

**UNIVERSITY GRANTS COMMISSION**  
**BAHADUR SHAH ZAFAR MARG**  
**NEW DELHI – 110 002**

**PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING**  
**THE FINAL REPORT OF THE WORK DONE ON THE PROJECT**

1.	Name and address of the Principal Investigator	<b>Dr.P.MEHALINGAM</b> Assistant Professor, Department of Botany, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, Tamilnadu, India-626 001. V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar, Tamilnadu, India-626 001.
2.	Name and address of the Institution	F.No.38-260/2009 dated 19.01.2010
3.	UGC approval No. and Date	01.02.2010
4.	Date of Implementation	3 year (From 01.02.2010 to 31.01.2013)
5.	Tenure of the Project	Rs. 10,22,300 /-
6.	Total Grant Allocated	Rs. 9,44,200 /-
7.	Total Grant Received	Rs. 10,31,709 /-
8.	Final Expenditure	
9.	Title of the Project	<b>Pharmacological and Phytochemical Studies of Ethnomedicinal Plants of Western Ghats, Virudhunagar District, Tamil Nadu</b>
10.	Objectives of the Project	Detailed ethnobotanical survey and screening of the plants used by <i>Paliyar</i> tribes in Southern Western Ghats, Virudhunagar district, Tamil Nadu a. Enumeration and Documentation. b. Pharmacological studies like, analgesic, anti-inflammatory activity, and antipyretic etc. c. Phytochemical characterization of the constituents of certain medicinal plants. d. Pharmacognostic standardization of selected medicinal plants e. Evaluation of antimicrobial potential of various extracts of dried samples of certain promising medicinal plants. f.

11. Whether Objectives Were Achieved (Give Details)

Yes. The objectives of the project are fully achieved and the results have been published in 7 International Journals, 4 National Journals, 2 Edited books, 5 International Conferences and 9 National Conferences

a. Detailed ethnobotanical survey was conducted by using semi-structured interview methods using questionnaire among traditional healers of Paliyar located in Virudhunagar district and all around the Southern Western Ghats of Tamil Nadu, India. Traditional medicinal value of around 250 plants treated to 55 different human related ailments by *Paliyars* aboriginal community have been documented

b. To scientifically support the ethnomedicinal claims of *Paliyars* tribes, the pharmacological analysis like analgesic, anti-inflammatory and antipyretic of two medicinal plants *Kleinia grandiflora*, *Vitex altissima* and antipyretic activity of *Pedaliium murex* has been studied. The analgesic activity was studied by tail immersion test and anti-inflammatory and antipyretic activity studied by carrageenan-induced paw edema model and Brewer's yeast induced pyrexia model respectively in rats. Similarly anthelmintic activity of *Strychnos Nux-vomica* has also been studied by using Indian earthworms.

c. Preliminary phytochemical analysis based on color reactions of ten selected medicinal plants have been reported

d. To standardize the medicinal plants as drug pharmacognostic analysis like physic-chemical constants, microscopic descriptions of tissues and fluorescence analysis five medicinal plants *Merremia tridentata*, *Mollugo nudicaulis*, *Alysicarpus monolifer*, *Launaea sarmentosa* and *Aponogeton natans* was studied.

e. Evaluation of antimicrobial activity of six medicinal plants was studied by well diffusion method against both Gram negative bacteria and Gram positive bacteria pathogens and fungus.

12. Achievements from the Project

About 250 valuable medicinal plants related to 55 human ailments which are regularly practiced by *Paliyar's* community have been reported to alleviate the regular problems of economically deprived populations of developing

countries like India.

Pharmacological value of four medicinal plants, pharmacognostical standardization of 5 medicinal plants, phytochemical analysis of 10 medicinal plants and antimicrobial analysis of 6 plants were done which are the preliminary approaches to find out a valid drug from natural resources.

Also the Project Fellow who was appointed in this Major Research Project Mr. N. Maria Francis Jeffrey Bose has registered for his Ph.D programme in Madurai Kamaraj University and having the Principal Investigator Dr. P. Mehalingam as Guide & Supervisor and he is about to complete his work.

