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"Multidisciplinary Approach to Overcome Challenges Posed by Covid-19 towards National & Global Development"

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"Multidisciplinary Approach to Overcome Challenges Posed by COVID-19 - Towards National & Global Development"

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MESSAGE FROM THE VICE-CHANCELLOR

It is my immense pleasure to provide a message for the 7th International Conference on Multidisciplinary Approaches (*i*CMA) - 2020, which is one of the flagship research events of the Faculty of Graduate Studies of the University of Sri Jayewardenepura.

I strongly believe that the theme selected for this year's conference "Multidisciplinary Approach to Overcome Challenges posed by COVID-19 towards National & Global Development" is timely and of high significance. By conducting this conference virtually, I hope that this will be reachable to a far bigger crowd. The COVID-19 virus is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case of the virus was confirmed in Sri Lanka on 27th January 2020, after a 44-year-old Chinese woman from Hubei Province in China was admitted to the National Institute of Infection Diseases. Currently, we are in the Second wave (4th October – present).

The University of Sri Jayewardenepura guided by its motto; '*Vijja Uthpata than Setta*' (Among all that arise, knowledge is the greatest) as quoted from the Dhammapada which was written 2,500 years ago, has long set its path to facilitate those who seek knowledge. The University's contribution to the education of this country can be traced back to its 146-year-old history when it was established as Vidyodaya Pirivena by Venerable Rev. Hikkaduwe Sri Sumangala Thero.

In the University, research is being conducted in highly demanding and necessary areas such as Water, Cancer, Dengue, Nano Technology, Herbal Products, etc. The University has collaborated with acclaimed local and foreign companies such as the British Council, Moody's Analytics, Deloitte, Siddalepa, etc.

As a University, we play a key role to ensure quality leaders are available with adequate knowledge on multidisciplinary approaches who can drive the innovation in the country. In this context the *i*CMA 2020 is going to be a challenging but exciting experience.

The Faculty of Graduate Studies had taken a great effort in organizing this conference for the seventh consecutive time and is bearing an important responsibility in uplifting the research culture and output of this nation. Thus, my sincere appreciation goes to the organizing committee of the *i*CMA 2020 for their tireless effort in ensuring the success of this event. I wish that the *i*CMA 2020 be a ground-breaking event which will benefit all participants and the country.

Snr. Prof. Sudantha Liyanage
Vice-Chancellor
University of Sri Jayewardenepura
Sri Lanka

MESSAGE FROM THE CONFERENCE CHAIR

As the Dean of Faculty of Graduate Studies of the University of Sri Jayewardenepura and the Chair of the Organizing Committee of the 7th International Conference on Multidisciplinary Approaches (*i*CMA) - 2020, it is my immense pleasure to issue this message. The Faculty of Graduate Studies (FGS) of University of Sri Jayewardenepura, since its establishment in 1996, had come a long way during a comparatively short period and is on the track of achieving its mission: 'to produce high caliber professionals with knowledge and skills by designing and providing innovative courses, achieving excellence in teaching, research and scholarship through local and global partnerships for the wellbeing of the larger community.' Faculty of Graduate Studies (FGS) of the University of Sri Jayewardenepura is the official coordinating body for postgraduate academic and research activities. The study programs of FGS stem from the strategic disposition of our University, which is thriving towards greater heights in an ultra-modern technological environment, but having a solid religious, cultural, traditional knowledge base. The rich natural resources in the country provide opportunities to both local and international students to get hands-on experience of nature and learn how to manage them for long-term sustainability.

The FGS engineered *i*CMA conference as it is linked with nine Board of Studies covering all academics and research areas of the University (i.e., Board of Studies in Humanities, Social Sciences, Management Studies & Commerce, Physical Sciences, Life Sciences, Medical Sciences, Engineering, Industrial Technology, and Multidisciplinary). Thus, with its purview, FGS organizes International Conference on Multidisciplinary Approaches (*i*CMA) to provide a forum for academics and industry professionals engaged in multidisciplinary research and development. Accordingly, a platform is created for them to share knowledge and experiences towards national and global development. I am happy to note that this time's *i*CMA - 2020, which is the seventh consecutive international conference, is held with the theme of 'Multidisciplinary Approach to Overcome Challenges Posed by COVID-19 - towards National and Global Development.' I believe that this is a highly contemporary theme for the year 2020 that encapsulates the main areas of high international and national significance.

Let me extend my heartfelt appreciation to the Chief Guest, Snr. Prof. Sudhantha Liyanage, the Vice-Chancellor, and the University of Sri Jayewardenepura for providing all the infrastructure and facilities that helped us to organize this conference successfully. Furthermore, I convey my sincere appreciation to the Guest speakers Mr. Robert Juhkam, Resident Representative United Nations Development Programme (UNDP), and Mr. Thorsten Bargfrede, Deputy Head of Mission, Delegation of the European Union to Sri Lanka and the Maldives for gracing the *i*CMA - 2020.

For this time's conference, we have received more than 160 abstracts, and 122 were accepted for oral presentations in six distinct themes. Considering the

prevailing COVID-19 situation, the conference is held on a hybrid mode, and all the oral presentations will be delivered in a virtual platform. Accordingly, I earnestly request all of you to participate virtually, share your experiences, thoughts, understandings, and enhance your and our knowledge. Overall, I strongly believe and wish that this conference will have a great impact on making this world a better place by overcoming the Challenges Posed by COVID-19 pandemic. Thank you immensely for all the commitment and effort to make *i*CMA - 2020 a success!

Snr. Prof. M. M. Pathmalal
Conference Chair & Dean, Faculty of Graduate Studies
University of Sri Jayewardenepura
Sri Lanka

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Abstract

This is a numerical simulation study of a thin film hybrid organic-inorganic perovskite solar cell with a p-i-n structure. The p-type semiconductor layer is an organic hole transporting material (HTM) called Poly (3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT:PSS). In this new device structure, we have intentionally included a double intrinsic layer (i) of 3D Methylammonium Lead Iodide ($CH_3NH_3PbI_3$) (MAPI) and the 2D monolayer of $CH_3NH_3PbI_3$ to minimize the degradation of the device, and also embedded deep and shallow defects in the 3D-MAPI layer. The n-type material, fullerene derivative (6,6)-phenyl-C61-butyric acid methyl ester (PCBM) is used as an organic electron transporting material (ETM). The solar cell performance has changed after including defects in the 3D-MAPI since the defects can alter the dark saturation current of the device. The simulation results show that the shallow defects and deep defects of 3D-MAPI can alter the open-circuit voltage of the perovskite solar cell model. The open-circuit voltage of the solar cell model depends on the dark saturation current, which indicates how much recombination is occurring in a semiconductor. The deep defects of 3D-MAPI should be minimized to increase the cell performance since the high dark saturation current decreases the open-circuit voltage of the solar cell. We have observed that Shockley-Read-Hall recombination is the most predominant recombination mechanism for the deep defects in the 3D-MAPI materials.

Keywords: perovskite-based solar cell, recombination, thin-films, dark saturation current, defects

BINDING INTERACTIONS OF ALDOSE REDUCTASE WITH BIOACTIVE COMPOUNDS EXTRACTED FROM SRI LANKAN PLANTS

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Abstract

Structure-based virtual screening has become an integral part in drug discovery efforts. Aldose Reductase (AR) plays a vital role in the secondary complications of diabetes, and it is an important drug target for the treatment of diabetes. This study was carried out to identify potential inhibitors of AR by screening against a natural product database using AutoDock Vina. The binding energies were compared with that of a known inhibitor of AR, Tolrestat. The active site residues of AR identified from the literature were confirmed based on the sites of Tolrestat binding, using Biovia Discovery Studio. For the ligand preparation, conformational analysis using molecular mechanics and semi-empirical methods was followed by geometry optimisation of the best conformer using HF/6-31G*. The initial analysis was made by examining simulation stability and protein structure. For the selected compound, beta amyrin trans cinnamate, extracted from the plant *Himatanthus articulates*, docking was carried out using AutoDock 4 and iGEMDOCK. The flexibility of the compound was considered in this process, and flexible residues of the receptor were accounted for. Molecular Dynamics was carried out to determine the stability of the receptor-ligand complex in solution medium and for free energy calculations. Furthermore, the optimised structure was used to generate RESP (Restrained Electrostatic Potential) charges for molecular dynamics. The RMSDs of the enzyme-tolrestat complex and the enzyme-beta amyrin cinnamate complex were analyzed using a 100 ns long trajectory to examine the dynamic behaviour of active site residues of AR and their interactions with beta amyrin trans cinnamate. Considering the docking results and the RMSD values from the molecular dynamic simulations we can conclude that beta amyrin trans cinnamate could be a potent non-peptide inhibitor of AR.

