Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed-to-be University under section 3 of UGC Act, 1956)
(Vide Notification No. F.9-5/2000 - U.3, Ministry of Human Resource Development, Govt. of India, dated 4th July 2002)
Accredited by NAAC NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL
Phone : 044-22290742 / 22290125 . Telefax : 044-22293886
Website : www.bharathuniv.ac.in
173, Agaram Road, Selaiyur, Tambaram,
Chennai - 600 073. Tamil Nadu.

Ref. No.SMS-2015-O-07 Date: 27.02.2018

TO

Mr. Anandaramajayan
Assistant Professor/Anatomy
BIHER



Thro: Concern Head of the Department

Greetings!!!

We are happy to announce that the Research Advisory Committee has approved your proposal for Seed Money Scheme-2015 which was presented by you. You are requested to complete the proposal and send the progress report to the Dean Research in the prescribed time period.

**Title of the Project: GC/MS Analysis of Bioactive Compounds in Aqueous Extract of Cynodon Dactylon**

**Seed Money Amount: Rs.1, 00,000/- (Rupees One Lakh Only)**

**Approved on: 21.02.2018**

**Payment details:**

**Voucher No.42** **Dated: 02.03.2018**

With Regards

Dean-Research

# Bharath University

SELAIYUR, CHENNAI - 600 073, TAMIL NADU, INDIA.

## CASH / PAYMENT VOUCHER

Date 02/03/2018

V.No. 42

Debit _____ Amount

**Rs.**

PAID TO Dr. Andandarangajayan

RUPEES One Lakh only

TOWARDS Seed Money Scheme – 2018

BHARATH UNIVERSITY CHENNAI 600 073. INDIA.

**Authorised by** **Finance Manager** **Cashier/Accountant** **Payee's Signature**

## PROPOSAL SUBMISSION

1. **Details of Principal Investigator**


| | |
|---|---|
| **Name** | : N.Anandaramajayan |
| **Designation** | : Assistant Professor |
| **Highest Qualifications** | : M.Sc., |
| **Department** | : Anatomy |
| **E-mail** | : anandaraman2006@gmail.com |
| **Contact no** | : 9894343517 |
| **Date of Joining** | : 1-12-2010 |


2. **Details of Principal Investigator**


| | |
|---|---|
| **Name** | : Dr. B Rajesh |
| **Designation** | : Professor |
| **Highest Qualifications** | : Ph.D. |
| **Department** | : Anatomy |
| **E-mail** | : anat_rajesh@rediffmail.com |
| **Contact no** | : 9345575143 |
| **Date of Joining** | : 14.06.2010 |

## Technical details

### 1. Introduction:

Plants are being used as the resources of nutrition and medicines since the beginning of the mankind. Each species of plants produces a mixture secondary metabolites or bioactive compounds. Humans use this property of the plants to make herbal medicines, flavoring substances or recreational drugs. Herbal drugs are effective, affordable and less toxic.1 Researchers use various types of method/techniques for the metabolite profiling of medicinal plants, but in the recent past gas chromatography mass spectrometry (GC/MS) based metabolite profiling got more acceptance due to its reliability and sensitivity than other method.

Cynodon dactylon or Bermuda grass is seen in moderate climate all over the world between south and north latitudes. C.dactylon is a stoloniferous, hardy, perennial grass, very much variable with long rapid growing, rooting at nodes, forming a dense tuft on the top of the soil. The runners of this plant are usually 2cm long, 0.2-0.6cm broad, flat and convolute. Inflorescence appears on culms 150mm to 1m tall, consisting of 2-12 spikes arranged star like at apex of stem; spikes 25-100mm long with numerous spikelet, arranged in 2 rows on one side of spike.

C. dactylon is widely used for traditional medical practice in India.4 Crude extract of this plant is used for treatment of cancer5 obesity, diabetic6 gastric ulcers7 etc. There are also evidence for its Antihyperlipedemic4, Hepatoprotective8 Antimicrobial9,10 and Anti-atherosclerotic11 properties of this plant. But there were a very few documents regarding secondary metabolite profile of C. dactylon.