### 13. Summary of the Findings (In 500 Words)

The growing interest in herbal medicines and nutraceuticals may reflect a general and increasing disenchantment with traditional medicine. This could be because issues related with toxic-effects of pharmaceutical treatment. In this sense, documentation of the indigenous knowledge through ethnobotanical studies is an innovative and powerful discovery engines for newer, safer and affordable medicines. Testing of plants on the basis of their use for specific diseases in traditional medicine would lead to a higher rate of discovering active lead compounds than simply testing plants "randomly" from the natural environment.

The present study deals with analysis indigenous value of medicinal plants by *Paliyar* tribes dwelling in and around Virudhunagar district, Tamil Nadu, India. The indigenous people of the study area are called *Paliyar/ Paliyan*. They are residing in a narrow strip of Western Ghats in the hilly regions of Virudhunagar district, Tamil Nadu. Because of lack of communication other people, *Paliyars* are largely relying on their indigenous health care system. Local herbs and other plant resources found in that area are one of the principal sources of medicine. Interviews were conducted with traditional healers of *Paliyars* aboriginal community regarding medicinal plant names and their uses during several field visits (2010-2013). Information was learned from healers using semi-structured interviews with questionnaire. The present survey concludes that the *Paliyars* aboriginal community has a fairly extensive and detailed knowledge regarding medicinal plants and their utility. The ethnobotanical study reveals the therapeutic potential of 250 plant species related to 55 human related ailments. The present study has brought to light certain little known therapeutic value of medicinal plants employed

to cure skin diseases like leucoderma, eczema, ringworm infection, psoriasis, scabies, leprosy, wound, dandruff etc. and other human ailments like urinary troubles, asthma, cough, ulcer, fever, kidney stone, abortifacient, impotence, diabetes, jaundice and inflammation etc.

Pharmacognostic standards of five medicinal plants (*Merremia tridentate*, *Mollugo nudicaulis*, *Aeschynomene indica*, *Alysicarpus monilifer*, *Aponogeton natans* and *Launaea sarmentosa*) were studied to standardize the medicinal plants as potential drugs. The physico-chemical constants, microscopic descriptions of tissues and fluorescence analysis were employed for determining the quality and purity of drugs. Preliminary phytochemical analysis of the various extracts of stem, leaf and root powder of above mentioned medicinal plants were performed and the results obtained were presented. Tannin, alkaloids, flavonoids, saponins, phenols, coumarines, quinones and phytosterols were reported in all the chosen plants. Evaluation of antimicrobial activity of six medicinal plants was studied by well diffusion method against both Gram negative bacteria and Gram positive bacteria pathogens and fungus. Antibacterial activity of the crude drug extract preparations showed a broad inhibition spectrum. Presence of wide antibacterial sensitivity of the plant extracts justifies the use of these plants in the traditional medicine for treating different kinds of skin diseases.

Ethnopharmacological knowledge is common and important among tribal populations but much of the information is empirical at best lacking scientific validation. To support *Paliyar's* traditional claims especially in pain and related inflammation, three potential plants were taken to pharmacological evaluation in animal models. Pain, inflammation and fever were artificially induced by physical, chemical or biological agents to study the significant activity of crude drugs. The analgesic effect was studied using tail immersion test and the anti-inflammatory effect was evaluated using carrageenan induced paw edema test. While antipyretic activity was studied by Brewer's yeast induced pyrexia model. The data were verified as statistically significant by using one way ANOVA at 5 % level of significance ( $p < 0.05$ ). In this study, the medicinal plants *Kleinia grandiflora* and *Vitex altissima* showed significant analgesic, anti-inflammatory and antipyretic activities; the medicinal plant *Pedaliium murex* showed significant antipyretic activities. Similarly *Strychnos Nux-vomica* which is practised by the tribes to expel

intestinal worms was studied pharmacologically. The plant *Strychnos Nux-vomica* also showed significant anthelmintic activity. To find out the possible mechanisms of its pharmacological activities, phytochemical screening study was conducted. The phytochemical screening study supports the possible mechanism behind its pharmacological activity. Particularly flavonoids, responsible phytoconstituents for above mentioned pharmacological activity have been reported in all the four plants.