Keywords: Aldose Reductase inhibitors, In-silico screening, Sri Lankan plant extracts

CORRELATION BETWEEN TOTAL POLYPHENOL CONTENT VARIATION OF AUTOMATED TEMPERATURE AND HUMIDITY MONITORING DEVICE IN BLACK TEA FERMENTATION PROCESS

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Abstract

The identity of "tea" is unique and cannot be substituted by any other beverage due to its health benefits. The manufacturing process of black tea has several stages such as withering, rolling, fermentation, drying, grading, sorting, and packing. The manufacturing process alters the biochemistry of tea and the concentrations of the constituents that determine the quality of the tea. The current method in practice involves humans to detect the optimum fermentation by smelling tea particles, observing colour changes and moisture content variation. The project proposed here will focus on monitoring the variation of total polyphenol content (TPP) during the fermentation stage and develop a correlation between temperature and moisture detection system to find optimum fermentation time. The sample collection was conducted at a tea factory in Avissavella, Sri Lanka, which is a wet zone low country tea manufacturing factory. The tea samples collected for polyphenol analysis were oven-dried at every 15 minutes intervals at 110-120^{o}C temperature, humidity device data collection was conducted simultaneously for selective batches. The mean variation of TPP content during the fermentation process in morning tea batches was (30.20±3.53% of Gallic acid equivalent (GAE), n=52), evening tea batches (31.19±3.41% of (GAE), n=73). Range of TPP variation in the morning tea batches, during the fermentation, was 19.84±3.53-41.37±3.53% of (GAE), evening tea batches 24.53±3.41-39.66±3.41% of (GAE). Inside the fermentation bed temperature varied from 28.9±1.42℃-35.8±1.42℃. Pearson correlation analysis was indicated a significant linear positive correlation with TPP and fermentation bed temperature in the morning tea batches. However, significant linear negative correlation, with the evening tea batches. The overall results show the study of TPP content and bed temperature variation appropriate to optimize quality variation in tea leaves in the fermentation process with minimum human involvement.

Keywords: fermentation, black tea, polyphenol

DESIGN AND IMPLEMENTATION OF IOT BASED SMART ELECTRICITY METER

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Abstract

In the process of moving towards smart cities in Sri Lanka, Smart electricity meter could be the first step to make a change in conventional Billing and metering system. The necessity of such a globally applicable system is well experienced during the recent COVID-19 pandemic situation as well mainly due to the problems related to billing, faced by both consumers and electricity board. The system proposed by Aswin Raj et al tried to incorporate real-time pricing in smart grids. It led to conserve the energy as well due to the synchronization of electrical energy cost and demand curves. Azaza & Wallin conducted a study to identify the customers who are mostly responsible for the peak system, using responsibility factor and consumption variability and through a mining approach for smart meter data. Although digital meter which was introduced by Ceylon Electricity Board has analysing and storing capability, it does not have the communication capability. Existing smart meters in the world provide one-way communication facility from the meter to suppliers. The main contribution of this study is the introduction of two-way communications through smart metering which can be used to manage the customers' power consumption and reduce the energy wastage and eventually the electricity bill. Hardware components of the meter are selected based on the reliability and the cost. Energy analyser is used to measure voltage, current, hertz and watt-hour (Wh). The processor collects and processes the data. All power consumption details of the meter are sent to the cloud in every 30second for billing process of the company GSM module. According to the calculation, both customer and the company will receive the notifications. All features of the meter were tested both from customer's and supplier's sides. All the data from the implemented smart meter with different loads were collected to analyse the performance. The results show that the accuracy of data and satisfactory performance of the real-time monitoring system. The proposed metering system also helps to identify unauthorized use of electricity in an efficient manner through real-time monitoring system. There is one possible failure called data lost which can be occurred by GPRS/GSM communication. It can be overcome by recoding data in EEPROM of energy analyser and once the communication channel established all these historical data will be transferred to the server.

Keywords: Smart electricity meter, Smart city, IoT, Energy management systems, Smart grid

LSTM BASED PREDICTION APPROACH FOR EXCHANGE RATE – A CASE STUDY ON LKR, YEN, AND YUAN

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Abstract

The exchange rate is a value of one country's currency concerning another country's currency. In the economic state, the currency exchange rate of every country is varying from time to time. Therefore, the exchange rate affects the country's economic system. Usually, most of the countries are using the United States Dollar (USD) as a reference exchange rate. Therefore, it is an important requirement for everyone to predict the exchange rate in advance corresponding to their country. In this research study, Long Short-Term Memory (LSTM) has been used to predict the exchange rate of three currencies namely Sri Lankan rupees, Japanese yen, and Chinese yuan concerning the USD. The LSTM model has implemented with two hidden layers to predict exchange rate. Ten years of past exchange data have been incorporated in this regard. The dataset consists of four variables namely high, low, open and closed values of exchange rate. From the dataset, the closed value of exchange rate is considered as an important factor to cover up the entire data. Therefore, the closed price of the exchange rate has been taken as an input for the neural network. To find the prediction accuracy of the model the Mean Squared Error (MSE) value has been considered. The proposed model has achieved an accuracy of 83%, 74%, and 64% for predicting the rupees, yen, and yuan in USD respectively. Further, this research can be expanded by combining an unsupervised technique along with the aforementioned methodology and making it as a hybrid one.

Keywords: Exchange Rate, Economic System, ANN, LSTM

MONITORING OF FERMENTATION LEVEL IN TEA MANUFACTURE BASED ON TEA AROMA USING DIGI-NOSE

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Abstract

Tea is a major export product in Sri Lanka. A high price for tea in international markets is obtained if the tea taste, aroma and liquor quality is high. These quality parameters are greatly influenced by the fermentation stage of the manufacturing process. The current practice to detect the optimum fermentation is a human smelling tea particle to notice the appearance of two distinct smell peaks namely, "first nose" and 'second nose". This is a very subjective way of detecting the optimum fermentation level hence difficult to maintain consistency during tea manufacturing. Therefore, this study is focused on the development of an electronic nose ("Digi-Nose") device to detect the appearance of two distinct smell peaks instead of human detection. An array of Metal Oxide Semiconductor gas sensors are used in this device for this purpose. The device is capable of sniffing the tea aroma as sniffing cycles similar to human breathing throughout the fermentation period. According to the results after signal enhancement, the first nose appeared at 15 minutes and 60 minutes with the MQ3 sensor while the MQ4 detects smell peak around 40-60 minutes. Therefore, this paper demonstrates that the developed Digi-nose is capable of detecting smell peaks during the fermentation stage of black tea.

Keywords: electronic nose, MOS gas sensors, black tea, tea fermentation

MULTIDIMENSIONAL DATA EXPLORATION WITH IMMERSIVE 3D USER INTERFACES

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Abstract

Multidimensional data visualization is crucial in disease surveillance and controlling outbreaks. To extract useful information, it requires to visually analyze complex multidimensional datasets such as patients' data including complex dimension hierarchies and measures. However, the available visualizations for disease surveillance are mostly based on 2D representations such as cartography, thematic maps, etc. Existing visualizations require high cognitive efforts to clearly understand these datasets. Therefore, it has become a challenge to get better insights into multidimensional datasets in controlling vector-borne disease outbreaks such as Dengue. In this context, 3D visualizations are mostly acknowledged for visualizing complex multidimensional datasets. Therefore, based on the concept of 3D metaphoric data visualization, this paper presents a novel 3D user interface metaphor to reduce the cognitive load on the brain and address the usability issues in large multidimensional data visualization in disease surveillance. This research involves the concept of a 3D carousel metaphor to implement drill-down and roll-up operations. Based on the Design Science Research methodology, it is attempted to addresses the design and investigation of artifacts and context. A pilot usability evaluation experiment has been carried out to measure the usability of the proposed 3D user interface metaphor over a synthetically generated dataset. A group of Public Health Inspectors (PHI) were selected via an open invitation as subjects for the evaluation. A prototype was given to the subjects to interactively perform pre-defined visual analysis tasks based on their routine work. Both qualitative and quantitative aspects were considered to measure statistical significance. According to the user feedback, it shows that the proposed metaphor has higher usability in visualizing complex multidimensional datasets. Therefore, it can be concluded that this research introduces a novel interactive 3D user interface metaphor to enhance the usability in visual analytics of complex multidimensional datasets in disease surveillance.

