A.V.V.M. Sri Pushpam College (Autonomous)
Poondi– 613 503, Thanjavur-Dt, Tamilnadu
(Affiliated to Bharathidasan University, Tiruchirappalli – 620 024)

3.7.1 Number of Collaborative activities per year for research/ faculty exchange/ student exchange/ internship/ on –the-job training/ project work

Collaborating Agency:

Dr.NakulamValsala Rajesh Associate Professor, Dept. of Wildlife Science,
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Date: 02.06.2016.

LINKAGE

For the year 2016-2017

Between

1. Dr.A.Panneerselvam,
   Associate Professor and Head (Rtd.,)
   PG & Research Department of Botany and Microbiology
   A.V.V.M Sri Pushpam College
   (Autonomous), Poondi – 613 503.

&

2. Dr. Nakulan Valsala Rajesh
   Associate Professor
   Department of Wildlife Science,
   Veterinary University Training and Research Centre, TANUVAS,
   Ramanathapuram - 623 503, Tamil Nadu, India.

Considering the significance of the noble cause for the student community, we have come forward to collaborate with each other to exchange research knowledge, expertise, laboratory and library facilities to the process of scientific research and education in the field of Biological science. The parties (mentioned above as 1. & 2.) have had preliminary discussion in this matter and have ascertained areas of broad consensus. The parties now therefore agreed to enter in writing these avenues of consensus, under a flexible linkage, and this project aims to fill the gap between knowledge demand and subject expertise related to the mentioned field.

Joint Responsibilities

- Sharing of laboratory facilities, library resources, database etc.,
- Joint Publication of research articles, books, magazines, bulletins etc.,
- Jointly organizing conferences, seminars, symposia and workshops.
- Submitting joint proposals for research funding from agencies like UGC, CSIR, DST and TNSCST.
- Patenting Microbes, Plants patents Procedure, Product development and Novel equipments in Biological sciences (Indian and Foreign Patenting)

Dr. A.Panneerselvam

Nakulan Vaisala Rajesh

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Research Article

PHYTOCHEMICAL ANALYSIS, *IN VITRO* ANTIOXIDANT POTENTIAL AND GAS CHROMATOGRAPHY-MASS SPECTROMETRY STUDIES OF *DICRANOPTERIS LINEARIS*

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ABSTRACT

Objective: The aim of the study was to analyze qualitative and quantitative phytochemicals, evaluate *in vitro* antioxidant properties and determine the bioactive compounds in extracts of *Dicranopteris linearis* (Burm.f.) Underw. collected from Western Ghats of Kanyakumari district.

Methods: The qualitative, quantitative phytochemical, and *in vitro* antioxidant analysis were performed using standard procedures. The bioactive compounds were analyzed using gas chromatography-mass spectrometry (GC-MS) instrument.

Results: The qualitative phytochemical analysis studied in aqueous, acetone, chloroform, ethanol, and petroleum ether solvent extract showed acetone had strong positivity to express the 12 phytoconstituents studied except anthocyanin when compared to other solvent extracts. The quantitative phytochemistry revealed considerable amount of terpenoids (97.0±1.15 mg/g), tannins (30.8±0.44 mg tannic acid equivalents/gram), phenols (28.6±0.33 mg gallic acid equivalents/gram), and flavonoids (8.50±0.29 mg quercetin equivalent/g) in decreasing order of concentrations. The *in vitro* antioxidant activity of aqueous, ethanol, acetone, chloroform, and petroleum ether suggested that the extract of DL has prominent antioxidant prospective against various free radicals such as 2,2-diphenyl-1-picrylhydrazyl while butylated hydroxy toluene being the standard antioxidant used. The GC-MS analysis displayed the presence of 11 bioactive compounds each belonging to various categories of phytochemicals such as terpenoids, flavonoids, phenols, and fatty acid derivatives.

Conclusion: The results indicate that *D. linearis* (Burm.f.) Underw. present in the Western Ghats of Kanyakumari is an effective scavenger of free radicals and has the potential to be used as a natural antioxidant which is attributed to the rich presence of secondary metabolites.

Keywords: *Dicranopteris linearis* (Burm.f.) Underw., Phytochemistry, Antioxidant activity, Gas chromatography-mass Spectrometry.

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INTRODUCTION

Medicinal plants are very ancient and are true natural medicines which are useful for the treatment of different diseases. Plants are eminent source of new therapeutic agents that helps to alleviate human ailments and promote health. The noteworthy preventive and protective properties of these substances are related to their strong antioxidative, antimutagenic and anticarcinogenic potential [1]. They can be used directly or in extracted forms for the management of various ailments due to the presence of various secondary metabolites [2]. Many plants contain a variety of phytochemical property found to be significant in the fields of agriculture, human and veterinary medicine. Natural products play a dominant role in the development of novel drug leading to treatment and prevention of diseases [3]. A sufficient number of plants have been proven to be effective against ailments and massively screened for their therapeutic compounds. Pteridophyta has been known for its medicinal and therapeutic values, gaining importance in plant-based novel drug therapy. Many species of this plant division are highly ignored and are determined to have potential secondary metabolites that act against various diseases [4]. The limited knowledge of these medicinal plants for disease control and their weed habitat make these ferns to be destroyed by human. The ferns had an important role in folklore medicine and are being used as valuable sources of food and medicine for the prevention of illness and maintenance of human and animal health. *Dicranopteris linearis* (Burm.f.) Underw. is a terrestrial pteridophyte covered with scales or hairs. Leaves monomorphic, large, scrambling or trailing, one to many times forked. Literature study reveals that the plant possesses significant antioxidant activity with high flavonoid content [5], antimicrobial [6], gastroprotective [7], antinociceptive, anti-inflammatory and antipyretic [8], and anthelmintic [9]. The above-mentioned properties of the plant could be credited to the presence of various primary and secondary metabolites in significant quantity.

Vegetables and plants consumed as food or medicines are widely accepted to provide new sources of antioxidants because of their potential biological and pharmacological activities. In recent times, research activities on antioxidants from plants sources have attracted a wide range of interest across the world. Antioxidants have great importance because they can reduce oxidative stress which could cause damage to biological molecules [10]. Various research activities on antioxidant property of Pteridophytes have been reported [11-13]. In recent years, there is an increasing trend of screening medicinal plants for bioactive compounds as a basis for further pharmacological studies. Several studies have shown that plant derived antioxidants scavenge free radicals and modulate oxidative stress. The chemistry of free radical is complicated and it caused a major limitation in the identification of free radical scavenging activity. To withstand this problem the potential antioxidant substance is tested in *in vitro* model and such approaches expand the scope of antioxidant activity [14]. Research on relationship between antioxidants and prevention of non-communicable disease such as cardiovascular disease, neoplastic, and diabetic condition has attain awareness in recent years. Epidemiological and *in vitro* studies strongly suggest that plant food containing phytochemicals with antioxidants have potent protective effects against these diseases. However, there is widespread agreement that some synthetic antioxidants such as