

1. Overview

1.1 Objectives of the Council

The Central Council for Research in Siddha (CCRS), an autonomous body under Department of AYUSH, Union Ministry of Health and Family Welfare is an apex body in India for undertaking, co-ordinating, 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 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 in various aspects, especially fundamental and applied aspects of Siddha and to promote and assist research institution 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.

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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 2011-12 depicts the activities and achievements of CCRS mainly in the areas of research, IEC activities and patient care. Actually the Research activities of Siddha were carried out earlier under the organization Central Council for Research in Ayurveda and Siddha (CCRAS). However in order to have a more focused research in Siddha the Central Council for Research in Siddha (CCRS) was established by bifurcating the erstwhile CCRAS and it started functioning from 1st September 2010.

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

Clinical research is one of the mandates which is supported by Drug and Literary research .In Clinical Research 7 trials are allocated and among them 3 are multicentric. All the clinical trials are being properly initiated after getting approval from IEC/IAEC.2 Trials are initiated while others are in Pre-Clinical Stage.

The extension activities comprise Health care services through Out–Patient Departments (OPD) and In-Patient Departments (IPD), Specialty Clinics for Geriatric Health Care and Flu-like Illness, National Pharmaco-vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs, etc.

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 2 survey and collection tours were undertaken and 33 consignments of plant materials covering 240 kgs (fresh) and 26.8 kgs (dried crude drugs) of materials were supplied to SCRI, Chennai, Siddha Regional Research Institute, Thiruvananthapuram and SRRI, Puducherry for Pharmacy and standardization purposes. 179 plant specimens were collected and stored in the Museum of the Medicinal Plants Garden. In addition to this seeds were collected for 37 plants to raise nursery seedlings. It is significant to mention here that during the reporting year a Medicinal Plants Nursery was started. At present there are 101 medicinal plants in the nursery. Documentation of Folklore claims is also an important activity of SMPG and 14 such claims have been recorded and documented. In the reporting period 277 photographs of important medicinal plants and the visits of dignitaries have also been documented. As a significant step the profile of SMPG was registered in the Website on Networking of Herbal Gardens in India.

The other activities related to Pharmacognosy, Drug Standardization, Pharmacological / Toxicological research have been carried out by Council's peripheral Institutes as per their mandate.

The Siddha Pharmacopoeia Committee constituted by the Dept. of AYUSH for establishing quality parameters for Siddha drugs and formulations is currently functioning at

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Siddha Central Research Institute, Chennai. As a part of its work the Siddha Pharmacopoeia of India, Part I, Vol. II has been published in 2011. The Siddha Pharmacopoeia of India, Part I, Vol. III has reached the stage of final drafting and 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, 2nd Revised Edition (Tamil) has been completed for publication.

As a remarkable progress in the Literary Research and Documentation Department annotations of 6 classical texts namely Romarishi Vaidhyam - 500, Yakobu Chunnam-300, Nandeesar Karukkadai Nigandu-300, Yugi Karisal-151, Dakshina Moorthy Paripooranam -1500 and Pulathiyar Vatha Soothiram - 300 have been completed. Three classical works namely, Yakobu Vaidhya Chintamani -700, Siddhar Kayakarpam and Therayar Kudineer are in print. The project of translating a Siddha classical text in Tamil named Agathiar Kalnandu Soothiram into Hindi, English, Telugu and Kannada has been completed for publication.

Standardization of 22 single drugs and 3 compound formulations have been completed. Safety and toxicity studies have been completed for the coded formulation D5 and the same for another coded formulation OA1 is in progress.

CCRS, through its peripheral institutes/units, has done a lot to achieve its objectives within a short span of time after its establishment as a separate council and it will continue its efforts for the sustained development of research activities in Siddha.

New Delhi

Dated: _____

(P.K. JHA)

Director General I/c

2. Management

2.1. Constitution of Several Bodies

The constitution of General Body, Executive Committee, Standing Finance Committee and Scientific Advisory Board of the newly established Council is in progress, since CCRS was bifurcated from CCRAS only on 1st September 2010.

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 roster 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 includes 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 falls 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

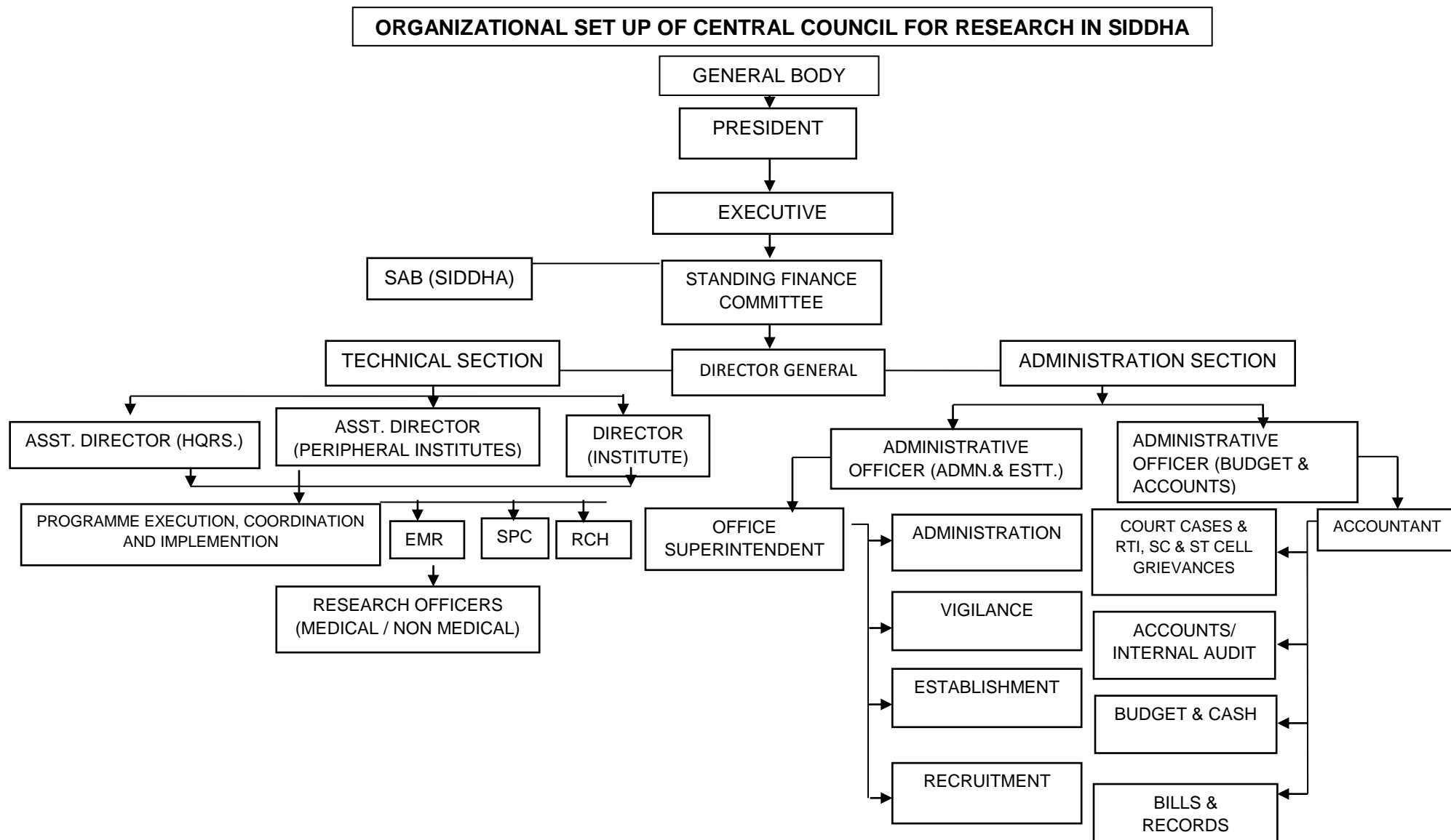
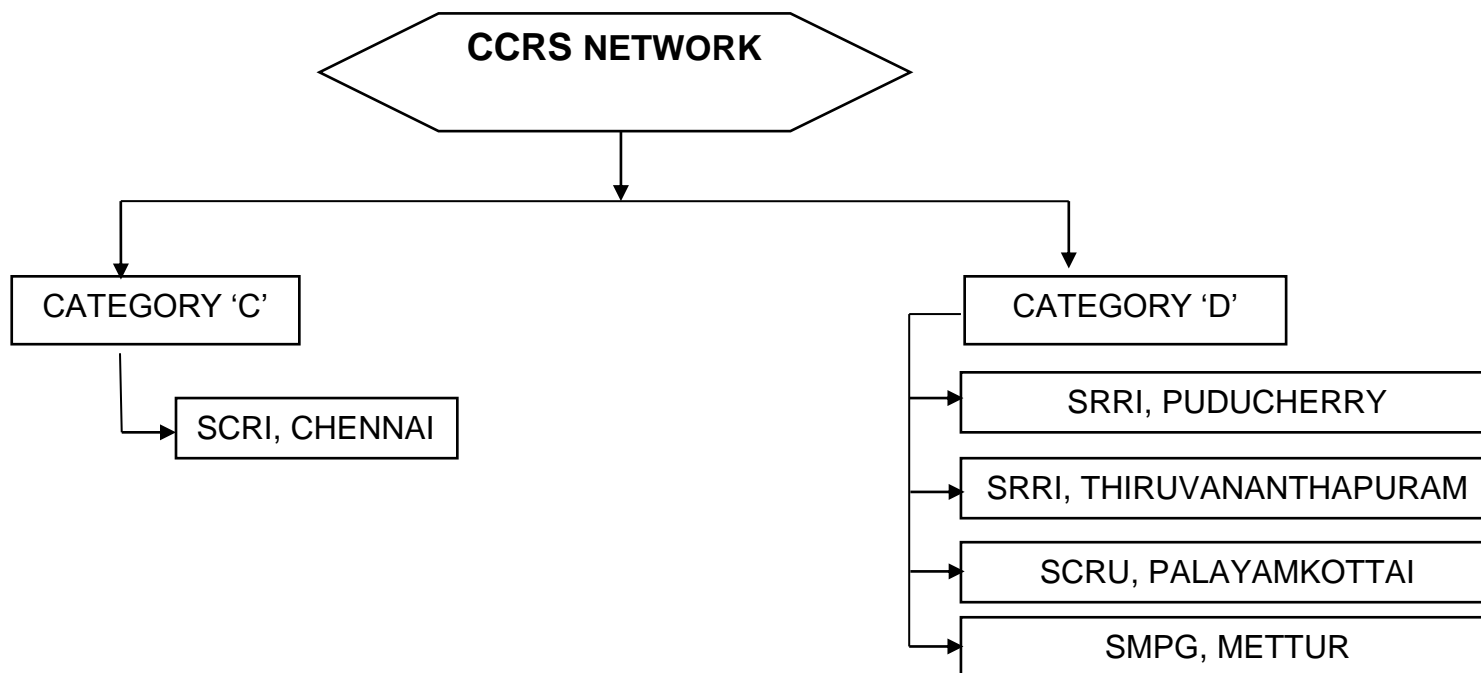


Chart No. 2



2.4. Budget

Table-4: Budget Provision at a Glance

Scheme	B.E. 2011-12 (In Lakhs)	Funds Released 2011-12 (In Lakhs)	Actual Expenditure 2011-2012 (In Lakhs)
PLAN	1038.00	1038.00	816.91
NON-PLAN	600.00	600.00	174.90
TOTAL	1638.00	1638.00	991.81

Table-5: Head - wise Actual Expenditure

Sl. No.	Particulars	Total Expenditure (In Lakhs)		
		Non-Plan	Plan	Grand Total
1.	Pay and Allowances	637.87	69.86	707.73
2.	Pension	20.87	0	20.87
3.	Payment of Gratuity (DCRG)	53.89	0	53.89
4.	Payment of Commutation	49.50	0	49.50
5.	New Pension Scheme Contribution (Employer)	6.20	0.03	6.23
6.	Leave Travel Concession (LTC)	3.38	0.01	3.39
7.	Short Term Advances - Festival Advance	3.01	0.23	3.24
8.	Re-imbursement of Medical Expenses	4.03	0	4.03
9.	Travelling Allowances	0.24	2.29	2.53
10.	Office Expenses (Contingencies)	27.74	12.37	40.11
11.	Other Administrative Expenses	0.41	0.09	0.50
12.	Research Activities	0	42.70	42.70
13.	Seminar, Workshop and AROGYA	3.21	16.50	19.71

14.	Purchase of Vehicle	0	7.31	7.31
15.	Advertisement and Publicity	6.56	0	6.56
16.	Machinery and Equipments	0	23.51	23.51
TOTAL		816.91	174.90	991.81

Table-6: Centre - wise Actual Expenditure

Particulars	Total Expenditure (In Lakhs)		
	Non-Plan	Plan	Grand Total
<u>De-centralized Units</u>			
Siddha Clinical Research Institute, Chennai	461.14	113.98	575.12
Siddha Regional Research Institute, Puducherry	156.08	29.60	185.68
Siddha Regional Research Institute, Trivandrum	70.95	6.63	77.58
Siddha Medicinal Plant Garden, Mettur Dam	29.57	2.83	32.40
<u>Centralized Units</u>			
Central Council for Research in Siddha, Hqrs. Office	99.17	10.17	109.34
Siddha Clinical Research Unit, Palayamkottai	0	11.69	11.69
TOTAL	816.91	174.90	991.81

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. Literary Research & Documentation Programme 2. Drug Standardization 3. Clinical Research 4. Miscellaneous Activities <ol style="list-style-type: none"> National Pharmaco-vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs Health care services through Out – Patient Department (OPD) and In-Patient Departments (IPDs) Specialty Clinics for Geriatric Health Care Specialty Clinics for Flu-like Illness Pharmacy
2.	Siddha Regional Research Institute, Puducherry.	1. Clinical Research 2. Miscellaneous Activities <ol style="list-style-type: none"> National Pharmaco - vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs Health care services through Out–Patient Department (OPD) and In-Patient Departments (IPDs) Specialty Clinics for Geriatric Health Care Specialty Clinics for Flu-like Illness Specialty Clinics for Varmam and Thokkanam
3.	Siddha Regional Research Institute, Thiruvananthapuram.	1. Drug Standardization 2. Clinical Research 3. Miscellaneous Activities <ol style="list-style-type: none"> National Pharmaco - vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs Health care services through Out–Patient Department (OPD) Specialty Clinics for Geriatric Health Care
4.	Siddha Clinical Research Unit, Palayamkottai.	1. Clinical Research 2. Miscellaneous Activities <ol style="list-style-type: none"> National Pharmaco-vigilance Programme for Ayurveda, Siddha and Unani (ASU) Drugs Health care services through Out–Patient Department. 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

3.2 Medicinal Plants Research

3.2.1. Medico-Ethno-Botanical Survey

Survey and Collection tours undertaken during the reporting period

The Medicinal Plants Garden, Pagalur is located in the Omalur Taluk, Salem District. It is being maintained by the Dept, of Forest, Tamilnadu. A visit was made to assess the in-situ conservation of plants available in the Pagalur medicinal plants Garden and to facilitate the scope of supplying raw drugs for CCRS peripheral Institutes / Units. The survey was conducted on 27th August 2011.