Keywords: Multidimensional Data Visualization, Visual Data Analytics, Metaphoric Data Visualization, 3D User Interface Metaphor

PRELIMINARY STUDY ON MINERALOGY AND CHEMISTRY OF SRI LANKAN ZIRCON SANDS TO BE USED FOR EXTRACTION OF HAFNIUM

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Abstract

Zircon (zirconium silicate, $ZrSiO_4$) is the primary source of zirconia. Beach sands in Sri Lanka contain zircon along with ilmenite, rutile and monazite. Zircon is often expressed as (Zr, Hf)SiO_4 when hafnium is present as the major impurity in the crystal lattice. Hafnium can be a by-product of zircon processing and purification if it is present in extractable amounts. Therefore, this study is focused to produce high-purity zirconia and extract hafnium from Sri Lankan zircon sand. In this project, zircon samples (separated from heavy mineral bulk) were collected from a mineral sands processing plant at Pulmoddai, Sri Lanka. Mineralogy of the initial zircon sand was characterized under EMZ-13TR MEIJI Microscope, whereas X-ray fluorescence (XRF) and X-ray diffraction (XRD) analyses were used to determine the chemical composition and the mineral phases present, respectively. XRF results showed the occurrence of ~44.35% of ZrO_2, ~40.36% of SiO_2 and ~9.18% of Al_2O_3 and the rest compensated by other minor oxides. XRD spectra of zircon revealed $ZrSiO_4$ and $HfSiO_4$ as the major mineral phases. In addition, yttrium (Y), erbium (Er) and phosphorous (P) are present in trace amounts. Accordingly, the results suggest an inductively coupled plasma mass spectrometric analysis for further evaluation of zircon sand to detect the amount of rare earth elements (REEs) present. Subsequently, ion-exchange purification after concentrated hydrochloric (HCl) acid digestion will be used for the separation of ZrO_2 and Hf. Finally, the purified zirconia will be tested for possible applications in advanced ceramics.

Keywords: Zircon, hafnium, zirconia, extraction, advanced applications

REDUCTION OF ZINC MIGRATION FROM FOOD CONTACT NITRILE RUBBER JAR SEALING RINGS

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Abstract

Zinc oxide (ZnO) is one of the basic indispensable components of rubber compounds, which acts as an activator in the rubber vulcanization process with sulfur and accelerator/s. However, since 2004, the European Union has classified ZnO as a harmful substance for the health, and recently their legislations have consolidated, that the application of ZnO in food contact rubber products to be reduced and controlled. Nano-zinc was used to reduce zinc migration; however, a scientific study was not conducted to explain the reduction of zinc migration. Hence, this research work focuses on the reduction of zinc migration in acrylonitrile-butadiene rubber (also called as nitrile rubber, NBR) based jar sealing rings used in food contact application. In search of finding out a new method to reduce zinc migration, the formation of a chelated zinc complex using ethylenediaminetetraacetic acid (EDTA) as a chelating agent is introduced. Several rubber compounds with varied loadings of nano-zinc (1 to 2 phr) and EDTA (1 to 3 phr) were prepared using a laboratory-scale two-roll mill and compression moulded at 140°C and at 0.2 MPa. Migration test was carried out for all vulcanizates according to BS EN 13130, using 3% (w/v) acetic acid aqueous solution as the food simulant (Simulant type B). Atomic absorption spectroscopy was used to determine the content of zinc in 15 ml of the food simulant. With the increase of EDTA loading, the zinc migration of the vulcanizates was reduced and with 3 phr EDTA loading, 37% reduction of zinc migration was obtained. When replacing the conventional ZnO with nano-zinc loading of 2 phr, 47% reduction of zinc migration was obtained. By adding both EDTA and nano-zinc in 1 phr loadings, 57% remarkable reduction of zinc migration was obtained.

Keywords: Zinc oxide, chelating agent, EDTA, food contact rubber, nitrile rubber

REGIONAL CRUSTAL MODEL OF MANNAR BASIN USING SEISMIC AND GRAVITY INTERPRETATION

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Abstract

Continental crust thinning and oceanic crust generation processes play a major role in the classification of sedimentary basins. The current study presents a regional crustal model for the Mannar basin offshore Sri Lanka based on seismic reflection details incorporate with forward and inverse modelling of satellite-derived observed gravity data. To determine the density contrast between subsurface layers interpreted in 2D seismic images, high-resolution density logs of Dorado and Barracuda exploratory wells were accessed and averaged. The density of water column, sedimentary layer and the volcanic layer which was sandwiched between sedimentary columns were assigned as $1.03 gcm^{-3}$, $2.5 gcm^{-3}$, and $2.9 gcm^{-3}$ correspondingly. To create correlated subsequence depth models, density values for crust and mantle were assigned as $2.67 gcm^{-3}$ and $3.4 gcm^{-3}$. Interpreted 4 major horizons were converted to depth domain using existing velocity details along the seismic surveys conducted in the region of interest. This model contains the details of 32 2-dimensional subsurface models along the average 220km length extended seismic lines, which were accessed from Petroleum Resources Development Secretariat (PRDS) data repository. Crustal thickness details from derived models were interpolated using universal kriging algorithm integrated with IHS Kingdom software. The derived regional crust model contains the details of thinned continental crust from 1 km to 34 km considering both landmasses situated both sides of the offshore basin. While global crust 5.1 model assigned 10 km to 30km of crustal thickness for the study area, explained that resolution plays a major role in determining the accuracy of regional results. Based on the subsurface models and the contour map of thinned crust further verified the Mannar basin as a failed-rift basin, which passively thinned the continental crust without creating oceanic crust by a relevant spreading centre. Derived crust model can be used as a base model to furthering future geophysical and geological research interest in the Mannar basin.

Keywords: Crustal thinning, Gravity modelling, Mannar basin, Seismic interpretation

THE COMPARISON OF SINGLE BUBBLE SONOLUMINESCENCE IN 40 WT% SELENIC AND SULFURIC ACIDS

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Abstract

Single Bubble Sonoluminescence (SBSL) is observed when an isolated gas bubble is acoustically trapped in a liquid and the bubble undergoes oscillations and produces sub-nanosecond flashes as the bubble collapses. In this study, we investigated the behaviour of SBSL in 40 wt% sulphuric acid (H_2SO_4) and 40 wt% selenic acid (H_2SeO_4) and compared them. The major reason for choosing 40 wt% concentrations of these acids is that the highest concentration of H_2SeO_4 commercially available is 40 wt%. The experimental setup consists of a spherical flask, an impedance matching circuit, and a spectral acquisition system. Before host liquids are used for the experiment, they have to be degassed and dissolved with Ar since only a specific concentration of Ar need to be present in the liquid for obtaining SBSL. The H_2SO_4 was first degassed by purging with Ar under atmospheric pressure for 12 hours and then vacuuming under 30 Torr for another 12 hours. We repeated this degassing and regassing procedure for two days. The same procedure was repeated for preparing H_2SeO_4. After preparing the host liquid, it was transferred into the flask and then resonance frequency was obtained. Obtained resonance frequencies are 24.1 kHz and 26.0 kHz at 15 ^{0}C for H_2SO_4 and H_2SeO_4, respectively. Next, the intensity of the sound wave was changed until SBSL was observed. The PMT and the spectral data were recorded for SBSL in H_2SeO_4 for 4 different temperatures and repeated the experiment for H_2SO_4. It was found that the H_2SeO_4 has higher intensities for the entire temperature range compared to H_2SO_4. At lower temperatures, the spectrum of SBSL for both acids trends towards the UV region. As the temperature has increased the intensity is reduced and the peak value is shifted towards the visible region, indicating the higher stability of the bubble at lower temperatures.

