

Undergraduate Research Grant Application

Name: Peace Olaoluwa

Cottey ID#: 28xxxCOTT

Phone: 618-xxx-xxx

E-mail: xxx@cottey.edu

Graduation: 2017

Major: Health Science

Minor:

GPA: X.XX

Faculty Sponsor: Dr. Ganga Fernando; gfernando@cottey.edu

Title of Project: Investigating Medicinal Value of Dried Polpala (Aerva lanata) available in the Sri Lankan and US Markets

Abstract:

A collaborative research project has been developed between Dr. Ganga Fernando of Cottey College and Dr. Pahan Godakumbura of University of Sri Jayawardenepura (USJP) of Sri Lanka on the topic of "Investigating medicinal value of dried Polpala (Aerva lanata) available in the Sri Lankan and US Markets". Dr. Fernando has completed a very similar project investigating medicinal properties of Indigofera tinctoria; which is used extensively in East Asian countries to treat skin diseases, urinary diseases and ulcers. Peace Olaoluwa; a third year undergraduate student majoring in Health Science, is working on this topic as part of her capstone project. She will spend eight weeks in Sri Lanka; from June 20th through August 12th, working under the direct supervision of Dr. Godakumbura; a senior lecturer at the USJP. Dr. Godakumbura completed her PhD in Analytical Chemistry at the Wayne State University in Detroit few years ago before joining the faculty at USJP.

I will collect plant samples; dried and fresh, extract medicinal compounds and analyze using UV/Vis Spectrophotometry and other laboratory testing methods. Once I return to campus for my fourth year, I will collect similar herbal medicines from local market and continue to investigate their medicinal properties using similar techniques. Both USJP and Cottey are completely capable of carrying out these investigations with the already existing facilities at both institutions.

Literature Review utilizing scholarly resources:

Phytochemicals and Their Importance in Traditional Medicine

Traditional treatments are employed in a wide spectrum of the medical field ranging through cancer, insomnia, depression, osteoarthritis, steatohepatitis and to many other conditions. However the field can even be more effective by employing recent scientific methods. Ayurveda as an ancient science of life has a long history, and its basic principles may be valid even today (Patwardhan, 2014). However, essence of any science is a continuous quest for new knowledge through research, development and newer applications. Human behavior, lifestyle and genetics have changed. Clearly, classical Ayurveda of yesteryears cannot be blindly practiced without

contemporary modifications. Continuous research on safety, quality and efficacy of Ayurvedic drugs and procedures is needed. This calls for research investigations of core components and their contemporary application as will be demonstrated through this research study.

Sri Lanka is a tropical island, rich with herbal plant varieties. Most of the plants have been used for Sri Lankan traditional medicinal practices and Ayurveda from ancient time. These systematic medicinal practices have gained the popularity and accepted by the Sri Lankan community for promoting health, preventing and curing diseases. Therefore, medicines made of herbal plant extracts are an important part of the culture and traditions of Sri Lankan people. It was interesting to note that 80% in developing countries depends directly on plants for their medicinal purposes. Although most of these herbs have been used for treating many health problems, medicinal value of many plants still needs to be properly analysed. Plants have nonnutritive plant chemicals, phytochemicals that have protective or disease preventive properties. Plant produces these chemicals for their defense mechanism or for other purposes, but recent research reveals that many phytochemicals can protect humans against diseases. These phytochemicals in each herb works differently and are very difficult to extract, and purify. Some are important for flavoring food as spices while a few have the aromatic fragrance and heavily used in perfume industry. Most of them are marketed as essential oils have been used in variety of products.