The Kombaikadu is located at a distance of 12 kms from Mettur under Moolakadu Panchayat of Salem District. A collection tour was undertaken to access the plants available in the forest and the cultivable area of Kombaikadu. The collection tour was conducted on 29th December 2011.

Apart from the above, live plants were also collected to be added in the Siddha Medicinal Plants Garden, Mettur. The details in a nutshell are given below:

Table-8: Areas covered and Medicinal Plants surveyed

Sl. No.	Name of the areas covered	Medicinal Plants collected / observed
1.	Medicinal Plants Garden, Pagalur	35
2.	Kombaikadu (Plain area)	11
3.	Kombaikadu (Wild area)	42
Total		88

Table-9: Raw Drugs collected for supply purpose

Sl. No.	Botanical Name	Tamil Name	Part	Weight (fresh)
1.	<i>Capparis sepiaria</i> L.	Senkaththari	Stem	6 Kgs
2.	<i>Capparis zeylanica</i> L.	Athandai	Whole plant	2 Kgs
3.	<i>Holoptelea integrifolia</i> Roxb	Ayil	Stem bark	4 kgs
4.	<i>Chrysanthemum indicum</i> L.	Sevanthi	Leaves	3 Kgs

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

Sl. No.	Botanical Name	Tamil Name	Part
1.	<i>Capparis sepiaria</i> L.	Senkaththari	Seedlings and Stem cuttings
2.	<i>Cleistanthus collinus</i> Benth.	Oduvan	Stem cuttings
3.	<i>Moringa concannensis</i> Mimmo	Kattu Murungai	Stem cuttings
4.	<i>Leonotis nepetaefolia</i> (L.)R.Br.	Chemmurandai	Seedlings
5.	<i>Diplocyclos palmatus</i> C.Jeffrey	Ivirali Kovai	Seedlings
6.	<i>Jatropha villosa</i> Wight.	Kattamanakku	Stem cuttings
7.	<i>Thevetia neriifolia</i> Juss.	Thanga Arali	Seedlings and Stem cuttings

8.	<i>Capparis divaricata</i> Lam.	Senkaththali	Stem cuttings
9.	<i>Alangium salvifolium</i> Wang.	Azhinjil	Seedlings
10.	<i>Triumfetta rhomboidea</i> Jacq.	Adaiotti	Seeds
11.	<i>Cyathula prostrata</i> Blume	Cirukadaladi	Seedlings
12.	<i>Ichnocarpus frutescens</i> R.Br.	Charikkodi	Seedlings
13.	<i>Salvadora persica</i> L.	Uga	Stem cuttings

Table-11: Specimens collected and stored in the museum

Sl. No.	Botanical Name	Tamil Name	Part
1.	<i>Cleistanthus collinus</i> Benth.	Oduvan	Leaves
2.	<i>Capparis sepiaria</i> L.	Senkaththari	Stem bark
3.	<i>Chrysanthemum indicum</i> L.	Sevanthi	Leaves

During the reporting period 14 folklore claims have been recorded and documented. Among them 5 were recorded during the survey and collection tours. Other 9 folklore claims were collected from the Vaidyas during their visit to SMPG, Mettur.

In addition to the above Siddha Medicinal Plants Garden, Mettur is also engaged in the maintenance and development of herbal garden along with the cultivation of many important medicinal plants.



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



Fig.2. Front view of the Siddha Medicinal Plants Garden, Mettur.

<ul style="list-style-type: none"> ➤ A view of the Model Herbal Garden - Phase I. ➤ 236 species of medicinal plants are being grown. ➤ 42 climbers are being grown over the steel arches. 	
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Fig.3. Model Herbal Garden - Phase I.

3.2.2. Cultivation, Maintenance & Development of Medicinal Plants

1. Date of initiation of the project : 1986
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, New Delhi)
 - b) Total area of the land allotted for cultivation project : 21.63 acres

Table-12: Development activities

Sl. No.	Blocks	Activities / Developments	Plants and Species
1.	Block A (1.73 Acres)	Arboretum	180 plants covering 111 species
2.	Block B (1.20 Acres)	Arboretum	191 plants covering 30 species
3.	Block C (1150 Sq.mtrs.)	Model garden I	236 species
		Model garden II	30 species
4.	Block D (497.5 Sq.mtrs.)	---	56 plants covering 32 species
5.	Block E (19.5 Cents)	---	303 live potted plants

Table-13: Cultivation activities

Sl. No.	Blocks	Botanical Name	Tamil Name
1.	Block F	Cultivation of <i>Piper longum</i> L.	Thippili
		Cultivation of <i>Alpinia calcarata</i> Rosc.	Araththai
		Cultivation of <i>Andrographis paniculata</i> Nees.	Nilavembu
2.	Block G	Cultivation of <i>Ocimum tenuiflorum</i> L.	Thulasi
		Cultivation of <i>Ocimum tenuiflorum</i> L.	Karunthulasi

**Fig.4.** Cultivation of *Andrographis paniculata* Nees. (Nilavembu)**Fig.5.** Thippili cultivated in the Polygreen house in controlled climate**Table-14: Types of irrigation adopted**

Sl. No.	Blocks	Type of irrigation
1.	Block A	Drip irrigation
2.	Block B	Drip irrigation
3.	Block C	Sprinkler irrigation
4.	Block D	Mini sprinkler, fogger and Drip irrigation
5.	Block E	Mobile overhead sprinkler
6.	Block F	Canal irrigation
7.	Block G	Canal irrigation

Management and Development of Model Herbal Garden

A model herbal garden covering an area of 1150 sq. mtrs. is being maintained with 236 individual species. Each species is grown in 2x2 ft pits margined with bricks and labelled with regional and botanical names in a cuddapah stone laid inside. The pathway is fitted with tiles.

List of Climbers

In addition to the plants grown in the boxes, 42 climbers are also grown over the steel arches fixed around the herbal demo garden. Weeding and manuring around the climbers in the model herbal garden are carried out periodically.

Model Herbal Garden

Block-D Phase II Model Herbal Garden is being maintained with 32 Individual Species.

Management and development of Arboretum:

An arboretum with 427 plants covering 173 species is being maintained covering in an area of 3.5 acres. The plants are being watered by Drip irrigation system. Manuring and weeding are being done periodically. Basin clearing of trees in the assorted tree block was also done. Stacking was provided to the required plants in the arboretum. During the current year tree species like *Couropita guianensis* Avhl., *Ixora parviflora* Roxb., *Cedrella toona* Roxb., *Morinda citrifolia* L., *Moringa oleifera* Lamk, *Gyrocarpus americanus* Jacq. and *Terminalia chebula* Retz. were added to the arboretum. Pruning of *Pongamia pinnata* Pierre, *Dalbergia sissoo* Roxb. and *Terminalia arjuna* W. & A. was also done as they would affect the growth of other plants.

Table-15: Plants grown in the blocks A, B & D

Sl. No.	Blocks	Area	Plants Species
1.	Block A	1.73 Acres	180 plants 111 species
2.	Block B	1.20 Acres	191 plants 30 species
3.	Block D	497.5 Sq.Mtrs.	56 plants 32 species

3.2.3. Management and Development of Poly Green House:

A poly green house is being maintained in an area of about 800 sq. ft. About 303 live potted plants including 30 nos. of RET species are being maintained, conserved and displayed in the concrete gallery. Plants grown at a height of 4 ft and above are either transferred to arboretum or to the model herbal garden. Manuring and weeding are being done periodically. Sprinkler system

of irrigation is provided for the plants species of poly green house. Stacking and Re-potting works were also carried out periodically.



• **Fig.6.** *Rauvolfia serpentina* (L.) Benth Ex Kurz.
an RET species conserved in the polygreen house.

Table-16: Medicinal plants under cultivation / trial cultivation

Sl. No.	Cultivation / Trial Cultivation	Details of Cultivation
1.	Cultivation of <i>Piper longum</i> L. (Thippili) in controlled climate	Cultivation of <i>Piper longum</i> L. (Thippili) in controlled climate (within the poly green house) is in progress. 6 kgs of fresh fruits were harvested, dried and 1.3 kg was supplied to SRRI, Puducherry.
2.	Cultivation of <i>Andrographis paniculata</i> Nees. (Nilavembu)	Cultivation of <i>Andrographis paniculata</i> Nees. is in progress. Around 1000 plant saplings of <i>Andrographis paniculata</i> Nees were planted in the field. Mobile sprinkler irrigation is provided on alternate days. Harvesting of <i>Andrographis paniculata</i> Nees. (Whole plant) yielded 15 kg of fresh material. 5.5 kg of the shade dried material was stored to be supplied to other CCRS institutes.
3.	Cultivation of <i>Alpinia calcarata</i> Rosc. (Araththai)	Cultivation of <i>Alpinia calcarata</i> Rosc. (Araththai) is in progress. Manual irrigation is provided on alternate days. During the year under report 4 kg. of rhizome was collected, dried and supplied to SRRI, Puducherry.
4.	Trial cultivation of <i>Ocimum tenuiflorum</i> L. (white variety)	Trial cultivation of <i>Ocimum tenuiflorum</i> L. (white variety - Thulasi) was carried out in 167.75 sq. mtrs. of area. Around 110 seedlings of <i>Ocimum</i> plants were planted and irrigated.
5.	Trial cultivation of <i>Ocimum tenuiflorum</i> L. (black variety)	Trial cultivation of <i>Ocimum tenuiflorum</i> L. (black variety - Karunthulasi) was carried out in 167.75 sq. mtrs. of area. Around 110 seedlings of <i>Ocimum</i> plants were planted and irrigated.

Nursery

In the programme of implanting nursery of medicinal plants, 106 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 37 medicinal plants were collected and stored.

List of plants introduced / added

During the reporting period 59 plant seedlings/cuttings were collected and added to the garden.

List of specimens collected for Museum

During the year 179 seeds / fruits were collected and stored in the museum as specimens for future reference and other purposes.

Drug collection and Drug supply

During the reporting period, 28 fresh plant materials amounting to 381.980 kg were collected to cater to the drug requirements of SCRI, Chennai, SRRI, Thiruvananthapuram and SRRI, Puducherry for standardization and other purposes.

During the reporting year, 27 plant materials were supplied in 33 consignments covering 240 kg fresh and 26.8kg dried crude drug materials to SCRI, Chennai, SRRI, Thiruvananthapuram and SRRI, Puducherry for standardization and other purposes.

3.2.4. Pharmacognosy

Table-17: Drugs studied for their Pharmacognostical aspects

Sl. No.	Tamil Name	Botanical Name	Part
1.	Kuruvichi poondu	<i>Ehretia microphylla</i> L.	Aerial portion
2.	Kozhi aavarai ilai	<i>Canavalia virosa</i> (Roxb.) W. & A.	Leaf
3.	Pungan ver	<i>Pongamia pinnata</i> (L.) Pierre	Root
4.	Tennam poo	<i>Cocos nucifera</i> L.	Tender & unopened inflorescence
5.	Nilakkumizh	<i>Gmelina asiatica</i> L.	Whole Plant
6.	Sisu	<i>Dalbergia sissoo</i> Roxb.ex DC.	Petiolule & leaf
7.	Vellerukku	<i>Calotropis gigantea</i> (L.) Ait.f.	Whole Plant
8.	Oomathai	<i>Datura metel</i> L.	Leaves
9.	Vellai karisalai	<i>Ecliptaprostrata</i> L.	Whole Plant
10.	Avuri	<i>Indigofera tinctoria</i> L.	Whole Plant
11.	Surai vittu	<i>Lagenaria siceraria</i> (Molina) Standley	Seed
12.	Neersambrani	<i>Klugia notoniana</i> A. DC	Aerial portion

Table-18: Identification / Microscopical study of Clinical Trial drugs

Sl. No.	Clinical Trial Drugs
1.	APNC Chooranam
2.	D5 Chooranam
3.	OA-1 Chooranam
4.	Puvarasam pattai kudineer Chooranam
5.	KPE Oil

Table-19: Medicinal plants subjected to literature review

Sl. No.	Tamil Name	Botanical Name
1.	Vacampu	<i>Acorus calamus</i> L.
2.	Manjal	<i>Curcuma longa</i> L.
3.	Nirbrahmi	<i>Bacopa monnieri</i> (L.) Wettst.
4.	Aatathodai	<i>Justicia adhatoda</i> L.
5.	Malai Elumichai	<i>Citrus limon</i> (L.) Burm. f

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.