Keywords: Sonoluminescence, spectrum, acoustic, resonance, electrical

ULTRA-LOW DETECTION OF METANIL YELLOW IN AQUEOUS MEDIUM BY SURFACE ENHANCED RAMAN SPECTROSCOPY

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Abstract

Surface-Enhanced Raman Spectroscopy (SERS) is a sensitive technique to detect chemical compounds with a distinct structural fingerprint. Recently, the potential of SERS has been recognized to detect food colourants. This study was conducted with the objective of ultra-low detection of metanil yellow (MY), in an aqueous medium by SERS. MY is a non-permitted, synthetic food colourant used in Sri Lanka. Most of the synthetic food colourants show adverse effects on human health. Hence, the detection of colour components in food is essential. Although there are some existing methods, SERS can be used as an alternative ultra-sensitive method to detect food colourants. Molecular sensitivity of SERS can be enhanced by amplifying Raman intensity through electromagnetic enhancement due to localized surface plasmon resonance and chemical enhancement caused by charge transfer from Raman active molecules to affinity level of adsorbed molecules. Metallic nanoparticles, prominently Au and Ag have been used as Raman active molecules. In this study, a concentration series of MY as 125 ppm, 25 ppm, 2.5 ppm, and 0.25 ppm were analysed using a Thermo Scientific DXR2 SmartRaman spectrometer in a range of 400 cm^{-1} to 1800 cm^{-1} at an excitation wavelength of 785 nm and laser power of 50 mW. Raman spectra were obtained for aqueous solutions of pure MY, MY+Ag nanocolloids mixture, and MY+Ag nanocolloids+$MgSO_4$ mixture, in triplicates. $MgSO_4$ was used to boost the Raman intensity further in order to sense ultra-low concentrations. Raman peaks were observed at 1616 cm^{-1}, 1589 cm^{-1}, 1454 cm^{-1}, 1392 cm^{-1}, 1325 cm^{-1}, 1155 cm^{-1} and 998 cm^{-1} for MY molecule. In conclusion, Ultra-low concentration of 0.25 ppm (250 ppb) of MY was sensed by SERS with this developed technique. However, with further optimizations, SERS could be used as a potential method in detection and quantification of various colour constituents in different matrices.

Keywords: Metanil yellow, AgNPs, ultra-low detection, SERS, Food safety.

ENVIRONMENTAL POLLUTION &
NATURAL RESOURCES MANAGEMENT

ASSESSMENT OF TRIBUTYLTIN CONTAMINATION IN MARINE SEDIMENTS AND BIOTA (*Perna viridis*) IN COASTAL BELT OF SRI LANKA

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Abstract

Tributyltin is a toxic organotin compound that belongs to the group of Persistent Organic Pollutants (POPs) and one of the active ingredients in antifouling paints in boats and ships. It has a long half-life in marine sediment (>5 years) and having a high specific gravity of 1.2 KgL-1 at 20 0C. Thus, the TBT contaminated sediment could act as a long-term source of TBT contamination in benthic animals and it has been documented to cause severe sexual disorders such as imposex development in aquatic fauna. The present study was aimed to quantify TBT in sediment and biological samples collected from adjacent coastal waters of commercial and fishery harbors in Sri Lanka. TBT was quantified by using Gas Chromatography Mass Spectrometry with Solid Phase Micro Extraction. The extraction recoveries of sediment and biological samples were recorded as 78±1.7% and 81±2.6% respectively. The TBT concentration in coastal sediment samples ranged from 107± 4.1 ngKg-1 to 17± 1.4 ngKg-1 wherein TBT in biological samples (Perna viridis) ranged from 4±1.2 ngKg-1 to 42±2.2 ngKg-1 in wet weigh following ascending order of the body weight. The highest TBT level in sediment was found in the Colombo port where the highest level of TBT in P. viridis (42±2.2 ngKg-1) was recorded from the Dikovita fishery harbor. A positive correlation between the percentage of P. viridis male and TBT level in sediment ($p<0.05$) suggests possible imposex development in aquatic animals exposed continuously to a high concentration of TBT directly effect on collapse of aquatic biodiversity.

Keywords: Tributyltin (TBT), Harbors, Sediment, Perna viridis, Imposex

DOES THE LONG RUN ECONOMIC GROWTH BOOSTS THE CARBON DIOXIDE EMISSION? (WITH SPECIAL REFERENCE TO SRI LANKA)

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Abstract

The natural environment provides resources as inputs and absorbs unwanted by-products in the form of pollution and waste. Thus, current economic activities have led to a plethora of environmental problems. Economic growth aims for an increase in real GDP. To encourage a high rate of growth, every individual country implements development mechanisms based on their potential of natural resources. Human activity, which often leads to increased GDP by goods production and services, unquestionably produces CO_2 emissions. Therefore, with the increased production and consumption we can witness the costs imposed on the environment and these costs led to a significant issue for the living condition of the population not only for the current but also for the long-term perspective. Focusing on solutions to pollution; the main objective of this paper is to queering the link between continuously increasing carbon emissions and the growing economy in Sri Lanka. Validated secondary data of GDP per Capita and CO_2 emission for over the past six decades were analysed by the Unit root test along with the VAR Granger Causality test to investigate the long-term effect of the two variables. Further, the study also contemplates proving the general EKC of middle-income countries' theory for the Sri Lankan economy. The results emphasized that the long-run relationship of GDP per Capita significantly causal to the country's CO_2 emission. While the CO_2 emission to the atmosphere does not causal the GDP per Capita in Sri Lanka. According to the Environmental Kuznets Curve (EKC), scrutinized results showed that after US$ 3000 GDP per Capita Sri Lanka about to experience composition and technique effect as a middle-income country. This research is a revelation of the theoretical and practical applications related to the green economy. In order to mitigate environmental degradation government should implement an efficient strategy to improve the quality of the environment sustainably.

Keywords: CO_2 emission, economic growth, EKC, cause and effect, green economy

FIRM SPECIFIC DETERMINENTS OF CORPORATE SUSTAINABILITY REPORTING: SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract

Corporate sustainability reporting (CSR) can be considered an important indicator to identify the link between global Sustainable Development Goals (SDG) and Corporate sustainable performance. Firms have a major responsibility towards achieving these goals and CSR is a mechanism used by them, to make aware of the type of activity firms engage into their stakeholders and monitor the effect of their activities have on the environment. Many researchers have focused their attention on determining firm specific characteristics on sustainability reporting. The objective of this study is to explore the commonly identified determinants of CSR in prior studies and their general effect, through the systematic review and meta-analysis technique. The systematic review conducted for the 20-year period from year 2000, included a final sample of 27 empirical journal articles. Random Effect model was employed for the meta-analysis with considering the effect size as correlation coefficients between CSR score and the firm characteristics and for more accurate results subgroup analysis according to country setting was used. The results exhibited that, the most frequently identified determinants in prior research were firm size, profitability and leverage. Firm size reported to have a significant positive overall effect (0.434 with p-value of 0.0) with SR, irrespective of the country setting, which indicates that, there is more tendency for that company to engage in CSR, when the corporate size increases which in line with previous research findings. Profitability and firm leverage had shown an insignificant relationship with SR. The analysis concluded that, the utmost influential firm specific factor on SR, is firm size, while other firm characteristics do not significantly affect SR. The effect of firm size is higher for developed countries compared with developing countries.

Keywords: Systematic Review, Meta- Analysis, firm attributes, correlation, sub-group analysis

ISOLATION AND IDENTIFICATION OF EFFECTIVE AND LOW-COST BACTERIA CONSORTIA FOR COD REDUCTION OF LAND FILLS LEACHATE (A GREEN SOLUTION FOR TREAT LAND FILLING LEACHATE)

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Abstract

The occurrence of high Chemical Oxygen Demand (COD) values in leachate is a potential health risk since it can contaminate ground water sources. The COD refers the amount of oxygen consumed by organic matters when they are oxidizing into inorganic compounds in water. The landfill leachate is one of the most significant types of waste water which contains higher COD levels since the accumulation of pollutants. The present study was focused on isolation and identification of more efficient bacterial consortia to reduce COD in landfill leachate. Samples were collected from Karadiyana control open damp site during November, 2019. In the preliminary study, bacterial isolates from leachate samples were screened to detect the COD reduction potential using 20% diluted sterile leachate sample. Initial and final COD levels were measured daily by closed reflux titrimetric method. Pour plate method and streak plate method was followed to isolate different bacterial colonies and three gram negative bacterial isolates (A, B, C) out of 32 morphologically different bacterial isolates were identified as more efficient bacteria candidates for reduction of COD. Bacterial isolates A, B and C was individually reduced COD levels up to 50.85%, 48.21% and 45.21% respectively within 14 days at room temperature. The bacterial isolates were used to prepare four bacterial consortia (AB, AC, BC, and ABC) which have ability to reduce COD levels in landfill leachate up to 52.8%, 51.2%, 49.3%, 60.1% respectively while control was reduced up to 15.25% Thus, the results of the present study suggest that the identified bacterial consortia ABC can be used as a potential biological treatment for reduction of high COD levels in landfill leachates

Keywords: Microbial consortia, leachate, COD, biological treatment, bacterial isolates.