### 2. Review of status of Research and Development in the subject

Samira Savadi, Mohsen Vazifedoost, Zohre Didar, Mohammad Mahdi Nematshahi, and Eisa Jahed. 2020. Phytochemical Analysis and Antimicrobial/ Antioxidant Activity of Cynodon dactylon (L.) Pers. Rhizome Methanolic Extract. Journal of Food Quality.10(3): 10-15.

Medicinal plants play a very important role in the development of alternative drugs without the adverse effects of the synthetic drugs [1]. Plants and natural products form the basis of both modern and traditional medicines and nowadays they are widely used in the production of commercially produced drugs. Scientific and reliable reports indicated that about 25% of prescribed medicines worldwide are taken from herbs [2]. Plant essential oils, extracts, and various kinds of secondary metabolites are known as substances with antimicrobial and antioxidant properties with little or no toxic effects, which are vital in the management of many diseases [2, 3]. Actually, secondary metabolites with tremendous biological potential, known as phytochemicals, are ubiquitously present in plants and now are used as the mainstay of drug development [4].

As reported in the literature, according to an estimation of the WHO, about 80 percent of the world's population in Latin America, Africa, Asia, and the Middle East in particular, relies on herbs for its primary healthcare needs [5]. These herbs have minimal side effects and recently millions of dollars have been invested in pharmaceutical plants by pharmaceutical companies in order to produce natural medicines extracted from herbs [5, 6]. The main reasons for using medicinal herbs are as follows: (i) they correspond more closely to the patient's ideology, (ii) they reduce concerns about the side effects of synthetic medicines, (iii) they are more affordable, (iv) they satisfy a desire for more personalized health care, and (v) they also allow more people's access to health information [2].

A substantial body of the literature has reported the multitude pharmacological applications of plant extracts and the compounds isolated from plant extracts [7]. Harnessing the biological potential of medicinal plants represents a sterling opportunity for the development of novel therapeutic candidates [8, 9]. The bioactive plant extracts are a promising source of many drugs. For example, berberine (Berberis) and Quinine (Cinchona) are the antibiotics obtained from plants, which are highly effective against bacteria (Escherichia coli and Staphylococcus aureus) [10]. Thanks to the climate diversity, a vast diversity of wild bioactive plants is found in Iran. Therefore, it is possible to obtain herbal extracts in large quantities on industrial scale.

Cynodon dactylon (family: Poaceae) commonly known as dhub, doob, or harialil; other common names include durba (Bengali), garikoihallu (Kanarese), garikagaddi

(Telugu), durua or haritali (Sanskrit), dhubkhabbal (Punjabi), durua (Marathi), and arugampul (Tamil). C. dactylon (L.) Pers. is a weed plant found in many regions such as East Africa, Asia, Australia, and Southern Europe [10]. It is a perennial grass which is used as forage, as medicinal plant, and for desert greening. The roots grow quickly leading to the rapid spread of C. dactylon (L.) Pers. It is mostly found in cereal fields, farms, road shoulders, and green spaces and parks. The plant is propagated through seeds and rhizomes. When crop seeds germinate and plants are established in the field, rhizomes of C. dactylon (L.) Pers. can grow in hard soils between roots of other crop plants to produce new plants [11]. Photochemical analyses have shown that C. dactylon (L.) Pers. contains flavonoids, alkaloids, glycosides, terpenoids, triterpenoid esters, saponins, tannins, resins, phytosterols, reducing sugars, carbohydrates, proteins, volatile oils, and fixed oils [6, 12]. According to Unani system of medicine, C. dactylon has a sharp and hot taste with a good odor. The aerial parts and rhizomes of the plant have cardioprotective action and antibacterial, antimicrobial, antioxidant, wound-healing, antidiabetic, and diuretic effects [10, 13].

**2.1. International Status:**

C. dactylon is used by traditional healers for purifying the blood, diarrhea, gonorrhea, conjunctivitis, anuria, biliousness, itches, and stomach ache [11]. The literature survey also reveals that the dried extracts of C. dactylon aerial parts were investigated for CNS activities in rat [5]. Other essential functions of this plant include analgesic and antipyretic, antiulcer, antihypertensive, antihysteric, antipyretic, antibiotic, antikidney stone, antiviral, antipsychotic, antigonorrheal infection as well as hypoglycemic agent [11, 14, 15]. Studies on lab animals have shown that methanolic extract of C. dactylon decreases the level of lipid peroxides. It was also revealed that the methanolic extract of C. dactylon had an antioxidant effect on COLO 320 DM cells, a colon cancer cell line, and the levels of antioxidant enzymes [6].