<ul style="list-style-type: none"> ➤ 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 	
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Fig.7.Collection and Identification of Plants / drugs**Table-20: Medicinal Plants identified and authenticated for research students from various Colleges / Universities / Institutions**

Sl. No.	Tamil Name	Botanical Name	Part
1.	Pungan ver	<i>Pongamia pinnata</i> (L.) Pierre	Root
2.	Thennam poo	<i>Cocos nucifera</i> L.	Tender and unopened inflorescence
3.	Kozhi aavarai ilai	<i>Canavalia virosa</i> (Roxb.) W. & A.	Leaves
4.	Nilakkumizh	<i>Gmelina asiatica</i> L.	Whole Plant
5.	Nuna	<i>Morinda pubescens</i> J. E. Sm	Aerial portion
6.	Kuruvichi poondu	<i>Ehretia microphylla</i> L.	Aerial portion
7.	Nathaichuri vidai	<i>Spermacoce hispida</i> L.	Seed

8.	Nathaichuri ilai	<i>Spermacoce hispida</i> L.	Leaves
9.	Marukkarai ilai	<i>Catunaregam spinosa</i> (Thumb.) Tiruv.	Leaves
10.	Karuvilanchi ver	<i>Smilax zeylanica</i> L.	Root
11.	Sisu	<i>Dalbergia sissoo</i> Roxb. ex DC.	Leaves
12.	Nithyakalyani ilai	<i>Catharanthus roseus</i> (L.) G. Don.	Leaves
13.	Vilva ilai	<i>Aegle marmelos</i> (L.) Corr.	Leaves
14.	Veppam ilai	<i>Azadirachta indica</i> L.	Leaves
15.	Kuppaimeni	<i>Acalypha indica</i> L.	Whole Plant
16.	Panai	<i>Borassus flabellifer</i> L.	Inflorescence
17.	Masipathiri	<i>Artemisia nilagirica</i> (Cl.) Pamp	Aerial portion
18.	Poduthalai	<i>Phyla nodiflora</i> (L.) Greene	Whole Plant
19.	Aivaeli	<i>Diplocyclos palmatus</i> (L.) Jeffrey	Leaves
20.	Ilavu	<i>Bombax ceiba</i> (L.)	Root
21.	Murungai ilai	<i>Moringa pterigosperma</i> Gaertn.	Leaves
22.	Elumicham pazham	<i>Citrus aurantifolia</i> (Christm.) Swingle	Fruit
23.	Perarathai	<i>Alpinia galanga</i> Sw.	Rhizome
24.	Manjal	<i>Curcuma longa</i> L.	Rhizome
25.	Aavarai Vidhai	<i>Cassia auriculata</i> L.	Seeds
26.	Karuvelam pisin	<i>Acacia nilotica</i> L.	Gum
27.	Maramanjal	<i>Coscinium fenestratum</i> (Gaertn.) Colebr	Rhizome
28.	Thetrankottai	<i>Strychnos potatorum</i> L.	Seeds
29.	Arali	<i>Nerium oleander</i> L.	Leaves
30.	Karun cembai	<i>Sesbania sesban</i> (L.) Merr.	Aerial portion
31.	Venkodiveli ver	<i>Plumbago zeylanica</i> L.	Root
32.	Nelli	<i>Phyllanthus emblica</i> L.	Fruit
33.	Thulasi	<i>Ocimum tenuiflorum</i> L.	Leaves
34.	Jathikkai	<i>Myristica fragrans</i> Houtt.	Kernel
35.	Nervalam	<i>Croton tiglium</i> L.	Seeds
36.	Nethirappoondur	<i>Blepharis maderaspatensis</i> (L.) Heyne	Whole plant

Table-21: Metals / Minerals identified and authenticated for research scholars from various Colleges / Universities / Institutions

Sl. No.	Tamil Name	Scientific Name
1.	Pooram	Calomel
2.	Vediuppu	Salt petre
3.	Padikaram	Alum
4.	Pooneer	Fuller's earth
5.	Lingam	Cinnabar
6.	Manosilai	Arsenic disulphide
7.	Thalagam	Arsenic trisulphide
8.	Mirutharsingi	Litharge
9.	Ganthagam	Sulphur
10.	Venkaram	Borax
11.	Silasathu	Selenite

Herbarium and Museum:

During the reporting year, 120 Herbarium specimens were prepared and 150 raw drugs were maintained in the storage of museum.

Guidance Imparted:

Guidance was provided for Ph.D, M.Pharm and M.D (Siddha) students with regard to Pharmacognostical aspects of their research work. One candiadte was awarded Ph.D. degree for the thesis entitled “Comparative Pharmacognostical and Pharmacological evaluation of *Cadaba fruticosa* (L.) Druce and *Cadaba trifoliata* (Roxb.) W & A. from the University of Vinayaga Mission, Salem during the reporting year.

3.3. Drug Standardization Research

3.3.1. Drug Standardization at SCRI, Chennai.

Department of Chemistry

<ul style="list-style-type: none">➤ Standardization of Clinical Trial Drugs➤ Identity, purity, strength and TLC of Siddha Pharmacopoeial single drugs and formulations➤ Studies on adulterants / substitutes through TLC➤ Identification of drugs of metal / mineral origin	
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Fig.8. Department of Chemistry, SCRI, Chennai

During the reporting year Physico-chemical parameters, heavy metals analysis, aflatoxin, pesticide residue and microbial load of coded formulations ‘D5’ and ‘OA1’ chooranams were completed. The details of the activities carried out are tabulated below:

Standardization aspects of D5 Chooranam

Table-22: Physico-chemical parameters of D5 Chooranam

Sl. No.	Parameters	Value (%)
1.	Loss on drying at 105°C	3.867
2.	Ash	8.36
3.	Acid insoluble ash	2.131
4.	Water soluble extractive	17.85
5.	Alcohol soluble extractive	19.7
6.	pH (10 %)	6.46

Table-23: Heavy Metals analysis of D5 Chooranam

Sl. No.	Parameters	Value
1.	Lead	BLQ
2.	Cadmium	BLQ
3.	Mercury	BLQ
4.	Arsenic	BLQ
(ICP-OES method; Detection Limit is 0.1 ppm)		

Table-24: Microbial load and pathogens of D5 Chooranam

Sl. No.	Parameters	Value	WHO Limit (CFU/g)
1.	<i>Escherichia coli</i>	Absent	10
2.	<i>Salmonella</i> spp.	Absent	None
3.	<i>Pseudomonas aeruginosa</i>	Absent	Absent
4.	<i>Staphylococcus aureus</i>	Absent	Absent
5.	Enterobacteriaceae	<10	10 ³
6.	Total Bacterial count	38,000	10 ⁵
7.	Total Fungal count	390	10 ³
(WHO method)			

Table-25: Aflatoxin Analysis of D5 Chooranam

Sl. No.	Parameters	Value
1.	B1	BDL (DL 0.3 µg/kg) (AOAC method; BDL – Below Detection Limit; DL - Detection Limit)
2.	B2	
3.	G1	
4.	G2	

Table-26: Pesticide (Organochlorine) Residue Analysis of D5 Chooranam

Sl. No.	Parameters	Value
1.	Aldrin	Below Limit of Quantification (Limit of Quantification 0.01 ppm; AOAC method)
2.	Chlordane (cis & trans)	
3.	Chlorothalonil	
4.	o,p DDT	
5.	p,p DDT	
6.	o,p DDD	
7.	o,p DDD	
8.	o,p DDE	
9.	o,p DDE	
10.	Dicofol	
11.	Dieldrin	
12.	Endosulfan I	

13.	Endosulfan II	Below Limit of Quantification (Limit of Quantification 0.01 ppm; AOAC method)
14.	Endosulfan sulphate	
15.	Endrin	
16.	alpha HCH	
17.	beta HCH	
18.	gama HCH (Lindane)	
19.	delta HCH	
20.	Heptachlor	
21.	Heptachlor epoxide	
22.	Methoxychlor	

Table-27: Pesticide (Organophosphorus) Residue Analysis of D5 Chooranam

Sl. No.	Parameters	Value
1.	4-Bromo-2-chlorophenol	Below Limit of Quantification (Limit of Quantification 0.01 ppm; AOAC method)
2.	Acephate	
3.	Chlorfenvinphos	
4.	Chlorpyrifos	
5.	Chlorpyrifos - methyl	
6.	Diazinon	
7.	Dichlorvos	
8.	Dimethoate	
9.	Ethion	
10.	Etrimphos	
11.	Fenitrothion	
12.	Iprobenphos	
13.	Malathion	
14.	Methamidophos	
15.	Monocrotophos	
16.	Omethoate	
17.	Oxydemeton – methyl	
18.	Parathion ethyl	
19.	Parathion methyl	
20.	Phorate	
21.	Phosalone	
22.	Phosphamidon	
23.	Profenophos	
24.	Quinalphos	
25.	Triazophos	

Standardization aspects of OA1 Chooranam

Table-28: Physico-chemical Parameters of OA1 Chooranam

Sl. No.	Parameters	Value (%)
1.	Ash	19.23
2.	Acid insoluble ash	3.05
3.	Loss on drying at 105°C	5.37
4.	Water soluble extractive	7.40
5.	Alcohol soluble extractive	3.32
6.	pH (10%)	6.42

Table-29: Aflatoxin analysis of OA1 Chooranam

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

Table-30: Heavy Metals analysis of OA1 Chooranam

Sl. No.	Parameters	Value	WHO Limit
1.	Lead	0.055 % (1.1 mg per 2 g or 550 mg per kg of drug)	10 ppm (10 mg per kg of drug)
2.	Cadmium	< 0.1 ppm (less than 0.1 mg per kg of drug)	0.3 ppm (0.3 mg per kg of drug)
3.	Mercury	3.35% (67 mg per 2 g or 33500 mg per kg of drug)	1 ppm (0.3 mg per kg of drug)
4.	Arsenic	0.145 % (2.9 mg per 2 g or 1450 mg per kg of drug)	3 ppm (3 mg per kg of drug)
(ICP-OES method)			

Table-31: Microbial load and pathogens of OA1 Chooranam

Sl. No.	Parameters	Value	WHO Limit (CFU/g)
1.	<i>Escherichia coli</i>	Absent	10
2.	<i>Salmonella</i> spp.	Absent	None
3.	<i>Pseudomonas aeruginosa</i>	Absent	Absent
4.	<i>Staphylococcus aureus</i>	Absent	Absent
5.	Enterobacteriaceae	<10	10 ³
6.	Total Bacterial count	52,000	10 ⁵
7.	Total Fungal count	530	10 ³
(WHO method)			

Table-32: Pesticide (Organochlorine) Residue Analysis of OA1 Chooranam

Sl. No.	Parameters	Value
1.	Aldrin	BLQ (LOQ 0.01 mg/kg)
2.	Chlordane (cis & trans)	
3.	Chlorothalonil	
4.	o,p DDT	
5.	p,p DDT	
6.	o,p DDD	
7.	o,p DDD	
8.	o,p DDE	
9.	o,p DDE	
10.	Dicofol	
11.	Dieldrin	
12.	Endosulfan I	
13.	Endosulfan II	
14.	Endosulfan sulphate	
15.	Endrin	
16.	alpha HCH	
17.	beta HCH	
18.	gama HCH (Lindane)	
19.	delta HCH	
20.	Heptachlor	
21.	Heptachlor epoxide	
22.	Methoxychlor	
(AOAC method)		

Table-33: Pesticide (Organophosphorus) Residue Analysis of OA1 Chooranam

Sl. No.	Parameters	Value
1.	4-Bromo-2-chlorophenol	BLQ (LOQ 0.01 mg/kg)
2.	Acephate	
3.	Chlorfenvinphos	
4.	Chlorpyrifos	
5.	Chlorpyrifos – methyl	
6.	Diazinon	
7.	Dichlorvos	
8.	Dimethoate	
9.	Ethion	
10.	Etrimphos	
11.	Fenitrothion	
12.	Iprobenphos	
13.	Malathion	
14.	Methamidophos	

15.	Monocrotophos	BLQ (LOQ 0.01 mg/kg)
16.	Omethoate	
17.	Oxydemeton – methyl	
18.	Parathion ethyl	
19.	Parathion methyl	
20.	Phorate	
21.	Phosalone	
22.	Phosphamidon	
23.	Profenophos	
24.	Quinalphos	
25.	Triazophos	
(AOAC method)		

The following 10 single drugs have been allotted by the SPC scheme for rechecking the analytical parameters.

Table-34: Single drugs allotted by the SPC scheme for rechecking purposes

Sl. No.	Botanical Name	Tamil Name	Part
1.	<i>Anethum sowa</i>	Sathakuppai	Seeds
2.	<i>Pistia stratiotes</i>	Akaya thamarai	Whole plant
3.	<i>Moringa oleifera</i>	Murungai ilai	Leaves
4.	<i>Boswellia serrata</i>	Parankic campirani	Exudate
5.	<i>Murraya koenigii</i>	Kariveppilai	Leaves
6.	<i>Sphaeranthus indicus</i>	Kottakaranthai	Leaves
7.	<i>Solanum nigrum</i>	Manathakkali	Leaves
8.	<i>Centella asiatica</i>	Vallarai	Whole plant
9.	<i>Chrysanthemum indicum</i>	Camanti	Leaves
10.	<i>Hygrophila auriculata</i>	Nirmulli	Seeds

Standardization of the Single Drugs for SPC Scheme

In addition to that, physico-chemical parameters of the following 16 single drugs were also completed for Siddha Pharmacopoeial work during the reporting period.

