandaged over the cracked/broken horn of the cattle. The bandage is wetted with sesame oil often till the paste fell down. The paste is said to heal and join the cracked/broken horn in 2 to 3 weeks.
Information given by Sh.S.Ravi, Thimmampatti

viii. Bot. Name: *Naravelia zeylanica* DC.
Tamil name: Mookurinji
Part used: Root
Disease: Head ache/Migraine
Mode of administration: Crushed root is inhaled. It stimulates the nostrils resulting in continuous sneezing. It is said to bring out the excess water accumulated in the fore head and provide relief from head ache.
Information given by Sh.S.Ravi, Thimmampatti

ix. Bot. Name: *Solanum torvum* L.
Tamil name: Sundai
Part used: Root
Disease: Head ache
Mode of administration: Dried root power is inhaled. It stimulates the nostrils resulting in continuous sneezing. It is said to bring out the phlem accumulated in the nostric and provide relief from head ache.
Information given by Sh.S.Ravi, Thimmampatti

x. Bot. Name : *Ficus racemosa* L.
Tamil name: Aththi
Part used: Leaves
Disease: eye sight

Mode of administration: It is said that intake of a fresh leaf will provide good vision

Information given by Sh.S.Ravi, Thimmampatti

xi. Bot. Name : *Cassia auriculata* L.
Tamil name: Avarai
Part used: Leaves, flowers
Disease: Bad odour
Mode of administration: Hot water bath with the leaves and flowers of Avarai is said to clear the bad odour of the body.
Information given by Sh.S.Ravi, Thimmampatti

xii. Bot. Name : *Cassia auriculata* L.
Tamil name: Avarai
Part used: Flowers
Disease: Enlargement of stomach
Mode of administration: Intake of dried flower powder along with honey is said to subside the stomach enlargement.
Collected from Sh.Neelavarnam, Vettaikaranpatti

xiii. Bot. Name : *Ficus racemosa* L.
Tamil name: Aththi
Part used: Young fruits.
Disease: Enlargement of stomach
Mode of administration: Young fruits are washed and prepared into a vegetable curry and is taken as side dish with rice. It is said to strengthen the ovary.
Information given by Sh.Anthony, Mettur

xiv. i. Bot. Name: *Ocimum tenuifolium* L.
Local Name: Tulasi
Part : Leaves

ii. Bot. Name: *Phyllanthus amarus* Schum. & Thonn.
Local Name: Kizkainelli
Part : Leaves

iii. Bot. Name: *Andrographis paniculata* Nees.
Local Name: Nilavempu
Part : Leaves

iv. Bot. Name: *Azadirachta indica A.Juss.*
Local Name: Vembu

Part : Young Leaves

Disease: Diabetes:
Mode of administration: Equal parts of the drugs 1-4 is mixed, shade dried and powdered. It is advised to take one spoon of powder 3 times a day.
Information given by Sh.Neelavarnam, Kulathoor

xv. Bot. Name: *Sesbania sesban* (L.) Merr.
Local Name: Karumsembai
Part : Flowers
Disease: To remove scars
Mode of administration: The flowers are ground into a paste, and the same is applied over the scars caused due to chicken box. It is said that the scars will get fade away.
Information given by Sh.Neelavarnam, Kulathoor

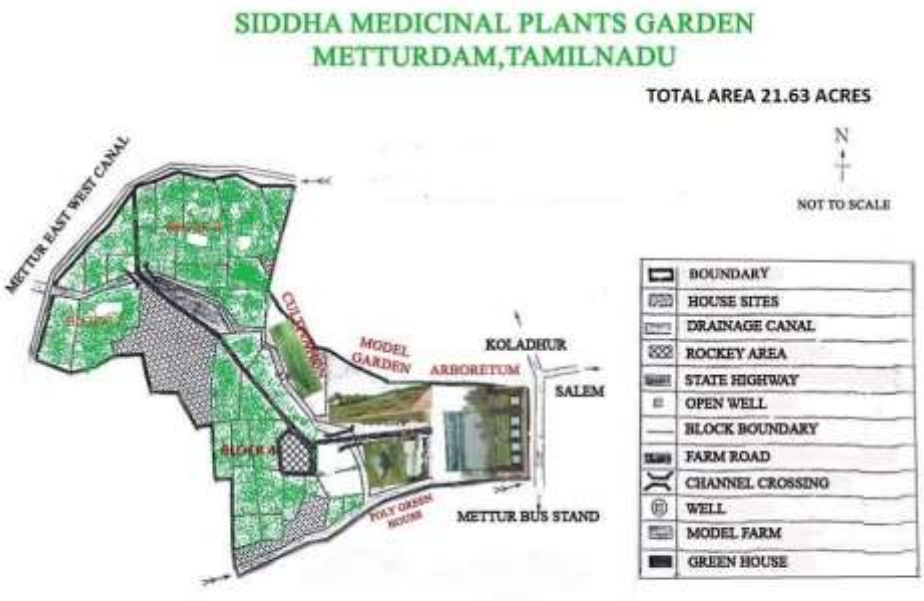


Fig. 1. Layout of the Siddha Medicinal Plants Garden, Mettur.

3.2.2. Cultivation, Maintenance & Development of Medicinal Plants

SIDDHA MEDICINAL PLANTS GARDEN:

1. Date of starting the project : 1993
2. Details of land under cultivation : **Siddha Central Research Institute**
   a) Ownership of the land, whether under control of CCRS/State or Central Govt. **Arumbakkam, Chennai 600 106** under **CCRS**, Chennai

   b) Total area of the land allotted for cultivation project: **18.14 acres**

3. Layout of the Garden/Farm, giving details of the plants cultivated in different Beds under experimental/ mass cultivation (Sketch plan to be provided)
   Lay out enclosed.Sketch plan enclosed.

Block A	**1.73acres**	**Arboretum**	**180 plants covering 100 species.**
Block B	**1.20 acres**	**Arboretum**	**193 plants covering 29 species.**
Block C	**1150 Sq.Mt.**	**Model garden I**	**236 individual species.**
Block D	**497.5 Sq.Mt.**		**70 plants covering 43 species.**
		Poly green house	**323 live potted plants covering 304 species.**
Block E	**19.5 Cents**	**Petaloid pond alongwith Agasthiyar statue with fountain**	
		Model garden II	**105 plants covering 105 species**

CULTIVATION

Block F (Nilavempu) — **Cultivation of *Andrographis paniculata* Nees.**

Block G

Cultivation of *Ocimum tenuiflorum* (Thulasi)
Cultivation of *Ocimum basilicum* L. *var.purpurascens* Benth. (KarunThulasi)
Cultivation of *Aloe vera* L. (Kumari)
Cultivation of *Vettiveria zizanoides* (L.) Nash. (Vettiver)
Cultivation of *Withania somnifera* Dunal (Amukkara)

4. Brief description of the land under cultivation giving its geographical, ecological and edaphic status, type of soil, erosion etc.

Block A and B covering an area of 1.73 and 1.20 acres respectively are having black clayey soil. The block A and B terrain falls 3-5 feet low from the rest of the blocks for which reason these blocks often gets waterlogged and the plants

become more susceptible for root rotting. Erosion of top soil is common occurance during rain. The water from upper reaches covering block C, D and E has to drain only through the blocks A and B. A three feet width permanent canal running at the left side of the block B and one concrete canal for each block adjacent to the garden road supports drainage of rain water in the Block A and B. Block C and D are having black clayey soil mixed with gravel. Exposed rockey exposures are also found common in this area. Block E and G show mixed sand black clayey soil. Block H is a raised bed of 3 feet high from block 5 and 6, having red gravel soil with rocky crests intermittently.

A three feet width canal arising from the Mettur east west bank channel runs through the garden and joins in the drainage canal. Of the 5 open existing wells two wells have been desilted and fitted with electric motor pumpsets. At present the well adjacent to the polygreen house provides required irrigation for the garden. Block E extends with the establishment of Model Herbal garden II alongwith petaloid pond adjacent to the channel.

i. Management and development of Arboretum:

An arboretum with 443 plants covering 172 species is being maintained covering an area of 3.5 acres. Drip irrigation is provided. Manuring and weeding is being done periodically. Basin clearing of trees was carried out. Stacking was provided to the required plants in the arboretum. Pruning of trees also carried out wherever it is necessary Clearing of plastic wastes drained from the adjacent drainage canal in Block A and B was carried out. Fencing with barbed wire was carried out in front of B block to prevent trespassers. Fencing with Prosopis was carried out in the A and B blocks to protect the plants from cattles.

List of plants grown in BLOCKS A,B &D:

Block A	**1.73acres**	**180 plants covering 100 species**
Block B	**1.20 acres**	**193 plants covering 29 species**
Block D	**497.5 Sq.Mt.**	**70 plants covering 43 species**
		Total 172 species.

Table-12: Development activities

Sl. No.	Blocks	Activities / Developments	Plants and Species
1.	Block A (1.73 Acres)	Arboretum	179 plants covering 110 species
2.	Block B (1.20 Acres)	Arboretum	194 plants covering 30 species
3.	Block C (1150 Sq.mtrs.)	Model garden I	234 individual species

		Model garden II	30 species
4.	Block D (497.5 Sq.mtrs.)	---	60 plants covering 32 species
5.	Block E (19.5 Cents)	---	304 live potted plants

Table-13: Cultivation activities

Sl. No.	Blocks	Botanical Name	Tamil Name
1.	Block F	Cultivation of *Piper longum* L.	Thippili
		Cultivation of *Alpinia calcarata* Rosc.	Araththai
		Cultivation of *Andrographis paniculata* Nees.	Nilavembu
2.	Block G	Cultivation of *Ocimum tenuiflorum* L.	Thulasi
		Cultivation of *Ocimum basilicum* L. *var. purpurascens* Benth.	Karunthulasi
		Cultivation of *Aloe vera* L.	Kumari
		Cultivation of *Vetiveria zizanioides* (L.) Nash.	Vettiver

3.2.3. Management and development of Model Herbal Garden:

Management and development of Model Herbal Garden –Phase I

A model herbal garden with 1150 sq. mt. is being maintained with 236 individual species. Each species is grown in 2x2 ft. pit margined with bricks and labelled with local and botanical names in a catappa stone laid inside. The pathway is fitted with tiles. Removal of annual and replace them with another species is a continuous process. Adding of new species and replacement of young seedlings for the older one in Model garden I was carried out wherever necessary. Manuring and weeding is being done periodically. Sprinkler system of irrigation is provided. Weeding and Pruning, was carried out wherever required. Labelling of plants in the pits is carried out periodically as and when it required. On the periphery of the garden 42 climbers are also grown over the steel arches.

3.2.4. Management and Development of Poly Green House:

Block E with 19.5 Cents:

A poly green house is being maintained in an area of about 800 sq, ft. A Polygreen house 323 live potted plants covering 304 species are displayed in the concrete gallery. Plants grown at a height of 4 ft and above are transferred to arboretum or to the model garden. Sprinkler system of irrigation is provided. Weeding, Staking, Manuring and Re potting works were also carried out periodically.

Nursery

In the programme of implanting nursery of medicinal plants, 100 medicinal plants were available during the reporting period.

Seed collection

Seed collection was done to raise the nursery seedlings. During the reporting year the seeds of 72 medicinal plants were collected and stored.

List of plants introduced / added

During the reporting period 51 plant seedlings / cuttings were collected and added to the garden.

List of specimens collected for Museum

During the year 10 plant materials covering seeds / fruits / roots / stembark / resin / etc. were collected and stored in the museum as specimens for future reference and other purposes.

Total number of medicinal plants photographed

Coloured Photo print : 66 **(stored in the system)**

Project:

ESTABLISHMENT OF MODEL HERBAL GARDEN - (PHASE II) AND CONSTRUCTION OF POND WITH A FOUNTAIN TO GROW AQUATIC PLANTS :

A project entitled " Establishment of Model Herbal garden (Phase II) and

Construction of Pond with a fountain to grow aquatic plants" was submitted by Dr.M.Padma sorna subramanian, Research officer –Botany, Siddha Medicinal Plants Garden, Mettur dam to the National Medicinal Plants Board, Dept. of AYUSH, Ministry of Health and Family Welfare, Govt. of India.

The project was approved by the Project Screening Committee (PSC) of NMPB. Dept. of AYUSH, Ministry of Health and Family Welfare, New Delhi. vide Project No.HG/TN-01/2013 with Lr.No. 017/187/CSS/HG/TN-01/2012-13-NMPB/1560 dt. 23rd October 2012 for Rs.16.06 lakhs. An amount of Rs.6,40,000/- (Rupees six lakhs and Forty Thousand) only in respect of 1st installment was received on 3rd December 2012.

As per the project proposal, the Executive .Engineer, Tamilnadu State Agricultural Engineering Dept., Salem was requested to undertake the civil work of construction of petaloid pond with fountain on 12th Dec. 2012. The Executive Engineer, Tamilnadu State Agricultural Engineering Dept., Salem, entrusted the work to the Asst.Exe.Engineer, Tamilnadu State Agricultural Engineering dept., Kunjandiyoor, Mettur circle, Salem dt. After several rounds of discussion in the office and inspection made in the Siddha Medicinal Plants Garden, a tentative estimate for Rs.4 lakhs was submitted by the Asst.Exe.Engineer, Tamilnadu State Agriculture Engineering dept, Kunjandiyoor, Mettur circle, Salem dt. to the Research officer i/c Siddha Medicinal Plants Garden at Mettur dam on 13th May 2013 and the estimate was forwarded to the Director General, CCRS, Chennai for approval.

In accordance with the approval of the Director General, Central Council for Research in Siddha,Chennai vide lr. No.4-4/2013-14/CCRS/Est./SMPG/Mettur dt.5th June 2013, towards the construction of petaloid pond with a fountain a SBI cheque no.653825 dt.18-06-13 for Rs.4 lakhs was issued to the Executive Engineer,Tamilnadu State Agricultural Engineering, Kumarasamypatti, Salem to execute the civil work as per the approved estimate. The civil work towards the construction of Pond with a fountain was completed and handed over to the Principal investigator and the Research officer i/c, Siddha Medicinal Plants Garden, Mettur dam on 11th December 2013.

As per the project proposal, after obtaining the permission from the Director General, Central Council for Research in Siddha, Chennai, the Statue of Agasthiyar (cement) was constructed in the central pedestal by engaging the sthapathis after following codal formalities and the work of construction of Agasthiyar statue was completed on 25th March 2013. Clearing of bushes and pruning of trees around the pond were also carried out for clear view of the statue.

The 5" height Agasthiyar statue in a sitting posture on the lotus peedam was constructed in the central median pedestal of the pond as proposed in the proposal submitted to the NMPB, Chennai. As proposed the statue of Agastiar is holding the Kamandalam in his left hand and rudrasha garland in the right hand. The statue is designed in such a way that the water springs out from the

Kamandalam and fills the pond and the Fountain spray is adjusted in such a way that the water sprinkles on the feet of the Agastiya statue and fills the pond. (Photo copies enclosed.)

The petaloid pond is sowed with the seeds/seedlings of floating herbs like Alli (Nymphaea stellata Willd), Neythal (Nymphoides hydrophylla (Lour) Ktze.), Akaya thamarai (Pistia stratiotes Linn.)etc. The space in between the petaloid pond was dug with 8 pits and the soil was replaced with red soil and manure. The pits were planted with marshy plants like Neer mel neruppu (Ammania baccifera L.) Karisalai (Eclipta prostrata L.) Sivakaranthai (Sphaeranthus amaranthoides L.) Isoetes coromandelina L. (fern) Basilicum polystachyon (L.) Moench, Vallarai (Centella asiatica Urban.), Nirbrahmi (Bacopa monnieri Penn.), Poduthalai (Phyla nodiflora Greene), Neer arai (Marsilea minuta L) etc.

As per the proposed Establishment of Model gardens Phase - II an another 0.5 cents of land and was allotted and is planted with 105 plants including the existing trees. 69 pits were dug out and each pit was fixed with cement rings having 3 feet breadth. Each pit bordered with cement rings were reclamated with red soil and manure and is planted with new plants. The existing trees along the canal were provided with basal clearing and are rounded at the base. Totally 105 plants were added in the proposed Model garden Phase –II. The list of plants is herewith enumerated.

3.2.6. Pharmacognosy

Table-16: Drugs studied for their Pharmacognostical aspects

1. Elanthai ilai – *Ziziphus jujuba* Mill.(Leaf)
2. Kazharchi kozhunthu ilai – *Caesalpinia bonduc* (L.) Roxb. (Tender leaf)
3. Kiranthinayagam – *Dipteracanthus patulus* (Jacq.) Nees (Whole plant)
4. Mukkurattai ilai – *Boerhaavia diffusa* L. (Leaf)
5. Nattam-tagarai ilai – *Senna occidentalis* (L.) Link. (Leaf)
6. Nuna ilai – *Morinda coreia* Buch.-Ham(Leaf)
7. Pudal ilai – *Trichosanthes anguina* L. (Leaf)
8. Puthina ilai – *Mentha arvensis* L.(Leaf)
9. Thekku ilai – *Tectona grandis* L.f. (Leaf)
10. Yaanai nerunjil – *Pedalium murex* L. (Whole plant)

The ingredients in the following Siddha formulations and Single drug were microscopically identified.

Table-17: Identification/Microscopical study of Siddha Formulations/Single drug

Sl. No.	Name of Siddha Formulations / Single drug

1.	Vajravalli chooranam
2.	Thiripala chooranam

Collection / Identification:

Drug samples purchased from the raw drug stores for the preparation of Siddha medicines were also examined for the authenticity of their botanical sources.

- Collection / Identification / Confirmation of Plants and Raw drugs
- Pharmacognostic studies on Medicinal Plants and Clinical Trial drugs
- Studies on adulterants / substitutes
- Pharmacognostic standards of Siddha Pharmacopoeial single drugs and formulations

Fig. 6. Collection and Identificat[illegible]y

Table-18: Medicinal Plants identified and authenticated for Students from various Colleges / Universities / Institutions

1. Aavarai vithai - *Cassia auriculata* L.(Seed)
2. Aavarai - *Cassia auriculata* L. (Aerial portion)
3. Adhathodai - *Justicia adhatoda*L. (Leaf)
4. Akkirakaram - *Anacyclus pyrethrum* (L.) Lag. (Root)
5. Amukkara - *Withania somnifera* (L.) Dunal (Root)
6. Athimaturam - *Glycyrrhiza glabra* L.(Stolon and root)
7. Athividayam - *Aconitum heterophyllum* Wall. ex Royle (Root)
8. Avuri ilai - *Indigofera tinctoria* L. (Leaf)
9. Catakuppai - *Anethum sowa* Roxb.ex DC. (Fruit)

10. Ceerakam - *Cuminum cyminum* L. (Fruit)
11. Chaviyam - *Piper nigrum* L. (Root)
12. Chukku - *Zingiber officinale* Roscoe (Dried rhizome)
13. Cirupeelai ver - *Aerva lanata* (L). Juss.ex Schult (Root)
14. Cittaraththai -*Alpinia officinarum* Hance(Rhizome)
15. December poo - *Barleria cristata* L (Aerial portion)
16. Drakchai - *Vitis vinifera* L.(Fruit)
17. Elakkai - *Elettaria cardamomum* (L.) Maton (Fruit)
18. Elarici - *Elettaria cardamomum* (L.) Maton (Seed)
19. Elumichai pazham - *Citrus aurantifolia* (Christm.) Swingle (Fruit)
20. Etti - *Strychnos nux-vomica* L. (Seed)
21. Gopuramthangi - *Andrographis echioides* (L.f.) Nees (Whole plant)
22. Ilavangappattai - *Cinnamomum verum* J.S.Presl (Stem bark)
23. Jadamanjil - *Nardostachys jatamansi* (D. Don) DC. (Rhizome)
24. Jathikkai - *Myristica fragrans* Houtt.(Fruit)
25. Jathipathiri - *Myristica fragrans* Houtt. (Aril)
26. Kaattu seeragam - *Vernonia anthelmintica* (L.) Willd.(Fruit)
27. Kadugurohini - *Picrorhiza kurroa* Royle ex Benth.(Root)
28. Kadukkai -*Terminalia chebula* Retz.(Fruit)
29. Kadukkai thol -*Terminalia chebula* Retz. (Fruit rind)
30. Kaiyanthagarai - *Eclipta prostrata* (L.) (Whole plant)
31. Kandankathiri - *Solanum virginianum* L.
Syn. *S. xanthocarpum* Schrad. & H. Wendl.
(Whole plant)
32. Kandathippili - *Piper longum* L. (Root)
33. Kandubarangi - *Rotheca serrata* (L.) Steane & Mabb.
34. Kasakasa - *Papaver somniferum* L. (Seed)
35. Kattrazhai - *Aloe vera* (L.) Burm.f.(Whole plant)
36. Kirambu/Ilavangam - *Syzygium aromaticum* (L.) Merr. & L.M. Perry (Flower bud)
37. Kizhanelli -*Phyllanthus amarus* Schum. & Thonn. (Whole plant)

38. Kodiveliver - *Plumbago zeylanica* L. (Root)
39. Kopparai thengai - *Cocosnucifera*L. (Dried kernel)
40. Koraikkizhangu - *Cyperus rotundus* L.(Rhizome)
41. Kostam - *Saussurea costus* (Falc.) Lipsch. (Root)
42. Kottamalli vithai - *Coriandrum sativum* L.(Seed)
43. Kovai ilai - *Coccinia grandis* (L.) Voigt(Leaf)
44. Kumkumapoo - *Crocus sativus* L. (Style & stigma)
45. Kuppaimeni - *Acalypha indica*L. (Leaf)
46. Iluppai poo -*Madhuca longifolia* (J.Koenig ex L.) J.F.Macbr. (Flower)
47. Manjal karicalai - *Wedelia chinensis* (Osbeck) Merr. (Whole plant)
48. Mavilangappattai - *Crataeva magna* (Lour.) DC. (Stem bark)
49. Milagaranai ver - *Toddalia asiatica* (L.) Lam.(Root)
50. Milagu - *Piper nigrum* L. (Fruit)
51. Moongil ilai -*Bambusa arundinacea* (Retz.) Roxb. (Leaf)
52. Murungai ilai - *Moringa oleifera* Lam. (Leaf)
53. Murungai pattai - *Moringaoleifera*Lam. (Stem bark)
54. Murungai poo - *Moringa oleifera* Lam. (Flower)
55. Musumusukkai - *Mukia maderaspatana* (L.) M.Roem.(Whole plant)
56. Mutchankan ver - *Azima tetracantha* Lam.(Root)
57. Naaikaduku - *Cleome viscosa* L. (Aerial portion)
58. Nachukkottai keerai - *Pisonia grandis* R. Br. (Aerial portion)
59. Nannari - *Hemidesmusindicus* (L.) R. Br. exSchult. (Root)
60. Nellikkai - *Phyllanthusemblica*L. (Fruit)
61. Nellivatral - *Phyllanthus emblica* L. (Dried fruit)
62. Nerunjil mul - *Tribulus terrestris* L. (Fruit)
63. Nerunjil ver - *Tribulus terrestris* L. (Root)
64. Nervalam - *Croton tiglium* L. (Seed)
65. Nilappanai kizhangu - *Curculigo orchioides* Gaertn. (Rhizome)
66. Nilavembu - *Andrographis paniculata* (Burm.f.) Wall. ex Nees (Aerial portion)
67. Nochi - *Vitex negundo*L. (Leaf)

68. Paeritchai - *Phoenix dactylifera*L.(Fruit)
69. Pagal ilai - *Momordicacharantia*L. (Leaf)
70. Panai vellam - Palm jaggery
71. Parangippattai - *Smilax china* L. (Stem bark)
72. Parpadagam - *Mollugo cerviana* (L.) Ser. (Whole plant)
73. Pasumunnai - *Premna latifolia* Roxb. (Leaf & Root)
74. Pazhampuli - *Tamarindus indicus* L. (Fruit pulp)
75. Peipudal - *Trichosanthes cucumerina*L.(Whole plant)
76. Perungayam - *Ferula assa-foetida* L. (Oleo-resin)
77. Perunjeeragam - *Foeniculum vulgare* Mill. (Fruit)
78. Pirandai - *Cissus quadrangularis*L. (Aerial portion)
79. Poongeerai - *Amaranthus cruentus*L. (Aerial portion)
80. Pudal ilai - *Trichosanthes anguina* L. (Leaf)
81. Sambu -*Typha domingensis* Pers. (Aerial portion)
82. Sandana thool - *Santalum album* L. (Wood powder)
83. Sangan ver pattai - *Azima tetracantha*Lam. (Root bark)
84. Sangankuppi ilai - *Clerodendrum inerme* (L.) Gaertn. (Leaf)
85. Sapota - *Manilkara zapota* (L.) Royen (Seed)
86. Seenthil - *Tinospora cordifolia* (Willd.) Miers (Stem)
87. Sengathari verpattai - *Capparis sepiaria*L. (Root bark)
88. Senkonrai pattai - *Cassia marginata*Roxb. (Stem bark)
89. Serankottai - *Semecarpus anacardium* L.f. (Fruit)
90. Sirukurinjan verpattai - *Gymnema sylvestre* (Retz.) R.Br. ex Sm (Root bark)
91. Sirukeerai - *Amaranthus tricolor* var. *tristis* L. (Leaf)
92. Sitramutti samoolam- *Sida cordifolia*L. (Whole plant)
93. Sivanarvembu verpattai - *Indigofera aspalathoides* DC. (Root bark).
94. Thagarai vithai - *Cassia tora* L.(Seed)
95. Thalai suruliverpattai - *Aristolochia indica*L. (Root bark)
96. Thalesapathiri - *Taxus wallichiana* Zucc. (Leaf)
97. Thandrikkai - *Terminaliabellirica*(Gaertn.) Roxb. (Fruit)
98. Thanneer vittan kizhangu - *Asparagus racemosus* Willd. (Rhizome)

99. Thekku ilai - *Tectona grandis* L.f. (Leaf)
100. Thippili - *Piper longum* L. (Fruit)
101. Thippiliver - *Piper longum* L. (Stem & root)
102. Thuthuvalai poo - *Solanum trilobatum* L. (Flower)
103. Thuthuvalai -*Solanum trilobatum* L. (Aerial portion)
104. Thottalsinungi - *Mimosa pudica* L. (Whole plant)
105. Thulasi - *Ocimum tenuiflorum* L. (Aerial portion)
106. Uttamani - *Pergularia daemia* (Forssk.) Chiov. (Whole plant)
107. Vai vidangam - *Embelia ribes* Burm.f. (Fruit)
108. Vazhai poo - *Musa paradisiaca* L.(Flower)
109. Velikkaathan - *Prosopis juliflora* (Sw.) DC. (Aerial portion)
110. Vellai kungiliyum - *Shorea robusta* Roth. (Resin)
111. Vellai poondu - *Allium sativum*L. (Bulb)
112. Vellaragu -*Enicostema axillare* (Poir. ex Lam.) A.Raynal (Whole plant)
113. Vellilothiram -*Symplocos racemosa* Roxb. (Stem bark)
114. Veppampoo -*Azadirachta indica* A. Juss. (Flower)
115. Vetrilai - *Piperbetle*L. (Leaf)
116. Vettiver - *Vetiveria zizanioides* (L.) Nash (Root)
117. Yaanai nerunjil - *Pedalium murex* L.(Aerial portion)
118. - - *Gomphrena serrata* L. (Aerial portion)

Herbarium and Museum:

120 Herbarium specimens and 150 raw drugs are being maintained.

Herbarium was prepared for the following plants.