POLYAROMATIC HYDROCARBON DEGRADING ABILITY OF *Bacillus* spp. PHYLLOSPHERE BACTERIA INHABITING URBAN AREAS IN SRI LANKA

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Abstract

Polyaromatic hydrocarbons (PAH) have become one of the common threats that contribute to air pollution. PAH were concerned as major pollutants since their higher carcinogenicity and genotoxicity. Even though there are numerous anthropogenic sources of PAHs, leading sources of PAHs are vehicular emission and oil refinery processes. The discharge of such air pollutants in dense concentrations are getting settled over the phyllosphere through dry and wet deposition and most of the phyllosphere bacteria are able to degrade PAHs. This study is to identify the best PAH degraders in *Bacillus* species and optimization of the method using spectrophotometer and High-Performance Liquid Chromatography (HPLC). Bacterial isolations were carried out by the leaf samples collected from Panchikawatta, Orugodawatta, Pettah, Maradana, Colombo Fort and Sapugaskanda oil refinery sites. Initially, the PAH degradation ability of isolated phyllosphere bacteria was screened using a plate assay. Subsequently, PAH degradation by each bacterial species was analysed using the UV-Vis spectrophotometer and HPLC. The selected bacterial isolates were identified up to species level through PCR amplification and sequencing the amplified 16s rRNA fragments using the primers 1492R and 27F. According to the HPLC confirmation results, the best Anthracene and Phenanthrene degrader was *Bacillus* sp. 1. The most efficient Naphthalene degrader was *B. velezensis*, *Bacillus* sp. P_2B-02 and *B. megaterium* showed 100% of Pyrene degradation capability. All these four Bacillus species had more than 25% of aromatic hydrocarbon degrading ability. The discoveries of the present investigation suggest the potential use of the phyllosphere microorganisms in remediating environment pollutants such as PAH. The *Bacillus* spp. could be useful as potential biological agents in effective bioremediation campaigns in polluted environments contaminated with polyaromatic hydrocarbons.

Keywords*: Phenanthrene, Anthracene, Naphthalene, Pyrene,* bioremediation

REMOVAL OF COMMERCIAL TEXTILE DYES BY IMMOBILIZED PUTATIVE LACCASE ENZYME FROM *Talaromyces* sp.

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Abstract

The removal of dyes from textile wastewater effluents grants a formidable challenge, as synthetic dyes are resistant for natural degradation processes. Laccases have high potential to degrade various aromatic compounds with less specificity. Therefore, potential applicability of laccase enzymes on textile dye decolorization processes was evaluated in the present study. The putative laccase enzymes were extracted from the fungi; *Talaromyces* sp. and partially purified by ammonium sulphate precipitation followed by dialysis. The putative laccase was immobilized on sodium alginate beads and 20 gL^{-1} of beads were introduced into 50 mgL^{-1} of three commonly used textile dyes; CI Direct Blue 201 (DB), Cibacron Blue FR (CB FR) and Moxilon Blue GRL (MB GRL) dyes, separately. Similarly, dye decolorization experiment was carried out using 8% (v/v) of putative laccase without immobilization. Controls were maintained without addition of enzyme. The extent of dye decolorization and the activity of laccase (ABTS oxidation, ε_{420} = 36000 M^{-1} cm^{-1}) were determined by measuring the changes of the absorbance using UV-Vis spectrophotometer. The protein contents of the samples were determined using Bicinchoninic Acid Protein Assay kit. In the present study, specific enzyme activity of crude and partially purified putative laccase enzymes were recorded as 2.4 and 40 Umg^{-1}, respectively. When dyes incubated with immobilized laccase gel beads, 100% dye decolorization was observed for MB GRL within 16 hrs of incubation. DB 201 and CB FR showed 65% and 78% dye decolorization, respectively at 24 hrs of incubation and then descending dye decolorization patterns were observed. All dyes showed less than 50% of dye decolorization as a response to the liquid laccase without immobilization while controls were remained unchanged. Therefore, the immobilized putative laccase enzyme extracted from *Talaromyces* sp. can be used for the removal of textile dye contained wastewater in greener aspects. Further studies on the enzyme kinetics are yet to be carried out.

Keywords: Immobilization, *Talaromyces* sp., dye decolorization, laccase, enzym

STEMFLOW GENERATION BY SEVEN URBAN TREE SPECIES WITH REFERENCE TO RAINFALL AND RAINFALL INTENSITY IN UNIVERSITY OF SRI JAYEWARDENEPURA, SRI LANKA

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Abstract

Stemflow (SF) is the process in which a portion of incident rainfall (RF) entrained by canopy and flowed down to trunks and stems. The SF generation of urban environment in single rain events are less frequently reported than in forested ecosystem. Therefore, SF variation was studied in the urban environment with reference to RF and RF intensity. The SF of 21 individual trees (belonging to 7 species with 3 replicates) located in University of Sri Jayewardenapura, Sri Lanka were studied by installing SF collars at diameter at breast height (DBH) and connected to storage tanks. The SF was measured for 20 number of rain events starting with dry canopy condition from August 2019 to November 2019. Gross precipitation was recorded using an automated weather station located in an open area in University premises. Relationships were built up with SF and RF, RF intensity. It was found that the all plant species have produced SF for all rain events greater than 4 mm. A strong positive relationship ($p<0.00$; $R^2=0.99$) was resulted between SF and RF for all studied plant species. The highest (50.14%) and the lowest (0.89%) SF were generated by *Felicium decipien* and *Pterocarpus marsupium* Roxburgh species. The RF intensity was not significantly influenced for SF generation for the all studied 7 plant species since this study was done under low RF intensity. The results suggest a significant variation in SF by species and the arrangement could be made as *Felicium decipiens* > *Mesua ferrea* L > *Diptercarpus zelanicus* Thwaites > *Delonix regia* (Boj. Ex Hook.) Raf. > *Azodrachata indica* > *Casuarina eqisetifolia* L > *Pterocarpus marsupium* Roxburgh based on species specific SF and the result can use to selection of urban tree species towards integrated rainwater management in cities.

Keywords: Rainfall, rainfall intensity, stemflow, storm water management, urban forestry

TOWARDS A SUSTAINABLE TEXTILE INDUSTRY: A PRELIMINARY STATUS QUO ANALYSIS OF THE TEXTILE WASTE MANAGEMENT IN SRI LANKA

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Abstract

Textile industry plays an important role in global economy. At the same time the generation of large amount of textile waste creates tremendous environmental problems. Textile waste management is a challenge in Sri Lanka due to the lack of sustainable waste management solutions. The main objective of this study is to present a preliminary status of the QUO analysis of Sri Lankan textile industry using Integrated Sustainable Waste Management Model (ISWMM) as a theoretical framework. Data were gathered through a questionnaire survey and in-depth interviews with the relevant persons in the sustainability divisions of the textile companies. The survey and interview data were cross-checked with reports submitted to other organizations. Twelve large scale textile industries were selected for the survey in the present study. The field observations and the analysis confirmed that the trends and practices in the textile waste management in Sri Lanka were not different among medium to large scale textile companies. The findings revealed that the Sri Lankan textile industry mostly use synthetic fabrics or the mixtures. Waste generation occurs at different stages of the manufacturing processes including cutting, knitting and finishing. A majority of raw material related waste mostly consisted of fabric offcuts, trimmings, rejected products and fabrics. Reusing and recycling of textile waste is given a priority and up cycling practice was also identified as a new trend to manage textile waste. Enabling aspects of the waste management were found to be technical, environmental, socio-cultural, financial and economic, institutional, political and legal aspects. The authors highlight that sharing these findings could assist more textile companies in the country and in the region to evaluate their current practices and identify best practices that could implement in transitioning to a sustainable textile sector.