Table-35: Physico-chemical parameters carried out for SPC Scheme

Sl. No.	Botanical Name	Tamil Name	Part	Place of Collection
1.	<i>Lagenaria siceraria</i>	Curai vittu	Seed	Salem
2.	<i>Solanum torvum</i>	Cuntai vatral	Fruit	Madurai
3.	<i>Solanum torvum</i>	Cuntai vatral	Fruit	Mettur
4.	<i>Jatropha curcus</i>	Kattamanakku ilai	Leaves - White variety	Tirunelveli
5.	<i>Calotropis gigantea</i>	Erukku	Root bark	Chennai
6.	<i>Jatropha gossypifolia</i>	Kattamanakku ilai	Leaves - Red variety	Chennai
7.	<i>Zizyphus mauritiana</i>	Ilantai ilai	Leaves	Chennai
8.	<i>Mukhia maderaspatana</i>	Musumusukkai ilai	Leaves	Mettur
9.	<i>Plumbago zeylanica</i>	Venkodi veli	Leaves	Mettur
10.	<i>Plumbago zeylanica</i>	Venkodi veli	Stem bark	Mettur
11.	<i>Jatropha gossypifolia</i>	Kattamanakku ilai	Leaves - Red variety	Mettur
12.	<i>Boerhaavia diffusa</i>	Mukkarattai	Leaves	Mettur
13.	<i>Sesbania grandiflora</i>	Agati	Leaves	Mettur
14.	<i>Plumbago zeylanica</i>	Venkodi veli	Leaves	Chennai
15.	<i>Tamarindus indica</i>	Puli	Leaves	Chennai
16.	<i>Canavalia virosa</i>	Koliyavarai	Leaves	Pudukkottai

Thin Layer Chromatography

Apart from the above, TLC of 6 drugs has also been carried out. The details are given below:

Table-36: The R_f values and colour of the spots of *Lagenaria siceraria* (whole plant), *Terminalia chebula* (leaves) and *Zizyphus mauritiana* (leaves) of TLC of chloroform extracts are tabulated below:

TLC of Chloroform Extracts					
<i>Lagenaria siceraria</i> Curaikkodi (whole plant)		<i>Terminalia chebula</i> Katukkai (leaves)		<i>Zizyphus mauritiana</i> Ilanthai (leaves)	
R_f	Colour of the spot	R_f	Colour of the spot	R_f	Colour of the spot
0.69	Pink	0.47	Pink	0.74	Pink
0.89	Pink	0.66	Pink	0.80	Pink
--	--	0.69	Pink	0.97	Pink
--	--	0.73	Pink	--	--
--	--	0.81	Pink	--	--
--	--	0.97	Pink	--	--

Table-37: The R_f values and colour of the spots of *Dipterocanthus patulus* (whole plant), *Dipterocanthus patulus* (root) and *Sphaeranthus amaranthoides* (whole plant) of TLC of Chloroform extracts are tabulated below:

TLC of Chloroform Extracts					
<i>Dipterocanthus patulus</i> Kirantinayagam (whole plant)		<i>Dipterocanthus patulus</i> Kirantinayagam (root)		<i>Sphaeranthus amaranthoides</i> Civakaranthai (whole plant)	
R _f	Colour of the spot	R _f	Colour of the spot	R _f	Colour of the spot
0.20	Grey	0.51	Violet	0.51	Violet
0.47	Pink	0.97	Greyish green	0.78	Grey
0.51	Violet	--	--	0.97	Greyish green
0.66	Grey	--	--	--	--
0.78	Greyish green	--	--	--	--
0.97	Greyish green	--	--	--	--

Table-38: The R_f values and colour of the spots of *Lagenaria siceraria* (whole plant), *Terminalia chebula* (leaves) and *Zizyphus mauritiana* (leaves) of TLC of Ethanol Extracts are tabulated below:

TLC of Ethanol Extracts					
<i>Lagenaria siceraria</i> Curaikkodi (whole plant)		<i>Terminalia chebula</i> - Katukkai (leaves)		<i>Zizyphus mauritiana</i> Ilanthai (leaves)	
R _f	Colour of the spot	R _f	Colour of the spot	R _f	Colour of the spot
0.21	Violet	0.10	Blue	0.22	Grey
0.53	Grey	0.54	Blue	0.58	Grey
0.57	Grey	0.56	Blue	0.64	Blue
0.63	Grey	0.61	Grey	0.97	Grey
0.67	Grey	0.67	Violet	--	--
0.88	Violet	0.97	Grey	--	--
0.97	Grey	--	--	--	--

Table-39: The R_f values and colour of the spots of *Dipterocanthus patulus* (whole plant), *Dipterocanthus patulus* (root) and *Sphaeranthus amaranthoides* (whole plant) of TLC of Ethanol Extracts are tabulated below:

TLC of Ethanol Extracts					
<i>Dipterocanthus patulus</i> Kirantinayagam (whole plant)		<i>Dipterocanthus patulus</i> Kirantinayagam (root)		<i>Sphaeranthus amaranthoides</i> Civakaranthai (whole plant)	
R _f	Colour of the spot	R _f	Colour of the spot	R _f	Colour of the spot
0.57	Grey	0.79	Pink	0.68	Blue
0.62	Blue	0.89	Pink	0.79	Blue
0.97	Grey	--	--	0.89	Pink

Standardization of Compound Formulations

Physico-chemical parameters of the following 2 compound formulations were also completed for SPC Scheme. The results are tabulated below:

Table-40: Physico-chemical parameters of Kalarcic Curanam

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	6.50	6.50	6.50
2.	Total Ash	4.40	4.42	4.41
3.	Acid-insoluble ash	0.55	0.55	0.55
4.	Water soluble extractive	17.32	17.27	17.30
5.	Alcohol soluble extractive	22.78	22.09	22.44
6.	pH (10%)	6.84		

Table-41: Physico-chemical parameters of Trikadukuc Curanam

Sl. No.	Parameters	I	II	Mean%
1.	Loss on drying at 105° C	7.55	7.75	7.65
2.	Total Ash	4.30	4.23	4.27
3.	Acid-insoluble ash	0.55	0.40	0.48
4.	Water soluble extractive	12.60	12.67	12.64
5.	Alcohol soluble extractive	9.97	10.08	10.03
6.	pH (10%)	6.84		

Apart from the allotted work the research scholars carried their work such as extraction, TLC, analytical parameters, assay, authentication of metals and minerals, etc. on payment basis.

Fund generated through research assistance during the year 2011- 2012: ₹ 7197.50/-

3.3.2. Drug standardization at SRRI, Thiruvananthapuram

Physico - chemical parameters and TLC studies.

During the reporting period physico chemical parameters and TLC pattern of the following 6 single drugs have been carried out for SPC scheme purpose and details are tabulated below:

Table-42: Physico-chemical parameters of the Single Drugs

Sl. No.	Botanical Name	Tamil Name	Part	Place of Collection
1.	<i>Cassia auriculata</i> Linn.	Aavarai	Seeds	Mettur
2.	<i>Pedaliium murex</i> Linn.	Aanai Neruncil	Whole plant	Mettur
3.	<i>Holoptelea integrifolia</i> Planch.	Ayil Pattai	Stem bark	Mettur
4.	<i>Capparis sepiaria</i> Linn.	Cenkattaripattai	Stem bark	Mettur
5.	<i>Tragia involucrata</i> Linn.	Cirukancori	Leaves	Mettur
6.	<i>Clerodendrum inerme</i> Linn	Cankankuppi	Leaves	Mettur

Table-43: The R_f values and colour of the spots of methyl alcohol extract of *Cassia auriculata* Linn. (seed) are tabulated below:

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.	0.90	Light Violet	7.0	Fluorescent Blue	7.6	Grey
2.	7.5	Light Violet	-	-	-	-
3.	9.9	Light Violet	-	-	-	-

Table-44: The R_f values and colour of the spots of methyl alcohol extract of *Pedaliium murex* Linn. (whole plant) are tabulated below:

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.	7.6	Light Violet	7.1	Fluorescent Blue	1.5	Grey
2.	-	-	-	-	2.1	Grey

Table-45: The R_f values and colour of the spots of methyl alcohol extract of *Holoptelea integrifolia* Planch. (stem bark) are tabulated below:

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.	2.1	Light Violet	7.1	Fluorescent Blue	2.1	Purple
2.	4.9	Light Violet	-	-	5.4	Light purple
3.	5.1	Light Violet	-	-	7.8	Grey
4.	7.8	Light Violet	-	-	-	-

Table-46: The R_f values and colour of the spots of methyl alcohol extract of *Capparis sepiaria* Linn. (stem bark) are tabulated below:

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.	7.8	Light Violet	7.2	Fluorescent Blue	5.5	Grey

Table-47: The R_f values and colour of the spots of methyl alcohol extract of *Tragia involucrata* Linn. (leaves) are tabulated below:

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	0.6	Brown	6.2	Brown	4.8	Grey
2	2.6	Light Brown	6.7	Brown	5.4	Grey
3	6.2	Yellow	7.3	Fluorescent Blue	6.2	Light Grey
4	6.7	Brown	7.7	Brown	6.7	Purple
5	7.7	Yellow	8.3	Brown	8.2	Purple
6	8.3	Brown	-	-	9.4	Grey
7	8.7	Brown	-	-	-	-
8	9.5	Brown	-	-	-	-

Table-48: The R_f values and colour of the spots of methyl alcohol extract of *Clerodendrum inerme* Linn. (leaves) are tabulated below:

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	0.50	Brown	6.0	Brown	1.2	Grey
2	1.7	Brown	6.7	Brown	2.1	Light Grey
3	2.4	Light brown	7.2	Fluorescent Blue	2.8	Grey
4	2.8	Pale yellow	7.7	Brown	5.2	Purple
5	3.3	Yellow	8.2	Brown	6.1	Purple

6	6.0	Yellow	-	-	6.7	Light purple
7	6.7	Brown	-	-	7.7	Grey
8	7.6	Yellow	-	-	8.3	Grey
9	8.2	Brown	-	-	-	-
10	9.5	Brown	-	-	-	-



Fig.9 -Department of Chemistry, SRRI, Thiruvananthapuram

Preparation and Supply of Nimbathiktham Capsules

A total number of 6612 capsules each filled with Nimbathiktham extract of 200 mg were supplied to the Clinical Research Section, Ayurvedic Research Institute for maternal and child health care (ARIMCHC), Thiruvananthapuram during the reporting period for treating Psoriasis.

Phytochemical Analysis

Phytochemical studies on the leaves of *Clerodendrum inerme* was carried out. During the process a compound named Ursolic acid was identified and isolated.



Fig.10- The Leaves of *Clerodendrum inerme*

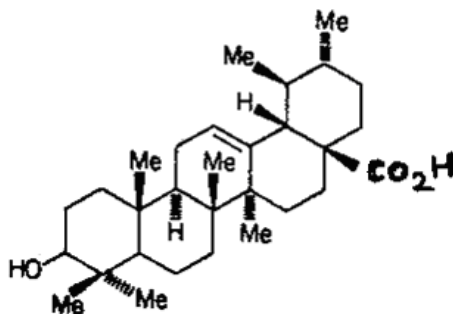


Fig. 11 - Chemical structure of Ursolic acid

Training of Phytochemical analysis was provided on payment basis

Training and guidance were given to a Ph.D scholar, Dept. of Biotechnology, University of Kerala, Thiruvananthapuram for phytochemical studies on *Psychotria curioblosa* (stem) for a period of 30 days.

In addition to that the following medicinal plant materials have also been analysed on payment basis. The details are enumerated in the below mentioned table:

Table-49: Analysis of Plant Materials for students on payment basis

Sl. No.	Botanical Name
1.	<i>Persea macrantha</i> (leaf)
2.	<i>Hybanthes enneaspermus</i> (leaf)
3.	<i>Momordica charantia</i> (leaf) (wild 2)
4.	<i>Momordica charantia</i> (leaf) (cultivated 1)
5.	<i>Momordica charantia</i> (leaf) (cultivated 3)
6.	<i>Abelmoschus caillei</i> (leaf)
7.	<i>Abelmoschus grandiflorus</i> (leaf)
8.	<i>Terminalia arjuna</i> (stem bark)
9.	<i>Terminalia catappa</i> (stem bark)
10.	<i>Terminalia paniculata</i> (stem bark)
11.	<i>Cleome viscosa</i> (seed)
12.	<i>Randia uliginosa</i> (fruit)
13.	<i>Persea macrantha</i> (root)
14.	<i>Momordica charantia</i> (leaf) (wild 1)
15.	<i>Momordica charantia</i> (leaf) (wild 3)
16.	<i>Momordica charantia</i> (leaf) (cultivated 2)
17.	<i>Decalepis arayalpathra</i> (root)
18.	<i>Abelmoschus tuberosus</i> (leaf)
19.	<i>Abelmoschus esculentus</i> (leaf)

20.	<i>Terminalia bellerica</i> (stem bark)
21.	<i>Terminalia chebula</i> (stem bark)
22.	<i>Terminalia tomentosa</i> (stem bark)
23.	<i>Cleome monophylla</i> (seed)
24.	<i>Randia uliginosa</i> (root)

Fund generated through research assistance during the year 2011-2012: ₹12,943/-

3.4. Clinical Research

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:

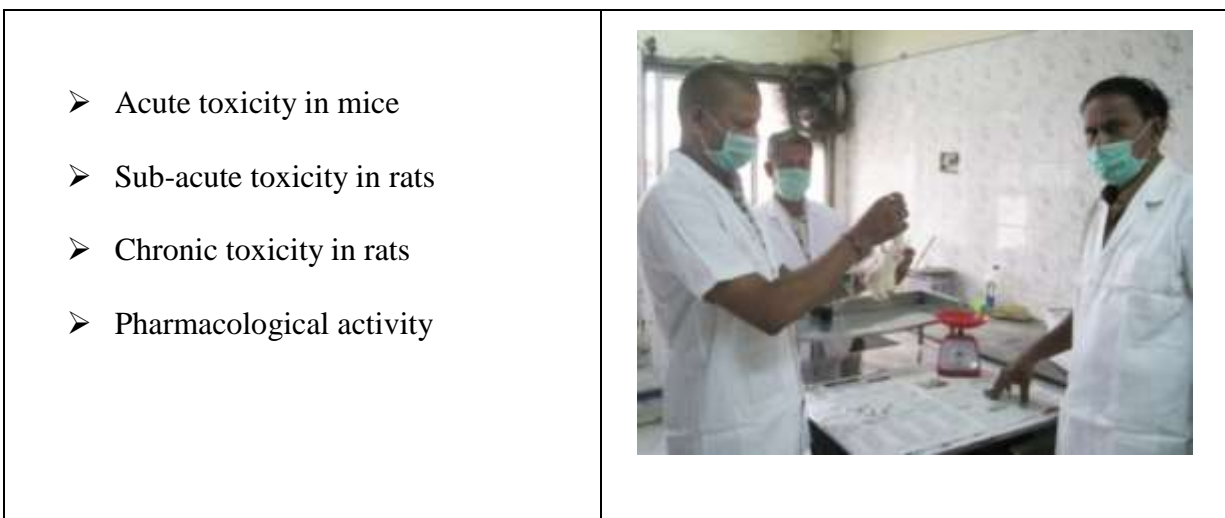


Fig. 12 - Pre-clinical and Safety / Toxicity Studies

Table-50: Pre-clinical activities carried out

Sl. No.	Activities performed	Status	Dosage
1.	Acute, Sub acute toxicity and anticancer activity (Chemical Induced) of folate modified paclitaxel attached titanium dioxide and hydroxyapatite nanoparticles.	Completed	Upto 500 mg/kg was safe. The dose of 250 mg/kg has shown anticancer activity.

2.	Anticancer effect of ethyl acetate and alcohol extract of <i>Ruellia tuberosa</i> (whole plant) on liver with animal model.	Completed	The dose of 500 mg/kg has shown anticancer activity.
3.	Acute toxicity and anti cancer activity (Chemical Induced) of ethanolic extract of <i>Couroupita guianensis</i> Aubl.	Completed	Upto 500 mg/kg was safe. The dose of 400 mg/kg has shown anticancer activity.
4.	Anti-diabetic activity of D5 poly herbal formulation.	Completed	Upto 5200 mg/kg was safe. The dose of 520 mg/kg has shown the anti-diabetic activity.