1. Arali - *Nerium oleander* L.
2. Chemmandarai - *Bauhinia variegata* L.
3. Elanthai -*Ziziphus jujuba* Mill.
4. Gopuramthangi - *Andrographis echioides* (L.) Nees

5. Imbural - *Hedyotis puberula* (G.Don) Arn.
6. Karumpula - *Kirganelia reticulata* (Poir.) Baill.
7. Keezhanelli - *Phyllanthus amarus* Schum. & Thonn.
8. Kiranthinayagam - *Dipteracanthus patulus* (Jacq.) Nees
9. Kovai - *Coccinia grandis* (L.) Voigt.
10. Kozhingi - *Tephrosia purpurea* (L.) Pers.
11. Mayilmanikkam - *Ipomoeaquamoclit*L.
12. Mukkurattai - *Boerhaavia diffusa* L.
13. Musumusukkai - *Mukia maderaspatana* (L.) M.Roem.
14. Naithulasi - *Ocimum americanum* L.
15. Nattam-tagarai - *Senna occidentalis* (L.) Link
16. Nel - *Oryza sativa* L.
17. Nerunjil - *Tribulusterrestris*L.
18. Oomathai - *Datura metel* L.
19. Orithaz thaamarai - *Hybanthus enneaspermus* (L.) F.Muell.
20. *Pavazha malli* - *Nyctanthesarbor-tristis*L.
21. Pudal - *Trichosanthes anguina* L.
22. Puliyarai - *Oxalis corniculata* L.
23. Sornapatti - *Tecoma stans* (L.) Juss. ex Kunth
24. Taivelai - *Gynandropsis pentaphylla*Blanco
25. Thotta sinungi - *Mimosapudica*L.
26. Thuthuvalai - *Solanumtrilobatum*L.
27. Thumbai - *Leucas aspera* (Willd.) Link
28. Tintanali - *Biophytum sensitivum* DC
29. Valampuri - *Helicteresisora*L.
30. Vellaimandarai - *Bauhinia acuminata* L.
31. Yanai nerunjil - *Pedalium murex* L.
32. - - *Sphagneticolatrilobata* (L.) Pruski
33. - - *Dombeya rotundifolia* (Hochst.) Planch.
34. - - *Peristrophe bicalyculata* (Retz.) Nees

Guidance Imparted:

Guidance was provided for Ph.D, M.Pharm and M.D (Siddha) students with regard to Pharmacognostical aspects of their research work.

3.3. Drug Standardization Research

3.3.1. Drug Standardization at SCRI, Chennai.

➢ Standardization of Clinical Trial Drugs ➢ Identity, purity, strength and TLC of Siddha Pharmacopoeial single drugs and compound formulations ➢ Studies on adulterants / substitutes through TLC ➢ Identification of drugs of metal / mineral origin	

Fig. 7. Department of Chemistry, SCRI, Chennai

Standardization of single drugs under CTR Scheme

During the reporting year Physico-chemical parameters of seven single drugs were completed. The details of the plants are tabulated below:

Table-19: Physico-chemical parameters of single drugs under SPC Scheme

Sl. No	Tamil Name	Botanical Name	Anatomical Part	Place of Collection	Sample No.
1.	Mutchangan	*Azima tetracantha* Lam.	Root	Erode	I
2.	Bhoomi sarkkarai	*Maerua oblongifolia* (Forssk.) A. Rich.	Tuber	Senkottai	I
3.	Peypirku	*Luffa amara* Roxb.	Leaf	Mettur	I
4.	Poolankilangu	*Kaempferia galanga* L.	Tuber	Mettur	I
5.	Malaivembu	*Melia dubia* Cav.	Leaf	Mettur	I

6.	Ponthagarai	*Cassia occidentalis* L.	Leaf	Mettur	I
7.	Ponthagarai	*Cassia occidentalis* L.	Leaf	Chennai	II
8.	Marutontri	*Lawsonia inermis* L.	Root	Mettur	I
9.	Maratti mokku	*Ceiba pentandra* (L.) Gaertn.	Unripe fruit	Mettur	I
10.	Nalvelai	*Cleome gynandra* L.	Root	Mettur	I
11.	Mukhavelai	*Tephrosia spinosa* (L. f.) Pers.	Root	Mettur	I
12.	Vizhuthi	*Cadaba fruticosa* (L.) Druce	Leaf	Thozankadu	I
13.	Imbural	*Hedyotis puberula* (G. Don) Arn.	Root	Tirunelveli	I
14.	Piramatandu	*Argemone mexicana* L.	Whole plant	Mettur	I
15.	Marukkarai	*Catunaregum spinosa* (Thunb.) Tirur.	Seed	Mettur	I
16.	Pusani	*Benincasa hispida* (Thunb.) Cogn.	Seed	Mettur	I
17.	Curaivittu	*Lagenaria siceraria* (Molina) Standley	Seed	Mettur	I
18.	Agati	*Sesbania grandiflora*L.	Leaf	Tirunelveli	III
19.	Mookirattai	*Boerhaavia diffusa* L.	Leaf	Chennai	III
20.	Puthina	*Mentha arvensis* L.	Leaf	Chennai	II

Table-1: Physico-chemical parameters of Mutchangam – *Azima tetracantha* Root (Erode)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	8.83	8.79	8.81
2.	Total ash	16.258	16.241	16.249
3.	Acid-insoluble ash	2.20	2.24	2.22
4.	Water soluble extractive	22.41	22.30	22.35
5.	Alcohol soluble extractive	4.00	4.10	4.05

Table-2: Physico-chemical parameters of Bhoomisarkkarai – *Maerua oblongifolia* Tuber (Senkottai)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	12.56	12.39	12.42

2.	Total ash	8.30	8.25	8.28
3.	Acid-insoluble ash	1.70	1.75	1.73
4.	Water soluble extractive	16.79	16.67	16.73
5.	Alcohol soluble extractive	8.78	8.68	8.73

Table-3: Physico-chemical parameters of Peypirku – *Luffa amara* Roxb.Whole plant (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	7.89	8.91	8.40
2.	Total ash	6.803	6.803	6.803
3.	Acid-insoluble ash	0	0	0
4.	Water soluble extractive	16.79	16.67	16.73
5.	Alcohol soluble extractive	8.78	8.68	8.73

Table-4: Physico-chemical parameters of Poolankilangu – *Kaempferia galanga* rhizome (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	10.21	9.48	9.85
2.	Total ash	4.614	4.654	4.634
3.	Acid-insoluble ash	0	0	0
4.	Water soluble extractive	16.42	15.56	15.99
5.	Alcohol soluble extractive	6.39	6.09	6.24

Table-5: Physico-chemical parameters of Malaivembu – *Melia dubia* leaf (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	10.97	11.07	11.02
2.	Total ash	13.82	13.77	13.79
3.	Acid-insoluble ash	5.19	5.19	5.19
4.	Water soluble extractive	35.00	34.98	34.99
5.	Alcohol soluble extractive	9.49	9.29	9.39

Table-6: Physico-chemical parameters of Ponthagarai –*Cassia occidentalis* (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	11.21	10.99	11.10
2.	Total ash	9.91	9.99	9.51
3.	Acid-insoluble ash	2.60	2.49	2.55
4.	Water soluble extractive	34.18	34.51	34.35
5.	Alcohol soluble extractive	12.29	12.60	12.45

Table-7: Physico-chemical parameters of Ponthagarai- *Cassia occidentalis* Leaf (Chennai)

Sl. No.	Parameters	I	II	Mean% CK
1.	Loss on drying at 105° C	14.08	14.20	14.14
2.	Total ash	10.90	10.90	10.90
3.	Acid-insoluble ash	1.65	2.40	2.03
4.	Water soluble extractive	31.00	31.10	31.05
5.	Alcohol soluble extractive	16.90	15.30	16.10

Table-8: Physico-chemical parameters of Marutontri ver - *Lawsonia inermis* root (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	9.17	9.24	9.21
2.	Total ash	13.37	13.20	13.29
3.	Acid-insoluble ash	1.30	1.25	1.28
4.	Water soluble extractive	19.18	18.90	19.04
5.	Alcohol soluble extractive	23.22	24.07	23.64

Table-9: Physico-chemical parameters of Maratti mokku – *Ceiba pentandra* Unripe fruit (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	12.39	12.25	12.32
2.	Total ash	6.40	6.39	6.40
3.	Acid-insoluble ash	0.55	0.45	0.50

4.	Water soluble extractive	17.07	16.97	17.02
5.	Alcohol soluble extractive	9.47	9.48	9.47

Table-10: Physico-chemical parameters of Nalvelai – *Cleome gynandra* Root (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	9.79	9.85	9.82
2.	Total ash	8.05	8.049	8.049
3.	Acid-insoluble ash	1.05	0.999	1.024
4.	Water soluble extractive	10.79	10.80	10.79
5.	Alcohol soluble extractive	3.39	3.50	3.45

Table-11: Physico-chemical parameters of Mukhavelai – *Tephrosia spinosa* Root (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	9.12	9.13	9.13
2.	Total ash	7.450	7.403	7.426
3.	Acid-insoluble ash	0.5	0.5	0.5
4.	Water soluble extractive	7.00	7.00	7.00
5.	Alcohol soluble extractive	4.49	4.60	4.55

Table-12: Physico-chemical parameters of Vizhuthi – *Cadaba fruiticosa* leaf (Thozankadu)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	10.87	10.92	10.89
2.	Total ash	12.55	12.55	12.55
3.	Acid-insoluble ash	2.67	2.65	2.66
4.	Water soluble extractive	37.07	37.28	37.18
5.	Alcohol soluble extractive	17.40	17.70	17.55

Table-13: Physico-chemical parameters of Imbural – *Hedyotis puberula* Root (Tirunelveli)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	10.01	9.95	9.98
2.	Total ash	8.40	8.35	8.38

3.	Acid-insoluble ash	1.80	1.85	1.83
4.	Water soluble extractive	15.19	15.00	15.09
5.	Alcohol soluble extractive	29.97	30.17	30.07

Table-14: Physico-chemical parameters of Biramathandu – *Argemone mexicana* Whole plant (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	14.55	14.44	14.49
2.	Total ash	11.71	11.59	11.65
3.	Acid-insoluble ash	2.25	2.20	2.23
4.	Water soluble extractive	33.82	33.60	33.71
5.	Alcohol soluble extractive	19.20	19.61	19.40

Table-15: Physico-chemical parameters of Marukkarai - *Catunaregam spinosa* Seed (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	8.75	8.78	8.76
2.	Total ash	3.20	3.35	3.28
3.	Acid-insoluble ash	0.00	0.05	0.03
4.	Water soluble extractive	35.10	34.20	34.65
5.	Alcohol soluble extractive	21.60	21.30	21.45

Table-16: Physico-chemical parameters of Pusani vittu – *Benincasa hispida* Seed (Mettur)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	7.55	7.41	7.48
2.	Total ash	3.59	3.54	3.57
3.	Acid-insoluble ash	0.10	0.10	0.10
4.	Water soluble extractive	9.68	9.50	9.59
5.	Alcohol soluble extractive	8.69	8.70	8.70
6.	n-Hexane soluble extractive	15.83	15.83	15.83

Table-17: Physico-chemical parameters of Curai vittu – *Lagenaria siceraria* Seed (Mettur)

Sl.	Parameters	I	II	Mean%

No.				
1.	Loss on drying at 105° C	7.50	7.40	7.45
2.	Total ash	2.45	2.69	2.57
3.	Acid-insoluble ash	0	0	0
4.	Water soluble extractive	17.38	17.30	17.34
5.	Alcohol soluble extractive	9.70	9.50	9.60
6.	n-Hexane soluble extractive	13.10	13.10	13.10

Table-18: Physico-chemical parameters of Agati - *Sesbania grandiflora* Leaf (Tirunelveli)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	10.194	10.250	10.222
2.	Total ash	8.700	8.654	8.677
3.	Acid-insoluble ash	1.250	1.200	1.225
4.	Water soluble extractive	33.600	33.383	33.491
5.	Alcohol soluble extractive	15.200	15.407	15.303

Table-19: Physico-chemical parameters of Mookirattai- *Boerhaavia diffusa* Leaf (Chennai)

Sl. No.	Parameters	I	II	Mean% CK
1.	Loss on drying at 105° C	13.03	12.93	12.98
2.	Total ash	14.85	14.80	14.83
3.	Acid-insoluble ash	1.75	1.35	1.55
4.	Water soluble extractive	23.4	24.00	23.70
5.	Alcohol soluble extractive	13.80	13.40	13.60

Table-20: Physico-chemical parameters of Puthina- *Mentha arvensis* Leaf (Chennai)

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	14.38	14.45	14.41
2.	Total ash	10.20	10.35	10.28
3.	Acid-insoluble ash	1.30	1.50	1.40
4.	Water soluble extractive	21.00	22.00	21.50
5.	Alcohol soluble extractive	17.60	16.20	16.90

Standardisation of Compound Formulations

Physico-chemical parameters of Thalisathy chooranam, Amukkarac chooranam and Parangipattai chooranam (each 4 batches); Sangu parpam and Silasathu parpam (each 1

batch) allotted under SPC were completed. The second batch of OA1 chooranam allotted under clinical trial was also analyzed and the results are tabulated. The TLC photo documentation and HPTLC finger printing of these drugs are yet to be done. Poovarasam pattai kudineer, a drug allotted under clinical trial was analysed for heavy metals, pesticide residue, microbial load and aflatoxin. The TLC photo documentation and HPTLC finger printing of Poovarasam pattai kudineer and D5 chooranam were also completed.

Table-21: Physico-chemical parameters of Thalisathy chooranam

S.No	Parameters	Batch I	Batch II	Batch III	Batch IV
1.	Loss on drying at 105°C (%)	5.11	4.08	6.28	6.40
2.	Total ash (%)	4.42	6.60	6.73	6.49
3.	Acid-insoluble ash (%)	1.11	1.22	1.05	0.75
4.	Water soluble extractive (%)	43.02	19.90	20.1	20.24
5.	Alcohol soluble extractive (%)	41.47	18.95	19.95	20.43
6.	pH (10% solution)	-	-	5.02	7.0

Table-22: Physico-chemical parameters of Amukkarac chooranam

S.No	Parameter	Batch I	Batch II	Batch III	Batch IV
1.	Loss on drying at 105°C (%)	3.93	3.60	3.87	3.94
2.	Total ash (%)	3.09	3.36	2.95	2.63
3.	Acid-insoluble ash (%)	1.31	0.35	0.93	0.48
4.	Water soluble extractive (%)	56.45	54.05	56.35	56.26
5.	Alcohol soluble extractive (%)	31.39	33.48	29.06	37.7
6.	pH (10% solution)	5.75	6.8	6.04	6.30

Table-23: Physico-chemical parameters of Parangipattai chooranam

S.No.	Parameter	Batch I	Batch II	Batch III	Batch IV
1.	Loss on drying at 105°C (%)	10.52	6.88	6.61	5.34
2.	Total ash (%)	2.06	6.14	3.10	7.40
3.	Acid-insoluble ash (%)	0.45	0.75	0.55	1.48
4.	Water soluble extractive (%)	10.25	8.09	10.05	11.93
5.	Alcohol soluble extractive (%)	6.10	2.79	7.85	7.78
6.	pH (10% solution)	-	-	-	4.71

Table-24: Physico-chemical parameters of Sangu Parpam (Batch I)

S.No.	Parameter	I	II	III
1.	Loss on drying at 105°C (%)	1.0	1.3	1.15
2.	Total ash (%)	93.02	94.20	93.61
3.	Water soluble ash (%)	6.57	6.99	6.78
4.	Alkalinity (ml/0.1N HCl)	5.4	5.4	5.4
5.	Acid-insoluble ash (%)	8.66	8.10	8.38
6.	pH (10% solution)	9.79		

Table-25: Physico-chemical parameters of Silasathu Parpam (Batch I)

S.No.	Parameter	I	II	III
1.	Loss on drying at 105°C (%)	1.55	1.52	1.54
2.	Total ash (%)	92.10	92.16	92.13
3.	Water soluble ash (%)	4.15	3.80	3.98
4.	Alkalinity (ml/0.1N HCl)	0.3	0.3	0.3
5.	Acid-insoluble ash (%)	24.49	23.19	23.84
	pH (10% solution)	7.28		

Table-26: Physico-chemical parameters of OA1 chooranam (Batch II)

S.No.	Parameters	I	II	III
1.	Loss on drying at 105° C (%)	7.29	7.07	7.18
2.	Total ash (%)	18.80	19.55	19.18
3.	Acid-insoluble ash (%)	2.15	2.35	2.25
4.	Water soluble extractive (%)	18.9	17.7	18.3
5.	Alcohol soluble extractive (%)	6.0	5.0	5.5
6.	pH (10% solution)	5.76	5.76	5.76

Table-27: Heavy Metals Analysis of Poovarasam Pattai Kudineer

S. No	Parameter	Value	WHO Limit
1.	Lead	<0.03 ppm	10 ppm
2.	Cadmium	<0.01 ppm	0.3 ppm
3.	Mercury	2.84 ppm	1 ppm
4.	Arsenic	0.17 ppm	3 ppm
(ICP-OES method)			

Table-29: Pesticide Residue Analysis of Poovarasam Pattai Kudineer

S. No	Parameter	Value
1.	Organo chlorine	BDL (DL 0.005 mg/kg)
2.	Organophosphorus	
(AOAC method)		

Table-30: Microbial load and pathogens of Poovarasam Pattai Kudineer

S. No	Parameter	Value	WHO Limit (CFU/g)
1.	*E. coli*	Absent	10
2.	*Salmonella* spp.	Absent	None
3.	*Pseudomonoasaeruginosa*	Absent	Absent
4.	*Staphylococcus aureus*	Absent	Absent
5.	Enterobacteriacea	<10	10^3
6.	Total Bacterial count	10	10^5
7.	Total Fungal count	<10	10^3
(WHO method)			

Table-31: Aflatoxin Analysis of Poovarasam Pattai Kudineer

S. No	Parameter	Value
1.	B1	BDL (DL 0.3 µg/kg)
2.	B2	
3.	G1	
4.	G2	
(AOAC method)		

7.3. TLC photo documentation and HPTLC finger print of Poovarasam Pattai Kudineer

50 ml of Poovarasam pattai kudineer was twice extracted with n-butanol (10 ml x 2) and separate and separated from aqueous using separating funnel. The separated n-butanol soluble was freed from solvent under reduced pressure. The residue was redissolved in ethanol and made up to 10 ml in a standard flask. 10 and 20 µl of this extract was applied on TLC aluminium plate precoated with Silica gel 60 F_{254} (Merck) of 0.2 mm thickness. Then developed in the solvent system of Butanol : Acetic Acid : Water (6.3 : 2.7 : 1, v/v) unto a height of 8 cm. The developed plate was viewed under UV 254 nm, 366 nm and the images were documented. Then dipped in vanillin sulphuric acid reagent, viewed under UV 366 nm

and image was documented. Then the plate was heated in an oven at 105^0C till the development of colour of the spots and the image was documented.

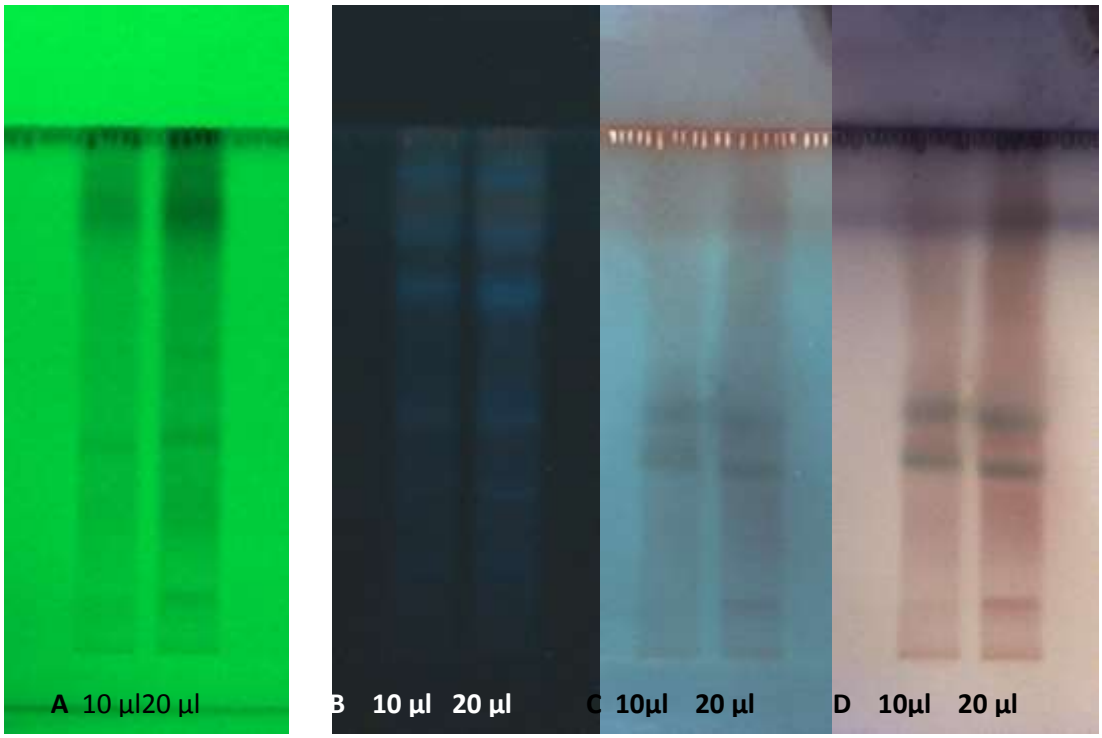


Figure 1. TLC Photo Documentation of Poovarasam Pattai Kudineer

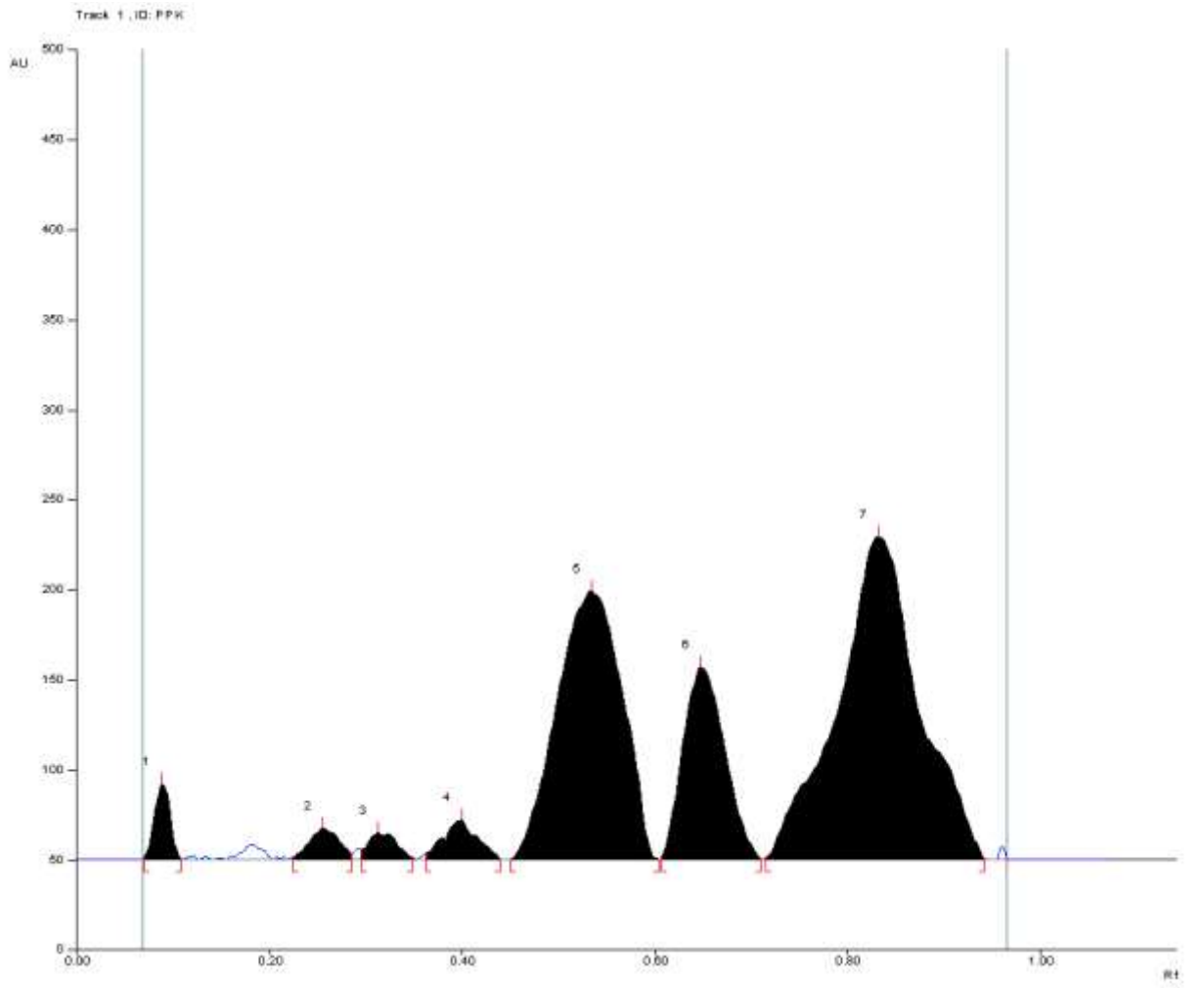
A. Under UV 254 nm;