Keywords: Textile industry, Textile waste, Sustainable waste management, ISWMM, Sri Lanka

HEALTH SCIENCES & NUTRITION

ASTHMA CONTROL AND SLEEP QUALITY AMONGST ASTHMATIC ADULTS: RESULTS FROM COLOMBO, SRI LANKA

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Abstract

Global asthma network recognises Sri Lanka as a country with high prevalence of asthma. Most asthma patients commonly have episodes of worsening nocturnal asthma symptoms causing sleep disturbances. However, sleep quality among asthmatic adults in Sri Lanka is unknown. Therefore, the study was conducted to determine asthma control, sleep quality and its association amongst asthmatic adults attending respiratory clinics in selected hospitals in Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted on 180 patients diagnosed with asthma. An interviewer administered questionnaire used to determine base line data. Asthma control was assessed using Asthma Control Test and lung function was measured using a spirometer (ndd Dynamic Inc., Switzerland) and a calibrated peak flow meter. Sleep quality was determined using the Pittsburg Sleeping Quality Index (PSQI). PSQI determines subjective sleep quality, sleep duration, habitual sleep efficiency, sleep disturbances, sleep disturbances, use of sleep promoting medications and daytime dysfunction by a questionnaire. In this study 60% were females. Only 33.3% had controlled asthma, 37.8% had partially controlled asthma and 28.9% had uncontrolled asthma. Asthma control was better amongst males (17.8%) than females (15.6%). Over 64.4% had deficient sleep according to the PSQI. Sleep disturbances due to asthma was greater in females ($p=0.019$). There was no significant difference between PSQI scores and lung function test parameters (FEV_1, FVC, FEV_1/FVC and PEFR). None of the patients with good asthma control (33.33%) complained of sleep disturbances. The study revealed that there was a strong negative correlation between PSQI scores and Asthma Control Test scores ($p<0.001$). Patients should be made aware of worsening of asthma during sleep. Asthma patients should be taught the use of rescue medications to prevent exacerbations. Quality of sleep is poorly addressed in most asthma clinics and need to be prioritised to achieve better asthma control.

***Keywords*:** Asthma, Sleep, Asthma control, Adults, Sleep quality

BIOFILM FORMATION AT DIFFERENT pH LEVELS BY GROUP B STREPTOCOCCUS ISOLATED FROM PREGNANT WOMEN

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Abstract

Group B Streptococcus (GBS) causes neonatal and maternal infections. Many bacterial species are capable of formation of biofilms and there is a growing body of evidence implicating biofilms in various human infections. Some studies investigated the GBS biofilm formation under neutral and acidic pH and found that larger biofilms formed at pH 6.5 or 7 than normal vaginal pH 4.2. However, some studies found that biofilm formation was enhanced at a low pH as 4.2. Conflicting data were reported regarding biofilm forming ability at different pH levels. Aim of this study was to determine the effects of pH changes on biofilm forming ability of GBS isolated from pregnant women in Western Province, Sri Lanka. A descriptive cross-sectional study was carried out from January to July 2019 in selected hospitals. Vaginal swabs were collected from 130 pregnant women at 35-37 weeks of gestation. Specimens were cultured according to standard methods. A total of 30 confirmed isolates of GBS out of 130 samples were tested for biofilm forming ability by using Todd Hewitt broth (THB) supplemented with 1% glucose at pH 4.5, 6.0 and 7.0. Average Optical Density with standard deviation (SD) was calculated. At pH 4.5, 13 isolates (43.3%) were non biofilm formers (NBF) and others formed weak/moderately strong biofilms. There were no strong biofilm formers. At pH 7, 17 (56.6%) and 11 were strong and moderate biofilm formers respectively. This shows that biofilm formation is sensitive to pH changes and is enhanced at a higher pH level. Determination of biofilm formation by GBS from vaginal swabs may be useful for developing an effective treatment plan for neonatal sepsis. High vaginal pH may be a risk factor for GBS infection and also influence both GBS survival and biofilm production.

***Keywords*:** Biofilm, Different pHs, Group B Streptococcus

CAREGIVER KNOWLEDGE AND PERSPECTIVES ON THE SPEECH LANGUAGE THERAPISTS' RECOMMENDATION OF TEXTURE MODIFIED FOOD IN THE MANAGEMENT OF PATIENT WITH DYSPHAGIA

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Abstract

Primary caregivers of patients with dysphagia are mainly involved in preparing recommended meals and feeding. Caregiver knowledge and perception on impacts of dysphagia management have not been studied adequately and there is limited evidence-based literature regarding nutritional care for patient with dysphagia. Objectives: The study focused on caregivers' knowledge and perspectives on the speech and language therapist recommendation of texture modified food in the management of patients with dysphagia. It also investigated caregivers' knowledge on diet modification techniques and food consistencies, methods by which information on diet modification was delivered to the caregiver, caregiver perception on diet modification techniques, and identifying factors that affect caregivers' perception on diet modification as a method of dysphagia management. Methodology: This was a descriptive cross-sectional study and a purposive sampling technique was used. From selected general hospitals, 40 caregivers of patients with dysphagia for whom a modified diet has been recommended participated and data was collected using an interviewer administrated questionnaire. The data was analysed by using SPSS and qualitative thematic analysis. Results: Caregivers perceived that there was a difficulty in texture modifying foods which were recommended by the Speech Language Therapists. Of the participants, 71% indicated that they were unaware or unsure of the different food consistencies (solid, semi-solid, mash food, pureed, thin liquid, liquid). Regarding their knowledge on their ability to change food from one consistency to another, 90% participants were unable or unsure on how to change food from one consistency to another. Participants (n=32) scored _<50% when asked to provide examples for the different food consistencies recommended for their patients. Although 39 (97.5%) participants received verbal information on the required diet,only 9 (22.5%) participants were shown real time examples of the recommended food consistencies for better understanding. Patients (n=20) refusal and traditional beliefs were identified as the factors that most affected the caregiver ability to provide recommended texture modified meal plan for their dependence. Conclusion: Caregiver who is the primary meal provider demonstrated significantly insufficient levels of knowledge on texture modification based on professional recommendations. The participant responses showed insufficient quantity and minimal variety in methods used by professionals to deliver information. Lack of time, lack of confidence in skill and worry of patient aspirating primarily affected the caregivers' overall confidence and led to negative perceptions. The caregivers' financial state, patient refusal and tradition and beliefs are the primary factors that affect caregiver ability to continually provide a recommended texture modified meal plan for their dependents.

***Keywords*:** dysphagia, texture modified diet, caregiver, knowledge, perception

Cinnamomum verum (Syn. *C. zeylanicum*) LEAF ESSENTIAL OIL AS A *Candida* BIOFILM CONTROL STRATEGY

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Abstract

The oils extracted from cinnamon leaves has been used as an antimicrobial agent for generations. However, the antibiofilm activity of cinnamon leaf oil is not well studied. This study evaluates the effect of *C. verum* leaf oil on biofilm formation and mature preformed biofilms of *C. albicans* and *C. tropicalis*. Effect of essential oil (EO) on adhesion of *Candida* was evaluated by allowing cells to adhere to polystyrene surface for 2 h followed by cellular quantification using XTT. Inhibitory effect of cinnamon oil on forming biofilms in the presence of oil was evaluated using XTT viability. Visualization of biofilm aggregates under chemical stress of EO was done using Scanning Electron Microscope (SEM) and the biofilm progression was analyzed using Time lapses microscope. Effect of EO on preformed biofilms was determined and visualized using XTT assay and SEM respectively. Post-exposure cellular alterations were visualized using Transmission Electron Microscopy (TEM). *In- vivo* toxicity of oil was determined using *Galleria mellonella* larvae. Positive control: Chlorhexidine digluconate. 1.0 and > 2.0 mg mL^{-1} reduced initial adhesion of *C. albicans* and *C. tropicalis* respectively by 50%. Minimum Biofilm Inhibitory Concentration ($MBIC_{50}$) of forming biofilms were $\leq$ 0.35 mg mL^{-1} for both strains. Minimum toxic concentration which prevent biofilm development was 1.0 mg mL^{-1}. $MBIC_{50}$ for preformed biofilms were $\leq$0.2 mg mL^{-1} for test organisms. SEM indicated cellular shrinkages, cell wall damages, and decreased hyphae formation of *Candida*. TEM showed cell wall damages, intracellular granulation and vacuolization. No toxicity was observed with *in-vivo* experiment. *C. verum* EO causes reduced adhesion, retardation of *Candida* biofilm development and destruction of established biofilms of *Candida* spp without exhibiting any lethal effect on the *in-vivo* model.