3.4.2. Safety/ Toxicity Studies

Table-51: Drugs allotted and studied during the reporting year

Sl. No.	Drug Allotted	Target Fixed	Studies Carried Out	Status
1.	D5	Toxicity	Acute toxicity in mice	Completed
			Sub-acute toxicity in rats	
			Chronic toxicity in rats	
2.	OA1	Toxicity	Acute toxicity in mice	Completed
			Sub-acute toxicity in rats	Study is in progress

Acute Toxicity Study

- I. Name of the Drug (Compound) : D5
- II. Type of material / parts received : Powder
- III. Supplying unit and details : SCRI, Chennai
- IV. Target allocated - General Pharmacological screening / Specific pharmacological studies / Pre-clinical : Pre-clinical
- V. Evaluation of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity) : **Acute toxicity**
- VI. Methodology

1. Animal profile:

- Animal species : Swiss albino mice
Sex : Male / Female
Average body weight : 25-30g
Number of animals : 3M+3F

2. Drug profile:

- Route of administration : Oral

**Table-52: Dosage regimen of D5
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 : 4000 mg once a day

Table-53: Therapeutic, average and highest dosages of D5

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

Species	Therapeutic Dose	Average Dose (TDx5)	Highest Dose (TDx10)
Mice	520	2600	5200

Frequency of administration : Once as a single dose
Period of administration : One day

3. Observations and Examinations

Experimental Procedure:

Test animals were exposed to drug by 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, which received test compound in therapeutic, average and high doses by oral route. No significant treatment related effects clinical signs or behavioral activity were observed in all the group of animals, which survived during the experimental period.

Conclusion:

There was no mortality in the entire drug treated group which indicates that D5 is safe up to 5200 mg/kg, which is ten times that of therapeutic dose.

Sub-acute Toxicity Study

- I. Name of the Drug (Single / Compound) : D5
- II. Type of material / parts received : Powder
- III. Supplying Unit and details : SCRI, Chennai.
Name of the Unit
- IV. Target allocated - General Pharmacological screening / Specific pharmacological studies / Pre-clinical : Pre-clinical
- V. Evaluation of safety profile (Acute, sub-acute, chronic, teratogenic, genotoxicity) : **Sub-acute toxicity**
- VI. Methodology

1. Animal profile:

- Animal species : Wister Albino Rats
 Sex : Male / Female
 Average body weight : 80-120g
 Number of animals : 6M+6F

2. Drug profile:

- Route of administration : Oral

Table-54: Dosage Regimen of D5

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 : 4000 mg once a day

Table-55: Therapeutic, average and highest dosages of D5

Calculation of animal dose

Test doses (Experimental) (mg/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

3. Observations and Examinations

Experimental Procedure:

Test animals were exposed to drug by 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 a day during the treatment period for survival and general conditions. 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 twice a week during the treatment period for all rats under study. Body weights of all rats were also recorded on the day of their scheduled necropsy. Food consumption by the rats 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, which received test compound in therapeutic, average and high dose administered regularly for 28 days by oral route. No significant treatment related effects in clinical signs or behavioral activity were observed in all the groups of animals, which 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.

Conclusion:

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

Chronic Toxicity Study

- | | | |
|------|--|---------------------------|
| I. | Name of the Drug (Single / Compound) | : D5 |
| II. | Type of extracts / material / parts received | : Powder |
| III. | Supplying Unit and details | : SCRI, Chennai |
| IV. | Target allocated – General Pharmacological screening / Specific pharmacological studies / pre-clinical | : |
| V. | Evaluation of safety profile (Acute, Sub-Acute, Chronic, Teratogenic, Genotoxicity) | : Chronic Toxicity |
| VI. | Methodology: | |

1. Animal profile:

Animal species : Wister Albino Rats
 Sex : Male / Female
 Average body weight : 80-120g
 Number of animals : 6M+6F

2. Drug profile:

Route of administration : Oral

Table-56: Dosage Regimen of D5

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		

Human dose of trial drug : 4000 mg once a day

Table-57: Therapeutic, Average and Highest Dosages of D5

Calculation of animal dose

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

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

Frequency of administration : Once daily

Period of administration : 90 days

3. Observations and Examinations

Experimental Procedure:

Test animals were exposed to drug by 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 in a day during the treatment period 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 twice a week during the treatment period for all rats under study. Also the body weights of all rats were recorded on the day of their scheduled necropsy. Food consumption of the rats 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, which received test compound in average dose and also no pre-terminal deaths were observed in therapeutic and high dose administered regularly for 90 days by oral route. No significant treatment related effects in clinical signs or behavioral activity were observed in all the groups of animals, which 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. Any sort of Pathological changes in various organs induced by specific test compound were observed in therapeutic, average and high dosage groups.

Conclusion:

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

Table-58: Research fund generated during 2011-2012

Sl. No.	Name of the Project	Amount (₹.)
1	Acute, sub acute toxicity and anti cancer activity (chemical induced) of folate modified paclitaxel attached titanium dioxide and hydroxyapatite nanoparticles.	94,000/-
2	Anticancer effect of ethyl acetate and alcohol extract of <i>Ruellia tuberosa</i> (whole plant) on liver with animal Model.	42,000/-
3	Acute toxicity and anti cancer activity (chemical induced) of ethanolic extract of <i>Couroupita guianensis</i> Aubl.	27,000/-
Total fund generated through research assistance provided to the research scholars during the year 2011-2012		1,63,000/-

3.5. Clinical Studies

During the reporting period the following clinical studies have been initiated and conducted at the Peripheral Institutes / Units of the Council.

1. Multicentric Open Labeled Randomized Controlled Trial of KPE Oil and 777 oil in Kaalanjagapadai (Psoriasis)
2. Multicentric Open Labeled Clinical Trial of D5 in Neerizhivu Noi (Diabetes Mellitus)

I. Multicentric Open Labeled Randomized Controlled Trial of KPE Oil and 777 oil in Kaalanjagapadai (Psoriasis)

Earlier study on 777 oil had shown that it helped in postponing the subsequent attacks. Even when there was recurrence the severity and extent of the lesion was very much minimized. The aim of the present study is to evaluate the efficacy of the selected KPE - Oil compared with 777 Oil as Control.

Objectives:

Primary:

To evaluate the efficacy of KPE-Oil (External application) in Kalanjagapadai (Psoriasis)

Secondary:

To study about the recurrent nature of Psoriasis in comparison with 777 Oil as Control

Study Design: Multicentric Open Labeled Randomized Controlled Trial.

Study Centres:

- ❖ Siddha Central Research Institute, Chennai.
- ❖ Siddha Regional Research Institute, Puducherry.
- ❖ Siddha Regional Research Institute, Thiruvananthapuram.

Sample Size: n=90 (3 Centres)

Study Period: 1 year

Intervention:

Arm 1: KPE-Oil (External application) – Study group

Arm 2: 777 – Oil (External application) – Control group

Status:

Seven participants have been enrolled in the reporting period and the study is continued.

II. 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).

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:

Five participants have been enrolled in the reporting period and the study is continued.

3.5.1. Other Projects:

During the reporting period, apart from the above clinical trials the following pilot study also had been carried out.

The details are mentioned below:

I. Azhalkeel Vayu [Osteoarthritis Knee joints] – a pilot Study with Nanthi Mezhugu and Kunthiriga Thylum

Siddha system of Medicine has broadly classified the joint diseases into several types. Azhal Keel Vayu is one among them and its clinical condition can be well correlated to Osteoarthritis (of Knee joints). Sabapathi Kaiyedu, a traditional text states that Azhal Keel Vayu is a condition in which the articular joints get swollen and which is accompanied by fever and pain later become very difficult to treat,.

Osteoarthritis is one of the most prevalent articular disorders affecting human kind and a major cause of disability and socio-economic burden. Osteoarthritis is a chronic degenerative disorder of multifactorial aetiology, including acute and /or chronic results from normal wear and tear, age, obesity and joint injury. Osteoarthritis is characterized by the degradation of the articulate cartilage resulting in an alteration of its biochemical properties. There is higher prevalence of osteoarthritis with advanced age and in women. Hence, there is a need for effective drugs without any complication in the management of osteoarthritis. A traditional formulation mentioned in Siddha Formulary of India, Part – I namely Nanthi Mezhugu (NM) 200 mg was given internally with sufficient quantity of palm jaggery and Kunthiriga Thylum (K1) was given for external application. Duration of the treatment was 21 days and up to a maximum of 45 days.

Materials and Methods

1.	Level of study	:	IPD
2.	Design of the Study	:	Open Trial
	Number of Groups	:	One
	Studies carried out in	:	42 patients

Criteria for selection/exclusion of patients

Inclusion Criteria	Exclusion Criteria
Age between 30 to 65 years	Age below 30 or more than 65 years
Patients with Primary osteoarthritis (Knee joints) single or both	Patients with systemic conditions such as Gouty arthritis, Rheumatoid arthritis,

Symptoms of OA over a period of at least 6 months	Psoriatic arthritis, SLE
Crepitation felt over the affected knee joints	Patients with Diabetes / Hypertension
Morning stiffness in the knee joints	Bedridden patients
Involvement of knee joints with / without other major / minor joints	Patients using anti-inflammatory medicines other than trial drug
Difficulty in walking / climbing stairs	Patients taking allopathic / Homeopathic treatment
	Low backache with / without radiation to legs
	Patients with metallic implants
	Subjects having any deformity of knee or hip
	History of bony or soft tissue injury to knee joints

RESULTS:

Table 59: Demographic profile of patients

Sex	Age in years				
	30 – 40	41 – 50	51 – 60	61 – 65	Total n (%)
Male	2	2	1	2	7 (16.7%)
Female	2	9	18	6	35 (83.3%)
Total	4	11	19	8	42

Table 60: Profile of patients with regard to Udaliyal

Sex	Udaliyal			
	V*	A [#]	I ^{\$}	T [^]
Male	-	-	-	7
Female	2	-	-	35
Total	2	-	-	42

* V – Vali, [#]A - Azhal, ^{\$}I – Iyam & T[^] – Thontham.

]

Table 61: Duration of the illness & response to the therapy

Response to Therapy	Duration of Illness, % (n)			Total % (n)
	6 – 12 Months	1– 3 Years	3 Years & Above	
Good	16.6% (7)	9.5% (4)	7.14% (3)	33.3% (14)
Fair	23.8% (10)	14.2% (6)	16.6% (7)	54.8% (23)
Poor	2.1% (1)	-	2.4% (1)	4.8% (2)
No	-	-	-	-
Dropout	7.1% (3)	-	-	7.1% (3)
Total	21	10	11	42

Table 62: Response to the treatment with respect to Age

Response	Age Group, % (n)				Total % (n)
	30-40 yrs	41-50 yrs	51-60 yrs	61-65 yrs	
Good	2.4% (1)	9.5% (4)	9.5% (4)	11.9% (5)	33.3% (14)
Fair	4.8% (2)	14.2% (6)	30.9% (13)	4.8% (2)	54.8% (23)
Poor	-	-	4.8% (2)	-	4.8% (2)
No	-	-	-	-	-
Dropout	2.4% (1)	2.4% (1)	-	2.4% (1)	7.1% (3)
Total	4	11	19	8	42

Table 63: Clinical Assessment using WOMAC Osteoarthritis Index

RESULTS OF TREATMENT, % (n)					
Good Response	Fair Response	Poor Response	No Response	Drop out	Total
33.3% (14)	54.8% (23)	4.8% (2)	-	7.1% (3)	42

Conclusion of the study:

In a total of 42 participants enrolled, majority were females (M:F=7:35) in the age group from 30 to 65 years. Most of the patients were found to be above 40 years of age and particularly in the age group between 51 - 60 years. In the Udaliyal study, almost all the cases belonged to Thontham category. Selection of patients with duration of the illnesses and response to the therapy were from 6 months to 3 years and above. Good response was observed in relatively less proportion of 27.3% (3/11) patients with duration of illness of 3 years and above. Treatment response with respect to age was observed and it was found that the treatment was relatively beneficial with good response in elderly patients of 61-65 years with 62.5% (5/8). Clinical assessment before and after treatment was done with Womac Osteoarthritis index (Pain, Stiffness, Physical function). Out of the 42 cases, 33.3% (n=14) showed Good Response, 54.8% (n=23) showed Fair Response, 4.8% (2) cases showed Poor Response and 7.1% (3) cases were lost to followup. There were no known side effects or any noticeable adverse reactions during the study. Overall it was observed that more than 85% of patients had good and fair response to the treatment and the drug was found to be safe in the patients treated for Osteoarthritis of knee joints.

3.6. Literary Research and Documentation Programme

3.6.1. Literary Research

Literary research works lay platform to any basic research in Siddha System as they are scientific reflections of the intuitions of Siddhars. Ancient Siddha literatures inscribed in the Palm leaves and Paper manuscripts still hold many unfolded scientific details with them and they need to be unearthed.


<ul style="list-style-type: none"> ➤ 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 	
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Fig.13. Manuscripts for Academic and Research Purpose

3.6.2. Publications

The literary works carried out during the reporting period by the LR & DD are tabulated below:

Table-64: Literary Projects translated into English

Sl. No.	Title of the works	Translation	Comparison / Correction	Preparation of Glossary	Status of Printing
1.	Yakobu Vaithiya Chinthamani-700	Completed	Completed	Completed	in print
2.	Siddhar Kaya Karpam	Completed	Completed	Completed	In print

Table-65: Literary Projects translated into Hindi

Sl. No.	Title of the works	Translation	Comparison / Correction	Preparation of Glossary	Status of Printing
1.	Therayar Kudineer	Completed	Completed	Completed	In print

Table-66: Completed Multilingual Projects (Tamil/Hindi/English/Telugu/Kannada)

Sl. No.	Title of the works	Calligraphy	Annotation	Comparison / Correction
1	Agathiar Kalnandu Choothiram	Completed	Completed	Completed

Table-67: SRF Project

Title	Status
Documentation of High Order Pharmaceutical Forms Like “Kattu, Kazhangu, Sattu” in Siddha System of Medicine	Completed Phase - I of literary documentation

Database of Siddha preparations for certain diseases as mentioned in the enlisted literature of Drugs and Cosmetics Act 1940

This project has been entrusted to SRRI, Puducherry. During the reporting period transliteration software was installed and the process of documentation was initiated.