B. Under 366 nm;

C. under 366 nm after dipping in Vanillin-sulphuric acid;

D. Under white light after dipping in vanillin-sulphuric acid

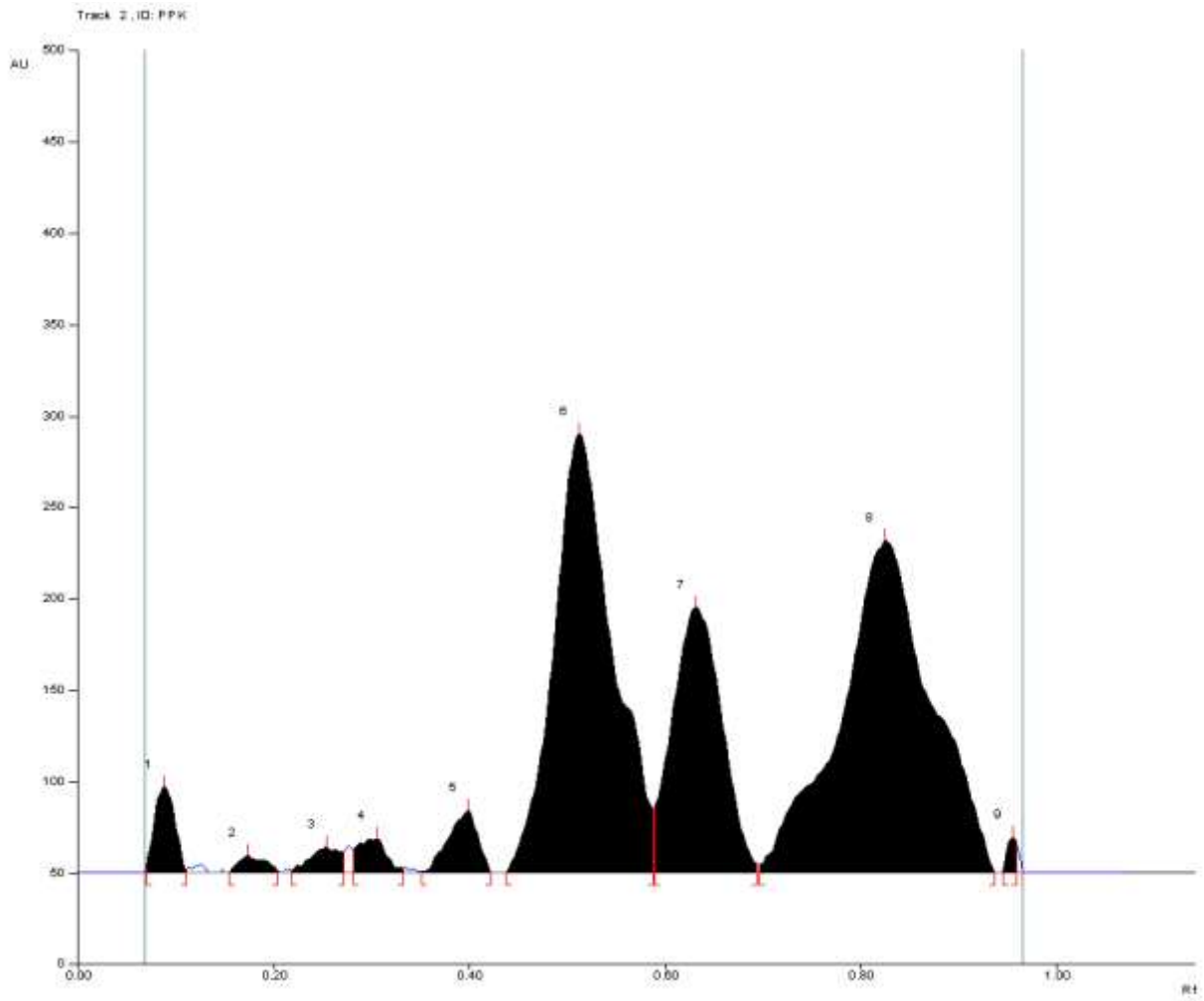
Solvent System : Butanol :Acetic Acid: Water (6.3:2.7:1, v/v)



Track 1, ID: PPK

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	0.07 Rf	0.7 AU	0.09 Rf	41.9 AU	7.88 %	0.11 Rf	0.4 AU	553.9 AU	2.12 %	unknown *
2	0.22 Rf	1.4 AU	0.26 Rf	17.4 AU	3.28 %	0.29 Rf	3.1 AU	435.0 AU	1.66 %	unknown *
3	0.30 Rf	5.5 AU	0.31 Rf	14.9 AU	2.80 %	0.35 Rf	1.1 AU	357.3 AU	1.37 %	unknown *
4	0.36 Rf	3.6 AU	0.40 Rf	21.9 AU	4.12 %	0.44 Rf	0.1 AU	626.7 AU	2.40 %	unknown *
5	0.45 Rf	0.1 AU	0.53 Rf	149.3 AU	28.08 %	0.60 Rf	0.1 AU	8198.1 AU	31.34 %	unknown *
6	0.61 Rf	0.5 AU	0.65 Rf	106.9 AU	20.12 %	0.71 Rf	0.5 AU	3773.3 AU	14.43 %	unknown *
7	0.72 Rf	1.3 AU	0.83 Rf	179.3 AU	33.73 %	0.94 Rf	0.5 AU	12211.3 AU	46.69 %	unknown *

Figure 2. HPTLC finger print profile of 10 µl of Poovarasam Pattai Kudineer



Track 2, ID: PPK

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	0.07 Rf	2.9 AU	0.09 Rf	47.0 AU	6.63 %	0.11 Rf	2.2 AU	788.6 AU	2.31 %	unknown *
2	0.15 Rf	0.1 AU	0.17 Rf	9.6 AU	1.35 %	0.20 Rf	1.1 AU	201.9 AU	0.59 %	unknown *
3	0.22 Rf	1.0 AU	0.25 Rf	13.8 AU	1.95 %	0.27 Rf	11.3 AU	344.9 AU	1.01 %	unknown *
4	0.28 Rf	12.6 AU	0.31 Rf	18.4 AU	2.60 %	0.33 Rf	2.3 AU	440.0 AU	1.29 %	unknown *
5	0.35 Rf	0.5 AU	0.40 Rf	34.1 AU	4.80 %	0.42 Rf	0.2 AU	818.2 AU	2.40 %	unknown *
6	0.44 Rf	0.1 AU	0.51 Rf	240.0 AU	33.85 %	0.59 Rf	35.1 AU	11709.5 AU	34.36 %	unknown *
7	0.59 Rf	35.7 AU	0.63 Rf	145.3 AU	20.50 %	0.69 Rf	4.9 AU	5931.8 AU	17.41 %	unknown *
8	0.70 Rf	4.3 AU	0.83 Rf	181.5 AU	25.60 %	0.94 Rf	0.1 AU	13695.2 AU	40.19 %	unknown *
9	0.95 Rf	1.0 AU	0.96 Rf	19.3 AU	2.72 %	0.96 Rf	15.9 AU	147.5 AU	0.43 %	unknown *

Figure 3. HPTLC finger print profile of 10 µl of Poovarasam Pattai Kudineer

7.4. TLC photo documentation and HPTLC finger print of D5 chooranam

4 g of D5 chooranam was soaked overnight in chloroform and boiled for 10 minutes. Filtered and concentrated to 10 ml with chloroform. This extract was applied on TLC aluminium plate precoated with Silica gel 60 F_{254} (Merck) of 0.2 mm thickness. Then developed in the solvent system of Toluene: Ethyl acetate (9.5:1.0, v/v) up to a height of 8 cm. The developed plate was viewed under UV 254 nm and 366 nm and the images were documented. Then dipped in vanillin sulphuric acid reagent, viewed under UV 366 nm and image was documented. Then the plate was heated in an oven at 105^0C till the development of colour of the spots and the image was documented.

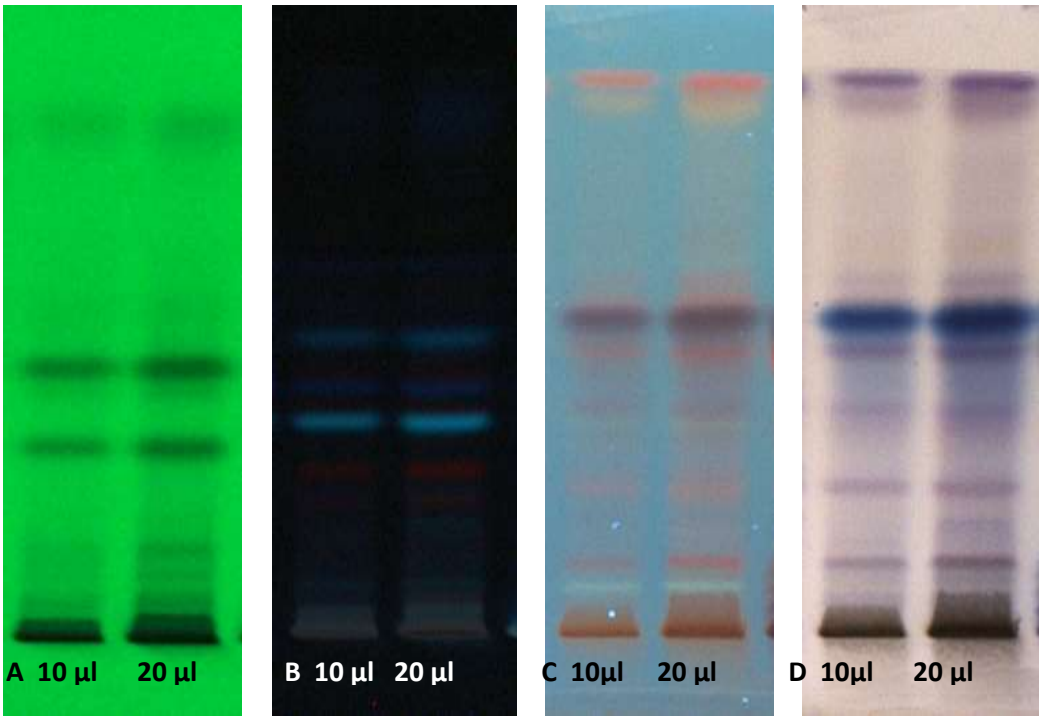


Figure 4. TLC photodocumentation of D5 chooranam

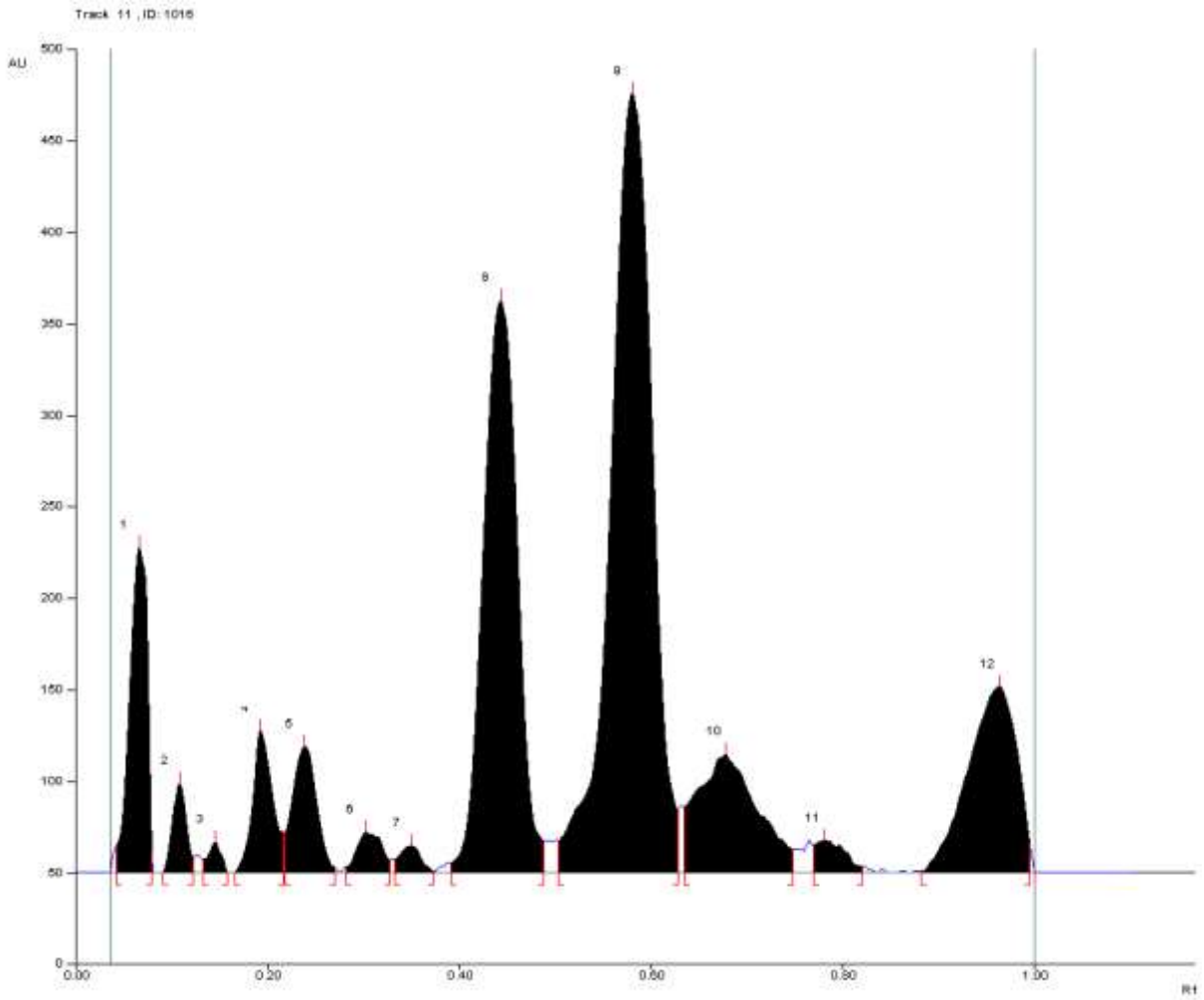
A. Under UV 254 nm;

B. Under 366 nm;

C. Under366 nm after dipping in Vanillin-sulphuric acid;

D. Under white light after dipping in vanillin-sulphuric acid

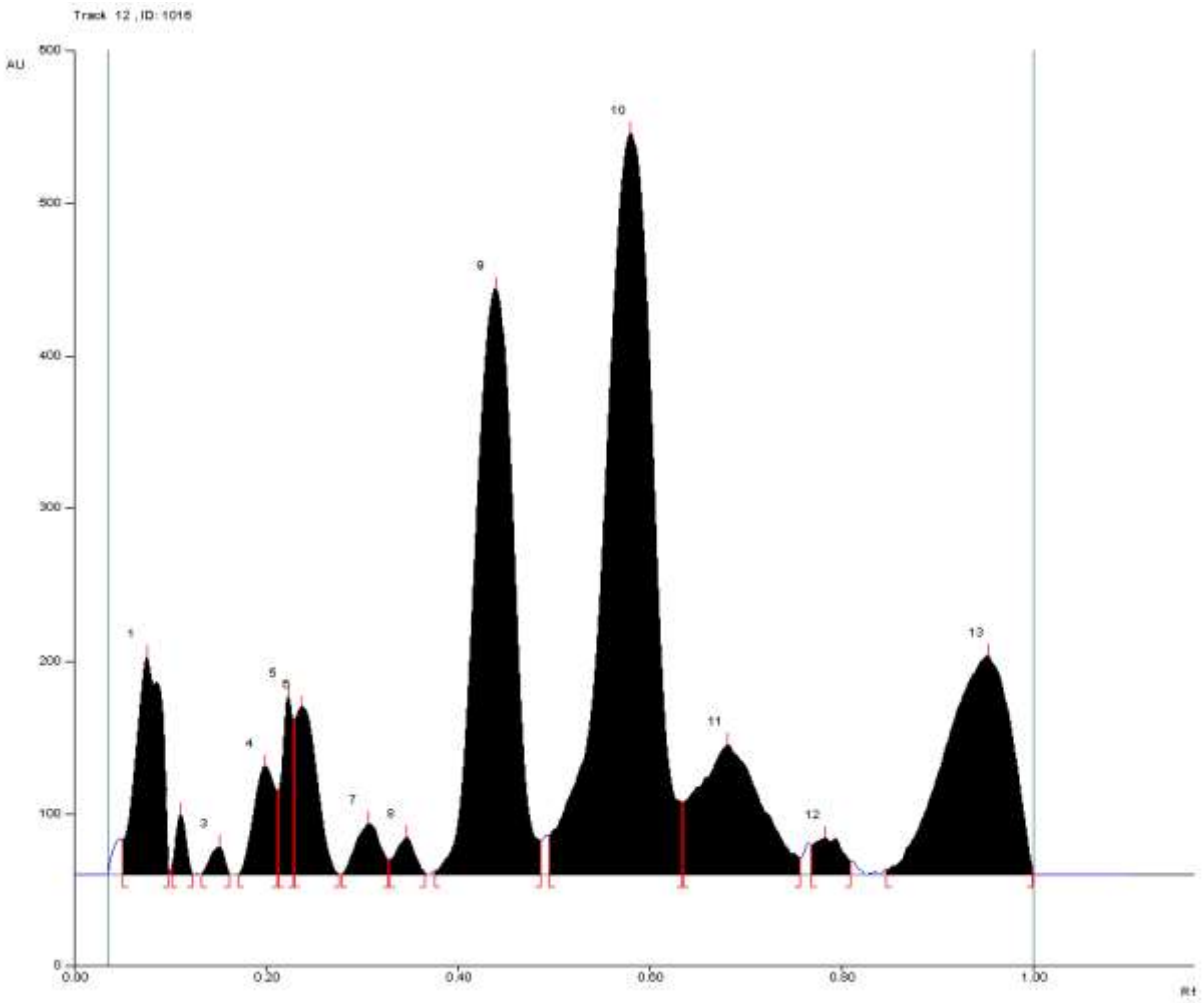
Solvent System : Toluene: Ethyl acetate (9.5:1.0, v/v)



Track 11, ID: 1016

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	0.04 Rf	14.2 AU	0.07 Rf	177.6 AU	13.17 %	0.08 Rf	10.4 AU	2949.5 AU	6.98 %	unknown *
2	0.09 Rf	0.1 AU	0.11 Rf	48.8 AU	3.62 %	0.12 Rf	8.7 AU	599.6 AU	1.42 %	unknown *
3	0.13 Rf	7.1 AU	0.15 Rf	16.4 AU	1.22 %	0.16 Rf	0.3 AU	204.3 AU	0.48 %	unknown *
4	0.17 Rf	0.1 AU	0.19 Rf	77.6 AU	5.76 %	0.22 Rf	21.8 AU	1448.3 AU	3.43 %	unknown *
5	0.22 Rf	22.0 AU	0.24 Rf	68.8 AU	5.11 %	0.27 Rf	2.8 AU	1505.5 AU	3.56 %	unknown *
6	0.28 Rf	3.0 AU	0.30 Rf	22.0 AU	1.63 %	0.33 Rf	6.9 AU	504.3 AU	1.19 %	unknown *
7	0.33 Rf	7.6 AU	0.35 Rf	14.6 AU	1.08 %	0.37 Rf	0.4 AU	293.2 AU	0.69 %	unknown *
8	0.39 Rf	5.2 AU	0.44 Rf	312.5 AU	23.18 %	0.49 Rf	17.3 AU	9758.4 AU	23.09 %	unknown *
9	0.50 Rf	17.6 AU	0.58 Rf	426.0 AU	31.60 %	0.63 Rf	34.8 AU	16266.3 AU	38.48 %	unknown *
10	0.64 Rf	36.0 AU	0.68 Rf	64.6 AU	4.79 %	0.75 Rf	13.0 AU	3616.3 AU	8.55 %	unknown *
11	0.77 Rf	15.0 AU	0.78 Rf	17.4 AU	1.29 %	0.82 Rf	3.2 AU	484.9 AU	1.15 %	unknown *
12	0.86 Rf	0.4 AU	0.96 Rf	101.8 AU	7.55 %	1.00 Rf	15.9 AU	4644.4 AU	10.99 %	unknown *

Figure 5. Finger print profile of 10 µl chloroform extract of D5 chooranam.



Track 12, ID: 1016

Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	0.05 Rt	23.3 AU	0.08 Rt	142.5 AU	8.49 %	0.10 Rt	9.0 AU	3389.7 AU	5.70 %	unknown *
2	0.10 Rt	5.1 AU	0.11 Rt	39.2 AU	2.34 %	0.12 Rt	0.6 AU	364.3 AU	0.61 %	unknown *
3	0.13 Rt	0.3 AU	0.15 Rt	18.2 AU	1.08 %	0.16 Rt	0.5 AU	238.7 AU	0.40 %	unknown *
4	0.17 Rt	0.1 AU	0.20 Rt	70.8 AU	4.22 %	0.21 Rt	34.4 AU	1401.3 AU	2.36 %	unknown *
5	0.21 Rt	54.5 AU	0.22 Rt	117.1 AU	6.98 %	0.23 Rt	30.5 AU	1169.4 AU	2.00 %	unknown *
6	0.23 Rt	100.6 AU	0.24 Rt	110.1 AU	6.56 %	0.26 Rt	0.2 AU	2203.4 AU	3.70 %	unknown *
7	0.26 Rt	0.3 AU	0.31 Rt	33.4 AU	1.99 %	0.33 Rt	9.6 AU	721.9 AU	1.21 %	unknown *
8	0.33 Rt	9.7 AU	0.35 Rt	24.6 AU	1.46 %	0.37 Rt	1.6 AU	430.7 AU	0.72 %	unknown *
9	0.38 Rt	2.4 AU	0.44 Rt	384.6 AU	22.92 %	0.49 Rt	22.3 AU	13543.5 AU	22.76 %	unknown *
10	0.50 Rt	25.5 AU	0.58 Rt	485.4 AU	28.93 %	0.63 Rt	47.2 AU	21660.7 AU	36.41 %	unknown *
11	0.64 Rt	47.3 AU	0.68 Rt	84.7 AU	5.05 %	0.76 Rt	11.2 AU	4995.8 AU	8.40 %	unknown *
12	0.77 Rt	19.3 AU	0.78 Rt	23.9 AU	1.43 %	0.81 Rt	6.6 AU	620.9 AU	1.04 %	unknown *
13	0.85 Rt	2.9 AU	0.95 Rt	143.4 AU	8.54 %	1.00 Rt	5.1 AU	8734.7 AU	14.68 %	unknown *

Figure 6. Finger print profile of 20µl chloroform extract of D5 chooranam.

Apart from the allotted work, the extraction, TLC, analytical parameters, assay, authentication of metals and minerals, etc. were carried out for students and research scholars on payment basis.Fund generated through research assistance during the year 2012- 2013: ₹ 19,295.00/-

3.3.2. Drug standardization at SRRI, Thiruvananthapuram

➢ Drug standardization ➢ Phytochemical investigations ➢ Extraction of medicinal plants	

Fig. 8. Department of Chemistry, SRRI, Thiruvananthapuram

(i) Standardization of Single Drugs

Physico-chemical parameters of 33 samples of 23 single drugs have been completed and the results of the following single drugs are tabulated below:

Table (1): Name of Single Drugs analysed during April 2013- March 2014

Sl. No.	Botanical Name	Tamil Name	Part	Place of Collection	No. of Samples
1	*Acacia catechu* (L.f.) Willd.	Kachikkattai	Resin	Mettur	I
2	*Alangium salvifolium* (L.f.) Wang.	Alinjil	Root bark	Poojappura, Mettur	II, III
3	*Albizia procera* Benth.	Ciruvakai	Root	Mettur	I
4	*Andrographis paniculata* Nees	Nilavembu	Whole plant	TVPM, Peyadu	II, III

5	*Caesalpinia bonduc (L) Roxb.*	Kalarci	Leaf	TVPM (2)	II, III
6	*Caesalpinia bonduc (L) Roxb.*	Kalarci	Bark	Poojappura, Mettur	II, III
7	*Calotropis gigantea* (L.) Ait.f.	Erruku	Leaf	TVPM, Peyadu	II, III
8	*Calotropis gigantea* (L.) Ait.f.	Erruku	Flower	Poojappura, Mettur	II,III
9	*Capparis zeylanica* L.	Athondai	Leaf	Mettur	III
10	*Cassia italica* (Mill) Lam.ex Ander	Nilayavarai	Leaf	Mettur, Poojappura	I, II
11	*Ceiba pentandra* (L.) Gaertn.	Ilavampisin	Resin	Mettur	I
12	*Citrus aurantifolia* (Christm.) Swingle	Elumitchi	Fruit	Mettur	I
13	*Desmodium trifolium* (L.) DC	Sirupulladi	Root	Mettur	II
14	*Elytaria acaulis* (L.f) Lindan	Nilakkadambu	Whole plant	Mettur	I
15	*Gmelina asiatica* L.	Sirukumiz	Root	Mettur	I
16	*Gossypium herbaceum* L.	Cemparuthippu	Flower	Mettur, Poojappura	I, II
17	*Lannea coromadelica* (Houtt.) Merr.	Othiyam	Stem bark	Mettur(2), Poojappura	I, II, III
18	*Limonia crenulata* Roxb.	Siruvizha	Root	Mettur	1
19	*Morinda pubescens* J.E.Sm,	Nuna	Leaves	Peyadu	II
20	*Pavetta indica L. var indica*	Pavattai	Leaves	Mettur	I
21	*Tragia involucrate* L.	Cirukancori	Leaves	Peyadu	III
22	*Trichosanthes cucumerina* L.,	Peypudal	Whole plant	Peyadu	II
23	*Trichosanthes tricuspidata* Lour.	Savuri	Fruit	Mettur	I

Table (2): Physico-chemical parameters of *Acacia catechu* (L.f.) Willd. (Kachikkattai) Resin

Sl. No.	Parameter	I
1.	Foreign Matter %	Nil
2.	Loss on Drying at 105^0C %	15.37
3.	Total Ash Content %	7.11
4.	Acid Insoluble Ash %	0.49
5.	Water Soluble Extractive %	80.03
6.	Alcohol Soluble Extractive %	53.91
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (3): Physico-chemical parameters of *Alangium salvifolium* (L.f.) Wang. (Alinjil) Root bark

Sl. No.	Parameter	*I	II	III
1.	Foreign Matter %	<2	<2	<2
2.	Loss on Drying at 105^0C %	11.54	12.36	10.11
3.	Total Ash Content %	10.91	10.10	6.77
4.	Acid Insoluble Ash %	3.33	1.33	0.61
5.	Water Soluble Extractive %	20.15	17.85	20.20
6.	Alcohol Soluble Extractive %	14.47	14.02	12.26
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

*This result was reported in the annual report 2012-2013.