***Keywords*:** *Cinnamomum verum,* Essential Oil, *Candida spp.,* Biofilms, *In-vivo* toxicity.

COLONIZATION AND INFECTIONS OF CENTRAL VENOUS CATHETERS IN CANCER PATIENTS ADMITTED TO AN INTENSIVE CARE UNIT

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Abstract

Central venous catheter (CVC) insertion is a common practice in medical care of patients with malignancies. However, CVCs get colonized with microorganisms leading to catheter related blood stream infection (CRBSI), with high morbidity and mortality. This study investigated microorganisms causing CRBSI and catheter colonization, their antibiotic resistance and factors associated with CRBSI at the National Cancer Institute, Maharagama. One hundred and seventy adult patients admitted to the intensive care unit (ICU) and with a CVC in-situ for >48 hours were included. Culture of peripheral blood, line blood and CVC tips were performed, and isolated microorganisms were identified and tested for antibiotic susceptibility. Incidence of CRBSI was 5.24 per 1,000 catheter days and 10 patients were detected to have CRBSI. Predominant pathogens were *Klebsiella* (5/10) and *Pseudomonas* species (3/10). Eighty-nine catheters (52.35%) were colonized, and it was mainly due to Coagulase Negative Staphylococci-CoNS (58.43%). Other colonizers were *Candida* species (7.87%), *Pseudomonas* species (6.74%) and *Acinetobacter* species (6.74%). Eighty percent (4/5) of *Klebsiella* species were resistant to piperacillin/ tazobactam while 66.66 % (2/3) of *Pseudomonas* species were resistant to meropenem. Mean duration of ICU stay in patients with CRBSI was 5.1 days while it was 2.94 days in patients without CRBSI which was statistically significant ($p = 0.0006$). Local complications were found only in one patient with CRBSI. In conclusion, although CoNS is the leading cause of colonization, Gram negative bacteria like *Pseudomonas* and *Klebsiella* species are the commonest organisms causing CRBSI in this patient population. Antibiotic resistance is common in bacteria causing CRBSI and colonization. ICU stay of more than 5 days is significantly associated with CRBSI.

***Keywords*:** Catheter related blood stream infections

COMPARISON OF THE ASSESSMENT OF ENERGY EXPENDITURE IN POSTPARTUM WOMEN WITH A HISTORY OF GESTATIONAL DIABETES FOLLOWING A HOME-BASED PHYSICAL ACTIVITY PROGRAM: OBJECTIVE VS SUBJECTIVE METHODS

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Abstract

Physical activity is recommended to postpartum women with prior gestational diabetes mellitus (GDM) to attenuate its progression to diabetes mellitus (DM). Accurate assessment of physical activity is crucial in order to estimate the daily energy expenditure. Although several methods are available, the use of international physical activity questionnaire (IPAQ) and the activity diary are popular self-reported, subjective methods while pedometer provides objective evidence of physical activity. The aim of this study was to compare these methods in determining energy expenditure of postpartum women. A purposive sample of 50 postpartum women with a history of GDM, recruited from special postnatal clinics in three Districts of Sri Lanka underwent a home-based physical activity program for a period of 12 months. They were advised to maintain activity diaries and pedometer readings for a period of one week each month and the IPAQ was administered by the investigator at the end of six and 12 months and the energy expenditure was calculated separately by the three methods at those time points. Friedman test was performed to compare the energy expenditure between the three methods. The median energy expenditure assessed by IPAQ, activity diary and pedometer readings were 407.45, 460.93, 370.00 kcal/day respectively at six months and 423.12, 447.08 and 380.00 kcal/day respectively at 12 months. The energy expenditure assessed by the two self-reported tools were comparable at both time points studied. However, the energy expenditure assessed by pedometer data were significantly lower ($p<0.001$) than the values obtained by the self-reported tools probably because pedometer output data is limited to the number of steps taken. A combination of one self-reported tool with pedometer is recommended to capture all activities contributing to energy expenditure while taking steps to eliminate subjective bias for accuracy of data.

***Keywords*:** Energy expenditure, IPAQ, pedometer, activity diary, women

DETERMINATION OF ANTIFUNGAL ACTIVITY OF AQUEOUS EXTRACT OF *Terminalia arjuna* BARK AGAINST *Candida albicans*

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Abstract

Terminalia arjuna commonly known as Kumbuk, is a plant used in ayurvedic medicine for the treatment of many diseases. Its therapeutic potential concerning the treatment of fungal infections is not yet investigated scientifically. The present study aims to determine the antifungal activity of aqueous extracts of *T. arjuna* bark against *Candida albicans* (ATCC 10231). Antifungal activity against *C.albicans* was screened using the agar well diffusion method and broth microdilution method using nystatin as the positive control. The Minimum Fungicidal Concentration (MFC) was determined by the broth microdilution method. The results were observed after 48-hour incubation at 37 ^{0}C. The potency was determined against nystatin (nystatin equivalent antifungal activity). The extract showed significant (p=0.667) mean zones of inhibition in the agar well diffusion assay at a concentration of 200 mg mL^{-1}. The MFC of the extract was observed at 50 mg mL^{-1}. The phytochemical analysis revealed the presence of triterpenoids, cardiac glycosides, tannins, carbohydrates, reducing sugars, and saponins in the extract. The study showed the aqueous extract of *T.arjuna* bark can be used in the treatment of *C.albicans* infections. Therefore, *T.arjuna* may be a potential candidate for further investigation on the development of new antifungal agents against candidiasis and candidemia.

***Keywords*:** Terminalia arjuna, Antifungal, Candida albicans

EATING BEHAVIOURS AND ASSOCIATED FACTORS AMONG ADOLESCENTS IN GOVERNMENT SCHOOLS IN RATHNAPURA DISTRICT, SRI LANKA

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Abstract

Adolescence is a period of rapid growth and development, bridging childhood and adulthood. Behaviours adopted during adolescence would continue into adult-life and determine the future health status. Sri Lanka is having a very high disease burden due to diet related non-communicable diseases. Research on adolescent eating behaviours is scarce in the country context. Hence, the objective of this study is to describe eating behaviours and to identify its associated factors among Sri Lankan adolescents. A descriptive cross-sectional study was conducted among cluster sampled; 384 secondary school children aged 12-16 years in governments schools in Rathnapura District using a self-administered questionnaire. The validated Sinhala version of 23-item Adolescents Food Habits Checklist (AFHC) was used to assess eating behaviours. Descriptive statistics and independent sample t test were used in data analysis. The level of statistical significance was taken as $p<0.05$. Mean age was 14.33 (SD=2.63) years. The majority were girls (50.8%, N=195), living in rural areas (88.0%, N=338). Mean AFHC score was 15.54, SD=3.62 (min=3; max=23). Significantly higher mean AFHC scores were associated with age <15 years [(M=15.83, SD=3.38) t=2.08, p=0.037], engaged in moderate to vigorous physical activities (MVPA) of >20 min per day [(M=15.72, SD=3.52) t=2.37, p=0.018], bringing home made meals [(M=16.54, SD=3.17) t=2.62, p=0.009)] and exposure to childhood healthy food practices [(M=15.63, SD=3.55) t=4.14, p<0.001], and school programmes on healthy eating behaviours [(M=15.82, SD=3.51) t=4.09, p<0.001]. Aged <15 years, engaged in MVPA of >20 min per day, bringing home-made meals, school programmes on healthy eating, exposure to childhood healthy food practices have a positive influence on healthy eating behaviours among adolescents. Generalizing the findings to be done with caution since only one District was included in the study.

***Keywords*:** Adolescents, Family factors, Eating behaviours, Adolescents Food Habits Checklist, Sri Lanka

EFFECT OF AEROBICS DANCE ON A SAMPLE OF SEDENTARY OBESE WOMEN

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Abstract

Obesity is one of the major problems in a sedentary lifestyle. The purpose of this study was to explore the effect of a 08-week aerobics dance training on Body Mass Index (BMI), body fat mass, and waist circumference, of sedentary obese women. The researchers utilized an experimental method with pre-test and post-test design, with no control group. This study employed 30 sedentary women who use the Kotahena jogging track. The sample was selected based on a convenience sampling technique. The intervention was given for 08-weeks with three sessions per week. Bio-impedance was utilized to measure BMI, and the skinfold calliper was used to measure the thickness of a pinch of skin and the fat beneath it in specific areas. Data were analysed using SPSS (23rd version) software. The mean BMI value (31.11kgm^{-3}) and mean waist circumference value (99.02cm) of the pre-test was significantly different from the mean values of the post-test which were 30.27kgm^{-3} ($p=0.001$) and 97.43cm ($p=0.001$) respectively. The mean differences between the pre and post-tests in body fat mass which included subscapular fat, right bicep fat, right triceps fat, abdominal fat, right thigh fat, and right calf fat were 1.73mm, 1.37mm, 1.97mm, 1.93mm, 1.93mm, and 1.57mm respectively. All the mean values for body fat mass parameters showed a significant difference in the post test ($p<0.001$). According to the obtained results, it can be concluded that aerobic dance training had resulted in a significant reduction in BMI, body fat mass, and waist circumference in the study sample. Hence, this study confirms that 8 weeks of aerobics dance training is a useful exercise modality for weight loss in sedentary obese women.