14. Contribution to the Society (Give Details)

Ethnopharmacology or natural product drug discovery approach used in this project have significant hope in the improving the poor livelihoods of rural communities. This holistic system approach that can serve as an innovative and powerful discovery engines for newer, safer and affordable medicines. Ethnobotanically derived compounds have greater activity than compounds derived from random screening and therefore ethnobotanical knowledge documented through this project has greater potential for product development. This project not only concerned with determining the scientific rationale for usage of plants but also deals with the discovery of novel compounds of pharmaceutical value.

Through this kind of work, we can contribute to the society to the discovery of many important plant-derived drugs. The information generated from the study will provide a needful dimension for developing conservation strategy for important medicinal plant species of selected region and its sustainable utilization. It is also hypothesized that the number of plants that would need to be collected and evaluated in order to discover a successful natural product drug could be significantly reduced. This would lead to financial savings and efficiencies in research. In future lot of measures need to be implemented like inculcating awareness of these plants among tribes about their medicinal and commercial importance, to develop efficient methods for propagation of these species in order to restrict them moving into the threatened category.

From this project around 250 medicinal plants to treat 55 common human ailments have been explored from traditional aboriginal communities of Virudhunagar district to benefit human society to get relief from their diseases. Similarly four plants have been further recommended as drug to treat pain and related ailments based on *in vivo* assay. Five medicinal plants have also been

standardized by various pharmacognostic studies which may be helpful in setting standards for particular medicinal plant or parts of the plant. With the help of this standards one can easily identify and characterize an individual drug, which may play a major role in maintaining quality and purity of that particular drug and its formulation and prevent it from being adulterated by drug of same or other genus having low potency. Five medicinal plants which are resistant to growth of various pathogenic microorganisms (both bacteria and fungi) have also been reported to treat skin and related diseases.

15. Whether any Ph.D. Enrolled/produced out of the project

The Project Fellow Mr. N. Maria Francis Jeffrey Bose who was appointed via this Major Research Project had registered for his Ph.D programme and having the Principal investigator Dr. P. Mehalingam as Guide & Supervisor and he is about to complete his work. He is going to submit his work Ph.D dissertation within a period of six months.

16. No. of publications out of the project (please attach re-prints)

The results obtained in this project work have been published in 7 International Journals, 4 National Journals, 2 Edited books, 5 International Conferences and 9 National Conferences

PRINCIPAL INVESTIGATOR

PRINCIPAL

## ANNEXURE B

### A. Research Publications in International Journals

1. S. Aron., V. Siva and **P. Mehalingam**. 2012. Pharmacognostical and Preliminary Phytochemical Investigation of *Launaea sarmentosa* (Willd.) Sch. Bip. ex Kuntze. *International Journal of Pharmaceutical Research*.4 (2): 80-83
2. V.Siva., N.J. Jeffrey Bose., **P.Mehalingam** and A. Thanga Thirupathi. 2012. Evaluation of Antipyretic Activity of *Pedalium murex* against Brewer's Yeast-Induced Pyrexia in Rats. *Journal of Ornamental and Horticultural Plants*. 2 (2): 131-137.
3. N. J. Jeffrey Bose and **P. Mehalingam**. 2011. Antinociceptive and Anti-inflammatory Activities of Leaf Extracts of Ethnomedicinal Plant, *Kleinia grandiflora*. *Acta Horticulturae*. (Accepted for Publication).
4. **P. Mehalingam** and P. G. S. Shirley. 2011. Traditional Knowledge on Medicinal Plants Used for the Treatment of Skin Diseases in Madurai District, Tamil Nadu (India). *Acta Horticulturae*. (Accepted for Publication).
5. M. Suresh, M. Ayyanar, L. Amalraj and **P. Mehalingam**. 2012. Ethnomedicinal Plants used to treat Skin Diseases in Pothigai hills of Western Ghats, Tirunelveli District, Tamil Nadu, India. *Journal of Bioscience Research* 3(1): 112-121.
6. S. Aron and **P. Mehalingam**. 2012. Pharmacognostic and Preliminary Phytochemical Investigation on Leaf of *Aeschynomene indica* L. *Journal of Bioscience Research* 3(1): 100-105.
7. S. Aron., N. Jeffrey Bose and **P. Mehalingam**. 2013. Pharmacognostical Studies on Stem and Leaves of *Alysicarpus monilifer* DC. *Journal of Ornamental and Horticultural Plants*. (Communicated).