Table (4): Physico-chemical parameters of *Albizia procera* Benth. (Ciruvakai) Root

Sl. No.	Parameter	I
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	8.11
3.	Total Ash Content %	1.17
4.	Acid Insoluble Ash %	0.27
5.	Water Soluble Extractive %	8.28
6.	Alcohol Soluble Extractive %	10.20
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (5): Physico-chemical parameters of *Andrographis paniculata* Nees (Nilavembu) Whole plant

Sl. No.	Parameter	*I	II	III
1.	Foreign Matter %	Nil	Nil	Nil
2.	Loss on Drying at 105^0C %	12.16	18.02	16.58
3.	Total Ash Content %	7.53	7.54	6.35
4.	Acid Insoluble Ash %	0.98	0.43	1.42
5.	Water Soluble Extractive %	15.72	13.32	8.32
6.	Alcohol Soluble Extractive %	11.22	6.51	6.19
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

*This result was reported in the annual report 2012-2013

Table (6): Physico-chemical parameters of *Caesalpinia bonduc (L) Roxb.* (Kalarci) Leaves

Sl.	Parameter	*I	II	III

No.				
1.	Foreign Matter %	Nil	Nil	Nil
2.	Loss on Drying at 105^0C %	11.66	18.50	18.49
3.	Total Ash Content %	7.25	6.36	5.58
4.	Acid Insoluble Ash %	1.25	2.01	0.58
5.	Water Soluble Extractive %	21.69	22.56	19.49
6.	Alcohol Soluble Extractive %	15.94	17.04	17.42
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

*This result was reported in the annual report 2012-2013

Table (7): Physico-chemical parameters of *Caesalpinia bonduc (L) Roxb.* (Kalarci) Bark

Sl. No.	Parameter	*I	II
1.	Foreign Matter %	Nil	Nil
2.	Loss on Drying at 105^0C %	10.39	18.01
3.	Total Ash Content %	2.25	3.41
4.	Acid Insoluble Ash %	0.15	0.19
5.	Water Soluble Extractive %	12.00	9.04
6.	Alcohol Soluble Extractive %	15.04	11.04
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

*This result was reported in the annual report 2012-2013

Table (8): Physico-chemical parameters of *Calotropis gigantea* (L.) Ait.f. (Erruku) Leaves

Sl.	Parameter	*I	II	III

No.				
1.	Foreign Matter %	<2	<2	<2
2.	Loss on Drying at 105^0C %	15.10	9.78	15.23
3.	Total Ash Content %	9.82	13.31	8.78
4.	Acid Insoluble Ash %	0.53	0.66	1.32
5.	Water Soluble Extractive %	28.21	23.07	19.39
6.	Alcohol Soluble Extractive %	13.69	10.58	4.94
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

*This result was reported in the annual report 2012-2013

Table (9): Physico-chemical parameters of *Calotropis gigantea* (L.) Ait.f. (Erruku) Flowers

Sl. No.	Parameter	*I	II
1.	Foreign Matter %	Nil	Nil
2.	Loss on Drying at 105^0C %	18.60	19.41
3.	Total Ash Content %	10.87	7.76
4.	Acid Insoluble Ash %	0.78	0.72
5.	Water Soluble Extractive %	26.17	21.09
6.	Alcohol Soluble Extractive %	14.09	8.80
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

*This result was reported in the annual report 2012-2013

Table (10): Physico-chemical parameters of *Capparis zeylanica* L. (Athondai) Leaf

Sl. No.	Parameter	#I	*II	III

1.	Foreign Matter %	Nil	Nil	
2.	Loss on Drying at 105^0C %	10.85	9.99	10.68
3.	Total Ash Content %	11.55	11.93	11.51
4.	Acid Insoluble Ash %	1.14	1.02	1.08
5.	Water Soluble Extractive %	25.63	25.46	29.20
6.	Alcohol Soluble Extractive %	8.78	9.44	11.93
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

#This result was reported in the annual report 2010-2011

*This result was reported in the annual report 2012-2013

Table (11): Physico-chemical parameters of *Cassia italica* (Mill) Lam.ex Ander (Nilayavarai) Leaf

Sl. No.	**Parameter**	**I**	**II**
1.	Foreign Matter %	<2	<2
2.	Loss on Drying at 105^0C %	10.42	12.83
3.	Total Ash Content %	9.51	10.90
4.	Acid Insoluble Ash %	1.79	1.92
5.	Water Soluble Extractive %	20.01	22.00
6.	Alcohol Soluble Extractive %	3.62	3.93
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

Table (12): Physico-chemical parameters of *Ceiba pentandra* (L.) Gaertn. (Ilavampisin) Resin

Sl.	**Parameter**	**I**

No.		
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	15.49
3.	Total Ash Content %	3.80
4.	Acid Insoluble Ash %	2.16
5.	Water Soluble Extractive %	32.88
6.	Alcohol Soluble Extractive %	25.99
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (13): Physico-chemical parameters of *Citrus aurantifolia* (Christm.) Swingle (Elumitchi) Fruit

Sl. No.	Parameter	I
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	14.63
3.	Total Ash Content %	4.95
4.	Acid Insoluble Ash %	0.22
5.	Water Soluble Extractive %	41.28
6.	Alcohol Soluble Extractive %	30.24
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (14): Physico-chemical parameters of *Desmodium trifolium* (L.) DC (Sirupulladi) Root

Sl. No.	Parameter	*I	II
1.	Foreign Matter %	<2	<2

2.	Loss on Drying at 105^0C %	10.70	10.64
3.	Total Ash Content %	4.11	5.51
4.	Acid Insoluble Ash %	0.45	0.62
5.	Water Soluble Extractive %	8.37	9.59
6.	Alcohol Soluble Extractive %	8.43	8.41
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

*This result was reported in the annual report 2012-2013

Table (15): Physico-chemical parameters of *Elytaria acaulis* (L.f) Lindan (Nilakkadambu) Whole plant

Sl. No.	**Parameter**	**I**
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	18.38
3.	Total Ash Content %	10.15
4.	Acid Insoluble Ash %	3.85
5.	Water Soluble Extractive %	8.59
6.	Alcohol Soluble Extractive %	3.69
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (16): Physico-chemical parameters of *Gmelina asiatica* L. (Sirukumiz) Root

Sl. No.	**Parameter**	**I**
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	12.69

3.	Total Ash Content %	1.40
4.	Acid Insoluble Ash %	0.20
5.	Water Soluble Extractive %	8.84
6.	Alcohol Soluble Extractive %	8.32
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (17): Physico-chemical parameters of *Gossypium herbaceum* L. (Cemparuthippu) Flower

Sl. No.	**Parameter**	**I**	**II**
1.	Foreign Matter %	<2	<2
2.	Loss on Drying at 105^0C %	11.35	11.39
3.	Total Ash Content %	9.50	11.26
4.	Acid Insoluble Ash %	0.38	0.57
5.	Water Soluble Extractive %	18.33	14.06
6.	Alcohol Soluble Extractive %	7.89	5.61
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

Table (18): Physico-chemical parameters of *Lannea coromadelica* (Houtt.) Merr. (Othiyam) Stem bark

Sl. No.	**Parameter**	**I**	**II**	**III**
1.	Foreign Matter %	<2	<2	<2
2.	Loss on Drying at 105^0C %	14.20	13.76	14.12
3.	Total Ash Content %	6.81	7.51	8.88
4.	Acid Insoluble Ash %	1.02	0.73	0.79

5.	Water Soluble Extractive %	16.33	17.75	15.91
6.	Alcohol Soluble Extractive %	10.04	11.09	8.61
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

Table (19): Physico-chemical parameters of *Limonia crenulata* Roxb. (Siruvizha) Root

Sl. No.	**Parameter**	**I**
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	14.60
3.	Total Ash Content %	2.64
4.	Acid Insoluble Ash %	0.10
5.	Water Soluble Extractive %	8.82
6.	Alcohol Soluble Extractive %	6.50
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (20): Physico-chemical parameters of *Morinda pubescens* J.E.Sm, (Nuna) Leaves

Sl. No.	**Parameter**	***I**	**II**
1.	Foreign Matter %	Nil	Nil
2.	Loss on Drying at 105^0C %	12.86	12.08
3.	Total Ash Content %	7.36	8.85
4.	Acid Insoluble Ash %	0.745	0.70
5.	Water Soluble Extractive %	22.53	18.99
6.	Alcohol Soluble Extractive %	13.60	10.51

7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

*This result was reported in the annual report 2012-2013

Table (21): Physico-chemical parameters of *Pavetta indica L. var indica* (Pavattai) Leaves

Sl. No.	**Parameter**	**I**
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	110.23
3.	Total Ash Content %	6.89
4.	Acid Insoluble Ash %	0.53
5.	Water Soluble Extractive %	33.47
6.	Alcohol Soluble Extractive %	17.69
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

Table (22): Physico-chemical parameters of *Tragia involucrate* L. (Cirukancori) Leaves

Sl. No.	**Parameter**	**#I**	***II**	**III**
1.	Foreign Matter %	Nil	Nil	Nil
2.	Loss on Drying at 105^0C %	14.12	13.13	16.87
3.	Total Ash Content %	7.12	7.65	8.16
4.	Acid Insoluble Ash %	0.169	0.48	0.68
5.	Water Soluble Extractive %	26.14	32.08	20.45
6.	Alcohol Soluble Extractive %	15.04	11.14	11.05
7.	Volatile oil %	Nil	Nil	Nil
8.	TLC Photodocumentation	Done		

#This result was reported in the annual report 2010-2011

*This result was reported in the annual report 2012-2013

Table (23): Physico-chemical parameters of *Trichosanthes cucumerina* L., (Peypudal) Whole plant

Sl. No.	Parameter	*I	II
1.	Foreign Matter %	<2	<2
2.	Loss on Drying at 105^0C %	12.16	15.08
3.	Total Ash Content %	17.53	14.45
4.	Acid Insoluble Ash %	3.53	3.74
5.	Water Soluble Extractive %	15.72	11.00
6.	Alcohol Soluble Extractive %	11.23	9.82
7.	Volatile oil %	Nil	Nil
8.	TLC Photodocumentation	Done	

*This result was reported in the annual report 2012-2013

Table (24): Physico-chemical parameters of *Trichosanthes tricuspidata* Lour. (Savuri) Fruit

Sl. No.	Parameter	Sample I
1.	Foreign Matter %	<2
2.	Loss on Drying at 105^0C %	21.54
3.	Total Ash Content %	7.10
4.	Acid Insoluble Ash %	0.58
5.	Water Soluble Extractive %	18.55
6.	Alcohol Soluble Extractive %	5.19
7.	Volatile oil %	Nil
8.	TLC Photodocumentation	Done

(ii) Thin Layer Chromatography (TLC)

TLC studies of the above single drugs were carried out and the results are given below. 1 gm of the coarsely powdered drug was extracted in 10 ml suitable solvent and concentrated to 1 ml. This solution was used for TLC. The extract was applied on aluminium plate precoated with silica gel 60 F_{254} (0.2 mm thickness). The plate was developed in appropriate solvent systems. The developed TLC plate was air dried, viewed in UV 254, UV 366 and photograph was taken. Then dipped in vanillin-sulphuric acid reagent, heated in an oven at 105°C until the development of coloured spots and photograph was taken. The R_f values and colour of the spots were listed in the table.

Table (25): R_f values and colour of the spots of ether extract of *Acacia catechu* (L.f.) Willd. (Kachikkattai) Resin

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.03	Light brown	0.64	Fluorescent yellow	0.08	Orange
2	0.07	,,			0.21	,,
3	0.29	Brown			0.35	,,
4	0.34	Light brown			0.58	,,
5	0.37	,,			0.95	Blue
6	0.43	,,				
7	0.49	,,				
8	0.51	,,				
9	0.58	Brown				
10	0.72	Light brown				

11	0.88	,,				
12	0.95	,,				

Solvent system – Toluene: Ethyl acetate (1:1)

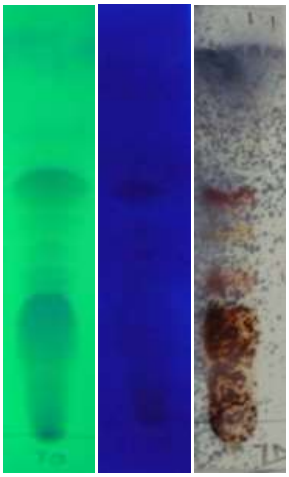


Fig 1: Ether extract of *Acacia catechu* (L.f.) Willd. (Kachikkattai) Resin; Solvent system – Toluene: Ethyl acetate (1:1)

Table (26): R_f values and colour of the spots of ethyl alcohol extract of *Alangium salvifolium* (L.f.) Wang. (Alinjil) Root bark*

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.21	Light brown	0.25	Fluorescent yellow	0.34	Light blue
2	0.26	,,	0.34	Fluorescent blue	0.70	Purple
3	0.34	,,	0.41	Fluorescent yellow	0.90	Dark blue
4	0.42	,,	0.49	Fluorescent blue		

5	0.49	Brown	0.58	Fluorescent yellow		
6	0.58	,,	0.78	,,		
7	0.64	,,	0.90	,,		
8	0.72	,,				
9	0.80	,,				

Solvent system –BAW (4:1:5, top layer)

***The TLC photodocumentation was given in the Annual report 2012-2013**

Table (27): R_f values and colour of the spots of ethyl alcohol extract of *Albizia procera* Benth. (Ciruvakai) Root

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.10	Brown	0.26	yellow	0.05	Bluish brown
2	0.18	,,			0.08	,,
3	0.24	,,			0.21	Light blue
4	0.38	Light brown			0.33	,,
5	0.46	,,			0.35	,,
6	0.61	Light violet				
7	0.84	,,				
8	0.98	,,				

Solvent system-Toluene: Ethyl acetate (1:1)

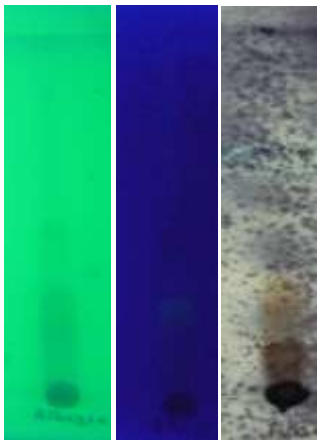


Fig 2: Ethyl alcohol extract of *Albizia procera* Benth. (Ciruvakai) Root;
Solvent system-Toluene: Ethyl acetate (1:1)

Table (28): R_f values and colour of the spots of ethyl alcohol extract of *Andrographis paniculata* Nees (Nilavembu) Whole plant*

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin – Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.02	Light purple	0.02	Fluorescent yellow	0.05	Dark brown
2	0.70	,,	0.11	Brown	0.27	Light brown
3	0.23	Light yellow	0.23	,,	0.38	,,
4	0.30	,,	0.30	,,	0.51	,,
5	0.67	,,	0.67	,,	0.75	,,
6	0.83	,,	0.82	,,	0.86	,,
7					0.98	Dark brown

Solvent system-Toluene: Ethyl acetate (6:1)
***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (29): R_f values and colour of the spots of ethyl alcohol extract of *Caesalpinia bonduc* (L) Roxb. (Kalarci) Leaf*

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin – Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.03	Light purple	0.03	Fluorescent yellow	0.04	Dark brown
2	0.07	,,	0.07	Brown	0.11	Light brown
3	0.13	Light yellow	0.13	,,	0.23	
4	0.24	,,	0.24	,,	0.44	Dark brown
5	0.31	,,	0.67	,,	0.62	,,
6	0.68	,,	0.83	,,		
7	0.93	,,				

Solvent system-Toluene: Ethyl acetate (6:1)
***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (30): R_f values and colour of the spots of ethyl alcohol extract of *Caesalpinia bonduc (L) Roxb.* (Kalarci) Bark*

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin –Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.18	Purple				
2	0.45	,,				
3	0.85	Yellow				

4	89	Yellowish brown				
5	96	,,				
6						

Solvent system-Toluene: Ethyl acetate (1:1)
***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (31): R_f values and colour of the spots of ethyl alcohol extract of *Calotropis gigantea* (L.) Ait.f. (Erruku) Leaf*Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.03	Light yellow	0.04	Brown	0.09	Dark brown
2	0.25	,,	0.25	,,	0.33	,,
3	0.69	,,	0.68	,,	0.35	,,
4	0.77	,,	0.84	,,	0.51	,,
5	0.84	,,			0.75	Greenish brown
6					0.79	,,

Solvent system-Toluene: Ethyl acetate (6:1)
***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (32): R_f values and colour of the spots of ethyl alcohol extract of *Calotropis gigantea* (L.) Ait.f. (Erruku) Flower*

Sl.No.	**UV 254 nm**	**UV 366 nm**	**After dipping in Vanillin-Sulphuric acid**

	R_f values	**Colour**	R_f values	**Colour**	**R_f values**	**Colour**
1	0.11	Light brown	0.05	Fluorescent yellow	0.21	Light blue
2	0.17	’’	0.16	’’	0.48	’’
3	0.23	’’	0.93	Light red	0.61	’’
4	0.29	’’			0.79	Dark blue
5	0.92	’’			0.86	’’
6					0.94	’’

Solvent system-Toluene: Ethyl acetate (1:1)
***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (33): R_f values and colour of the spots of ethyl alcohol extract of *Capparis zeylanica* L. (Athondai) Leaf*

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.25	Light yellow	0.5	Reddish brown	0.49	Brown
2	0.49	Yellow	0.91	Fluorescent yellow	0.97	Brown
3	0.58	Purple	0.98	Reddish brown		
4	0.72	Light purple				
5	0.83	Purple				
6	0.97	Yellow				

***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (34): R_f values and colour of the spots of ethyl alcohol extract of *Cassia italica* (Mill) Lam.ex Ander (Nilayavarai) Leaf

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin – Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.05	Brown	0.09	Brick red	0.11	Light brown
2	0.11	”	0.44	”	0.21	”
3	0.14	Light brown	0.75	Fluorescent green	0.28	”
4	0.19	”	0.92	Brick red	0.32	”
5	0.28	”			0.47	Brown
6	0.32	”			0.62	Blue
7	0.45	”			0.73	”
8	0.74	”			0.79	Brown
9	0.82	”			0.90	”
10	0.88	”			0.96	Blue
11	0.93				0.99	”

Solvent system-Toluene: Ethyl acetate (6:1)

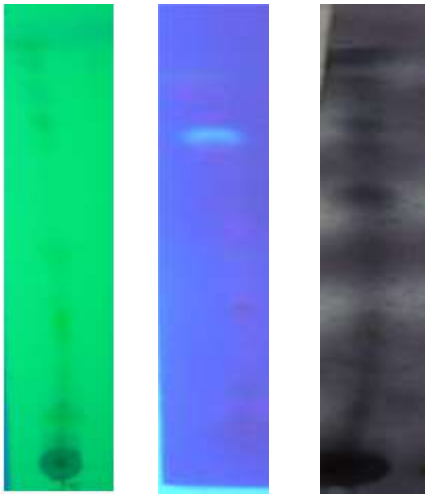


Fig 3: Ethyl alcohol extract of *Cassia italica* (Mill) Lam.ex Ander (Nilayavarai) Leaf; Solvent system-Toluene: Ethyl acetate (6:1)

Table (35): R_f values and colour of the spots of ether extract of *Ceiba pentandra* (L.) Gaertn. (Ilavampisin) Resin

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.16	Light brown	0.67	Fluorescent yellow	0.15	Light orange
2	0.20	,,			0.25	Blue
3	0.43	Brown			0.40	Light blue
4	0.56	Yellowish green			0.50	,,
5	0.64	Light brown			0.70	Blue
6	0.90	,,			0.73	,,

Solvent system-Toluene: Ethyl acetate (1:1)

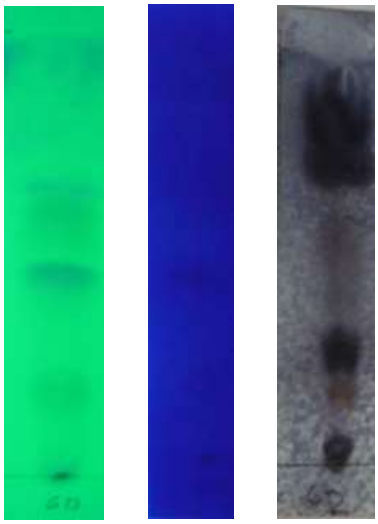


Fig 4: Ether extract of *Ceiba pentandra* (L.) Gaertn. (Ilavampisin) Resin; Solvent system-Toluene: Ethyl acetate (1:1)

Table (36): R_f values and colour of the spots of ethyl alcohol extract of *Citrus aurantifolia* (Christm.) Swingle(Elumitchi) Fruit

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.04	Light purple	No spots		0.06	Purple
2	0.09	,,			0.09	Bluish purple
3	0.17	,,			0.12	,,
4	0.23	,,			0.14	Light purple
5	0.29	,,			0.33	Bluish purple
6	0.43	,,			0.56	,,
7	0.89	,,			0.62	Purple
8	0.94	,,			0.96	,,

9	0.99	,,			

Solvent system - Toluene:Ethyl acetate(6:1)

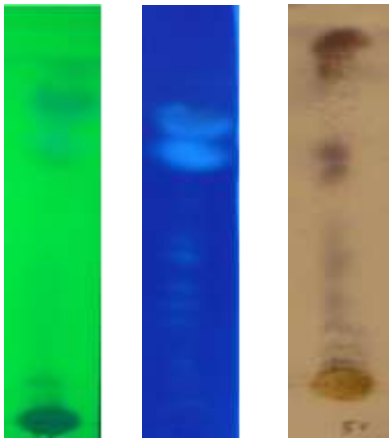


Fig 5: Ethyl alcohol extract of *Citrus aurantifolia* (Christm.) Swingle(Elumitchi) Fruit; Solvent system - Toluene:Ethyl acetate(6:1)

Table (37): R_f values and colour of the spots of ethyl alcohol extract of *Desmodium trifolium* (L.) DC (Sirupulladi) Root

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.07	Light purple	0.76	Fluorescent green	No spots observed	
2	0.14	”				
3	0.31	”				
4	0.77	”				

Solvent system - Toluene:Ethyl acetate(6:1)

Table (38): R_f values and colour of the spots of ethyl alcohol extract of *Elytaria acaulis* (L.f) Lindan (Nilakkadambu) Whole plant

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour

1	0.05	Light brown	0.05	Brown	0.05	Light green
2	0.09	,,	0.09	,,	0.08	,,
3	0.62	,,	0.62	,,	0.66	purple
4	0.82	,,	0.82	,,	0.78	Light green
5					0.88	green
6					0.96	purple

Solvent system - Toluene:Ethyl acetate (6:1)

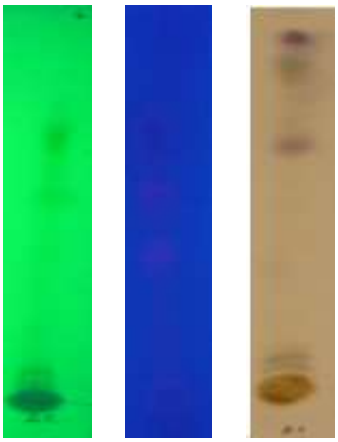


Fig 6: ethyl alcohol extract of *Elytaria acaulis* (L.f) Lindan (Nilakkadambu) Whole plant; Solvent system - Toluene:Ethyl acetate (6:1)

Table (39): R_f values and colour of the spots of ethyl alcohol extract of *Gmelina asiatica* L. (Sirukumiz) Root

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.08	Light purple	0.1	fluorescent light blue	0.07	Light purple
2	0.17	,,	0.24	,,	0.14	Light green

3	0.31	,,	0.31	,,	0.23	Light purple
4	0.39	,,	0.48	fluorescent blue	0.49	,,
5	0.47	,,	0.57	Light fluorescent blue	0.65	,,
6	0.57	,,	0.88	fluorescent purple	0.82	Blue
7	0.86	Purple			0.96	purple

Solvent system - Toluene:Ethyl acetate (6:1)

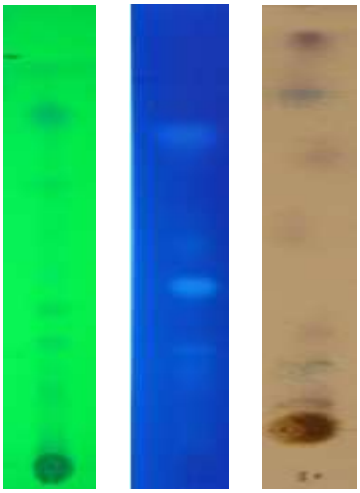


Fig 7: of ethyl alcohol extract of *Gmelina asiatica* L. (Sirukumiz) Root;
Solvent system - Toluene:Ethyl acetate (6:1)

Table (40): R_f values and colour of the spots of ethyl alcohol extract of *Gossypium herbaceum* L. (Cemparuthippu) Flower

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.3	Light brown	0.2	Fluorescent Yellow	0.05	Light purple

2	0.43	,,	0.82		0.08	,,
3	0.53	,,			0.17	,,
4	0.82	,,			0.45	,,
5	0.89	Purple			0.66	purple
6					0.88	,,

Solvent system - Toluene:Ethyl acetate (6:1)

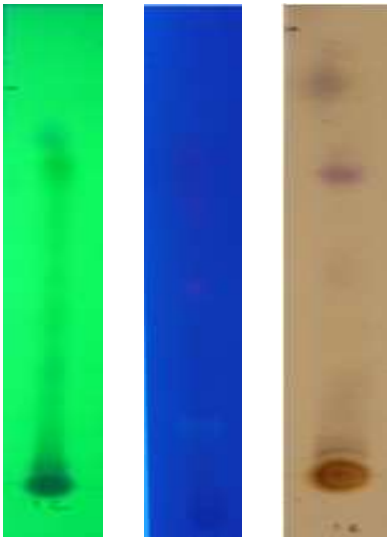


Fig 8: Ethyl alcohol extract of *Gossypium herbaceum* L. (Cemparuthippu) Flower; Solvent system - Toluene:Ethyl acetate (6:1)

Table (41): R_f values and colour of the spots of ethyl alcohol extract of *Lannea coromadelica* (Houtt.) Merr. (Othiyam) Stem bark

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.04	Light purple	No spots		0.07	light purple
2	0.09	,,			0.09	,,
3	0.17	,,			0.13	,,
4	0.23	,,			0.19	,,