**2.2. National Status:**

**NIL**

**3. Progress/ achievement so far, if any**

a) Reference papers were collected.

b) Literature survey was studied.

c) Experiments were designed.

## 4. Work plan

### 4.1 Methodology

**Plant material and extract:**

C.dactylon plants were collected from the campus of Sri Lakshmi Narayana Institute of Medical Sciences Puducherry. The plant was identified and certified by Dr. R.Sridharan, M.D(S), Nodal officer, Siddha and Consultant Phyto-Medicine, Government of Puducherry.

Collected plants were washed thoroughly with tap water, rinsed with distilled water and air dried in a shady place. Dried plants were pulverized in to fine powder with a grinding machine. To make the aqueous extract, 100gm of plant powder was mixed with 1000ml of distilled water and heated till boiling temperature. The mixture was filtered using Whatmans no 1 filter paper.

**GC MS analysis:**

The extract from C. dactylon plant was analyzed with JEOL GCmate II GC/MS system (JEOL USA, Inc.), which includes quadruple double focusing mass analyzer. The Colum used was HP 5Ms capillary (0.10 – 1.00 μm film thickness) composed of (5%-Phenyl)-methylpolysiloxane. High pure Helium at a flow rate of 1ml/min was used as the carrier gas. The inlet temperature was maintained as 250°C. The oven temperature was programmed initially 50 to 250 @ 10 deg/min. The MS transfer line was maintained at a temperature of 250°c. Mass spectra was analyzed using electron impact ionization at 70eV and data was evaluated using total ion count (TIC) for compound identification and quantification. The spectrums of the components were compared with the database of spectrum of known components stored in the GC/MS library.

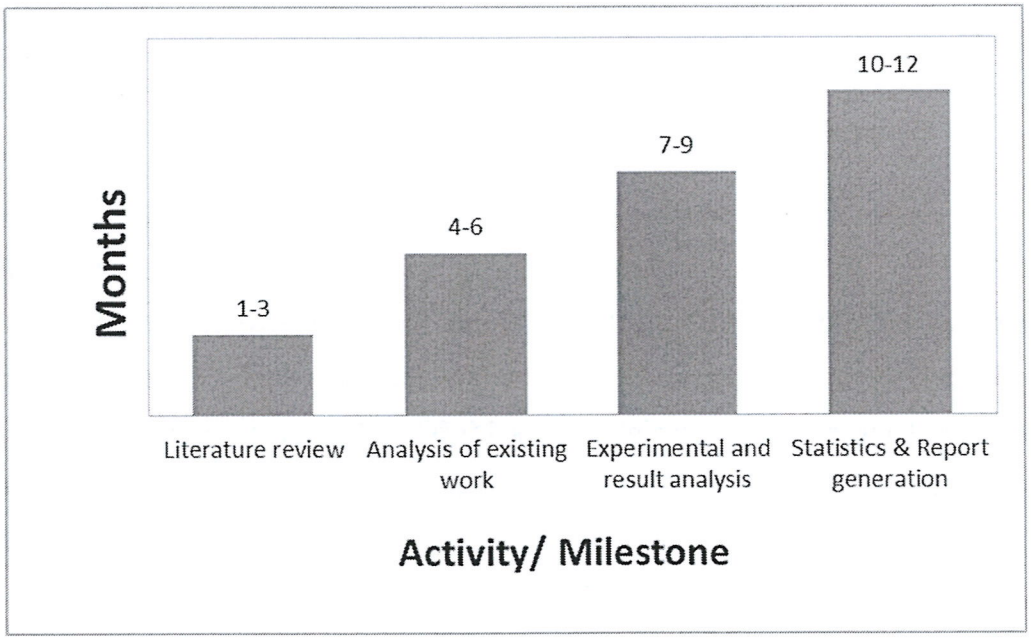
**Data Analysis**

Each set of experiments will be carried out at least in duplicate, and in triplicate in some cases. Experiments will be repeated separately to ensure reproducibility. In each set of

repeated experiments, standard deviations and standard error should have 95% confidence leval.