However, some of the herbal plants used in traditional medicine are considered as weeds by agriculture. These weeds grow and reproduce aggressively and limit the growth of other plants by blocking the sunlight or used up nutrients from the soil. Therefore these herbs consistently been destroyed in order to increase the crop production. Some farmers are not aware of the value of these herbs while others do not know what is to be done for them once they have been removed. Therefore protecting of these weeds and planned cultivation of such weeds will help the industry and Sri Lankan community. On the other hand, some medicinal herbs have been imported to Sri Lanka to satisfy the need of the traditional medical practices. People are using these herbs without knowing the quality, or proper identity of the plant material. Polpala or *Aerva lanata* is a commonly found weed, which grows wild everywhere in Sri Lanka. It has widely been used in traditional medicines from the ancient times. It has been reported that the roots of polpala has a camphor-like aroma. Therefore the aim of this project is to investigate of the medicinal values in dried herbal plant, Polpala (*Aerva lanata*) available in Sri Lankan market and compare it with the freshly harvested plant from the home garden. Upon return to Cottey campus, the student will collect Polpala products from local herbal markets and investigate the medicinal properties using the same analytical techniques.

References

1. Handa SS, Khanuja SPS, Longo G, Rakesh DD. Extraction Technologies for Medicinal and Aromatic Plants. International centre for science and high technology, Trieste, 2008, 21-25.
2. Harborne JB. Phytochemical methods: A guide to modern techniques of plant analysis. 2nd ed. London: Chapman and Hall; 1998, p. 54-84.

3. Jadeja, R., Devkar, R. V., & Nammi, S. (2014). Herbal Medicines for the Treatment of Nonalcoholic Steatohepatitis: Current Scenario and Future Prospects. *Evidence-Based Complementary and Alternative Medicine : eCAM*, 2014, 648308. <http://doi.org/10.1155/2014/648308>
4. Joshi, A., Mehta, C. S., Dave, A. R., & Shukla, V. D. (2011). Clinical effect of *Nirgundi Patra panda sweda* and *Ashwagandhadi Guggulu Yoga* in the management of *Sandhigata Vata* (Osteoarthritis). *Ayu*, 32(2), 207–212. <http://doi.org/10.4103/0974-8520.92588>
5. Khan, M. A., Gupta, A., Sastry, J. L. N., & Ahmad, S. (2015). Hepatoprotective potential of kumaryasava and its concentrate against CCl₄-induced hepatic toxicity in Wistar rats. *Journal of Pharmacy & Bioallied Sciences*, 7(4), 297–299. <http://doi.org/10.4103/0975-7406.168029>
6. Marchand L. Integrative and complementary therapies for patients with advanced cancer. *Ann Palliat Med* 2014;3(3):161-171. Doi: 10.3978/jissn.2224-5820.2014.07.01
7. Margret, A. A., Begum, T. N., Parthasarathy, S., & Suvaitenamudhan, S. (2015). A Strategy to Employ *Clitoria ternatea* as a Prospective Brain Drug Confronting Monoamine Oxidase (MAO) Against Neurodegenerative Diseases and Depression. *Natural Products and Bioprospecting*, 5(6), 293–306. <http://doi.org/10.1007/s13659-015-0079-x>
8. Patwardhan, B. (2014). Bridging Ayurveda with evidence-based scientific approaches in medicine. *The EPMA Journal*, 5(1), 19. <http://doi.org/10.1186/1878-5085-5-19>
9. Perera, P. K., Perera, M., & Kumarasinghe, N. (2014). Effect of Sri Lankan traditional medicine and Ayurveda on *Sandhigata Vata* (osteoarthritis of knee joint). *Ayu*, 35(4), 411–415. <http://doi.org/10.4103/0974-8520.159007>
10. Perrone, D., Ardito, F., Giannatempo, G., Dioguardi, M., Troiano, G., Lo Russo, L., Lo Muzio, L. (2015). Biological and therapeutic activities, and anticancer properties of curcumin. *Experimental and Therapeutic Medicine*, 10(5), 1615–1623. <http://doi.org/10.3892/etm.2015.2749>
11. Talukdar, S. N., & Hossain, M. N. (2014). Phytochemical, Phytotherapeutical and Pharmacological Study of *Momordica dioica*. *Evidence-Based Complementary and Alternative Medicine : eCAM*, 2014, 806082. <http://doi.org/10.1155/2014/806082>
12. Vinjamury, S. P., Vinjamury, M., der Martirosian, C., & Miller, J. (2014). Ayurvedic Therapy (*Shirodhara*) for Insomnia: A Case Series. *Global Advances in Health and Medicine*, 3(1), 75–80. <http://doi.org/10.7453/gahmj.2012.086>