5	0.29	,,		0.39	,,
6	0.43	,,		0.54	,,
7	0.89	,,		0.66	,,
8	0.94	,,		0.79	,,
9	0.99	,,		0.97	purple

Solvent system - Toluene:Ethyl acetate (6:1)

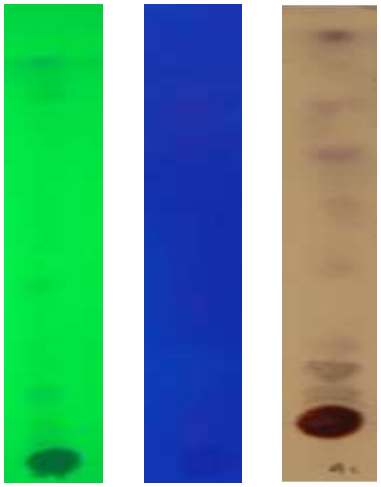


Fig 9: ethyl alcohol extract of *Lannea coromadelica* (Houtt.) Merr. (Othiyam) Stem bark; Solvent system - Toluene:Ethyl acetate(6:1)

Table (42): R_f values and colour of the spots of ethyl alcohol extract of *Limonia crenulata* Roxb. (Siruvizha) Root

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.1	Light brown	0.06	Light purple	0.18	Blue
2	0.23	,,	0.18	,,	0.38	Light blue
3	0.33	Light purple	0.24	Purple	0.52	Dark blue

4	0.36	,,	0.36	Light purple	0.76	,,
5	0.46	,,	0.46	Purple	0.91	,,
6	0.52	,,	0.56	,,	0.97	,,
7	0.58	,,	0.63	Greenish blue		
8	0.64	Purple	0.86	,,		
9	0.70	Light purple	0.93	Purple		
10	0.76	,,				
11	0.83	,,				
12	0.87	,,				
13	0.93	purple				

Solvent system-Toluene: Ethyl acetate (1:1)

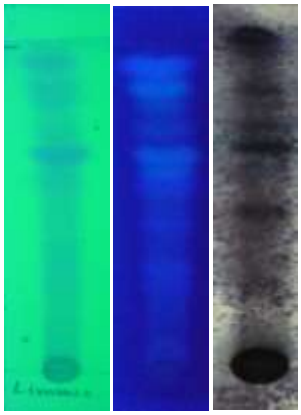


Fig 10: Ethyl alcohol extract of *Limonia crenulata* Roxb. (Siruvizha) Root;
Solvent system-Toluene: Ethyl acetate (1:1)

Table (43): R_f values and colour of the spots of ethyl alcohol extract of *Morinda pubescens* J.E.Sm, (Nuna) Leaves

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin –Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour

1	0.05	Light brown	0.03	Reddish brown	0.08	Light yellow
2	0.09	Light green	0.76	Fluorescent green	0.41	Blue
3	0.20	Light purple			0.61	Light blue
4	0.29	”			0.94	”
5	0.64	”			0.99	Blue
6	0.71	”				
7	0.94	Purple				

Solvent system-Toluene: Ethyl acetate (6:1)

***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (44): R_f values and colour of the spots of ethyl alcohol extract of *Pavetta indica* L. var indica (Pavattai) Leaves

Sl.No.	**UV 254 nm**		**UV 366 nm**		**After dipping in Vanillin – Sulphuric acid**	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.12	Light brown	0.98	Dark brown	0.15	Light blue
2	0.61	Yellowish green			0.31	,,
3	0.78	Light brown			0.51	,,
4	0.96	,,			0.76	,,
5	0.98	Dark brown			0.88	,,
6					0.98	,,

Solvent system - Toluene: Ethyl acetate (1:1)

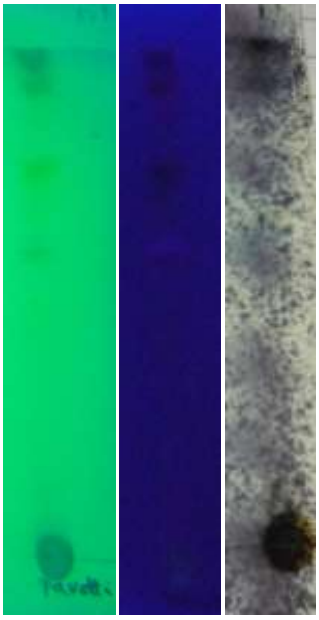


Fig 11: Ethyl alcohol extract of *Pavetta indica* L. var indica (Pavattai) Leaves; Solvent system-Toluene: Ethyl acetate (1:1)

Table (45): R_f values and colour of the spots of ethyl alcohol extract of *Tragia involucrate* L. (Cirukancori) Leaves*

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin – Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.28	Light yellow	0.62	Brown	0.13	Light green
2	0.50	Yellow	0.67	’’	0.22	’’
3	0.67	Brown	0.73	Fluorescent blue	0.90	’’
4	0.77	yellow	0.83	Brown		
5	0.83	brown	0.96	Reddish brown		
6	0.95	Light yellow				

Sol. system-Toluene: Ethyl acetate (6:1)

***The TLC photodocumentation was given in the Annual report 2012-2913**

Table (46): R_f values and colour of the spots of ethyl alcohol extract of *Trichosanthes cucumerina* L., (Peypudal) Whole plant*

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin-Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.04	Light brown	0.07	Brown	0.16	Light yellow
2	0.09	’’	0.15	’’	0.48	Light purple
3	0.15	’’	0.62	Light	0.72	purple
4	0.43	’’			0.90	purple
5	0.47	’’			0.94	brown
6	0.60	’’				
7	0.69	’’				
8	0.97	Light purple				

***TLC Photodocumentation was given in the Annual report 2012-2013**

Table (47): R_f values and colour of the spots of ethyl alcohol extract of *Trichosanthes tricuspidata* Lour. (Savuri) Fruit

Sl.No.	UV 254 nm		UV 366 nm		After dipping in Vanillin –Sulphuric acid	
	R_f values	Colour	R_f values	Colour	R_f values	Colour
1	0.06	Light brown	0.66	Reddish brown	0.07	Light purple
2	0.09	,,	0.73	,,	0.13	,,
3	0.13	,,	0.84	,,	0.21	,,
4	0.64	,,	0.91	Brick red	0.29	,,

5	0.76	,,			0.6	,,
6	0.83	,,			0.67	Purple
7	0.91	,,			0.80	,,
8					0.88	Green
9					0.96	Purple

Solvent system - Toluene:Ethyl acetate (6:1)

Fig 12: Ethyl alcohol extract of *Trichosanthes tricuspidata* Lour. (Savuri) Fruit; Solvent system - Toluene:Ethyl acetate (6:1)

(iii) Methods of Manufacture – Not allotted

(iv) Finished products – Not allotted

OTHER ACTIVITIES

OTHER ACTIVITIES

(v) Extraction and supply of medicinal plant materials on payment basis.

1. Musa paradisiacea, Fruit peel (1100 gm) - Acetone extract
2. Flacourtia mondana, Leaf (500 gm) - Alcohol extract
3. Annona reticulata, Leaf (550 gm) - Alcohol extract
4. Plumbago indica, Root (440 gm) - Alcohol extract
5. Buchnanna sp., Bark (420 gm) - Alcohol extract
6. Musa paradisiacea, Fruit peel (850 gm) - Acetone extract
7. Samadara indica (240 gm) - Alcohol extract
8. Samadara indica (240 gm) - Ethyl acetate extract
9. Samadara indica (240 gm) - Chloroform extract
10. Samadara indica (240 gm) - Petroleum ether extract
11. Pouteria campechiana (360 gm) - Alcohol extract

12. Pseudarthria viscida, Leaf (1 Kg) - Alcohol extract
13. Annona maricata, Leaf (1Kg) - Alcohol extract
14. Andrographis elongata, Leaf (50 gm) - Acetone extract
15. Andrographis elongata, Leaf (50 gm) - Petroleum ether extract
16. Andrographis elongata, Leaf (50 gm) - Chloroform extract
17. Andrographis elongata, Leaf (50 gm) - Methanol extract
18. Andrographis elongata, Stem (50 gm) - Acetone extract
19. Andrographis elongate, Stem (50 gm) - Petroleum ether extract
20. Andrographis elongate, Stem (50 gm) - Chloroform extract
21. Andrographis elongate, Stem (50 gm) - Methanol extract
22. Morus alba, Fruit (28 g) - Alcohol extract
23. Morus alba, Fruit (27 g) - Petroleum ether extract
24. Morus alba, Fruit (27 g) - Ethyl acetate extract
25. Morus alba, Fruit (27 g) - Alcohol extract
26. Pseudarthria viscida, Leaf (250 gm) - Petroleum ether extract
27. Pseudarthria viscida, Leaf (250 gm) - Chloroform extract
28. Annona muxicata, Leaf (200 gm) - Petroleum ether extract
29. Annona muxicata, Leaf (200 gm) - Chloroform extract
30. Naregamia alata, Leaf (25 gm) - Acetone
31. Naregamia alata, Leaf (25 gm) - Water
32. Naregamia alata, Leaf (25 gm) - Chloroform
33. Naregamia alata, Leaf (25 gm) - Petroleum ether
34. Naregamia alata, Leaf (25 gm) - Methanol
35. Naregamia alata, Stem (25 gm) - Acetone
36. Naregamia alata, Stem (25 gm) - Water
37. Naregamia alata, Stem (25 gm) - Chloroform
38. Naregamia alata, Stem (25 gm) - Petroleum ether
39. Naregamia alata, Stem (25 gm) - Methanol
40. Naregamia alata, Root (25 gm) - Acetone
41. Naregamia alata, Root (25 gm) - Water

(vi) Phytochemical Training on payment basis – 4 no.

1. Facilities and guidance for phytochemical training was given to Saranya K. P., M. Phil. student, University College, Thiruvananthapuram (5 days).
2. Facilities and guidance for phytochemical training was given to Smt. Sheeba Jasmine, Ph. D. student from University College of Pharmacy, Mahatma Gandhi University, Kottayam (15 days).
3. Facilities and guidance for Phytochemical training is being given to Miss. Kavitha. S from Dept. of Biochemistry, University of Kerala, Thiruvananthapuram (46 days).

4. Facilities and guidance for Phytochemical training is being given to Mrs. Rejitha. S from Dept. of Biochemistry, University of Kerala, Thiruvananthapuram (46 days).

(vii) Analysis of plant materials for students on payment basis - 1 nos.

1. Morus alba (Fruit)

(viii) Literature collection of single drugs for the preparation of monograph - 6 No.

Literature collection of the following single drugs were carried out, compiled and the preparation of monograph is in progress

1. *Acacia catechu* (L.f.) Willd. (Kachikkattai)
2. *Andrographis paniculata* Nees (Nilavembu)
3. *Caesalpinia bonduc (L)* Roxb. (Kalarci)
4. *Capparis zeylanica* L. (Aathondai)
5. *Ceiba pentandra* (L.) Gaertn. (Ilavampisin)
6. *Gossipium herbaceum* L. (Paruthi)

(d) DETAILS OF STUDIES CARRIED OUT DURING THE REPORTING YEAR (2013-2014)

Sl.No.	**Studies on**	**No. of drugs/ Finished products/ Methods of Manufacture**	
		Completed	**In hand**
i	Single drugs	23 No. (33 samples)	Nil
ii	TLC studies	23 No. (33 samples)	Nil
iii	Methods of Manufacture	Not allotted	Not allotted
iv	Finished products	Not allotted	Not allotted
Other activities			
v	Extraction and supply of medicinal plant materials on payment basis	8.889 kg	
vi	Phytochemical Training on payment basis	4 No.	

vii	Analysis of plant materials for students on payment basis	1 No.
viii	Literature collection of single drugs for the preparation of monograph	6 No.
ix	Research papers presented/ published in scientific seminars/ journals	6 No.
x	Seminars attended by the scientists of the section	3 No.
xi	Seminars organised by the Institute	1 No.
xii	Technical meetings attended	1 No.
xiii	Radio Talk	1 No.
ix	Fund generated	Rs. 22,083/-

3.4. Pharmacology & Toxicology

3.4.1. Pre-clinical Studies

The studies have been conducted on the predetermined experimental models in the laboratory attached to the SCRI, Chennai. These studies are based on experimental models in different species of animals. This provides vital information for pursuing clinical studies. During the reporting period single drugs, coded drugs and compound formulations used in Siddha system have been investigated. Two Siddha formulations have been screened for their Safety / Toxicity / Activity. Evaluations of anticancer and antidiabetic activities have been carried out in rats for Single and Compound Siddha preparations. The details of these studies are given below:

➢ Acute toxicity in mice ➢ Sub-acute toxicity in rats ➢ Chronic toxicity in rats ➢ Pharmacological activity	

Fig. 9. Pre-clinical and Safety / Toxicity Studies

Drugs allocated and studied during the current year

Sl. No.	Drug allotted	Target fixed	Studies carried out	Remarks
1.	HB1	Toxicity	Acute toxicity in rats	Completed
			Sub-acute toxicity in rats	Completed
			Chronic toxicity in rats	Completed
2.	APNC	Toxicity	Acute toxicity in mice	Completed
			Sub-acute toxicity in rats	Yet to start
			Chronic toxicity in rats	Yet to start
3.	Seenthil Sekkarai	Toxicity	Sub acute	Completed
4.	Seenthil Sekkarai	Activity	Anti-Diabetic	Completed
5.	Toxic Impact of Titanium Dioxide Nanoparticles	Activity	Biochemical and Histological changes in different organs	Completed
6.	Ameliorative Effect of Ginger Extract on Aluminium Chloride	Activity	Biochemical and histological changes in the brain and reproductive organs of male wistar rats	Completed

8.2. Statement of the work carried out during the current year

HB1

Name of the Drug (Single/Compound) : HB1

Botanical/Chemical/English Name

Type of extracts/material/parts received : Powder

Supplying Unit and details : Siddha Central Research Institute,

Name of the Unit : Chennai.

Target allocated – General Pharmacological screening / specific pharmacological studies/ Pre-clinical: Evolution of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity): Acute toxicity

Type of parts studied-crude drug/fraction/isolates/compound drugs/any other (Specify)

Methodology:

Animal species : Swiss Albino Mice

Sex : Male / Female

Average body weight : 25-30g

Number of animals : 3M+3F

Drug profile :

Route of administration : Oral

Dose levels:

Test details	Test species	Dosage Regimen		Study duration
		Dose Level	Frequency	
Acute toxicity	Mice	Therapeutic Dose	Once (Single dose)	14 days
		Therapeutic Dose x 5		
		Therapeutic Dose x 10		
		Vehicle control Honey: Water (1:4)		

Human dose of trial drug : 260 mg once a day

Calculation of animal dose : Test doses (Experimental) (mg/kg body weight)

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Mice	33.8	169	338

Frequency of administration : Once as a single dose

Period of administration : One day

Observations and examinations :

Experimental procedure:

Test animals were exposed to drug at 11 A.M. as a single dose. The drug was administered orally through a feeding needle based on the body weight.

Animal observations:

All mice were observed for 72 hours for any mortality or toxic manifestations. Detailed observations of physical condition and behavior were recorded after the treatment. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices.

Results:

No mortality was observed in animals receiving test compound in therapeutic, average and high dose by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

Conclusion:

There was no mortality in the entire drug treated group which indicates that HB1 is safe up to 338 mg/kg, which is ten times of therapeutic dose.

Name of the Drug (Single/Compound) : **HB1**

Botanical/Chemical/English Name

Type of extracts/material/parts received : Powder

Supplying Unit and details : Siddha Central Research Institute,

Name of the Unit Chennai.

Target allocated – General Pharmacological screening / specific pharmacological studies/ Pre-clinical: Evolution of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity) : Sub-acute toxicity

Type of parts studied-crude drug/fraction/isolates/compound drugs/any other (Specify)

Methodology:

Animal profile:

Animal species : Wister Albino Rats

Sex : Male / Female

Average body weight : 120-150g

Number of animals : 6M+6F

Drug profile

Route of administration : Oral

Dose levels :

Test details	Test species	Dosage Regimen		Study duration
		Dose Level	Frequency	
Sub-acute toxicity	Rats	Therapeutic Dose	Once a day for 28 days	28 days
		Therapeutic Dose x 5		
		Therapeutic Dose x 10		
		Vehicle control Honey: Water (2:3)		

Human dose of trial drug : 260 mg once a day

Calculation of animal dose : Test doses (Experimental) (mg/kg body weight)

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Rat	23.4	117	234

Frequency of administration : Once daily

Period of administration : 28 days

Observations and examinations :

Experimental procedure:

Test animals were exposed to drug at 11 A.M. daily for 28 consecutive days. The drug was administered orally through a feeding needle based on the most recent weekly body weight.

Animal observations:

All rats were observed twice each day during the treatment periods for survival and general condition. Detailed observations of physical condition and behavior were recorded2-

4 hours after the daily dose during the treatment period. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices. Body weights were recorded weekly twice during the treatment period for all rats on study. Body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption was measured daily during the treatment.

Statistics:

Data will be compiled and analyzed for significant difference between treatment groups and vehicle control by appropriate tests.

Results:

No Pre-terminal deaths were observed in animals receiving test compound in therapeutic, average and high dose regularly for 28 days by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

Data is to be subjected to statistical analysis for food intake, body weight, hematological parameters and clinical chemistry parameters. Organ (Liver, kidney, heart, spleen, lung, stomach, intestine, testis and ovary) samples have been sent for histopathological analysis.

Animal observations:

All rats were observed twice each day during the treatment periods for survival and general condition. Detailed observations of physical condition and behavior were recorded 2-4 hours after the daily dose during the treatment period. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices. Body weights were recorded weekly twice during the treatment period for all rats on study. Body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption was measured daily during the treatment.

Statistics:

Data was compiled and analyzed for significant difference between treatment groups and vehicle control by appropriate tests.

Results:

No Pre-terminal deaths were observed in animals receiving test compound in average dose whereas, no pre-terminal death were observed in therapeutic and high dose regularly for 28 days by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

There were no significant changes in food intake, body weight, hematological parameters and clinical chemistry parameters in all the treated group of animals.

No specific test compound induced pathological changes in various organs were observed in therapeutic, average and highest dose group.

Conclusion:

No specific abnormalities in pathological profiles were recorded in rats exposed to the test compounds at therapeutic, average and highest dose as per intended clinical dosage schedule under the experimental conditions.

Name of the Drug (Single/Compound) : **HB1**

Botanical/Chemical/English Name

Type of extracts/material/parts received : Powder

Supplying Unit and details : Siddha Central Research Institute,

Name of the Unit : Chennai

Target allocated – General Pharmacological screening / specific pharmacological studies/ Pre-clinical: Evolution of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity)

: Chronic toxicity

Type of parts studied-crude drug/fraction/isolates/compound drugs/any other (Specify)

Methodology:

Animal profile:

Animal species : Wister Albino Rats

Sex : Male / Female

Average body weight : 80-120g

Number of animals : 6M+6F

Drug profile:

Route of administration : Oral

Dose levels :

Test details	Test species	Dosage Regimen		Study duration
		Dose Level	Frequency	
Chronic toxicity	Rats	Therapeutic Dose	Once a day for 90 days	90 days
		Therapeutic Dose x 5		
		Therapeutic Dose x 10		
		Vehicle control Honey: Water (2:3)		

Human dose of trial drug : 260 mg once a day

Calculation of animal dose :

Test doses (Experimental) (mg/kg body weight)

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Rat	23.4	117	234

Frequency of administration : Once daily

Period of administration : 90 days

Observations and examinations :

Experimental procedure:

Test animals were exposed to drug at 11 A.M. daily for 90 consecutive days. The drug was administered orally through a feeding needle based on the most recent weekly body weight.

Animal observations:

All rats were observed twice each day during the treatment periods for survival and general condition. Detailed observations of physical condition and behavior were recorded 2-4 hours after the daily dose during the treatment period. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices. Body weights were recorded weekly twice during the treatment period for all rats on study. Body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption was measured daily during the treatment.

Statistics:

Data was compiled and analyzed for significant difference between treatment groups and vehicle control by appropriate tests.

Results:

No Pre-terminal deaths were observed in animals receiving test compound in average dose whereas, no pre-terminal death were observed in therapeutic and high dose regularly for 90 days by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

There were no significant changes in food intake, body weight, hematological parameters and clinical chemistry parameters in all the treated group of animals.

No specific test compound induced pathological changes in various organs were observed in the highest dose group.

Conclusion:

No specific abnormalities in pathological profiles were recorded in rats exposed to the test compound at highest dose level as per intended clinical dosage schedule under the experimental conditions.

APNC

Name of the Drug (Single/Compound) : APNC

Botanical/Chemical/English Name

Type of extracts/material/parts received : Powder

Supplying Unit and details : Siddha Central Research Institute,

Name of the Unit Chennai.

Target allocated – General Pharmacological screening / specific pharmacological studies/ Pre-clinical: Evolution of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity): Acute toxicity

Type of parts studied-crude drug/fraction/isolates/compound drugs/anyother (Specify)

Methodology:

Animal profile:

Animal species : Swiss Albino Mice

Sex : Male / Female

Average body weight : 25 -30g

Number of animals : 3M+3F

Drug profile:

Route of administration : Oral

Dose levels :

Test details	Test species	Dosage Regimen		Study duration
		Dose Level	Frequency	
Acute toxicity	Mice	Therapeutic Dose	Once (Single dose)	3 days
		Therapeutic Dose x 5		
		Therapeutic Dose x 10		
		Vehicle control		

Human dose of trial drug : 2-4 gmonce a day

Calculation of animal dose : Test doses (Experimental) (mg/kg body weight)

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Mice	**162**	**810**	**1620**

Frequency of administration : Once as a single dose with honey

Period of administration : One day

Observations and examinations:

Experimental procedure:

Test animals were exposed to drug at 11 A.M. as a single dose. The drug was administered orally through a feeding needle based on the body weight.

Animal observations:

All mice were observed for 72 hours for any mortality or toxic manifestations. Detailed observations of physical condition and behavior were recorded after the treatment. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices.

Results:

No mortality was observed in animals receiving test compound in therapeutic, average and high dose by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

Conclusion:

There was no mortality in the entire drug treated group which indicates that APNCis safe up to 1620 mg/kg, which is ten times of therapeutic dose.

Seenthil Sarkkarai

Name of the Drug (Single/Compound) : Seenthil Sarkkarai Botanical/Chemical /English Name

Type of extracts/material/parts received : Powder

Supplying Unit and details Name of the Unit : Siddha Central Research Institute, Chennai

Target allocated – General Pharmacological screening / specific pharmacological studies/ Pre-clinical: Evolution of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity): Sub-acute toxicity

Type of parts studied-crude drug/fraction/isolates/compound drugs/any other (Specify)

Methodology:

Animal profile:

Animal species : Wister Albino Rats

Sex : Male / Female

Average body weight : 80-120g

Number of animals : 6M+6F

Drug profile :

Route of administration : Oral

Dose levels :

Test details	Test species	Dosage Regimen		Study duration
		Dose Level	Frequency	
Sub-acute toxicity	Rats	Therapeutic Dose	Once a day for 28 days	28 days
		Therapeutic Dose x 5		
		Therapeutic Dose x 10		
		Vehicle control		

Human dose of trial drug : 2-4 gmonce a day

Calculation of animal dose :

Test doses (Experimental) (ml/kg body weight)

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Rat	**360**	**1800**	**3600**

Frequency of administration : Once daily

Period of administration : 28 days

Observations and examinations:

Experimental procedure:

Test animals were exposed to drug at 11 A.M. daily for 28 consecutive days. The drug was administered orally through a feeding needle based on the most recent weekly body weight.

Animal observations:

All rats were observed twice each day during the treatment periods for survival and general condition. Detailed observations of physical condition and behavior were recorded 2-4 hours after the daily dose during the treatment period. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices. Body weights were recorded weekly twice during the treatment period for all rats on study. Body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption was measured daily during the treatment.

Statistics:

Data will be compiled and analyzed for significant difference between treatment groups and vehicle control by appropriate tests.

Results:

No Pre-terminal deaths were observed in animals receiving test compound in therapeutic, average and high dose regularly for 28 days by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

Data is to be subjected to statistical analysis for food intake, body weight, hematological parameters and clinical chemistry parameters.

Organ (Liver, kidney, heart, spleen, lung, stomach, intestine, testis and ovary) samples have been sent for histopathological analysis.

Animal observations:

All rats were observed twice each day during the treatment periods for survival and general condition. Detailed observations of physical condition and behavior were recorded 2-4 hours after the daily dose during the treatment period. Cage side observations were made which included changes in the skin and fur, eyes and mucous membrane, respiratory, central nervous system, behavioral patterns and discharge from various body orifices. Body weights were recorded weekly twice during the treatment period for all rats on study. Body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption was measured daily during the treatment.

Statistics:

Data was compiled and analyzed for significant difference between treatment groups and vehicle control by appropriate tests.

Results:

No Pre-terminal deaths were observed in animals receiving test compound in average dose whereas, no pre-terminal death were observed in therapeutic and high dose regularly for 28 days by oral route.

No significant treatment related effect on clinical signs or behavioral activity etc was observed in all the groups of animals that survived during the experimental period.

There were no significant changes in food intake, body weight, hematological parameters and clinical chemistry parameters in all the treated group of animals.

No specific test compound induced pathological changes in various organs were observed in therapeutic, average and highest dose group.

Conclusion:

No specific abnormalities in pathological profiles were recorded in rats exposed to the test compounds at therapeutic, average and highest dose as per intended clinical dosage schedule under the experimental conditions.

3.5. Clinical Studies

The research programme of the CCRS mainly focuses on Clinical Research including safety and efficacy studies of Siddha drugs and validation of the Fundamental principles. CCRS has emerged as global leader for research in Siddha system of Medicine.

The clinical research programme of the Council mainly aims the validation of therapeutic efficacy of Siddha medicines and therapies, used in more than 10 decades. The council also concentrates on innovation of newer drugs for non-communicable diseases especially Diabetes Mellitus, Psoriasis, Vitiligo, Hypertension, Dyslipidemia, Urolithiasis, Fibroid Uterus, Osteo arthritis, Rheumatoid arthritis and in Benign Prostatic hypertrophy.

During the reporting period the following clinical studies were completed at the Peripheral Institutes / Units of the Council.