3.7. Research articles

Table-68: Research articles Published during 2011-2012

Part – I (Journals / Bulletins)					
Sl. No.	Name of the Author / Co- Author	Title of the Paper	Name of the Journal / Bulletin	National / International	Month / Year of Publication
1.	Anitha John, V. et.al.	Physico-chemical evaluation of Hutabhugadi curna- An Ayurvedic formulation.	Journal of Research and Education in Indian Medicines	International	2011; 17 (1-2); 7-13.
2.	Santhammal. Y et.al. Pramod reddy. G	Evaluation of Immunomodulatory activity of Saya Churnam (Siddha Poly herbal formulation) in albino rats.	Journal of Advances in Pharmacy and Healthcare Research	National	2011; 1(3): 8 – 15.
3.	Arthika S. et.al. Elankani. P	Hepatoprotective activity of the ethanolic extract of Azima tetracantha against paracetamol induced hepatotoxicity in Wistar albino rats.	Journal of Advances in Pharmacy and Healthcare Research	National	2011; 1(2): 14 – 21.
4.	Omprakash K K et.al. Sasikala. E	Pharmacognostic studies of the leaf and stolon of <i>Pistia stratiotes</i> L.	International Journal of Ayurvedic Medicine	International	2011; 2(3): 128 – 15.
5.	Saraswathy A et.al. Shakila. R	Pharmacognostic, physico-chemical and preliminary phytochemical studies on stem bark of <i>Caesalpinia coriaria</i> (Jacq.) Willd.	J Pharm Res.	National	2011; 4(6) : 1666 - 1669.

6.	Saravanagandhi A. et.al. Padma Sorna Subramanian	Documentation of medicinal plants used by the people of Radhapuram taluk, Tirunelveli district.'	Jour. of BPNR	National	ISBN No. 978-81-7966-299-1; June, 2011
7.	Balachandar S et.al. Sathiyarajeswaran. P	Preliminary phytochemical screening, acute toxicity study and anti- inflammatory activity of Pitta sura kudineer.	Indo American Journal of Pharmaceutical Research.	International	ISSN No. 2231-6876; June, 2011
8.	Gayathri Devi.V et.al.	Isolation and standardization of Nimbathiktham- An Effective Medicine for Psoriasis - from Neem oil.	Journal of Ayurveda	National	July-Sep. 2011; Vol. IV No. 3.
9.	Saravanagandhi. A et.al. Padma Sorna Subramanian	Genetic variability studies in chosen species of <i>Cadaba</i> and <i>Maerua</i> (Capparaceae) by RAPD Markers.	RAC Journal of Research	National	Feb.2012; Vol. I. No.4.
10.	Natarajan. S et.al.	An open Clinical Trial for Cegana Vatham using Varmam Procedure.	http://www.webmedcentral.com/article_view/2968	International	ISSN No. 2046-1690; Feb. 2012
11.	Sathya Rajeswaran. P et.al.	Management of Kalladaippu (Renal Calculi)	http://www.webmedcentral.com/article_view/3031	International	ISSN No. 2046-1690; Feb. 2012
12.	Kannan. M et.al.	Anemia (Pandu) Primary Care in Siddha	http://www.webmedcentral.com/article_view/3172	International	ISSN No. 2046-1690; March, 2012
13.	Rooban B N et.al. Gayathri devi	Prevention of Selenite-induced Oxidative stress and Cataractogenesis by Luteolin isolated from <i>Vitex negundo</i>	Chemico-Biological Interactions	International	2012; 196: 30-38.

14.	Gayathri Devi. V et.al.,	Pharmacognostic and antioxidant studies on Clerodendrum inerme and identification of Ursolic acid as marker compound	International Journal of Pharmacy and Pharmaceutical Sciences (IJPPS)	International	2012; 4(2): 145-148.
15.	Sathiya Rajeswaran. P et.al	Conservation of Palm leaf Manuscripts	Journal of Siddha	National	2009; 2(2): 37-44
16.	Anandan. T Natarajan. S Jeyakannan. J	Somato typing study of Leucoderma according to Siddha System of Medicine	Journal of Siddha	National	2009; 2(2): 5-7
17.	Shyamala Rajkumar, et. al.	Controversial identity of some medicinal plants in Siddha Medicine	Journal of Siddha	National	2009; 2(2): 31-36. (Published in 2012).
18.	Ponmuthu Rani. C et al	A case Report on Karuppai sathai kattigal (Fibroid uterus) - Short Research Communication	Journal of Siddha	National	Vol: 2, Issue: 2, July-Dec 2009. pp 1-4 (Published in 2012).
19.	Annathai J., et. al	Evaluation of therapeutic efficacy of Ayabringaraja Karpam (A Siddha drug) in the treatment of Venpadai (Leucoderma)	Journal of Research in Ayurveda and Siddha	National	Vol.XXXI, No.1, (Jan-Mar.,2010) pp1-8 (Published in 2011)
Part – II (Published in the Proceedings)					
Sl. No.	Name of the Author	Title of the Paper	Name of Conference / Seminar	National / International	Month / Year of Publication
1.	Saravanan .S et.al.	A health drink from banana - A traditional approach	NCOFTECH	National	ISBN No. 978 93 81450-00-0; June, 2011

2.	Padma Sorna Subramanian. M	Scared groves - a biosaviour of hydrophytes	National Seminar on 'Shrinking wet lands! Raising Global temperature.	National	July, 2011
3.	Padma Sorna Subramanian. M	Scared groves in conservation of wetlands in Point calimere	National Seminar on Shrinking wet lands Raising Global temperature	National	July, 2011
4.	Kannan. M. et.al.	Home based Digitization of Manuscripts	Workshop on Manuscriptology at SCRI, Chennai	National	Nov. 2011
5.	Pramod Reddy. G	Evaluation of Immunomodulatory activity of Saya Churnam (Siddha Poly herbal Formulation) in albino rats	International Conference on Medicinal Plants Herbal Products and Expo (ICMPHD 2011), Colombo, Srilanka.	International	Dec. 2011
6.	Sathiya Rajeswaran. P	Sanga Ilakkiyangalil Siddha Maruthuva Pathivukal	National Conference on Traditional heritage in Sangam literature. organised by Gandhigram University	National	Jan. 2012
7.	Ganesan.R	Hepato protective effect of Coldenia procumbens linn. Against D-galactosamine induced acute liver damage in rats	International Conference on Traditional Drugs in Disease Management organised by SASTRA, University, Thanjavur	National	Jan. 2012
8.	Natarajan. S	Muppu - Information from palm leaf manuscripts	National Seminar on Siddha Manuscripts its relevance to Education, Industry and Research By Govt. Museum, Chennai.	National	Feb. 2012

9.	Kannan. M	Digitization of Manuscripts	National Seminar on Siddha Manuscripts its relevance to Education , Industry and Research By Govt. Museum, Chennai.	National	Feb. 2012
10.	Sathiya Rajeswaran. P	Efficacy testing of Metallic Drugs	National Workshop on Evidence based Research on Safety and Efficacy of metallic preparations in Siddha at SRRI, Thiruvananthapuram	National	Feb. 2012
11.	Padma Sorna Subramanian. M	Traditional knowledge of wild edible plants used by the tribal people of Point Calimere, Nagapattinam district, Tamilnadu	Proceedings of International Conference on Environmental security for Food and Health	International	Feb. 2012
12.	Ganesan.R	Hepatoprotective activity of alcoholic extract of Coldenia Procumbens on D-Galactosamine induced rats.	In 16th National Convention of Society of Pharmacognosy and International Symposium on Herbal and Traditional Medicine on the theme of “Frontiers in Drug Discovery from Herbal & Traditional Medicine” Saurashtra University, Rajkot, Gujarat	National	March 2012

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 is 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 Pharmacovigilance programme. The hospitals functioning under the Council provided medical aid to 72574 patients at OPD level. Out of them 17272 were new and 55302 were old 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 SCRUI, 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 illness 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-69: Census of OPD and IPD Patients

Sl. No.	Instt. / Unit	No. of patients in OPD					No. of patients in IPD				Bed occupancy (%)
		New		Old		Total	Admitted		Discharged		
		M	F	M	F		M	F	M	F	
1	SCRI, Chennai	5052	3900	15179	11193	35324	109	37	110	42	22.20%
2	SRRI, Puducherry	2502	2259	11872	11284	27917	7	35	8	41	13.00%
3	SRRI, Thiruvananthapuram	845	727	1531	2260	5363	--	--	--	--	--
4	SCRU, Palayamkottai	965	1022	1010	973	3970	--	--	--	--	--
	Total	9364	7908	29592	25710	72574	116	72	118	83	17.60%**

**Average Bed Occupancy

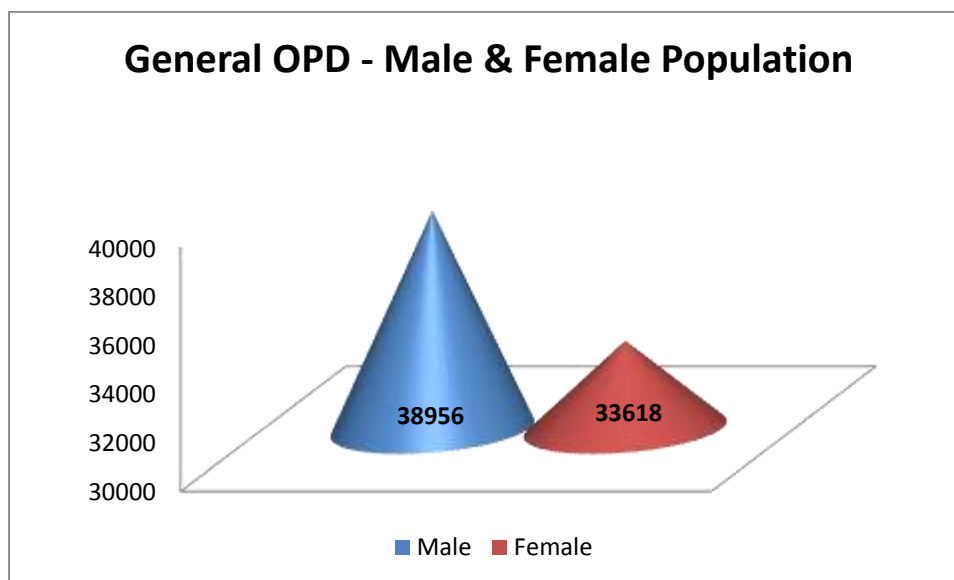


Diagram No 1. Schematic presentation of Male & Female population of General OPD

3.8.2. Pharmacovigilance Programme

Worldwide movement for the improvement of patient's safety is gaining momentum. Hence the subject of drug safety gained more significance in the present day scenario. In the context of Siddha with increased use of drugs the issue of adulteration and preparation of counterfeit drugs have also increased. Hence a mechanism is required to address these issues. Pharmacovigilance is the science, which 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 Pharmacovigilance 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. SCRUI, 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 12 cases of suspected ADRs and the report has been sent to the National Pharmacovigilance Centre, Jamnagar, Gujarat.



Fig.14- Clinical Section (Male), SCRI, Chennai / **Fig. 15-** 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 protocol specifications.
- 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 are carried out in multi-centric trials in Diabetes and Psoriasis in the reporting year.

Fig. 16 & Fig. 17- Bio Chemistry Department, SCRI, Chennai



Fig.18- Geriatric Special OPD at SCRUI, Palaymkottai



Fig.19- Clinical Pathology Department, SCRI, Chennai



Fig.20- Performing skin biopsy in the Clinical pathology laboratory

Skin Biopsy

During the reporting period skin biopsy was performed for 9 patients as a confirmatory finding for Psoriasis. Incisional Biopsy was taken under aseptic precaution 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 all Clinical Siddha Institutes/Units of CCRS SCRI, Chennai; SRRI, Puducherry; SRRI, Thiruvananthapuram and SCRUI, Palayamkottai in 2008. During the reporting period, 14077 patients were benefited from the Geriatric Special Clinics.

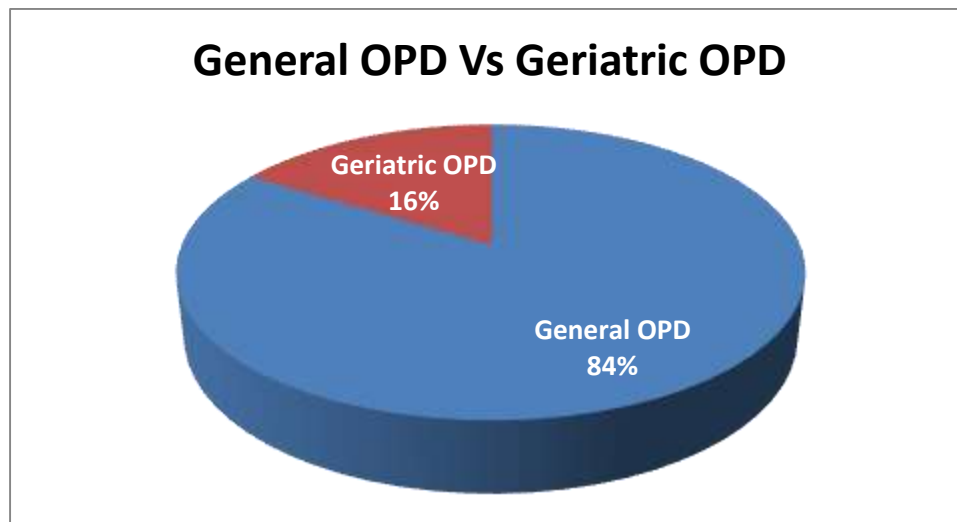
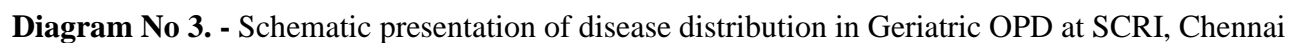


Diagram No 2. Schematic presentation of General OPD and Geriatric Specialty OPD census

Table-70: 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 (Bronchitis)
6.	Iraippu noigal (Bronchial Asthma)
7.	Valigunmam (Peptic ulcer)
8.	Venpadai (Leucoderma)
9.	Iduppu vali (Lumbago)
10.	Neerkovai (Sinusitis)

Disease Distribution



3.8.4. Flu-like Illness Specialty OPD

As per the direction of Dept. of AYUSH in August 2009 the Council started 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-71: 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	7	5	13	2	27
2.	SRRI, Puducherry	8	9	--	--	17
Grand Total		15	14	13	2	44

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-72: Census of Varmam special OPD

Sl. No.	Institute	M	F	Total
1.	SRRI, Puducherry	589	739	1328
Grand Total		589	739	1328

3.8.6. Thokkanam Special OPD

Patients who attended Thokkanam special OPD at SRRI, Puducherry during the reporting period.