### B. Research Publications in National Journals

8. S. Aron and **P. Mehalingam**. 2013. Pharmacognostic Standardization of Leaves and Roots of *Mollugo nudicaulis* Lam. *Phytomorphology* 62 (3 & 4): 01-11.
9. S. Aron., N. J. Jeffrey Bose and **P. Mehalingam**. 2013. Pharmacognostic Evaluation of Stem, Leaves and Roots of *Merremia tridentata* (L.) Hallier. F. (Convolvulaceae). *Indian Journal of Traditional Knowledge* (In Press) 12(4).
10. S. Aron., K. Rajarathinam and **P. Mehalingam**. 2011. Pharmacognostic Standardization of Rhizome of *Aponogeton natans* L. *Botanical Studies*. (Communicated).
11. N. J. Jeffrey Bose., S. Aron and **P. Mehalingam**. 2011. Traditional Knowledge on Medicinal Plants used by *Paliyars* in Virudhunagar District, Tamil Nadu (India). *Indian Journal of Traditional Knowledge*. (Communicated).

### **C. Research Publications in Edited Books**

1. S. Aron., V. Siva and **P. Mehalingam**. 2012. Ethnobotanical Study of Medicinal Plants Used for the Treatment of Various Skin Diseases by Native Doctors in Ramanathapuram District, Tamilnadu. In: Sanjay Singh and Rameshwar Das. *Non-Timber Forest Products and Medicinal Plants, Conservation, Improvement and Sustainable Utilization*, Institute of Forest Productivity, Ranchi. 1: 162-166.
2. P. G. S. Shirley., N. J. Jeffrey Bose and **P. Mehalingam**. 2011. Ethnobotanical Study of Medicinal Plants Used by *Paliyars* in Madurai District, Tamilnadu (India). In: Sanjay Singh and Rameshwar Das. *Non-Timber Forest Products and Medicinal Plants, Conservation, Improvement and Sustainable Utilization*, Institute of Forest Productivity, Ranchi. 1: 185-192.

### **D. Paper Presented in International level Seminars / Workshops / Conference**

1. “Traditional Knowledge on Medicinal Plants Used for the Treatment of Skin Diseases in Madurai District, Tamilnadu (India)” P. Mehalingam and P. G. S. Shirley, “ISHS Sponsored The International Symposium on Medicinal and Aromatic Plants” Organized by Department of Agriculture at The Empress Hotel, Chiang Mai, **Thailand** on 15-18 December 2011 held on 15-18 December 2011.
2. “Antinociceptive and Anti-inflammatory Activities of Leaf Extracts of Ethnomedicinal Plant, *Kleinia grandiflora*” N. J. Jeffrey Bose and P. Mehalingam , “ISHS Sponsored The International Symposium on Medicinal and Aromatic Plants” Organized by Department of Agriculture at The Empress Hotel, Chiang Mai, **Thailand** on 15-18 December 2011 held on 15-18 December 2011.
3. “Evaluation of Antipyretic Activity of *Canna indica* (L.) in rats”, V. Siva., N. J. Jeffrey Bose and **P. Mehalingam**, “ UGC Sponsored International Conference on “ Current Trends in Medicinal Plant Research”, Organized by, Department of Botany, University of Pune, Pune, 10-12 January 2012. (p49-50).
4. “Pharmacognostic Standardization of Leaves of *Aeschynomene indica* Linn. (Leguminosae)”, S. Aron and **P. Mehalingam**, “ UGC Sponsored International Conference on “ Current Trends in Medicinal Plant Research”, Organized by,

Department of Botany, University of Pune, Pune, 10-12 January 2012. (p 171).