1. Multicentric Open Labeled Clinical Trial of D5 Chooranam in Neerizhivu Noi (Diabetes Mellitus)
2. Open labelled clinical trial on Karuppai Sathai Kattigal [Fibroid uterus]
3. Clinical evaluation of sirupeelaiyathi kudineer in the Management of kalladaippu (Urolithiasis)

I. Multicentric Open Labeled Clinical Trial of D5 in Neerizhivu Noi (Diabetes Mellitus)

Several studies conducted in India in the last decade have highlighted the high prevalence of diabetes and its rapid increasing nature in the urban population. Nowadays many time tested studies in Siddha are creating good scope in the area of Clinical research. One such codified Polyherbal formulation named D5 Chooranam was chosen for the clinical trial on Neerizhivu Noi

(Diabetes Mellitus). This trial has got proper IEC certifications from all the trials centres participating in the study and it has been registered under CTRI.

Objectives:

Primary:

To study the Clinical efficacy of D5 Chooranam in Diabetes mellitus

Secondary:

1. To study the effect of D5 Chooranam in lipid metabolism
2. To study the effect of D5 Chooranam in different types of Udal Vagu (Body constitution) mentioned in Siddha (on the basis of generated data)
3. To validate the Kuttram verupadugal (Patho physiology) of Neerizhivu mentioned in Siddha (on the basis of generated data)

Study Design: Multicentric Open Label Study.

Study Centres:

- ❖ Siddha Central Research Institute, Chennai.
- ❖ Siddha Regional Research Institute, Puducherry.
- ❖ Siddha Clinical Research Unit, Palayamkottai.

Sample Size: n=90 (3 Centres)

Study Period: 1 year

Intervention:

4 Capsules (each 500 mg) twice a day with water for a period of 90 days with a follow up period of 15 days.

Status:

1.	Preclinical Study	i. Clearance for Trial Drug D5 Chooranam by IAEC& IEC ii. IAEC Approval No: 105/Pharma/SCRI/2011, dated 08.07.2011 iii. IEC Approval No: CCRS/SCRI-1/2011-12/04

		iv. Preclinical studies have been completed and Monograph Preparation is under process.
	Clinical study	i. Trial completed and preparation of monograph will be initiated. ii. There exists significant reduction in the HbA1c (P=0.013) which is the gold standard diagnosis. . In the pre -treatment the 49.4% were above 7.5. 32.6% of the population amongst the 49.4% of the population there is reduction in the HbA1c level below 7.5. In the post treated group 66% of the population has reduction in HbA1c level (P=0.002).But there is no significance in the FBG reduction (P=0.850). iii. With the above results it has been planned to conduct a multicentric larger sample study with longer duration between 9 month to 12 month iv. Steps are being taken for obtaining IPR through NDRC

2. OPEN LABELED CLINICAL TRIAL ON KARUPPAI SATHAI KATTIGAL

[FIBROID UTERUS]

1.	Title of the problem	:	**KARUPPAI SATHAI KATTIGAL** [Fibroid Uterus]
2.	Title of the Study	:	Open Labeled Clinical Trial On Karuppai Sathai Kattigal [Fibroid Uterus]
3.	Investigators	:	Dr.Shyamala Rajkumar Dr. C. Ponmuthurani

4.	Year and month of starting the study	:	April 2012
5.	Year and month of closure of the study	:	March 2013. Treatment period completed for all patients. Follow-up is in progress.
6.	Principal Drug (s) therapies taken for clinical evaluation/trial and supporting therapy (s)	:	Rasaganthi Mezhugu
7.	Duration of treatment	:	Ninety days
8.	Diagnosis and response of therapy	:	Based on Siddha fundamentals and modern parameters
9.	Results of the cases completed	:	20 cases completed. Data have been collected and the statistical analysis will be done after the completion of the project.
10.	Whether the study is continuing?	:	Treatment completed; Follow-up is in progress.

11.	Specific observations, if any	:	As per the criteria of the selection 72 subjects were screened and 26 subjects were included in the study. Clinical and biochemical investigations were done as per the protocol. The patients were regularly assessed as per Siddha and Bio-chemical parameters. The drug was administered for 90 days. The trial drug Rasaganthi Mezhugu was been prescribed at the dose of 1 Capsules (500 mg) twice a day after food in the morning and night. Complete haemogram, LFT, RFT and lipid profile were done before, during and after treatment. Proper strategy and designing of clinical trials may produce a better scope for potential drug development and to evaluate the toxicity.
12.	Design of Study	:	Open labelled Clinical Trial
13.	No. of Group	:	One group
14.	Number of Cases	:	20 Subjects
15.	Plan of Study	:	The Subjects were screened and selected according to the Siddha and modern parameters respectively. These Subjects have also been instructed to attend the outpatient department every 15 days for observations and to collect the medicine. Transvaginal sonogram was taken before and after treatment. Their urine and blood parameters were estimated and recorded before, during and after treatment.
16.	Criteria for Inclusion	:	1. Clinical signs and symptoms of Fibroid uterus for ≥ 6 months. 2. Women in the age group of 25-55 years 3. Presence of Fibroid 4. Ambulatory and co-operative 5. Confirmed by Transvaginal ultra-sonogram

17.	Criteria for exclusion	:	1.If under any previous treatment procedure 2.Malignancy in any part 3.Metabolic disorder like Diabetes Mellitus 4.Other chronic diseases involving vital organs like Heart, Liver,Kidney or Lung diseases 5.HIV/AIDS 6.Chromosomal abnormality
18.	Criteria for assessment	:	The full details of history and physical examination of the patients will be recorded as per the proformas (Forms I, II, III & IV). Clinical and physiological assessment will be done before drug administration and after every two weeks. The laboratory investigations will be recorded before, during and after drug administration (Form-IV). Transvaginal sonogram was taken before and after treatment.

Principal drug and the supporting therapy including diet prescribed:

Principal Drug : Rasaganthi Mezhugu

Diet Regimen : Prescribed diet schedule.

Dose schedule : 500 mg twice a day with water after food.

Duration of treatment : Ninety days. Medicines were given for 45 days followed by a drug holiday of 15 days and again medicines were given for 45 days.

Source of supply of drugs : The trial drug has been procured from the IMPCOPS (GMP certified).

1.	Preclinical Study	i. IEC Approval No: CCRS/SRRI-1/2011-12/02 ii. Monograph Preparation is under process.
2.	Clinical Study	Status of the Clinical study 1. The drug does not show any toxicity 2. There is complete disappearence of fibroid in 15% of the study population. 50% redution in size has been noticed in 15% of the cases. In 35% of the cases redcution of fibroid has been noticed. At the same time, among 35% of the population there is no significant reduction in size.

3. CLINICAL EVALUATION OF *SIRUPEELAIYATHI KUDINEER* IN THE MANAGEMENT OF *KALLADAIPPU* (UROLITHIASIS)

a.	Title of the problem	:	***KALLADAIPPU* (UROLITHIASIS)**
b.	Title of the Study	:	CLINICAL EVALUATION OF *SIRUPEELAIYATHI KUDINEER* IN THE MANAGEMENT OF *KALLADAIPPU* (UROLITHIASIS)
c.	Investigator	:	Dr. V.Vijaya Kumar
d.	Year and month of starting the study	:	January 2013
e.	Year and month of closure of the study	:	Still continuing
f.	Principal Drug (s) therapies taken for clinical evaluation	:	Sirupeelayathi Kudineer

	/trial and supporting therapy (s)		
g.	Duration of treatment	:	Forty five days
h.	Diagnosis and response of therapy	:	Based on Siddha fundamentals and modern parameters
i.	Results of the cases completed	:	7 cases completed. Data has been collected and the statistical analysis will be done after the completion of the project.
j.	Whether the study is continuing?	:	Yes, continuing.
k.	Specific observations, if any	:	As per the criteria of selection 41 subjects were screened and 15 subjects were recruited for the study. Clinical and biochemical investigations were done as per the protocol. The patients were regularly assessed as per Siddha and Bio-chemical parameters. The drug was administered for 45 days. Among the 15 patients recruited, 4 dropped out of the trial, 7 patients completed the study and study in 4 patients is in progress.
l.	Design of Study	:	Open labelled Clinical Trial
m.	No. of Group	:	One group
n.	Number of Cases	:	30 Subjects

o.	Plan of Study	:	The Subjects are being screened and selected according to the Siddha and modern parameters. They were instructed to attend the outpatient department every week for observations and to collect the medicine. Confirmatory diagnosis was made with USG report. Their urine and blood parameters were estimated and recorded, before and after treatment.
p.	Criteria for Inclusion	:	1. Age group: 18 to 65 years 2. Presence of any three of the following signs and symptoms: a. Intermittent dull / colicky pain in back radiating from loin to groin, which aggravates on movements b. Burning micturition c. Haematuria d. Frequent micturition 3. Evidence of calculus in any of the following modern diagnostic procedures: X-Ray - KUB region Ultrasonogram - KUB region 4. Patients with renal stones of size 3 to 10 mm.

q.	Criteria for Inclusion	:	5. Age group: 18 to 65 years 6. Presence of any three of the following signs and symptoms: a. Intermittent dull / colicky pain in back radiating from loin to groin, which aggravates on movements b. Burning micturition c. Haematuria d. Frequent micturition 7. Evidence of calculus in any of the following modern diagnostic procedures: X-Ray - KUB region Ultrasonogram - KUB region 8. Patients with Renal stones of size 3 to 10 mm.
r.	Criteria for exclusion		1. Stag horn calculi 2. Severe Hydronephrosis / Pyelonephrosis 3. Cystitis 4. Severe urinary tract infections 5. Any other complications of calculus 6. Pregnant and Lactating women 7. Patients undergoing treatment for chronic illness – Diabetes mellitus, Cardiovascular diseases, Tuberculosis, Hypertension etc.
s.	Criteria for assessment		a) Absence or reduction in size / no. of stones b) Reduction of presence of Pus cells, Epithelial cells, RBCs and Calcium oxalate crystals in urine.

Principal drug and the supporting therapy including diet prescribed:

Principal Drug : Sirupeelayathi Kudineer

Diet Regimen : Salt restricted diet

Dose schedule : Sirupeelayathi Kudineer 80 ml twice a day (in empty stomach)

Duration of treatment : Forty five days

Source of supply of drugs : Pharmacy of SCRI, Chennai.

1.	Preclinical Study	--
2.	Clinical Study	IEC No:CCRS/SRRI – 1/2011-12/03 **Status of the Clinical study** 1. The clinical trial has been completed. 2. Statistical analysis and compilation is in progress.

3.5.1. Other Projects:

During the reporting period, apart from the above said multicentric clinical trials the following single centric studies have been carried out.

The details are mentioned below:

III.

Other than the above said trials the following clinical trials are carried forward to the next year as pre-clinical trials related to them have been completed/are nearing completion.

S.No	Title	Single/ Multicentric	Institutes involved	Remarks
1.	Clinical trial on herbal drug in venpadai (vitiligo) by open labeled method	Single centre	SCRI, Chennai	Preclinical complteted and clinical study to be iniated.
2.	Clinical Study on Herbo Mineral Compounds in	Single centre	SCRI, Chennai	Preclinical complteted and

	Incidentally Detected Asymptomatic HBsAg Positive subjects **(IDAHS)**			clinical study to be iniated.
3.	Open labeled clinical trial on Peenisam (Sinusitis)	Single centre	SCRI, Chennai	Preclinical is in progress
4.	Clinical trial on Ceganavatham	Multicentric	SCRI, Chennai; SRRI, Puducherry; SRRI, Trivandrum	The study not iniated due to discontinuation of services of the consultant (Varmam Therpy)
5.	Multicentric studies on Dyslipidemia	Multicentric	SCRI, Chennai; SRRI, Puducherry; SRRI, Trivandrum	Preclinical is in progress
6.	Observation studies on role of Siddha medicine in Geriatrics	Single centre	SCRI, Chennai	The trial to be initiated
7.	Observational studies on the role of Siddha medicine as an add on	Single centre	SCRI, Chennai	The trial to be initiated

	therapy in Diabetes Mellitus			

3.6. LITERARY RESEARCH AND DOCUMENTATION

- Siddha Central Research Institute holds nearly 1500 Manuscripts
- Periodical Calligraphy, Annotation, Cataloguing and Digitization of the Manuscripts are done
- Rare books are published periodically from the Manuscripts

Fig. 10. Manuscripts for Academic and Research Purpose

Literary research lays the platform for any research in Siddha System as they are scientific reflections of the intuition of Siddhars. Palm leaves and paper manuscripts still hold with them many unfolded scientific details which are to be unearthed.

A Literary Research Unit was started by the Government of India, at Saraswathi Mahal Library, Thanjavur in the year 1964 for the enlightment of the Siddha system. In 1971, one more Literary Research Unit was started at Govt. Siddha Medical College, Palayamkottai. They have made wonderful collections of traditional manuscripts and very old Siddha printed Books dealing with treatment of ailments by the traditional physicians all over Tamilnadu. In 1979, the units were merged and formed as LITERARY RESEARCH & DOCUMENTATION DEPARTMENT At CRIS., Chennai. In April 2007 the LR&DD was merged with CRIS, Chennai-106. The the mandate of this department is to carry out Literary Research.

The wealth of traditional medicines is available both as coded and non-coded documents. Answers to many unsolved questions have been properly culled out via extensive literary research. This traditional knowledge should be properly documented, digitalized, preserved and published in the public domain. Both virtual and real manuscripts made available as a ready beckoner for

students, research scholars and the public. Literary Research and Documentation Department under the umbrella of Siddha central research institute is carrying out the above said activities in a systematic manner.

MAJOR RESEARCH ACTIVITIES

- Collection of Manuscripts and other old rare printed books and hand written copies.
- Cleaning and preservation of collected materials.
- Preparing, cataloguing and classification.
- Transcription of palm leaf Manuscripts.
- Annotation of poems.
- Typing of transcribed poems along with annotations.
- Correction of typed copies.
- Comparison with original
- Submission for approval.
- Publication.
- Translation of books published in Siddha into English & Hindi.
- Publication of translated Siddha Text in English and Hindi.
- Sale of publications.
- Preparation of IEC Materials for AYUSH and CCRS.
- Submission of Manuscripts to SRMMC For digitization.
- Periodical training for students.

Activities in the Current year

S.No	Category	Details	Status
1	Siddha System Dossier	Final edition by experts	To be completed
3	Monograph	Therapeutic and chemo preventive effect of Nandhi Mezhugu on DMBA induced mammarian tumour in rats.	Compilation is in progress

		RGM in Fibroid Uterus.	Compilation is in progress
		Drug Standardization	Compilation is in progress
4	Revised IEC Materials	Nine new IEC materials 21 – Brochures &Translites.	10 brochures printed / 11 Translites completed.
5	Clinical trial protocols	Compilation for 25 Diseases.	Published.

S.No.	Title of the Siddha Books in Tamil	Translated to	Status	Remarks
1	Yokobu Vaithiya Chinthamani-700	English	Proof correction is being carried out	Will be published in due course
2	Siddhar Kaya Karpam	English	Proof correction is being carried out	Will be published in due course
3	Theraiyar Kudineer	Hindi	First Proof correction completed	Will be published in due course

3.7. Research articles

Table-94: Research Articles Published during 2013-2014

S. No.	Name of the Author	Title of paper	Name of Journal/ Bulletin	Year of Publication
	International			
1.	S. Thillaivanan K. Kanagavalli, P. **Sathiyarajeswaran.** P. Parthiban and J.Anbu	Spermatogenetic activity of Isappukol chooranam - Siddha medicine	International Journal of Pharmaceutical Research and Bio-science (IJPRBS), 2013; Volume 2(2): 164-179.	April 2013
2.	K.Samraj , K.Kanagavalli , **P. Sathiya rajeswaran**, J.anbu, P.Parthiban,	Anti-tumour activity of velvanga parpam (official siddha drug) dalton's ascites lymphoma in rodents	International Journal of Pharmaceutical Research and Bio-science (IJPRBS) 2(2): 152-163, Apr-2013.	April 2013
3.	K.Kanagavalli, P.Kavitha,J.Anbu, **P.Sathiya Rajeswaran** and P.Parthiban	Analgesic Activity of Sathikkai Podi - A Siddha Drug	International journal of pharmaceutical and chemical sciences, vol. 2 (2) Apr-Jun 2013, 1033-37.	April 2013
4.	P.Parthiban, K.Kanagavalli, **P.Sathiyarajeswaran**, J.Anbu and G.Krishnaprakash	Antiarthritic Activity of Kanthaga Parpam (KP) (Official Siddha Drug) in CompleteFreund's Adjuvant (CFA) Induced Arthritic rats	International Journal of Pharma Research & Review, May 2013; 2(5): Page: 1-7	May 2013

5.	P.Parthiban, K.Kanagavalli , **P.Sathiya Rajeswaran**, J.Anbu, N.T.Parthiban	Evaluation of Anti Histaminic and Bronchodilator Activity of Linga Mathirai (Formal Siddha Drug)	International Journal of Pharma Research & Review, May 2013; 2(5):8-12.	May 2013
6.	S.Umera, K.Kanagavalli, P.Parthiban, J.Anbu, **P.Sathiya Rajeswaran**	Central and Peripheral Acting Analgesic Activity of Karunkali Ver (AcaciaCatechu)	International Journal of Pharma Research & Review, May 2013; 2(5):13-17.	May 2013
7.	P.Parthiban, K.Kanagavalli, **P. Sathiya Rajeswaran**, J. Anbu, A. Chinnasamy	Hypoglycemic Activity of Serankottai Thiravam (Semicarpus Anacardium. Linn) in Alloxan Induced Diabetic Rats	International Journal of Pharma Research & Review,May 2013; 2(5):18-23	May 2013
8.	K. Kanakavalli, P.Parthiban, J.Anbu, **P.Sathiya Rajeswaran**, R. Sathyavathy	Lithotriptic Activity ofSiddha Drug Megarajanga Chooranam on Ethylene GlycolInduced Urolithiasis in Rats	International Journal of Pharma Research & Review, May 2013; 2(5):24-32.	May 2013
9.	**Natarajan. S** **Kannan. M** **Sathiyarajeswaran. P**	Scientific Validation of purification of Kadukkai (Terminalia Chebula)- A Siddha Drug	International Journal of Pharmaceutical Research and Development (IJPRD) IJPRD, 2013: Vol 5 (06): August 2013(018- 024) ISSN No: 0974- 9446	Aug. 2013
10.	**Sathiyarajeswaran. P** **Kannan. M** **Natarajan. S**	Mother and Child Care in Siddha	International Conference on Siddha Medicine 2013 (Siddha Medicine in Primary Health Care) By Ministry of Health Malaysia Malaysian Association of traditional Indian medicine	Nov. 2013

11.	K. Samraj,K. Kanagavalli, **P. Sathiya Rajeswaran** and P. Parthiban	Acute and sub acute toxicity study on Siddha drug Velvanga parpam	International Journal of Pharmaceutical Sciences and Research,2013; Vol. 4(11): 4384-4391	Nov. 2013
12.	S. Thillaivanan K. Kanagavalli, **P. Sathiyarajeswaran** and P. Parthiban	Acute and subacute toxicity study on spermatogenic Siddha drug'isappukolchooranam' (IC)	International Journal Pharmaceutical Science and Research (IJPSR) (2013), Vol. 4, Issue 11, 4448-4456.	Nov. 2013
13.	**R. Ganesan**, Mathuram Venkatanarasimhan, Sharad pawar, **G. Pramod Reddy,** T. Anandan and G. Masilamani	Hepato-protective activity of *Coldenia procumbens* linn against D-galactosamine induced acute liver damage in rats	International Journal of Integrative Science, Innovation Technology, Vol 2 (2), 9-11, 2013.	2013
14.	K. Manjula Devi, **G. Pramod Reddy**, A.R. Kothai, M. Thenmozhi, M. Dhanalakshmi,	"Evaluation of Immunomodulatory activity of aqueous extract of a poly herbal formulation by invivo method"	Asian Journal of Pharmaceutical and Clinical Research Vol-6 (2), 129-133, 2013.	2013

	S. Sarumathy			
15.	G. Devanand Venkatasubbu, S. Ramasamy, **G. Pramod Reddy** & J. Kumar	In vitro and In vivo anticancer activity of surface modified paclitaxel attached hydroxyapatite and titanium dioxide nanoparticles	Biomed Microdevices (2013) 15:711–726	2013
16.	**Dr. S. Jega Jothi Pandian**	Food for Thought Principles and practice of Siddha medicine	Journal Indian studies, Univeristy of Malaya	2013
17.	**Shakila. R**	Chromatographic studies on *Artemisia nilagiria* Leaf Volatile oil	Asian J Pharm Life Sci 3(3): 185-190.	2013
18.	**Natarajan. S** **Kannan. M** **Sathiya rajeswaran. P**	Fasting – A medico historical review	International Refereed Journal of Reviews and Research Volume 2 Issue 1 January-February 2014 , International Manuscript ID : 23482001V2I101022014-05 (Approved and Registered with Govt. of India) ISSN (Online) : 2348 – 2001	Feb. 2014
19.	**R. Ganesan** Mathuram venkatanarasimhan A. Saraswathy A.R. Shirolkar	Antioxidant activity of *Coldenia procumbens* linn. Whole plant methanolic extract	International Journal of Pharmacy and Pharmaceutical Sciences Int J Pharm Pharm Sci, Vol 6, Suppl 1, 75-79	Jan. 2014

	A.v. Raskar S. D. Pawar S.N. Murthy and S. Jega jothi pandian			
20.	Priya F, **Shakila R, Sathiyarajeswaran P**, Pitchiahkumar. M	Standardization of Milagathi Choornam	International Journal of Herbal Medicine, 2014; 1 (6): 69-74	March 2014
21.	**Dr.Shyamala Rajkumar**	Medicinal Plants mentioned in the Holy Bible and in Siddha system and their Ethanomedicinal Studies.	International Journal of Recent Scientific Research (IJRSR)	Communicated

S. No.	Name of the Author	Title of paper	Name of Journal/ Bulletin	Year of Publication
	National			
1.	**Sasikala Ethirajulu**, SaradaVasanth, Balakrishna K, Veluchamy G.	Pharmacognostical evaluation of *Toddalia asiatica (L.) Lam.*	Journal of Drug Research in Ayurveda & Siddha Vol. XXXII, No.1-2, 37-46.	2013

2.	**Shakila R**	Review on Sphaeranthus indicus Linn. (Koṭṭaikkarantai	Phcog Rev 7(14): 157-169.	2013
3.	Perundevi TS, Kothai S, **Shakila R**	Comparative evaluation of flaxseed mucilage, gum acacia and peach gum as pharmaceutical excipients	Asian Journal of Biochemical and Pharmaceutical Research 4(3): 181-190	2013
4.	**Shakila. R** **Elankani P.** **Jega Jothi pandian S.**	Development of Finger Print Profiles for *Andrograrphis echioides Nees*. and *Andrographis paniculata Nees*.	Research Journal of Pharmacognosy and Phytochemistry 6(1) 22-29.	January-March, 2014,
5.	Meena R **Ramaswamy R.S** **Shakila R**	Physico chemical analysis of Kandhaga Rasayanam, a Siddha herbomineral formulation	IOSR Journal of Pharmacy 4(2): 28-34.	2014
6.	**Anitha john, V. Gayathri Devi,** Arjun Singh and **K. Gopakumar**	Chemical standardisation of *Sida cordifolia* Linn. a common Siddha herbal drug	Indian Journal of Pharmacy and Technology (IJPT), July – 2013, Vol.5, Issue No.2, 5448-5457	July, 2013
7.	Dr.Shyamala Rajkumar	Basic Philosophy of Neuropsychiatric Diseases in Siddha system of Medicine.	http://Siddhapapers.webs.com/literaryreviews.htm.	Aug. 2013

Publications Research papers/articles in the conference/ workshop/ Seminar proceedings only

S. No.	Name of the Author	Title of paper	Name of Journal/ Bulletin	National / Inter national	Year of Publi-cation
1.	**Mr. R. Ganesan** **Mathuram Venkatanarasimhan, A.R. Shirolkar,** **C.S. Mulye, S. D. Pawar, S.N. Murthy and S.Jega Jothi Pandiaan**	Antimicrobial activity of whole plant alcoholic extract of *Coldenia procumbens*	Proceedings of Third Euro-India International Conference on Holistic Medicine (ICHM 2013), Kottayam, Kerala	International	Sep. 2013
2.	**R. Shakila** **Dr. P. Elankani** **Dr. S. Jega Jothi Pandian**	Quality Control Aspects of Eladi chooranam	International Conference and Exhibition on Pharmacognosy, Phytochemistry and Natural products at Hyderabad	International	Oct. 2013
3.	**Dr. Kannan. M** **Dr. S. Natarajan** **Dr. P. Sathiya Rajeswaran** **Dr. S. Jega Jothi Pandian**	Kal Nandu Soothiram-Manuscript on Siddha Medicine	Proceedings of National Seminar on Unpublished Manuscript on Medicine Organized by Andhra Pradesh Government Oriental Manuscript Library & Research Institute, Hyderabad	National	Nov. 2013
4.	**R. Shakila**, A. Saraswathy	Iridoid glycosides from *Coldenia procumbens*	Proceedings of **50th Annual Convention of Chemist 2013** of	National	Dec. 2013

	S. Jega Jothi Pandian		Indian Chemical Society at Panjab University, Chandigarh.		
5.	**Dr. Shyamala Rajkumar**	Clinical Trial of Rasaganthi Mezhugu on Karuppai Sathai Kattigal (Fibroid Uterus)	Proceedings of the National Workshop on the Management of Obstetric and Gynaecological Disorders in Siddha, SRRI, Puducherry.	National	Feb. 2014
6.	**Dr. G. Aadinaath Reddy**	"Anti gastric ulcer activity of Mayilaragathi choornam (Siddha formulation) in rats".	Proceedings of National Conference on Plant Bio resource Management & Biotechnology. Univ. of Jaipur, Jaipur, Rajasthan.	National	Jan. 2014
7.	**Dr. Jeyakannan. J Saravanan. S Selvarajan. S Gopakumar. K Jega Jothi Pandian.S Anandan.T**	Clinical study on the effect of Centella asiatica (Vallarai) in Psoriasis (Kalanjagapadai)	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	Jan. 2014
8.	**Mr. R. Ganesan** **Mathuram Venkatanarasimhan, G. Aadinaath Reddy, A. Saraswathy and** **S. JegaJothi Pandian**	"Evaluation of anti-diabetic activity of *Coldenia procumbens* Linn in Steptrozotozin - induced diabetes in rats".	Proceedings of National Conference on Plant Bio resource Management & Biotechnology. Univ. of Jaipur, Jaipur, Rajasthan.	National	Jan. 2014

9.	**Dr. M. Kannan**	Multi-centric Clinical trial Experiences in Diabetes mellitus	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
10.	**Dr. G. Aadinaath Reddy**	Efficacy and Safety assessment of clinical trial drugs of Life Style Disorders	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
11.	**Mrs. R. Shakila**	Standardization of Clinical trial Drugs in LSDs.	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
12.	**Dr. P. Elankani**	"Efficacy and Clinical Evaluation of KPE Thylum in the Management of Kalanjakapadai (Psoriasis)"	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
13.	**Mr. R. Ganesan**	Recent Diagnostic techniques in Life style disorders	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
14.	**Dr. S. Jega Jothi Pandian**	Role of functional foods in the management of LSDs	Proceedings of National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	National	Mar. 2014
15.	**V. Gayathri Devi, Anitha John**, Arjun	Physico-Chemical Evaluation of Dhurva using HPTLC and	Proceedings of the the 23rd Swadeshi Science Congress – 2013	National	6th November 2013

	Singh and **S. Selvarajan**	Identification of Marker Compound			
16.	**Anitha John, V. Gayathri Devi**, R. Sreekala Devi and **S.Selvarajan**	Physico-Chemical and preliminary antioxidant studies on *Trichosanthes cucumerina*	Proceedings of the the 23rd Swadeshi Science Congress – 2013	National	6th November 2013
17.	**S.Saravanan**, M.Padmasorna Subramanian and **S.Selvarajan**	A simple and cost effective folklore medicine for migraine	Proceedings of the 23rd Swadeshi Science Congress – 2013	National	6th November 2013
18.	***S. Selvarajan, S.Saravanan***, *J.Jeyakannan, K. Kumaresan, D.Balakrishnan, N. Raaman*	Anti-Microbial activity of *Achyranthus aspera* – Linn.	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	24th January, 2014
19.	***S.Saravanan***, *M.Ramani, J.Jeyakannan &* ***S.Selvarajan***	Efficacy of *Naga Parpam* in first degree haemorrhoids & the potential Role of processing herbal Juice	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	24th January, 2014
20.	*Jeyakannan.J,* ***Saravanan.S***, ***Selvarajan.S***, *Gopakumar.K, JegaJothiPandian.S, Anandan.T*	Clinical study on the effect of *Centella asiatica* (*Vallarai*) in Psoriasis (*Kalanjagapadai*)	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	24th January, 2014
21.	*Nithin Vinod KM, Gayatri R, Namitha Das MT, Brahamadathan U , Rahul VA, Santhiprabhu J,*	Certain Purification techniques of metals and minerals in Siddha	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	24th January, 2014

	Parvathy L, ***Saravanan S, Selvarajan S***				
22.	*Deepthy Mol M. J, P. M. Radhamany and* ***V. Gayathri Devi***	Comparative pharmacognostic evaluation and preliminary phytochemical analysis of the fruits and roots of *Tamilnadia uliginosa* (Tiruvengadam and Sastre)	Proceedings of the National Seminar on Safety and Efficacy of Herbo-mineral Formulations of Siddha	National	24th January, 2014
23.	**V. Gayathri Devi, Anitha John, S. Selvarajan**	Differentiation of Two Sources of *Gokshura* using Chemico-botanical and HPTLC Methods	Proceedings of 26th Kerala Science Congress - 2014	National	28th January, 2014
24.	**V. Gayathri Devi** et al.	Prevention of selenite induced aggregation of rat lens crystallins by *Moringa oleifera*	Proceedings of 26th Kerala Science Congress - 2014	National	28th January, 2014
25.	**S.Saravanan**	Draft on Cataloguing the Siddha medical books existed in the period of Siddhars and the lost medical books of Siddhars	Proceedings of the National Seminar on 'Language for Healthy Life' organized by Prof.K.Nachimuthu Institute for Research in Language and Culture, Coimbatore.	National	23-03-2014.