**4.2 Time Schedule of activities giving milestones through BAR diagram.(Maximum of 1/2 pages)**

| S.No | Activity/ milestone | 1st Year | | | |
|---|---|---|---|---|---|
| 1. | Literature review | **1-3 month** | | | |
| 2. | Analysis of existing work | - | **4-6month** | | |
| 3. | Experimental and result analysis | - | - | **7-9 month** | |
| 4. | Statistics & Report generation | - | - | - | **10-12month** |




**4.3 Expected outcome within the time period of See Money Scheme**

The GC-MS analysis of the hot aqua extract of Cynodon dactylon will explore noval bioactive compounds can be utilized for function in related to human health.

**5. Suggested Plan of action stating the name of funding agency where the project will be communicated for financial support within the time period of project.**

Nil

**6. Bibliography:**

Nil

**7. List of Projects submitted/implemented by the Investigators (Separate for PI and Co-PI)**

**7.1 Details of Projects submitted to various funding agencies:**

| S.No | Title | Cost in Lakhs | Month of Submission | Role as PI/Co-PI | Agency | Status |
|---|---|---|---|---|---|---|
| 1 | NA | NA | NA | NA | NA | NA |

**7.2 Details of Projects under implementation**

| Sl. | Title | Cost in | Duration | Role as PI/ Co-PI | Agency |
|---|---|---|---|---|---|
| 1 | NA | NA | NA | NA | NA |

**7.3 Details of Projects completed during the last 5 years**

| Sl. | Title | Cost in Lakhs | Duration | Role as PI/ Co-PI | Agency |
|---|---|---|---|---|---|
| 1 | NA | NA | NA | NA | NA |

**8. List of publications published by the Investigators, if any:**

**a) Principal Investigator**

| S.No | Author names | Title of paper | Name of Journal | Vol (Issue) | Page No. | Year |
|---|---|---|---|---|---|---|
| 1. | Jisha Phalgunan1, Anandaramajayan Nallathambi2 | A Study on Bifurcation of Brachial Artery in South Indian Population (Tamil Nadu and Puducherry) | Indian Journal of Anatomy | 7(1) | 73-77 | 2018 |
| 2. | 1N.**Anandaramajayan***, 2K.C.Mallikarjuna. | Fused Typical Cervical Vertebra – A Case Report | Journal of Current Trends in Clinical Medicine & Laboratory | 2(4) | 64-66 | 2015 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Biochemistry | | | |
| **3.** | 1N.**Anandaramajayan***, 2B.Rajesh. | Unilateral Renal Agenesis with variations in the vascular pattern of Testis, Supra Renal Gland And Diaphragm - A Case Report | Journal of Current Trends in Clinical Medicine & Laboratory Biochemistry | 2(2) | 66-72 | 2014 |
| 1. | 1B. Rajesh*, 2N.**Anandaramajayan**, 2V. Santhi, 3K.C. Mallikarjuna,3S.I. Tolanur, 4R. Praveen Kumar | An abnormal radicle of Median Nerve from Musculocutaneous nerve in the Arm | Journal of Current Trends in Clinical Medicine & Laboratory Biochemistry | 1(2) | 34-36 | 2013 |