Table-73: Census of Thokkanam Special OPD

Sl. No.	Institute	M	F	Total
1.	SRRI, Puducherry	553	555	1108
Grand Total		553	555	1108

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 that some of the medicines are prepared for activities related to Siddha Pharmacopoeia scheme.

Table-74: Medicines prepared in the Pharmacy during the reporting period

Sl. No.	Name of Trial Drugs / General medicines	Quantity prepared Kg. / Ltrs.	Quantity supplied to other Institutes of CCRS/ Kg. / Ltrs.	Quantity used in OPD / IPD of SCRI /Kg. / Ltrs.	Balance Kg. / Ltrs.
1.	777 Oil	224.500	15	221.500	8.000 (inclusive of previous stock)
2.	Amukkara chooranam	67.500	10	38.000	19.500
3.	Amukkara chooranam plain	227.500	-	227.500	Nil
4.	Arathai chooranam	110.000	3.000	94.500	12.500
5.	Arathai kudineer chooranam	73.000	--	51.000	22.000
6.	Arugan thylam	513.000	--	418.00	95.000

7.	Asta chooranam	61.000	--	49.500	11.500
8.	Avuri thylam (Trial drug)	97.700	--	24.7	73.000
9.	D2 chooranam (Panchavalkachooranam)	20.000	--	20.000	Nil
10.	D5 chooranam (Trial Drug)	272.500	--	210.500	62.000
11.	Elathy chooranam	245.000	--	210.00	35.000
12.	G1 chooranam (Trial Drug)	15.300	--	14.000	1.300
13.	Gowri chinthamani chenduram	7.500	--	7.500	Nil
14.	Karpoorathy thylam	519.000	--	468.00	51.000
15.	Kavikkal chooranam	19.000	2.000	3.700	13.300
16.	Kazharchi chooranam	10.225	2.100	0.125	8.000
17.	Keezhanelli chooranam	2.100	--	2.100	Nil
18.	KP-1 chooranam (Trial Drug)	7.000	7.000	--	Nil
19.	KPE Oil- (Trial Drug)	49.400	15.000	19.400	20.000 (inclusive of previous stock)
20.	Kukkil parpam	48.000	0.500	12.800	34.700
21.	Kukkil thylam (No.2)	1040.00	20.000	855.00	165.000
22.	Linga chenduram	13.000	--	13.000	Nil
23.	Mathan thylam (Trial drug)	13.000	--	6.200	6.800
24.	Mathan thylam	252.500	--	242.500	10.000
25.	Moolakudara ennai	7.000	--	0.500	6.500
26.	Muthu chippi parpam	21.500	--	--	21.500
27.	Nagapoochu marundhu	--	--	7.200	1.900 (inclusive of

					previous stock)
28.	Nandukkal parpam	--	--	5.700	14.200 (inclusive of previous stock)
29.	Neerkovai mathirai	24.00	--	16.400	7.6
30.	Nilavembu kudineer chooranam	106.000	--	92.000	14.000
31.	Nilavagai chooranam	135.000	3.000	132.000	Nil
32.	OA1 chooranam (Trial Drug)	6.150		2.700	3.450
33.	Padigapanneer	--	--	3.000	6.700 (inclusive of previous stock)
34.	Palagarai parpam	47.000	--	23.700	23.300
35.	Parangipattai chooranam	208.000	10.000	156.000	42.00
36.	Sangu parpam	45.500	0.500	45.000	Nil
37.	Silasathu parpam	--	0.500	28.500	25.300 (inclusive of previous stock)
38.	Sivanar amirtham	--	--	11.700	13.700 (inclusive of previous stock)
39.	TAT chooranam	189.000	--	162.000	27.000
40.	Thalisathy chooranam	169.400	--	122.900	46.900 (inclusive of previous stock)
41.	Thirikadugu chooranam	84.500	3.000	77.100	4.400
42.	Thiriphala chooranam	299.500	5.000	271.000	23.500
43.	Vaividanga chooranam	9.000	--	9.000	Nil
44.	Vangavirana kalimbu	60.000	--	33.000	27.0

45.	Vengara podi	--	--	2.000	5.500 (inclusive of previous stock)
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4. Information, Education and Communication

4.1. IEC Materials / Pamphlets

An IEC material entitled **Veetu Thottangalil Valarkkappadum Mooligaigal** was prepared and 1000 copies of the same were printed and distributed to the visitors of Siddha Medicinal Plants Garden, Mettur dam.

4.2. Organization of Seminars / Conferences / Workshops by the Institutes / Units

Table-75: Workshop on Manuscriptology organized at Chennai

Sl. No.	Title of the Seminar / Conference / Workshop	National / International	Name of the Institute	Date
1.	Workshop on Manuscriptology	National	Siddha Central Research Institute, Chennai.	14 th – 16 th November 2011.



Fig.21 & Fig.22 Dr. K. Meenakshi Sundara Murthy, Asst. Director i/c of SCRI, Chennai delivering the welcome address at the inaugural session of the Workshop on Manuscriptology.

A National workshop on Manuscriptology was held between 14th and 16th November 2011 by SCRI, Chennai. The workshop proceedings and guidelines were compiled by the Scientific committee comprising Dr. K. Meenakshi Sundara Murthy, Asst. Director i/c; Dr. R. Yasodha, Asst. director/ HOD, Dept. of Clinical Research; Dr. P. Sathiyarajeswaran, Research

Officer (S); Dr. M. Kannan, Research Officer (S); Dr. S. Natarajan, Senior Research Fellow. A total of 72 registered participants attended the three days workshop and 9 resource persons delivered lectures on various aspects of Manuscriptology.

Table-76: Workshop on Evidence based Research on Safety and Efficacy of Metallic Preparations of Siddha organized at Thiruvananthapuram

Sl. No.	Title of the Seminar / Conference / Workshop	National / International	Name of the Institute	Date
1.	Workshop on Evidence based Research on Safety and Efficacy of Metallic Preparations of Siddha	National	Siddha Regional Research Institute, Thiruvananthapuram	24 th - 25 th February, 2012.



Fig. 23& Fig. 24 Dr. K. Gopakumar, Asst. Director I/c., SRRI, Thiruvananthapuram delivering the welcome address at the inaugural session of the Workshop on Evidence based Research on Safety and Efficacy of metallic preparations in Siddha.

A National workshop on Evidence based Research on Safety and Efficacy of metallic preparation of Siddha was held between 24th and 25th February 2012 organized by SRRI, Thiruvananthapuram. The workshop proceedings and guidelines were compiled by the Scientific committee comprising Dr. K. Gopakumar Asst. Director i/c, Dr. V. Gayathri Devi, ARO (Chem), Smt. Anitha John, ARO (Chem), Sh. Ariful zeman Lab. Tech, Sh. K. Mohana Kumar Lab. Asst. A total of 158 registered participants attended the two days workshop in which 8 resource persons from various aspects delivered lectures related to the safety and efficacy of Siddha medicines.

**Table-77: Workshop on Kalladaippu (Urolithiasis) and its Management in Siddha
organized at Puducherry**

Sl. No.	Title of the Seminar / Conference / Workshop	National / International	Name of the Institute	Date
1.	Workshop on Kalladaippu (Urolithiasis) and its Management in Siddha	National	Siddha Regional Research Institute, Puducherry.	5 th - 6 th March 2012.



Fig. 25 & Fig. 26 The Workshop CD being released by Dr. K. Manickavasagam, Director, NIS, Chennai and the first copy being received by Dr.T.S.Ravikumar, Director, JIPMER

A National Workshop on Kalladaippu (Urolithiasis) and its management in Siddha was held on 5th and 6th March 2012 by SRRI, Puducherry. The workshop Manual and CD containing the proceedings and important guidelines were compiled by the Scientific and Editorial Committee comprising Dr.J.Annathai, A.D I/c, Dr.Shyamala Rajkumar, R.O, Dr.H.Mubarak, SRF, Dr.C.Ponmuthurani, SRF and Dr.V.Vijaya Kumar, SRF. A total of 91 registered participants attended the two days workshop. Eight resource persons from various academic and research institutes delivered lectures on Kalladaippu (Urolithiasis) related topics.

4.3. Seminars / Conferences / Workshops

Table-78: Seminars / Conferences / Workshops Participated by the Officers

Sl. No.	Participants	Title	Organized by	National / International	Date
1.	Dr.K.Gopakumar et. al.	World Siddha Doctors Meet	Thiruvananthapuram	International	14 th - 15 th April 2011
2.	Dr.S. Saravanan	Career and Research Trends in Food Processing	Indian Institute of Crop Processing Technology, Thanjavur.	National	24 th - 25 th June 2011
3.	Dr. M. Padma Sorna Subramanian	Shrinking wet lands - Raising Global temperature	Dept. of Botany, Rani Anna Govt. College for Women, Tirunelveli.	National	21 st - 22 nd July 2011
4.	Dr.Shyamala Rajkumar	Orientation course on Records Management	National archives of India, Puducherry.	National	8 th - 12 th August 2011
5.	Dr. S. Jega Jothi Pandian	Continuous Medical Education Training Programme on Diet regimen and its influences in health and diseases	Santhigiri Siddha Medical College, Santhigiri, Thiruvananthapuram	National	8 th August 2011
6.	Dr. P. Sathiya Rajeswaran Dr.M.Kannan Dr.J.Jeya Kannan Dr.S.Natarajan Sri R. Ganesan and Dr.G.Pramod Reddy	Nanobiotechnology - The force of the future	Postgraduate & Research Department of Biotechnology, Woman's Christian College, Chennai.	National	10 - 12 August 2011
7.	Dr.K. Gopakumar	Continuous Medical Education Training Programme	Santhigiri Siddha Medical College, Santhigiri, Thiruvananthapuram	National	24 th August 2011
8.	Dr.K. Meenakshi Sundaramoorthy and Dr. P. Sathiya Rajeswaran	Workshop on Preventive, curative and Conservation of Manuscripts	Govt. museum Chennai.	National	9 th - 13 th September 2011

9.	Dr.V. Vijayakumar and Dr. Shyamala Rajkumar	Fundamentals and Basic Principles of Siddha Medicine	Thulir-1 A CME Program, WUS Centre, Chennai.	National	17 th September 2011
10.	Dr.V.Vijayakumar	To prepare curriculum and syllabus for new PG Degree & P.G.Diploma courses in Siddha and to revive review the syllabus of PG Degree courses.	Siddha expert in the Meeting conducted by CCIM, New Delhi.	National	29 th - 30 th September 2011
11.	Sh. R. Ganesan	Workshop on Research Methodology and Biostatistics	Dr.M.G.R Educational and Research Institute University, Chennai.	National	30 th September to 4 th October 2011
12.	Dr. S. Jega Jothi Pandian Dr. A. Kanagarajan	Workshop on Manuscriptology in Siddha	SCRI, Chennai	National	14 th - 16 th November 2011
13.	Dr.S. Saravanan	Workshop on 'Changing Contour of World Knowledge Economy – India's Tryst with Intellectual Propriety in the 21 st Century	PSG College of Arts and Science, Coimbatore.	National	2 nd - 3 rd December 2011
14.	Dr.Shyamala Rajkumar	Management of Respiratory diseases through Siddha System	CME Programme, ISM &H, Puducherry	National	14 th December 2011
15.	Dr.V. Vijayakumar and Dr. H. Mubarak	Fundamentals and Basic Principles of Siddha Medicine	Thulir-2 A CME Program, WUS Centre, Chennai.	National	18 th December 2011
16.	Dr.Shyamala Rajkumar	Management of Neurological disorders through Ayurveda	CME programme, ISM&H, Puducherry.	National	21 st December 2011
17.	Dr. P. Elankani	International Conference on Traditional Drugs	SASTRA University, Thanjavur.	International	11 - 12 January 2012

		in Disease Management			
18.	Dr. V. Gayathri Devi	As a guest speaker in Inservice Training for serving Pharmacists	Dept of Indian System of Medicine Kerala State.	National	21 st January 2012
19.	Smt. R. Shakila Dr. Sathiya Rajeswaran Dr. M. Kannan Dr.A. Kanagarajan	Workshop on Evidence based research on safety and efficacy of metallic preparations of Siddha	SRRI, Thiruvananthapuram	National	24 th - 25 th February 2012
20.	Dr. E. Sasikala Ethirajulu Dr. P. Elankani	Traditional Medicines and Globalization – The Future of Ancient Systems of Medicine	School of Natural Products, Jadavpur University, Kolkatta	International	17 th - 19 th February 2012
21.	Dr.S. Saravanan	Training programme on Innovative Techniques in Urban Forestry	Institute of Forest Genetics and Tree breeding, Coimbatore.	National	2 nd March 2012
22.	Dr.K.Meenakshi Sundaramoorthy Dr.R.Yasodha Dr.P.Sathiya Rajeswaran Dr.M.Kannan Dr.J.Jeya Kannan Dr.S.Natarajan Dr.S. Saravanan	Workshop on Kalladaippu (Urolithiasis) and its management in Siddha	Siddha Regional Research Institute, Puducherry.	National	5 th - 6 th March 2012
23.	Dr.Shyamala Rajkumar	Guest Speech on Non Invasive cost effective Siddha Diagnostic tools for selected ailments	CME programme National Institute of Siddha, Chennai.	National	29 th March, 2012

Abroad Deputation of CCRS Officials abroad:

Three Research Officers of CCRS viz. Dr .P. Sathiya Rajeswaran, Dr. G. Senthilvel and Dr. A. Rajendra Kumar were deputed to Brazil as an exposure visit for various laboratories and institutions between 30th January 2012 and 5th February 2012, which was sponsored by the Dept. of Science & Technology, Govt. of India.

Table-79: Deputation of CCRS Officials abroad

S.No	Name of the Research official	Details of visit	Date
1.	Dr .P. Sathiya Rajeswaran Dr. G. Senthilvel Dr. A. Rajendra Kumar	Exposure Visit to Brazil Sponsored by DST.	30 th January 2012 to 05 th February 2012
2.	Dr. G. Pramod Reddy	Presented a paper on Evaluation of Immunomodulatory Activity of Saya Churnam (Siddha Poly Herbal Formulation) on Albino rats in the International Conference on Medicinal Plants Herbal Products and Expo (ICMPHD 2011), Colombo, Srilanka.	19 th to 21 st December 2011



Fig. 27 - Dr .P. Sathiya Rajeswaran, Dr. G. Senthilvel and Dr. A. Rajendra Kumar with other team members at Brazil as an exposure visit for various labs and institutions between 30th January 2012 and 5th February 2012.