3.8. Miscellaneous Activities

3.8.1. Health Care Services through Out-Patient Department (OPD) and In-Patient Departments (IPD)

The Clinical Research Programme under the Council focuses mainly on clinical evaluation of selected therapies in clinical conditions. The activities in the following areas have been carried out during the reporting period:

All the cases registered in IPD and OPD were screened for ADRs under the Pharmaco-vigilance programme. The hospitals functioning under the Council provided medical aid to 70334 patients at OPD level. Out of them 37868 are male cases and 32466 were female cases. Besides this a total number of 188 patients were admitted in the In-patient Department of the Institutes of (SCRI, Chennai and SRRI, Puducherry. The Geriatric OPD was also conducted in 4 (SCRI, Chennai; SRRI, Puducherry; SRRI, Thiruvananthapuram and SCRU, Palayamkottai) Clinical Research Centres. A total number of 14077 patients have benefited from the Geriatric Specialty OPD. A special Flu-like illness OPD was also conducted in the 2 (SCRI, Chennai and SRRI, Puducherry) peripheral Institutes of the Council and 44 patients of different Flu-like illnesses were provided treatment. Apart from the above Varmam and Thokkanam therapies have also been provided to 3812 patients at SRRI, Puducherry.

The census of OPD and IPD patients are as follows:

Table-95: Census of OPD and IPD Patients

Sl. No	Instt. / Unit	No. of patients in OPD					No. of patients in IPD				BOR (%)
		New		Old		Total	Admitted		Discharged		
		M	F	M	F		M	F	M	F	
1	SCRI, Chennai	6398	4861	16463	12568	40292	93	28	100	30	21.1
2	SRRI, Puducherry	2766	2569	11402	10835	27572	8	5	7	56	13.21

3	**SRRI, Thiruvananthapuram**	623	662	1280	2310	4875	--	--	--	--	--
4	**SCRU, Palayamkottai**	1841	1591	1726	1490	6648	--	--	--	--	--
	Total	**11628**	**9683**	**30871**	**27203**	**79387**	**101**	**13**	**107**	**96**	--

BOR- - Bed Occupancy Ratio

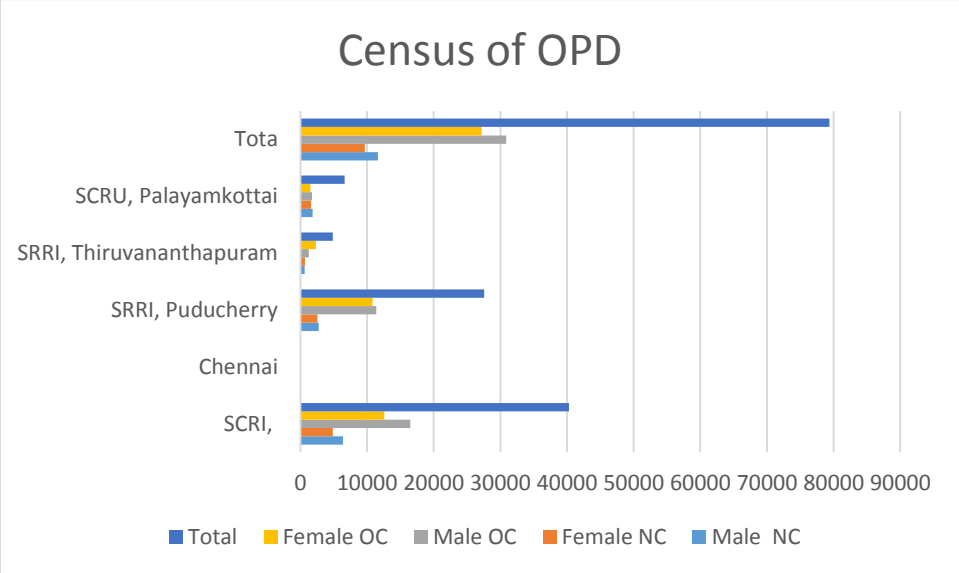


Table-96: CCRS Hospitals Male/Female Patient Ratio

Institute	Male	Female
SCRI, Chennai	22864	17428
SCRU,Palayamkottai	3567	3081
SRRI, Thiruvananthapuram	1280	2310
SRRI, Puducherry	14188	13379
TOTAL	41899	36198

Grand Total	**70334**

S.No	Male	Female
1.	41899	36198

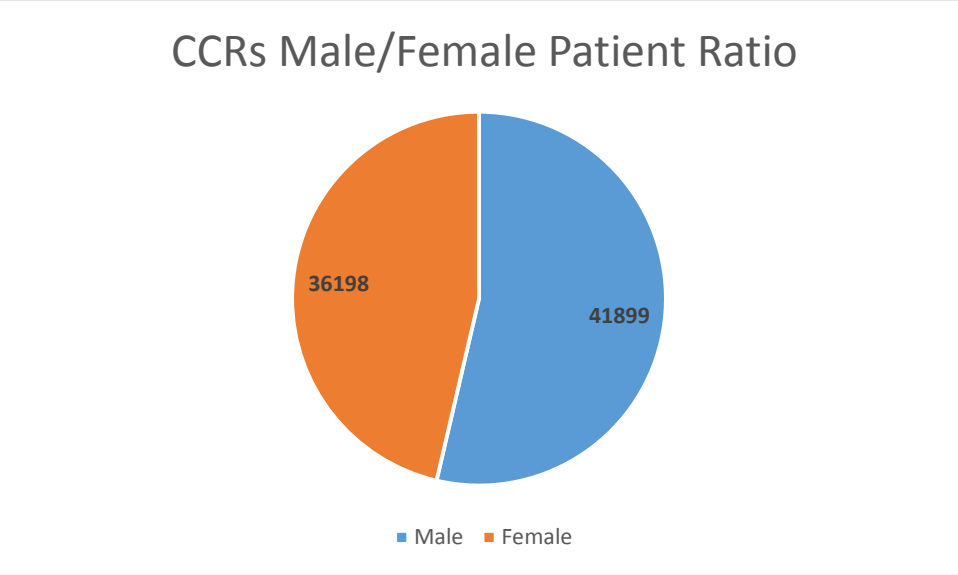


Diagram No 1. Schematic presentation of Male & Female population of General OPD

3.8.2. Pharmaco-Vigilance Programme

Worldwide movement for the improvement of patients' safety is gaining momentum. Hence the subject of drug safety has gained more significance in the present day scenario. Presently with increased use of Siddha drugs the issue of adulteration and use of counterfeit drugs have also increased. Hence a mechanism is required to address these issues. Pharmaco-vigilance aims at documenting the harmful effects of any drug causing adverse reactions. The number of adverse reactions / ill-effects of Siddha drugs reported in the National Pharmaco-vigilance in India are negligible. To collate and document the data related to ADRs this programme was initiated.

Aims & Objective

This programme aims at providing the data of adverse drug reactions of the drugs of herbal mineral, metallic, animal and other origin used in Siddha system of medicine.

Date of Implementation: April 2009

Participating Institutes/Units

1. SCRI, Chennai
2. SRRI, Puducherry
3. SRRI, Thiruvananthapuram
4. SCRU, Palayamkottai

Participating Institutes / Units have screened all the OPD and IPD patients for ADRs, if any. Among the 4 Institutes / Units participated, 3 Institutes have not found any ADRs and SCRI Chennai has reported 01 case of suspected ADR and the report has been sent to the National Pharmaco-vigilance Centre, Jamnagar, Gujarat.

Fig.11. Clinical Section (Male), SCRI, Chennai

Fig. 12. Clinical Section (Female), SCRI, Chennai

- Biochemistry Department extends its support both in pre-clinical and Clinical studies.
- In pre-clinical studies Biochemical investigations of animal blood samples are being carried out as per the specifications in the protocol.
- Liver Function Tests, Kidney Function Tests, Serum Electrolytes and Lipid Profile were also tested for Multi-centric trials in Diabetes patients.
- The routine Biochemical Analysis is also provided for OPD/IPD patients.
- In Clinical Research, Biochemical investigations of animal blood samples were carried out in multi-centric trials in Diabetes and Psoriasis in the reporting year.

Fig. 13. Bio Chemistry Department, SCRI, Chennai

Fig. 14. Geriatric Special OPD at SCRU, Palaymkottai

Fig. 15. Clinical Pathology Department, SCRI, Chennai

Fig.16. Performing skin biopsy in the Clinical pathology laboratory

Skin Biopsy

During the reporting period skin biopsy was performed for 9 patients as a confirmatory test for Psoriasis. Incisional biopsy was taken in aseptic condition from one of the prominent skin lesions under local anesthesia subcutaneously. The incision was done in vertical as well as elliptical shape for easy healing. An adequate depth up to deeper layer of dermis and an amount of normal tissue were also included. So this could be compared with the pathological area. The wound was sutured with a proper sterile silk thread to enhance faster healing. Cleaning and dressing was done for 4 days and sutures were removed on 5th day. The specimens of skin biopsy were preserved in a special container with 10% Formalin and sent to the Department of

Pathology of A. L. Mudaliyar Post graduate Institute of Basic Medical Sciences (ALMPGIBMS) Taramani, Chennai for preparation of slides and to provide expert histopathology reports for the same.

3.8.3. Specialty Geriatric Clinics

Geriatric OPD was started in the peripheral Clinical Siddha Institutes/units of CCRS viz., SCRI, Chennai; SRRI, Puducherry; SRRI, Thiruvananthapuram and SCRU, Palayamkottai in 2008. During the reporting period, 9502 patients were benefited from the Geriatric Special OPD Clinics.

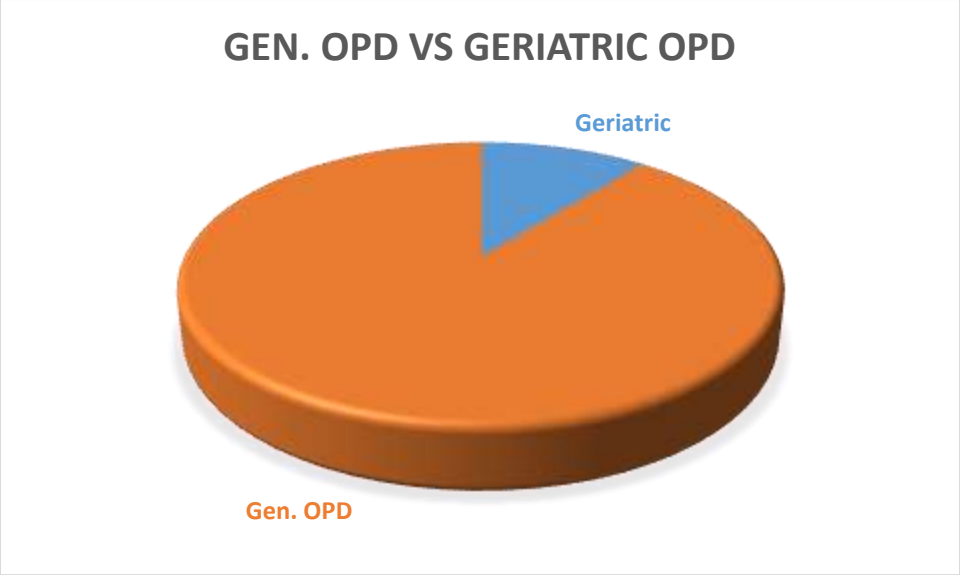


Diagram No 2. Schematic presentation of General OPD and Geriatric Specialty OPD census

Table-97: Top ten prevalent diseases treated in Geriatric Specialty OPD

Sl.No.	Prevalent Diseases
1.	Neerizhivu (Diabetes Mellitus)
2.	Vatha noigal (Musculo – Skeletal disorders)
3.	Thol noigal (Skin diseases)

4.	Azhal Keel Vayu (Osteoarthritis)
5.	Irumal (Cough due to respiratory or other causes)
6.	Iraippu noi (Bronchial Asthma)
7.	Valigunmam (Peptic ulcer)
8.	Venpadai (Leucoderma)
9.	Iduppu vali (Lumbago)
10.	Neerkovai (Sinusitis)

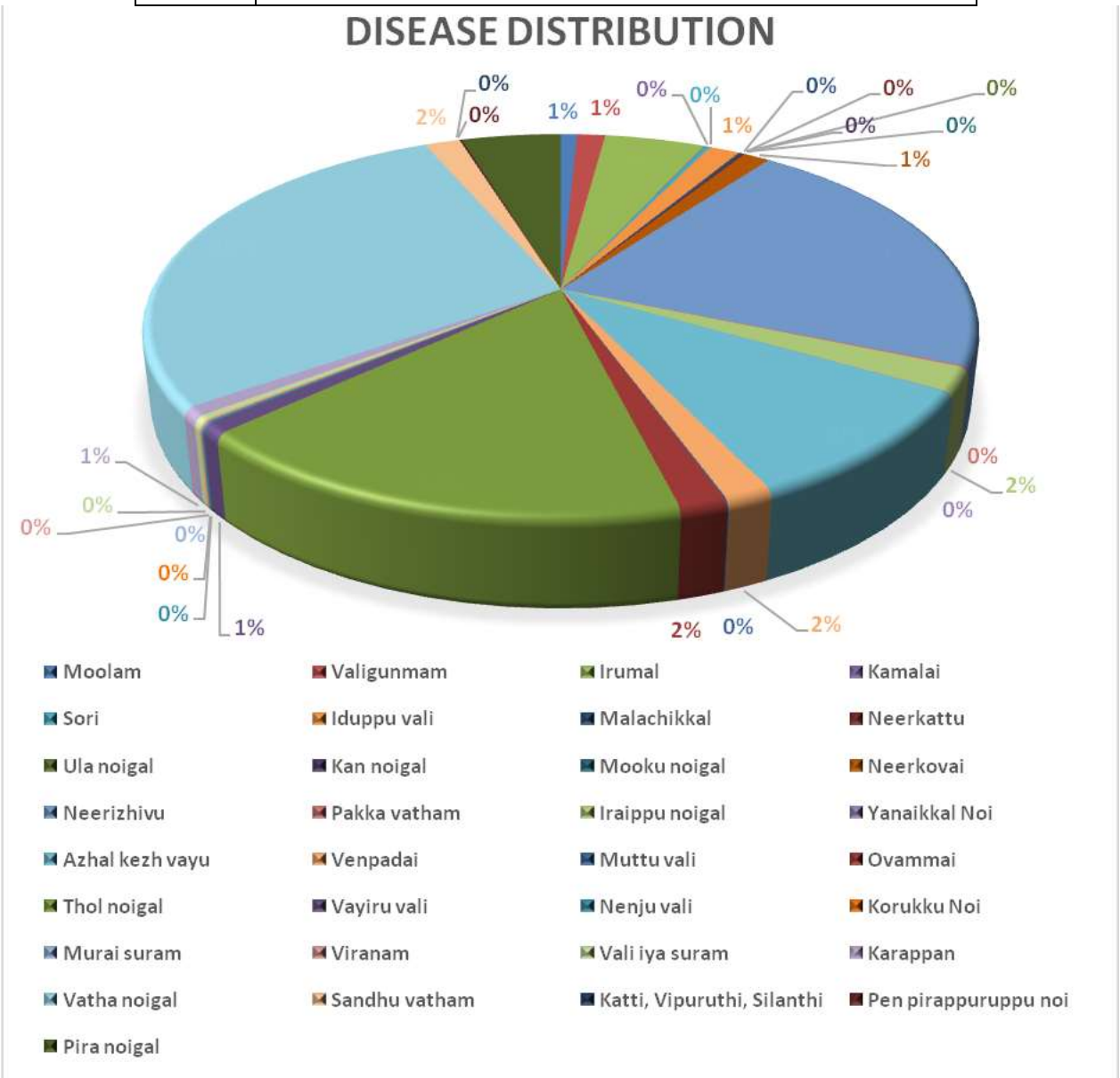


Diagram No 3. - Schematic presentation of disease distribution in Geriatric OPD at SCRI, Chennai

3.8.4. Flu-like Illness Specialty OPD

As per the direction of Dept. of AYUSH in August 2009 the Council started specialty OPD clinics for Flu like illness specialty OPD Clinics in October, 2009 in the peripheral Institutes / Units of CCRS viz. SCRI, Chennai and SRRI, Puducherry for prevention, management and counseling of the patients with flu-like symptoms. During the reporting period 44 patients of such conditions attended the OPD.

Table-98: Details of beneficiaries in Specialty Clinics of Flu-like Illnesses

Sl. No.	Institutes / Units	New Cases		Old Cases		Total
		M	F	M	F	
1.	SCRI, Chennai	11	02	07	03	23
2.	SRRI, Puducherry	18	21	--	--	39
Grand Total		**29**	**23**	**07**	**03**	**62**

3.8.5. Varmam Specialty OPD

Varmam and Thokkanam are unique and special therapeutic entities in Siddha, which are useful in treating several neurological and musculo – skeletal diseases mostly without the intervention of internal drugs. This specialty OPD was started at SRRI, Puducherry in 2008 and it has been receiving an overwhelming response since then.

Patients who attended Varmam special OPD at SRRI, Puducherry during the reporting period are tabulated below:

Table-99: Census of Varmam special OPD

Sl. No.	Institute	M	F	Total
1.	SRRI, Puducherry	333	379	712
2.	SCRI,Chennai	362	412	774

Grand Total	**695**	**791**	**1486**

3.8.7. Pharmacy

Pharmacy of Siddha Central Research Institute was established to fulfill the needs of Clinical research activities of all the peripheral Institutes/Units of CCRS. Since inception the pharmacy was functioning in the main building and later it was shifted to the new pharmacy block constructed during the year 1986 and it is currently functioning in the same building. The drugs are being prepared for OPD/IPD purposes. The drugs are also prepared as per SOPs for clinical research activities and supplied to all the CCRS peripheral Institutes/Units. Apart from this some of the medicines are prepared for activities related to Siddha Pharmacopoeia scheme. During the reporting period SCRI Pharmacy got its license renewed.

Table-101: Medicines prepared in the Pharmacy during the reporting period

S. No	Name of Trial / General Medicines	Quantity in Hand (in Kg)	Quantity prepared (in Kg)	Quantity supplied to other institutes of CCRS (in Kg)	Quantity issued to OPD/IPD, etc. (in Kg)	Balance (in Kg)	Remarks
1.	Amukkara chooranam	-	-	-	35.500	Nil	Purchased from IMPCOPS
2.	Amukkara chooranam combination (Siddha Formulary of India)	38.000	331.550	8.000	361.550	NIL	
3.	Amukkara chooranam(plain)	9.000	73.700	-	82.700	NIL	
4.	Annabedhi chenduram	24.300	-	-	17.690	6.610	Previous Stock
5.	Arathai chooranam	-	175.000	-	175.000	NIL	
6.	Arathai kudineer chooranam	-	79.000	-	75.000	4.000	
7.	Arugan Thylam	-	667.000	-	562.000	105.000	
8.	Asta chooranam	-	70.500	-	49.000	21.500	

9.	Avuri Thylam	76.000	-	-	27.500	48.500	Previous Stock
10.	D5 Capsules	346 Nos.	-	200	100	46 Nos.	Previous Stock
11.	D5 chooranam (Trial Drug)	45.000	313.900	19.000	339.900	NIL	
12.	Dhasana Podi	-	11.900	-	11.900	NIL	
13.	Elathy chooranam	7.000	255.000	5.000	239.300	17.700	
14.	G1 chooranam	7.800	44.000	-	40.800	11.000	
15.	Gowri chinthamani Chenduram	5.200	-	-	5.200	NIL	Previous Stock
16.	K.P.E oil	-	59.000	-	59.000	NIL	
17.	Karpoorathi Thylam	12.000	675.000	-	687.000	NIL	
18.	Kavikkal chooranam	20.500	45.000	4.000	19.000	42.500	
19.	Kazharchi chooranam	2.500	5.480	-	6.980	1.000	
20.	Kukkil Parpam	-	55.000	-	31.500	23.500	
21.	Kukkil Thylam No II	150.000	1030.000	-	1180.000	Nil	
22.	Linga Chenduram	-	13.100	-	13.100	Nil	
23.	Mathan Thylam	-	-	-	10.000	2.500	Purchased from IMPCOPS
24.	Mathan Thylam with Thurusu (Research)	1.000	258.000	-	259.000	NIL	
25.	Mathan Thylam with Thurusu (Research)	1.000	258.000	-	259.000	NIL	
26.	Moolakkudora Ennai	5.500	-	-	0.500	5.000	Previous Stock
27.	Muthuchippi Parpam	13.500	19.000	-	32.500	NIL	
28.	Nagaparpam	-	-	-	0.500	Nil	Purchased for Arogya
29.	Nandukkal Parpam	9.350	8.000	-	6.300	11.050	
30.	Neerkovai Mathirai	-	22.000	-	13.100	8.900	
31.	Neermulli kudineer chooranam	56.000	-	-	56.000	NIL	
32.	Nilavaagai chooranam	2.000	165.000	-	154.000	13.000	
33.	Nilavembu kudineer chooranam	11.500	75.000	8.000	52.500	26.000	
34.	OA 1 Chooranam - Trail Drug	-	9.500	4.000	2.000	3.500	
35.	Padiga panneer	2.950	-	-	2.250	0.700	Previous Stock
36.	Palagarai Parpam	6.000	60.000	3.000	50.450	12.550	
37.	Parangipattai chooranam	8.250	297.300	11.000	286.550	8.000	
38.	Pavala Parpam	-	-	-	0.400		Purchased for Arogya

39.	Punga Thailam	-	-	-	10.000	Nil	Purchased for Arogya
40.	Rasagandhi Melugu	-	-	-	3000 nos.	Nil	Purchased for Arogya
41.	Sangu Parpam	2.000	45.000	-	45.350	1.650	
42.	Silasathu Parpam	-	28.000	3.000	25.000	NIL	
43.	Sirupeelaiyadhi kudineer chooranam	-	35.900	33.400	-	2.500	
44.	TAT chooranam	-	138.500	-	138.500	NIL	
45.	Thalisathi chooranam	19.000	73.000	-	92.000	NIL	
46.	Thirikadugu chooranam	7.100	98.000	-	104.100	1.000	
47.	Thripala chooranam	27.500	230.000	-	245.500	12.000	
48.	Vaividangam Chooranam	8.000	72.500	-	56.500	24.000	
49.	Vangavirana kalimbu	20.000	107.000	-	111.000	16.000	
50.	Vengarapodi	0.500	11.600	-	7.500	4.600	
51.	777 Oil	8.000	231.000	-	207.000	32.000	

4. Information, Education and Communication

4.1. IEC Materials / Pamphlets

10 Brochures revised and printed / 11 Translites completed and were distributed/displayed in the AROGYA health melas and other campaigns.

4.1.1. Training to National/International students

Fig. 17. Dr. R. S. Ramaswamy, Director General, CCRS is addressing the foreign students who came to CCRS to know about Siddha System of medicine as a part of their training in international health exchange programme

Fig. 18. Mr. Padma Sorna Subramanian, Research Officer, Botany, SMPG, Mettur teaching the students who visited the medicinal plants garden at Mettur.