**b). Co-Principal Investigator**

| S. No | Author names | Title of paper | Name of Journal | Vol (issue) | Page no. | Year |
|---|---|---|---|---|---|---|
| 1 | Mary Hydrina D'Silva1, Rijied Thompson Swer2, J. Anbalagan3, **Bhargavan Rajesh 4** | Effect of Radiofrequency Radiation Emitted from 2G and 3G Cell Phone on Developing Liver of Chick Embryo – A Comparative Study | Journal of Clinical and Diagnostic Research | 11(7) | AC05 - AC09 | 2017 |
| 2. | M. Senthil Murugan,[1,*] R. Sudha,[1] and **Rajesh Bhargavan[2]** | Clinical Significance of an Unusual Variation Anomalous additional belly of the sternothyroid muscle | Sultan Qaboos University Med J, | 16(4) | e491–494, | 2016 |
| 3. | Mary Hydrina D'Silva,1 Rijied Thompson Swer,1 J. Anbalagan,1 and **Rajesh Bhargavan2** | Effect of Ultrahigh Frequency Radiation | Advances in Anatomy | 10(2) | 1-9 | 2014 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Emitted from 2G Cell Phone on Developing Lens of Chick Embryo: A Histological Study | | | | |
| 4. | Vasudev Anand Rao, Subashini Kaliaperumal, Thanikachalam Subramanyan, Kotapalli Rachandra Rao, **Rajesh Bhargavan** | Goldenhar's sequence with associated juvenile Glaucoma in turner's syndrome | Indian Journal Of Ophthalmology | 53(4) | 267-268 | 2005 |

**9. Budget**

| SI. No | Head | Amount (Rs.) |
|---|---|---|
| 1 | Minor Equipment | 20,000/- |
| 2 | Consumables (gels bottles, cotton, sprit, testing charges, tools, etc.) | 30,000/- |
| 3 | Travel support for the purpose of research work. | 10,000/- |
| 4 | Contingency | 30,000/- |
| 5 | Others consumables | 10,000/- |
| | **Total** | **1,00,000/-** |

*In case of any joint proposal for purchasing a same equipment, each of the associated PLs is also required to give separate budget(without any clubbing) to avoid any ambiguity, if all the associated projects are not awarded by committee.

**10. Name of at least two subject experts from the Institute and one from the outside Institute with their contact details:**

| | |
|---|---|
| 1. **Dr. T K Balaji,**<br>Professor in Anatomy,<br>Chettinad Medical College Hospital and Research Centre, Chennai<br>**Mobile No**: 9710905221<br>**E-mail id:** balajitk@gmail.com | 2. **Dr. Senthil Kumar**<br>Associate Professor in Anatomy,<br>AIIMS, Nagpur<br>**Mobile No**: 8524863767<br>**E-mail id:** senkumar@yahoo.co.in |

## CERTIFICATE FROM THE INVESTIGATOR

**Project Title:**
**GC/MS Analysis of Bioactive Compounds in Aqueous Extract of Cynodon Dactylon**

It is certified that

1. I do hereby agree to submit a complete proposal for financial support to the external funding agency within the time period of SMS-2018.
2. I undertake that spare time on equipment procured in the project will be made available to other users.
3. I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in to.
4. I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involved field trails/experiments/exchange of specimens, human & animal materials etc.
5. I agree to abide by the terms and conditions of SMS-2018, BIHER, and Chennai.

**Name and signature of**
**Principal Investigator**

**Name and signature of**
**Co-Principal Investigator**

**Date: 09.01.2018**
**Place: Pondicherry**

**Forwarded by Head of the Department**

**Signature of the Head**

DEAN
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSUDU, AGARAM VILLAGE,
KOODAPAKKAM POST
PUDUCHERRY - 605 502

## PROJECT EVALUATION FORMAT

**Recommendation sheet**

| | |
|---|---|
| Name of the Principal Investigator | N.Anandaramajayan |
| Name of the Co-Principal Investigator | B. Rajesh |
| Name of the Department | Anatomy |
| Title of project | GC/MS Analysis of Bioactive Compounds in Aqueous Extract of Cynodon Dactylon |
| Recommendation of the evaluation committee (Recommended/Revision/Not Recommended) | Recommended |
| Financial allocation recommended | Rs. 1,00,000/- |

| SI. No | Head | Amount (Rs.) |
|---|---|---|
| 1 | Equipment | 20,000/- |
| 2 | Consumables (gels bottles, cotton, sprit, testing charges, tools, etc.) | 30,000/- |
| 3 | Travel support for the purpose of research work. | 10,000/- |
| 4 | Contingency | 30,000/- |
| 5 | Others consumables | 10,000/- |
| | **Total** | **1,00,000/-** |

Name and Signature of the Research Advisory Committee members with date.

Internal Quality Assurance Cell ★ IQAC ★ SLIMS ★ Pondicherry-02

(Dr. A. Suguna...)