4.3.1. AYUSH Research Portal

Around 750 Research papers about Literary, Drug and Clinical Research articles have been uploaded by the following CCRS Officials during the reporting period.

1. Dr. P. Sathiyarajeswaran, Research officer (S)
2. Dr. M. Kannan, Research officer (S)
3. Dr. S. Natarajan, Senior Research Fellow

4.3.2. 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.

4.3.3. Registration of SMPG, Mettur in the Website on Networking of Herbal Gardens in India:

The SMPG, Mettur was registered in the Website (<http://www.herbalgardenindia.org>) on Networking Herbal Gardens in India, which is developed and maintained by Directorate of Medicinal Plants & Aromatic Plants Research, Boriavi, Anand - 387 310, Gujarat, (URL: www.dmapr.org.in), which is funded by National Medicinal Plants Board, New Delhi. In January 2012, the task of registration in networking herbal garden has been achieved and now SMPG, Mettur is one among the 100 Member Gardens. It is easily accessible to the general public through internet and peoples those who are interested in herbals/medicinal plants can access the information available about SMPG, Mettur.

People of different works of life students along with their teachers, vaidyas and farmers visited the garden and gathered information about the medicinal plants. Thus SMPG serves the purpose of creating awareness among the students and the visitors on the importance of medicinal plants and thus helps the propagation and conservation by distributing providing nursery seedlings at low cost.

Table-80: Books purchased / added (2011-2012) at SMPG, Mettur

Sl. No.	Books purchased / added
1.	RED data book of Indian Plants Vol.I
2.	Floristic & Medico-Ethno Botanical studies and climatic characteristics of Point Calimere wildlife sanctuary, Nagapattinam District Tamil Nadu.
3.	Flora of Presidency of Madras Vol. I, II, III
4.	Mooligai Thavarangal Agarathi

During the reporting period photographs of 218 numbers of important medicinal plants have been taken by SMPG, Mettur and the same have been stored in the system for further research works.

4.4. Other Activities

4.4.1. Integrated Clinical Decision Support System - Electronic Health Records [ICDSS – EHR]

The first Professional meet to develop the Integrated Clinical Decision Support System - Electronic Health Records [ICDSS – EHR] was held at SCRI on 30.06.2011. The following working group members of CCRS and members from National Institute of Siddha discussed to prepare the Siddha knowledge module for 358 diseases.

1. Dr. P. Sathiya Rajeswaran, SCRI, Chennai
2. Dr. A. Rajendra Kumar, SRRI, Puducherry
3. Dr. M. Kannan, SCRI, Chennai
4. Mr. D. Radha Krishna Reddy, SCRI, Chennai



Fig.28 - ICDSS Professional Meeting at SCRI, Chennai.



Fig.29- ICDSS Professional Meeting at National Institute of Siddha, Chennai.



Fig.30- Institutional Ethical Committee (IEC) Meeting held at SCRI, Chennai on 20.07.2011

- 60 pupils along with 6 teachers of Panchayat Union Middle School, Tharkadu Sundarapuram Kulathor union, Salem dt. visited the poly green house of Siddha Medicinal Plants Garden at Mettur Dam.
- Dr.M.Padma Sorna Subramanian, Research Officer (Botany) explained to them about the importance of medicinal plants, their uses and their conservation.



Fig.31- Visit of the School students to the Poly green house at Siddha Medicinal Plants Garden

- Students along with their teachers of Govt. Higher Secondary School, Mattukaranoor, Salem made an educational visit to the garden and were very keen on knowing about the Medicinal Plants of Model Herbal Garden at SMPG, Mettur.
- Dr.S.Saravanan, SRF, explained to them about the therapeutic uses of medicinal plants.



Fig. 32- Visit of the School students to the Model Herbal Garden at Siddha Medicinal Plants Garden

- Dr.M.Padmasorna Subramanian, Research Officer (Botany) was interacting with the farmers of the nearby villages about the importance of the medicinal plants and their cultivation.
- The Asst. Engineer, Dept. of Agricultural Engineering guided the farmers to the SMP Garden as a part of field training during their training course conducted by the Dept. of Agriculture Engineering, Kunjandiyoor, Salem dt.



Fig.33- Visit of the farmers to Siddha Medicinal Plants Garden



Fig.34- International Women's Day on 8th March 2012, celebrated at SRRI, Puducherry



Fig.35- Awareness Programme for students from Pondicherry University held on 24th October 2011, organized by SRRI, Puducherry



Fig.36 - Dr.C. Ponmuthurani, SRRI, Puducherry delivering an Awareness Lecture at Sinnatha Govt. Girls High School, Puducherry



Fig. 37 - Dr. Shyamala Rajkumar, SRRI, Puducherry delivering a Lecture in the CME Programme held at NIS, Chennai



Fig.38 -Dr. A. Rajendra Kumar, SRRI, Puducherry giving a speech to the school students about the importance of medicinal plants at SRRI, Puducherry



Fig. 39- Siddha Clinical Research Unit conducted a CME programme on AYUSH Research Portal on 18.08.2011 at Palayamkottai



Fig. 40- An eye opener session on the topic Research Methodology to all the Medical Officers in Anna Hospital in the presence of the Principal Commissioner for ISM &H, Govt. of Tamilnadu and AD I/c. SCRI, Chennai.

4.4.2. AROGYA Health Melas participated by the CCRS

1. An AROGYA Health Mela was held at Jaipur, Rajasthan from 5th to 9th January 2012, in which the CCRS Officials Dr. A. Rajendra Kuamr, Dr.S.Saravanan, Dr. V. Vijaya Kumar, Dr. S. Natarajan and Sh. Shaik Anwar Babu participated to propogate Siddha System.The AROGYA Mela was inaugurated by Shri Ashok Gehlot, Chief Minister of Rajasthan State.



Fig. 41 & Fig. 42 The AROGYA Health Mela in Jaipur was inaugurated by Shri Ashok Gehlot, Chief Minister, Rajasthan State. During the event the Hon'ble HFM Shri Gulam Nabi Azad visited the CCRS stall.

2. AROGYA Health Mela in Bangalore, Karnataka was held between 9th -14th February 2012, in which Dr. I. Chelladurai, Dr. P. Sathya Rajeswaran, Dr. P. Elankani, Dr. Ninapriya, Dr. Shyamala Rajkumar, Dr. C. Ponmuthurani and Sh. Kasinathan participated. The AROGYA Mela was inaugurated by Hon'ble Shri G. Gandhiselvan Minister of State, Health and Family Welfare.



Fig. 43. & Fig. 44. -The AROGYA Health Mela in Bangalore was inaugurated by Hon'ble Shri G. Gandhiselvan, Minister of State, Health and Family Welfare.

3. AROGYA Health Mela in Thiruvananthapuram, Kerala was held between 12th -14th March, 2012, in which Dr. K. Gopakumar, Dr. A. Suresh, Dr. J. Jeyakannan and Dr. H. Mubarak participated. The AROGYA Mela was inaugurated by the Hon'ble Chief Minister of Kerala Shri Oommen Chandy.



Fig. 45. & Fig. 46. - The CCRS officials attending patients in Specialty Clinics during the AROGYA mela in Thiruvananthapuram.

In all the above three AROGYA Health Melas a display stall on behalf of CCRS was arranged to emphasis the significance of CCRS Institutes / Units. A wide range of raw drugs and information translites were displayed. Pamphlets on various health topics were issued in public interest and also provided free healthcare was also provided to the public through Siddha Specialty Clinics. There was a very good response for the Specialty OPD of CCRS.

4.4.3. Participation in AROGYAS / Melas / Exhibitions / Camps / Others

Table-81: Participation in AROGYAS / Melas / Exhibitions / Camps / Others by the Officers

Sl. No.	Place of the Event	Participants	Duration
1.	AROGYA 2012 Jaipur	Dr. A. Rajendra Kumar Dr.S.Saravanan Dr. V. Vijaya Kumar Dr. S. Natarajan, Sh.Anwar Babu Sh. Loganathan	5 th to 9 th January 2012
2.	AROGYA 2012 Bangalore	Dr. I. Chelladurai Dr.P.Sathya Rajeswaran Dr.P.Elankani Dr.Ninapriya Dr.Shyamala Rajkumar Dr. C. Ponmuthurani Sh. Kasinathan Sh. Gopala krishnan	9 th -14 th February 2012
3.	AROGYA 2012 Thiruvananthapuram	Dr.K.Gopakumar Dr. A. Suresh Dr. J. Jeyakannan Dr. H. Mubarak Sh.Tamilselvan	12 th -14 th March 2012

4.4.4. Invited Lectures

Table-82 Science Club Events

Sl. No.	Name of the Speakers	Topic	Date
1.	Vaidyar. K. P. Arjunan	Arithmetics in Naadi Paritchai	30 th June 2011
2.	Sh.R. Manickavasagam, Head Consultancy, ISO, HACCP and Solution for Management System, Chennai.	GMP and GLP	14 th July 2011
3.	Dr. C. Chandrasekaran	Complementary and Alternative Medicine (CAM)	25 th August 2011
4.	Dr. R. Murugesan Senior Scientific Officer, Indian Institute of Technology (IIT), Madras	Standardization of Siddha Drugs	28 th September 2011
5.	Dr. D. Velmurugan Professor & Head Department of Biophysics, University of Madras, Chennai	Anti - inflammatory, Antiviral and Anti - diabetic drugs from natural products and Structure based drug design approach	7 th December 2011
6.	Dr. P. Sathiyarajeswaran Research Officer (Siddha) SCRI, Chennai	“AYUSH GCP Guidelines”	21 st March 2012



Fig. 47. & Fig. 48. - A session of Science Club activities

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

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

1. Development of Pharmacopoeial Standards for single drugs.
2. Development and standardization of methods of preparation, quality parameters for compound formulations and their shelf life studies.
3. Data generation on heavy metals, microbial load and pesticide residues present in the single drugs of plant origin, which are collected from the natural habitats.
4. To develop SOPs for maintaining the Pharmacopoeial Standards and Shelf life of compound formulations.
5. Translation of Pharmacopoeia / Formulary into Hindi / Tamil / English.

The Secretariat of SPC is functioning at SCRI, Chennai under the supervision of CCRS. During the reporting period the following activities have been undertaken:

Achievements during the year 2011-2012

1. The Siddha Pharmacopoeia of India, Part I, Vol. II published in 2011.
2. The Siddha Pharmacopoeia of India, Part I, Vol. III is under final drafting.
3. Preparation of The Siddha Pharmacopoeia of India Part I Vol. IV is in progress.
4. The Siddha Formulary of India, Part II Tamil published in 2011.
5. The Siddha Formulary of India, Part I, 2nd revised edition (Tamil) was completed and about to be published.

Meeting Organised

A meeting was organized at SCRI, Chennai on 21st May 2011 to finalize the monographs of Siddha Pharmacopoeia of India and Siddha Formulary of India.

Table-83: Siddha Pharmacopoeia Committee (SPC)

Sl. No.	Name	Position
1.	Dr. V. Subramanian, 1063/15, 25 th street, H- Block, Ponni colony, Annanagar, Chennai- 600040	Chairman
2.	Dr. S.K. Sharma Adviser (Ayurveda), Dept. of AYUSH, New Delhi	Member (Ex-officio)
3.	Dr. M.A. Kumar Deputy Advisor (Siddha), Dept. of AYUSH, New Delhi	Member (Ex-officio)
4.	Dr. D.R. Lohar Director, PLIM, Ghaziabad	Member (Ex-officio)
5.	Dr. T. Anandan Assistant Director-Incharge, SCRI, Chennai	Member Secretary (Ex-officio)

Sub-committee for Classical Siddha methods of quality control and assurance		
6.	Prof. P. Jayaprakash Narayanan, (Vice principal (Rtd.), GSMC, Chennai) No.5, Panchali Amman Koil Street, Arumbakkam, Chennai -106	Chairman, Sub Committee
7.	Dr. A. Saraswathy, Director CSMRIASDD, Chennai	Member
8.	Dr. G. Sivaraman C-18, Divyam Appartments, 474, 1 st Main Road, Mugapair East, Chennai- 37	Member
Sub-committee for identification of formulations / single drugs for inclusion in Formulary II		
9.	Dr. M. Murugesan, Professor National Institute of Siddha, Tambaram sanatorium, Chennai- 47	Chairman
10.	Dr. V.R. Sheshadri, Former Secretary, IMPCOPS, Chennai -41	Member
11.	Dr. S.K. Sasi, Lecturer Government Siddha Medical College, Palayamkottai, Tamil Nadu - 627002	Member
Sub-committee for Pharmacology and Pharmacognosy		
12.	Ms. Savita Satakopan, Ex. Senior Scientific Officer Gujarat State, Chennai	Chairperson, Sub Committee
13.	Dr. J. Mohanasundaram Rtd. Prof. of Pharmacology & Dy. Director of Medical Education, H-44-B, Kaveri Road, Kalachetra Colony, Besant Nagar, Chennai-90	Member
14.	Dr. Sasikala Ethirajulu, Assistant Director (Pharmacognosy) (In-situ) SCRI, Chennai	Member

6. 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, Pharmacology etc. 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 an intense 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. Actually the 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).

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

Current Status

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

Table-84: Ongoing Projects of (EMR) – Siddha

Sl. No.	Title of the Project	Principal Investigators / Participating Institutes	Main Objectives
1.	Pre-clinical Studies of a Polyherbal and a Herbo-mineral Formulation in the Management of Urolithiasis – A Comparative study	Dr. D. Chamundeeswari Sri Ramachandra Medical College, Chennai.	<ul style="list-style-type: none"> • To trace the history of the use of polyherbal formulation (<i>Sirupeelai Samoola kudineer</i>) and a herbo-mineral formulation (<i>Nandukkaal Parpam</i>). • To evaluate the scientific rationale behind the different combinations of various ingredients in the formulations. • To compare the safety and efficacy profile of two formulations in the animal models for Urolithiasis. • To study the mechanism of action of two formulations in the management of Urolithiasis.

2.	Biochemical and Molecular investigations on the role of Thiratchathi Choornam and Thamaraga Kudineer in experimental model of myocardial infarction in rats.	Dr.J.Venkatesh Sri Ramachandra University, Chennai.	<ul style="list-style-type: none"> • 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. • 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.	<ul style="list-style-type: none"> • 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.

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