Fig. 19. Dr. Pramod Reddy, R.O (Pharmacology), SCRI, Chennai with trainees - Course for CPSCEA Nominee

4.1.2. Seminars / Conferences / Workshops

Table-102: Seminars / Conferences / Workshops Participated by the Officers

S. No.	Name of the participant	Name of Seminar/ conference / workshop / Training	Name of the Organiser	Date
	International			
1.	Dr. R. S. Ramaswamy DG, CCRS	International Conference on Siddha Medicine	Traditional and Complimentary Medicine Division, Ministry of Health, Malaysia Malaysian Association of Traditional Indian Medicine (MATIM)	11 Nov. 2013 To 12 Nov. 2013
2.	Dr. P. Sathya Rajeswaran Dr. M. Kannan Research officers			

S. No.	Name of the participant	Name of Seminar/ conference / workshop / Training	Name of the Organiser	Date
	National			
1.	Dr. P. Elankani Dr.Shyamala Rajkumar	National Workshop on "Scientific writing and Review process of Researches in Ayurveda"	Gujarat Ayurved University – Jamnagar, Gujarat.	20th & 21nd July 2013

2.	Dr. P. Sathya Rajeswaran Dr. M. Kannan	Dissemination workshop of Clinical Trial Registry-India	National Institute of Medical Statistics, ICMR, New Delhi Centre for Research in Medical Entomology, ICMR, Madurai	24th July 2013
3.	Dr. M. Kannan	Training on Results Framework Documentation (RFD) and Research Framework Management System (RFMS) – a web based training programme	Performance Management Division Cabinet Secretariat Government of India	26th Aug. 2013
4.	Dr. P. Elankani	Workshop on "Prevention and Conservation of Manuscripts"	Government Museum, Egmore, Chennai.	20th & 21th Nov. 2013
5.	Dr. M. Kannan	National Seminar on Unpublished Manuscript on Medicine	Andhra Pradesh Government oriental Manuscripts Library and Research Institute National Mission for Manuscript	21th to 23rd Nov. 2013
6.	Dr. P.Elanakani Dr. Shyamala Rajkumar Dr. M. Kannan	Training workshop on Research Methodology	Central Council for Research in Yoga and Naturopathy Dept. of AYUSH	3rd to 7th Feb. 2013
7.	Dr. S. Jega Jothi Pandian Dr. P. Sathya Rajeswaran,	Workshop on the Management of Obstetric and Gynaecological	SRRI, Puducherry	22nd & 23rd Feb.2014

	Dr. M. Kannan, Dr.Shyamala Rajkumar Dr. E. Meenakshinathan	Disorders in Siddha		
8.	Dr. S. Jega Jothi Pandian Dr. K. Gopakumar Dr. R. Yasodha Dr. E. Meenakshinathan Dr. P. Sathya Rajeshwaran Dr. P. Elankani Dr. Shymala Rajkumar Dr. M. Kannan Dr. G. Aadinaath Reddy Sh. R. Ganesan Smt. R. Shakila Dr.R. Aruna Selvi. Catharine Kalaiselvi Sh. Kanagarasu	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	SCRI, Chennai	22nd & 23rd March 2014
9.	Smt. R. Shakila	Intellectual Property Rights in Unani Medicine	RRIUM, Chennai	23rd March 2014
10.	Dr. E. Meenakshinathan	Free Medical Campaign	Indian Medical Association	14th July 2013 & 6th Oct. 2013

11.	Dr. G. Aadinaath Reddy	Federation of Europian Laboratory Animal Science Administration (FELASA)	TANUVAS Madras Vetrinary College Chennai	14th Sep. 2013 To 23rd Sep.2013
12.	R. Kanagarsu	DST Purse sponsored National workshop on "Impact of information Technology on Scientometric studies"	Bharathidasan university Library Tiruchirapalli	17th Feb. 2014

1.1.3. Special Lectures

Table-103: Lectures delivered in Training/Workshop/Colleges

S. No	Name of the Author(s)	Name of the paper/ abstract published	Conference/ Seminar	Date
1.	Smt. R. Shakila	Quality Control Aspects of Eladi chooranam	International Conference and Exhibition on Pharmacognosy, Phytochemistry and Natural products at Hyderabad	21Oct. 2013 To 23Oct. 2013
2.	Dr. M. Kannan	Kal Nandu Soothiram-Manuscript on Siddha Medicine	National Seminar on Unpublished Manuscript on Medicine ByAndhra Pradesh Government Oriental Manuscript Library & Research Institute, Hyderabad	21 Nov. 2013 To 23 Nov. 2013
3.	Smt. R. Shakila	Iridoid glycosides from *Coldenia procumbens*	**50th Annual Convention of Chemist 2013** of Indian Chemical Society at Panjab University, Chandigarh.	4 Dec.2013 To 7 Dec.2013

4.	Dr. R. Aruna	Home gardens of Irulars, Anaikatty, Western Ghats: Biodiversity, food security and Nutrient management.	World Congress on Pharmaceutical Sciences and Chemical Technology in Colombo, Srilanka	16 Dec. 2013 18 Dec. 2013
5.	Dr. P. Sathiyarajeswaran	Research methodology for PG Scholars	Auditorium, GSMC, Palayamkottai	23 Jan,2014
6.	Dr. M. Kannan	Multicentric Double Blind Randomized Controlled Clinical Trial on Urolithiasis/ Kalladaippu with the intervention of coded Siddha formulation T.VCN	Presented a Project proposal on behalf of CCRS- part of Training programme	03 Feb. 2014 To 07 Feb. 2014
7.	Dr. S. Jega Jothi Pandian	Siddha system to keep fit & balance health at the age after 60 +	Senior Citizens to understand the latest development in treatment of Disease and Prevention organized by Dignity Foundation, Stella Marys College , Chennai	21 Feb. 2014
8.	Dr.Shyamala Rajkumar	Clinical Trial of Rasaganthi Mezhugu on Karuppai Sathai Kattigal (Fibroid Uterus)	Workshop on the Management of Obstetric and Gynaecological Disorders in Siddha, SRRI, Puducherry	22 Feb. 2014
9.	Dr. M. Kannan	Multi-centric Clinical trial Experiences in Diabetes mellitus	National workshop on “The role of Siddha Medicine in the management of Lifestyle disorders”	22 Mar. 2014

10.	Dr. P. Sathiyarajeswaran	Cancer –review	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	22 Mar. 2014
11.	Dr. G. Aadinaath Reddy	Efficacy and Safety assessment of clinical trial drugs of Life Style Disorders	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	23 Mar. 2014
12.	Mrs. R. Shakila	Standardization of Clinical trial Drugs in LSDs.	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	23 Mar. 2014
13.	Dr. P. Elankani	"Efficacy and Clinical Evaluation of KPE Thylum in the Management of Kalanjakapadai (Psoriasis)"	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	23 Mar. 2014
14.	Mr. R. Ganesan	Recent Diagnostic techniques in Life style disorders	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	23 Mar. 2014
15.	Dr. S. Jega Jothi Pandian	Role of functional foods in the management of LSDs	National workshop on "The role of Siddha Medicine in the management of Lifestyle disorders"	23 Mar. 2014

1.1.4. Deputation of CCRS Officials abroad:

Prof. Dr. R. S. Ramaswamy, DG, CCRS was deputed to Malayasia as a key note speaker in the International Conference on Siddha Medicine organized by the Traditional and Complimentary Medicine Division, Ministry of Health, Malaysia and Malaysian Association of Traditional Indian Medicine (MATIM) held on 11 Nov. 2013 To 12 Nov. 2013

4.1.4. AYUSH Research Portal

Periodically Research papers about Literary, Drug and Clinical Research articles have been uploaded by CCRS Officials during the reporting period.

4.1.5. Siddha Dossier:

A preliminary draft of Siddha Dossier was prepared and submitted by the SCRI, Chennai. The objective of the dossier is to provide a snapshot of Siddha System of Medicine to the researchers, academicians, stakeholders of various inter-disciplinary fields and also the general public. Continuous vetting process is going on and under the chairmanship of Joint Secretary (BP), series of meetings for vetting conducted in Delhi and also in Chennai. The Siddha Dossier has attained a final shape and will be published.

Table-104: Organized Arogya / Mela / Exhibition / Camp / others

S. No	Name of Mela/ Exhibition / Camp	Name of the Officers	Organizer	Inaugurated by	Activities	Duration & place
1.	Special Geriatic Health Care Camp	Dr. S. Jega Jothi Pandian Dr. P. Elankani Dr. M. Kannan Dr. S. Natarajan	Senior Citizens Bureau (SCB) and SCRI	Dr. R. S. Ramaswamy DG, CCRS and Dr. P. Jeyaprakash Narayanan	Free Consultation and supplied medicines for Geriatric Population	Auditorium SCB Centre Mylapore Chennai
2.	Free Medical Camp and Karutharanagu	Dr. S. Jega Jothi Pandian Dr. P. Elankani	Tamil Cultural Development Centre,	Dr. R. S. Ramaswamy DG, CCRS and Dr. P. Jeyaprakash Narayanan	Free Consultation and supplied medicines and	06th Oct. 2013

		Dr. M. Kannan Dr. Sasikala Ethirajulu	Mugappair,Anna Nagar, Chennai & SCRI, Chennai		Guest lectures also given to the general Public	Vels School Mugappair Chennai

Table 105. Participation in Arogya/Mela/Exhibition/Camp/Others by the Officers

S. No	Name of Mela/ Exhibition / Camp	Participation	Duration & place	Activities
1.	National Level Arogya Fair by Dept. of AYUSH M/o Health and Family Welfare , Govt. of India	Dr.J.Annathai, R.O Dr. G. Senthilvel Dr. S. Selvarajan Dr. M. Kannan	25th to 28th Oct. 2013 Ried Hall Ground, Christian College of Physical Education, Gopalgunj, Lucknow, U.P.	Conducted Special OPD and issued free Siddha medicines Publications of CCRS were sold. Charts were exhibited. Lectures given to the public. Pamphlets describing about the Siddha system of medicine and remedy for different diseases were distributed. Created awraeness about Siddha System of medicine
2.	AROGYA	Dr. P. Elankani Dr. H. Mubarak	21st to 24th Dec. 2013 Parade Ground, Jammu, J&K District	
3.	National Arogya Mela	Dr. S. Jega Jothi Pandian Dr. Sasikala Ethirajulu Dr. R. Yasodha	10th to 13th May 2013 Chandigarh	
4.	National Arogya Mela	Dr. S. Jega Jothi Pandian Dr. R. Yasodha	08th to11th Feb.2014 Kolkata	

		Dr. P. Sathiyarajeswaran		

Table 106. Lectures delivered in Arogya Mela/Camp/Others by the Officers

S. No	Name of Mela/ Exhibition / Camp	Name of the Officers	Organizer	Topic of the Lecture	Duration & place
1	National Arogya Mela	Dr. Sasikala Ethirajulu	Dept. of AYUSH	Simple Herbal Remedies in Siddha system	10th to 13th May 2013 Chandigarh
2	Free Medical Camp and Karutharangu on Siddha Medicine	Dr. S. Jega Jothi Pandian	Tamil Cultural Development Centre, Mugappair, Anna Nagar, Chennai & SCRI, Chennai	Siddha Maruthuvamum Aaraichiyum	06th Oct. 2013 Vels School Mugappair Anna Nagar Chennia
3	Free Medical Camp and Karutharangu on Siddha Medicine	Dr. Sasikala Ethirajulu	Tamil Cultural Development Centre, Mugappair, Anna Nagar, Chennai & SCRI, Chennai	Mooligai Maruthuvam	
4	Free Medical Camp and Karutharangu on Siddha Medicine	Dr. P. Elankani	Tamil Cultural Development Centre, Mugappair, Anna Nagar, Chennai & SCRI, Chennai	Mahalirukku varum Nalakuraivugal	
5	Free Medical Camp and Karutharangu on Siddha Medicine	Dr. M. Kannan	Tamil Cultural Development Centre, Mugappair, Anna Nagar,	Noi Indri Vazha Siddha Maruthuvam	

			Chennai & SCRI, Chennai		
6	National Arogya Mela	Dr. P. Sathiyarajeswaran	Dept. of AYUSH	Care of elderly	08th to11th Feb.2014

Workshop/Conference /Seminar organized by CCRS:

S.No	Name of workshop	Organizing Institute	Date
1.	**National workshop on safety and efficacy of Herbo-mineral formulations of Siddha**	**Siddha Regional Research Institute, Thiruvananthapuram**	**24th to 25th January 2014.**
2.	**National Workshop on Management of Obstetric and Gynaecological disorders in Siddha**	**Siddha Regional Research Institute, Puducherry**	**22nd to 23rd February 2014**
3.	**National Workshop on Siddha medicine in the management of Life Style disorders**	**Siddha Central Research Institute, Chennai**	**22nd and 23rd March 2014.**

3. SCIENCE CLUB

The Science club of SCRI is chaired by Incharge of the Institute. Mr. Ganesan, Research Officer (Biochemistry) is the secretary and Dr. P.Elankani, Research Officer (S) is the Co-ordinator. Science Club focuses its activities on dissemination of Scientific and updated Research information to Students and Research scholars. Faculties from different educational Institutions and neibouring Research Institutes including SRRI, Puducherry were invited to deliver lectures in the science club. Following were the lectures delivered by the invited speakers in the science club.

Table 107. Special Invited Lectures in Science Club

S.No.	Date	Speaker name	Topic
1.	25.06. 2013	Dr.V.BalamuruganMD(Siddha)	Respiratory Medicine and Clinical Siddha Medicine
2.	19.07.2013	Ramaswamy Sundaram, Ph.D.(Tech.) Food Processing Consultant	FoodA component of the greatest Wealth
3.	26.08.2013	*Dr.S.D.Inbaraj* B.Sc.,M.B.B.S.,M.D.,PG.Dip (Diabetology)	Management of Type 2 Diabetes Mellitus and recent concepts.
4.	30.10.2013	Dr. Nikhat Shaikh, Research Officer (Unani), R.R.I.U.M. Chennai.	Management of specefic diseases by regimenal therapy in unani system of medicine.
5.	04.12.2013	Prof. Dr.M.Kuppusamy M.D(Internal Medicine) Senior Diabetologist, Dean, Govt. Vellor Medical College (Retd.)	Recent trends in Diabetes mellitus.

6. Objectives and Achievements of Siddha Pharmacopoeia Committee (SPC)

The Secretariat of SPC is functioning at SCRI, Chennai under the supervision of CCRS.

The main objective of Siddha Pharmacopoeia Committee (SPC) is to develop the Pharmacopoeial Standards for Siddha Medicines with a focus on the following areas.

1. To prepare Siddha Pharmacopoeia of India of Single and Compound drugs.

2. To prepare Siddha Formulary of India.
3. To prepare Pharmacopoeial Standards for single drugs mentioned in the Siddha Formulary of India.
4. To prepare standards of compound formulations mentioned in The Siddha Formulary of India.
5. Development and standardization of methods of preparation, quality parameters for compound formulations including tests for identity, purity, strength and quality to ensure uniformity of the finished products.
6. Data generation on heavy metals, microbial load and pesticide residues present in the Siddha compound formulations.
7. To develop SOPs for maintaining the Pharmacopoeial Standards and Shelf-life of compound formulations.
8. Translation of Pharmacopoeias / Formularies into Hindi / Tamil / English.

Work done during the year 2012-2013

1. The Siddha Formulary of India - Part II (Tamil) – Published.
2. The Siddha Pharmacopoeia of India, Part-I, Volume –II- Published
3. The Siddha Formulary of India - Part I (Tamil) – Revision. Awaiting SPC approval.
4. The Siddha Pharmacopoeia of India, Part-I, Volume III. Awaiting SPC approval.

Table-108: Siddha Pharmacopoeia Committee (SPC)

Sl. No.	Name	Position
1.	Dr.G.Veluchamy, No.24, Chokkanathar Street, Karthikeyan Nagar, Maduravoyal, Chennai- 600 095	Chairman
2.	Dr.K.Ravi, Joint Advisor (Siddha), Dept. of AYUSH, AYUSH Bhawan, B-Block, GPO Complex, INA, New Delhi - 110023	Member (Ex-officio)

3.	Dr.Rajeev Kr. Sharma Director, PLIM, Kamla Nehru Nagar, Ghaziabad- 201 002	Member (Ex-officio)
4.	Dr.A.Kumaravel No/25, II Street Ram Nagar, North Extension Vijayanagar, Velacherry, Chennai	Member
5.	Prof. P. Jayprakash Narayanan Former Vice-Principal, Old No.55, New No.70, Panchaliamman Koil Street, Arumbakkam, Chennai- 600 106	Member
	Dr.P.Jayaraman Retd. Prof. Of Botany, Plant Anatomy Research Center (PARK), No.4, Second Street, Sakthi Nagar, West Tambaram, Chennai- 45	Member
6.	Dr.(Prof.) I. Sornamariammal Retired JD of Indian Medicine,A-3, Hemasadtham apartments, 19th cross street, 3rd Main street, Lenin nagar, Ambattur, Chennai - 53	Member
7.	Dr. T. Anandan No.75,O-Block,Ganapathy Colony,Anna Nagar (E), Chennai	Member
8.	Dr.G.Thiyagarajan Rtd. Joint Director of ISM, No.19/5,Arunachalapuram Street, Sandopalayam,Aminjikarai, Chennai	Member
9.	Dr.Sharada Vasanth Rtd. Research Officer (Chem), No.6,Sowbakkiya Apartments, 60,Moosa Street, T.Nagar, Chennai-17	Member
10.	Dr. K.Balakrishan Rtd. Research Officer (Chem), No.4/930, Near Priya Mat.School, Block No.4, Door No.930, Mogappair West, Chennai- 37	Member
	Dr.Sasikala Ethirajalu, Rtd.Research Officer (P'cognosy) Scientist –II, No.18, 10th Cross Street, Indira Nagar, Adyar, Chennai-20	Member

11.	Prof. V. Gopal, Principal Govt College of Pharmacy, Mother Teresa, PG Research Institute of Health Sciences, Puducherry- 605 006	Member
12.	Dr.P. Kumar, Drug License Issuing Authority for ISM, Arumbakkam, Chennai-106	Member
13.	Dr.V.Kalidass Proprietor, Raja Siddha Marunthagam, 1/3, Dhermathupatty, Madurai- 625 008	Member
14.	Dr.K.Vasanthira Prof. of Pharmacology, Stanley Medical College, Chennai	Member
15.	Prof. Dr. R. S. Ramaswamy Director general, CCRS, Chennai -600 106	Member Secreatary

7. Extra Mural Research (EMR) - Siddha

Background

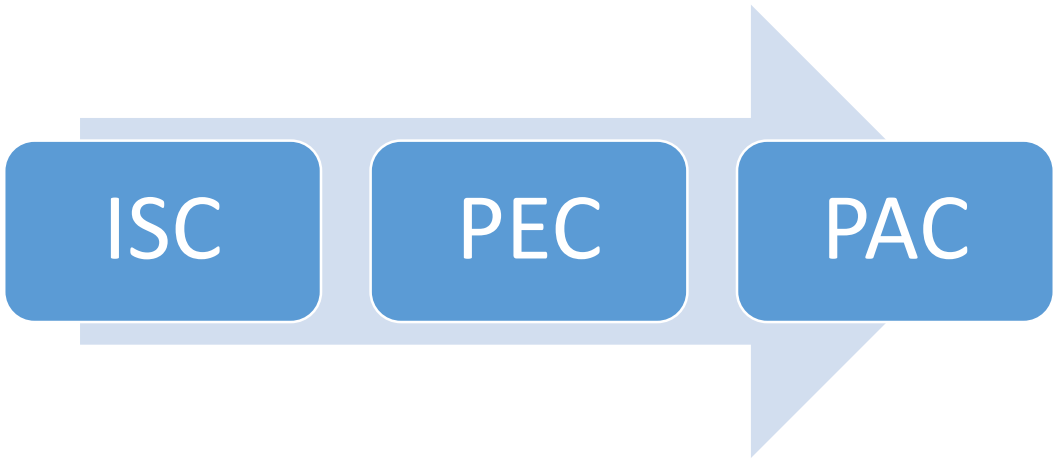
The Department of AYUSH has introduced the scheme of Extra-mural Research in addition to the Intra-mural Research works undertaken by the Research Councils of Ayurveda, Siddha, Unani, Homoeopathy, Yoga and Naturopathy. The purpose of this scheme is to encourage academic and research organizations to pursue research activities in their respective field along with related sciences like Botany, Chemistry, Pharmacy, and Pharmacology to enrich scientific data and develop innovations having IPR value.

In the present era of globalization and development of a world market for traditional and herbal medicine, research and development is essential to promote the production and export of quality products in the form of drugs, nutraceuticals, cosmetics etc. There is a keen competition among other countries in the trade of herbal products. The Extra-mural Research scheme has been designed to encourage Research and Development in priority areas through financial assistance so that the research findings lead to validation of the AYUSH approaches and drugs. CCRS is coordinating the research projects related to Siddha under the Extra- mural Research

Scheme of Department of AYUSH since 2011. Central Council for Research in Siddha was established and started functioning since 1st September 2010 (Ref. CCRAS office order No. 1634/2010 vide Lr. 12-38/2009-CCRAS/Estt. dated 01.09.2010) and all the projects related to Siddha have been transferred to Central Council for Research in Siddha.

Aims and Objectives

- To produce Research and Development (R & D) based AYUSH drugs for prioritized diseases
- To generate data on safety, standardization and quality control for AYUSH products and practices
- To develop evidence based support on the efficacy of AYUSH drugs and therapies
- To encourage research on classical texts and investigate fundamental principles of AYUSH Systems
- To generate data on heavy metals, pesticide residues, microbial load, Safety/Toxicity etc. in the raw drugs and finished products
- To develop AYUSH products having intellectual property Rights (IPR) and potential for increasing AYUSH exports
- To develop potential Human Resource in AYUSH systems, especially to develop scientific aptitude and expertise related to AYUSH systems
- To develop joint research venture among AYUSH Departments and other Organizations / Institutes



Flow chart No: 3 Extra Mural Research Process Snap Shot

ole of Internal Scrutiny Committee in EMR

- Application by A stake holder (University,Researcher,College,NGO)
- Thorough examination by ISC(Internal Scrutiny committee)
- If found fit, EMR projects are recommended to PEC by DG, CCRS, Chairman of ISC.
- If not sent back to the PI for necessary modification/correction or rejection.

Role of PEC in EMR

- Applicant recommended by ISC is called for presentation.
- Thorough examination by PEC(Project evaluation committee)
- If found fit, EMR projects are recommended to PAC by JS, AYUSH, Chairman of PEC.

Role of PAC in EMR

- Thoroughly examines the project referred by PEC.
- If approved, recommended for grants.

S.No	No of projects received	No of projects Recommended to PEC	Sent for modification	No of projects Granted by PAC
1	11	4	6	01

Current Status

The EMR projects tabulated here were initiated before bifurcation of Siddha Council from CCRAS and now being pursued by CCRS:

Table-109: Ongoing Projects of EMR – Siddha

Sl. No.	Title of the Project	Principal Investigators / Participating Institutes	Main Objectives	Status
1.	Documentation and Clinical validation of efficacy of traditional medical practice Suttigai in Siddha medicine for Azal keelvaayu	Dr.S.Sridhar , BSMS,M.Sc,Ph. D(SIDDHA), Ashram Siddha Yoga Research Institute, 3/33.Iyer line, Swarnapuri, Salem-636 004, contact no; 09443244664	The main objective of the proposal is to revalidate one of the external therapies "Suttigai" in Siddha medicine .The aim of the present proposal is o To collect the methods of suttigai found in ancient Siddha literature o To document the methods of suttigai followed by traditional vaidyas o To study the efficacy of Suttigai therapy in the treatment of azal keelvaayu in humans	Initiated
2.	Biochemical and Molecular investigations on the role of Thiratchathi Choornam and Thamaraga Kudineer in experimental	Dr.J.Venkatesh Sri Ramachandra University, Chennai.	• Phytochemical analysis and fingerprinting analysis, chemical standardizations of Thiraatchathi Chooranam and Thamaraga Kudineer for their active principle(s) and heavy metals contents as per the AYUSH guidelines.	Ist Phase completed and has been recommended for second phase.

	model of myocardial infarction in rats.		• To ascertain the effect of Thiraatchathi Chooranam and Thamaraga Kudineer on cardiac myocytes viability by MTT assay. • To investigate the effects of Thiraatchathi Chooranam and Thamaraga Kudineer on cardiac myocytes viability in vitro model of ischemia / re-perfusion.	
3.	Documentation of Visha Vaidya Practices (Treatment for poison intake and poisonous bites) and related Local Health Traditional Practices in the Southern parts of Tamilnadu.	Dr. V. Ganapathy Vivekananda Kendra-NARDEEP Kanyakumari.	• To collect the addresses of Visha Vaidyas and encourage them for their practices. • To document the methods of Visha Vaidya Practices including the local practitioners and traditional practitioners. • To document the uses of local Visha Vaidya Practices / Medicines. • To develop the Visha Vaidya herbal garden in selective regions.	Report to be modified and submitted.

Members of Project Evaluation Committee:

S.No.	Name	Designation/Institute	Capacity
1	Dr.R.S.Ramaswamy	Director General, Central Council for Research in Siddha	Member
2	Dr.K.Manickavasagam	Director, NIS.	Siddha expert
3.	Dr.A.Kumaravel	Retd. Professor/Principal	Siddha expert

Members of Internal Scrutiny Committee

S.No.	Name	Designation	Capacity
1	Dr. R. S. Ramaswamy	Director-general, Central Council for Research in Siddha	Chairman
2	Dr.S.Thirunavukkarasu	Asst.Director (Siddha)-Retd, CCRAS	External Member
3.	Prof. P. Jayabal	Biostatistician (Retd), NIS.	External Member
4.	Dr. E. Meenakshinathan	Biomedicine	Member
5.	Dr. Sasikala Ethirajulu	Pharmacognosy	Member
6.	Dr. G. Pramod reddy	Pharmacology	Member
7.	Dr. P. Elankani	Pharmacy	Member
8	Dr. M. Kannan	LR&DD	Member
9	Mr.R.Ganesan	Biochemistry	Member
10	Mrs. R. Shakila	Chemistry	Member
11.	Dr.P.Sathiyarajeswaran	Clinical Trial/Coordinator-EMR.	Member