Relationship of the project to the study of leadership and leadership development within your academic discipline:

This research internship will directly benefit my leadership development in the field of health science. Until recently, STEM has been a male dominated field, and even with the uprising of strong women leaders in the field, who are making remarkable findings through research, the gap has not yet being adequately bridged. It is my aspiration to join the group of those women

who are making changes in lives of many through their work in STEM and to inspire many young women after me.

The skills, knowledge, and technical know-how I will gain from this research opportunity will not only sharpen my scientific skills for the future but it will also give me a practical means to demonstrate and apply what I have learned in class and from my numerous bibliography research thus far which I believe is a form of leadership in action in itself. Leadership skills such as working effectively as part of a team and as an individual towards a goal will be practiced in the course of this research. Effective time management skills, building resilience, working effectively in a diverse group and adapting to new environment which I think are all part of leadership and leadership development will also be practiced. My engagement in this research study will not only give me the resume I desire for medical school but will also build the leader in me as I am exposed to a challenging environment in which I must adapt, grow and be productive.

Proposed Budget: Total – \$1,930

- a. Supplies: USJP will cover the cost of the laboratory supplies approximately \$2000
- b. Incentives (i.e. for human subjects):
- c. Technology: USJP will cover the cost of the laboratory technology for the eight weeks
- d. Stipends: This is a unpaid research internship
- e. Conference costs for presentation: attendance at the Missouri Academy of Science in April 2017 \$ 25
- f. Other:

Please provide a description of “other” \$1,905.00 (see justification below for more details)

Justification of proposed budget:

Estimated Cost US \$	
Airfare (from Korea to Sri Lanka)	\$ 600
Housing (sharing a room for 8 weeks)	\$ 60
Food (cafeteria and local food for 8 weeks)	\$ 500
Local Transportation (bus and taxi fees)	\$ 200
Visa costs	\$ 60
Health Insurance (covered till Aug 12th)	\$ 285
Personal Expenses	\$ 200
Total	\$1,905

Description of Research Project:

In this project, I expect to qualitatively and quantitatively discover the chemical compounds that carry medicinal properties and the effect of processing (drying and other preparation methods) on the concentration/activity of these compounds when the herbal medicine reach the market.

Common analytical laboratory techniques of extraction, purification and testing will be used.

Common laboratory chemicals will be used. I have extensive experience in laboratory techniques that will be used during this internship and I have gone through safety handling of chemicals and been trained on the instruments. Dr. Godakumbura has supervised several undergraduate students in research and is the advisor of the chemical society in USJP. Dr. Fernando has supervised several undergraduate students in research at Cottey College.

During the Eight weeks, I will conduct chemical and biological analysis of Polpala plant samples. She will work full time (at least 40 hours a week) to complete this project. Upon return to campus, I will continue the project during her fourth year.

Specific objectives

1. Qualitative and quantitative study of the phytochemicals in the dried Polpala and compare it with fresh plant grown in the home garden as a weed.
2. To determine the effect of drying on proximate composition, volatile compounds, heavy metals and antioxidant activity of Polpala.

Overview of Informed Consent Process:

This will be a minimally invasive research project. At this stage no informed consent will be necessary.

Plan for assessment and presentation to campus and/or outside source:

The results of this project will be submitted for an oral presentation at the Missouri Academy of Science in April 2017 and will also be shared at the Cottey Academic Showcase. Cottey Internship Guidelines will be followed by Dr. Godakumbura and Dr. Fernando to assess the outcomes of the internship. I will, then, record the Activity Log each week and will send that to both supervisors via email. Faculty Evaluation of Internship, Student Evaluation of Internship and Employer Evaluation of Student Intern will all be completed and submitted to Renee Hampton at the end of the internship.