5. “Phytochemical Analysis and Antimicrobial Activity of *Mollugo nudicaulis* Lam.”, S. Aron., **Mehalingam P** and G. Rameshkumar, “ DST, UGC, CSIR, DRDO, TNSCST TNSCHE Sponsored International Conference on “Bioresource Technology” Organized by Department of Botany, Nirmala College for Women, Coimbatore, 07-08 October 2010. (p167).

**E. Paper Presented in National level Seminars / Workshops / Conference**

1. “Scientific Validation of Ethnomedicinal Plant, *Kleinia grandiflora* (DC) N. Rani (Asteraceae) for its antipyretic claims”, N. Maria Francis Jeffrey Bose., P. Natarajan and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5<sup>th</sup> October 2012. (p109).
2. “Pharmacognostical Studies and Preliminary Phytochemical Investigations on the Rhizome of *Aponogeton natans* L. (Aponogetonaceae)”, S. Aron and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5<sup>th</sup> October 2012. (p79).
3. “Phytochemical Analysis and Antimicrobial Activity of *Alstonia scholaris* and *Rauvolfia serpentina* (Apocyanaceae)”, T. Anbu and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5<sup>th</sup> October 2012. (p114).
4. “Ethnoveterinary Medicinal Uses of Some Plant Species by the *Paliyar* Tribes of Southern Western Ghats, Virudhunagar District, Tamil Nadu (India)”, V. Siva and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5<sup>th</sup> October 2012. (p172).
5. “Phytochemical and Antimicrobial Properties of *Smilax zeylanica* Linn. (Liliaceae)”, P.G.S. Shirley., G. Rameshkumar and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5<sup>th</sup> October 2012. (p174).

6. “Preliminary Phytochemical Screening of Two Traditionally Used Ethnomedicinal Plants from South Western Ghats, India”, T. Anbu and **P. Mehalingam**, National Conference on “Phytomedicine”, Organized by, Department of Botany, Bharathiar University, Coimbatore, 4<sup>th</sup> and 5th October 2012. (p109).
7. “Antinociceptive and Anti-inflammatory Activities of Leaf Extracts of Ethnomedicinal Plant, *Kleinia grandiflora* (DC) N. Rani”, N. Jeffrey Bose., A. Thanga Thirupathi and **P. Mehalingam**, 42<sup>nd</sup> Aqua-Terr Annual Conference on “Genomic Sciences”, Organized by, School of Biological Sciences, Madurai Kamaraj University, Madurai, 28 February 2011. (p12).
8. “Ethnobotanical Study of Medicinal Plants Used for the Treatment of Various Skin Diseases by Native Doctors in Ramanathapuram District, Tamilnadu ”, S. Aron, V. Siva and **P. Mehalingam**, “National Medicinal Plant Board Sponsored National Conference on “Conservation, Improvement and Sustainable Use of Medicinal Plants and Non-Wood Forest Products” Organized by Institute of Forest Productivity, Lalgotuwa, Ranchi, 08-09 March 2011. (p132).
9. Ethnobotanical Study of Medicinal Plants Used by *Paliyars* in Madurai District, Tamilnadu (India)”, P. G. S. Shirley., N. Jeffrey Bose and **P. Mehalingam**, “National Medicinal Plant Board Sponsored National Conference on “Conservation, Improvement and Sustainable Use of Medicinal Plants and Non-Wood Forest Products” Organized by Institute of Forest Productivity, Lalgotuwa, Ranchi, 08-09 March 2011. (p132).