***Keywords*:** Body Fat Mass, Body Mass Index, Waist Circumference, Women Obesity

EFFECTS OF MICROCYSTIN-LR ON KIDNEY AND LIVER; A TOXICOLOGICAL RAT MODEL ASSESSMENT

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Abstract

Naturally derived cyanotoxin, Microcystin-LR (MC-LR) found in freshwater systems poses a threat to human health mainly affecting the functions of the kidney and liver. The present study was aimed to determine the possible effects of MC-LR on mammalian kidneys using male Wistar rats as the animal model. An ethically approved (No. 17/18, ERC, FMS, USJ) experimental protocol was used in the study. Thirty-five rats were divided into five groups (n=7) and were orally treated with different doses of MC-LR (0.105 µg/kg, 0.070 µg/kg, 0.035 µg/kg) and an environmental water sample collected from a well contaminated with MC-LR (0.091 µg/kg) from Padaviya in the district of Anuradhapura, Sri Lanka where high prevalence of Chronic Kidney diseases of Unknown etiology (CKDu) was recorded. The control group was treated with distilled water. The total exposure of the rats to the relevant doses was for 90 days. Blood and urine samples from individual animals were collected at 0, 7, 14, 28, 42, 60, 90 days to analyze serum and urine creatinine and the Kidney Injury Molecule-1 (KIM-1). Concentrations of MC-LR in urine was quantified by an ELISA method. Aspartate Amino Transferase (AST), Aspartate Alanine Transferase (ALT) and Full Blood Count (FBC) were also analyzed. The mean body weight of the treated and control groups of rats gradually decreased until the sixteenth week and a statistically significant difference was found (p=0.03) between treated and control groups. The absolute and relative weights of liver and kidneys of the treated groups were less than those of control group. A marked increase in the concentration of serum creatinine from 0.50±0.01 to 0.54±0.05 mg/dL, 0.50±0.02 to 0.55±0.06 mg/dL, 0.50±0.02 to 0.57±0.09 mg/dL, 0.50±0.02 to 0.51±0.06 mg/dL were detected for 0.105 µg/kg, 0.070 µg/kg ,0.035 µg/kg and 0.091 µg/kg doses of the MC-LR treated groups of rats compared to the control (0.50±0.01 to 0.59±0.08 mg/dL) following 90 days of exposure. Reductions in the concentrations of urine creatinine from 52±1 to 43±4 mg/dL, 51±1 to 43±1 mg/dL, 52±2 to 45±7 mg/dL, 52±2 to 44±7 mg/dL were recorded when MC-LR concentration in urine increased from 0.4±0.1 to 1.2±0.3 µg/L, 0.2±0.1 to 0.6±0.1 µg/L, 0.1 to 0.3 µg/L and 0.5 to 1.0±0.3 µg/L in MC-LR exposed animal groups. The highest AST, ALT and KIM-1 concentrations were recorded in animals given the treatment dose of 0.105 µg/kg. Thus, the results of the present study confirms that the consumption of Microcystin-LR contaminated water leads to liver and kidney injuries in Wistar rats.

Keywords: Microcystin-LR (MC-LR), Wistar Rats, ELISA, AST, ALT, KIM-1

ENVIRONMENTAL RISK FACTORS RELATED TO CUTANEOUS LEISHMANIASIS IN A DERMATOLOGY CLINIC AT BASE HOSPITAL THABUTHTHEGAMA: A DESCRIPTIVE STUDY

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Abstract

Cutaneous Leishmaniasis (CL) is an endemic disease in Sri Lanka and it is considered to be a notifiable disease from year 2008. It is a vector-borne disease caused by a protozoan parasite and transmitted by an infected female phlebotomine sand fly. Anuradhapura has been one of the areas to show high incidences of Leishmaniasis in Sri Lanka. The purpose of this study was to identify the environmental risk factors related to CL. A quantitative descriptive study was conducted among patients who were diagnosed with CL and visited the dermatology clinic of the Base Hospital, Thabuththegama**.** Two hundred participants were recruited to the study by using a convenience sampling method. A self-administered questionnaire was used to collect data and Statistical Package for Social Sciences (SPSS) Version 21 was used to analyze the data. Most (41.5%, n=83) infected with Leishmaniasis were living in a residence less than 50m away from a forest and 43% (n=86) of participants had never used insect repellents (the substances applied to skin, clothing, or other surfaces which discourage insects from landing or climbing on the surfaces). Study findings revealed that not using insect repellents ($p<0.05$), residing near the forest ($p<0.05$) had a significant association with CL. People living close to paddy fields and forests, not using insect repellents, raring animals (dogs), having open drainage systems and keeping garbage exposed were found to be main environmental risk factors which highly influenced the prevalence and development of CL and contributed to the spread of the disease. Hence, an awareness programme aimed towards environmental risk factors related to CL, identifying reservoir hosts and vector control to be integrated within the community is highly recommended.

Keywords**:** Environmental risk factors, Cutaneous Leishmaniasis, Dermatology, Thabuththegama, Descriptive

EXAMINATION OF SKELETAL REMIANS: IMPORTANCE OF FORENSIC ANTHROPOLOGY IN CRIME SCENE INVESTIGATIONS

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Abstract

The scene examination is usually an exhaustive, time consuming exercise needing a lot of manpower and money. However, it is almost always useful in determining medico-legally important facts but occasionally it might become a futile exercise. Two scene examinations related to forensic anthropology are illustrated here. The case number one is regarding a suspicious case of homicide which was said to be secretly disposed by burning after killing the victim. The second case was a set of bones found in a temple following an anonymous call to the police. According to the routine practice both scenes were visited by the magistrate and the Judicial Medical Officer (JMO) of the relevant area. Examination of the two sets of bones revealed one to be human and the other to be of animal origin. At times, the scene investigation seems to be of no use but for formulation of medico-legal opinion scene examination is considered to be a mandatory exercise.

Keywords: futile crime scene investigation, JMO, forensic anthropology

EXPERIENCE GATHERED BY JUDICIAL MEDICAL OFFICERS DURING THE COVID-19 PANDEMIC INCLUDING A MINI REVIEW

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Abstract

The staff of a mortuary should invariably be responsible when handling "high risk" autopsies such as suspected cases of COVID 19. SARS-CoV-2 transmission is mainly through respiratory droplets and the other method being the direct contamination secondarily from already infected surfaces. The novel corona virus is considered as a Hazard Group 3 (HG3) pathogen. Performing of autopsies are considered relatively safe provided the guidelines are followed and the mortuary is well equipped. The author was personally involved in obtaining samples for SARS-CoV-2 in many cases. In the case under discussion a scene visit had been ordered by the magistrate as the deceased was found dead by the side of a road with suspicious circumstances. The deceased had experienced mild respiratory symptoms before his death. The cause of death was finalized as IHD (Ischemic Heart Disease) upon all investigations as it was possible to exclude other differential diagnoses including COVID 19. Since this case was handled rather early in the epidemic, many hardships were faced by the author. Transportation of the dead body to the mortuary was also quite problematic. The single dissection area of the mortuary without an ideal ventilation system to handle Hazard Group 3 pathogen, limited storage area for dead bodies, and the staff anxieties were a few out of many. A mini review about COVID 19 is illustrated here with the emphasis of the necessity of well-equipped mortuaries with engineering control (proper ventilation system).

***Keywords*:** well ventilated mortuary, Hazard Group 3 pathogen, COVID 19

EXPLORATION OF HEALTH-RELATED ARTICLES PUBLISHED IN DAILY SINHALA MEDIUM NATIONAL NEWSPAPERS

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Abstract

According to provisional data in the latest edition of Central Bank's Economic and Social Statistics publication Sri Lanka, more than 30 million newspaper copies were sold in 2016 compared to 2015. This is going against the global flow. Therefore, newspapers could be utilized as a one of the effective media for health education and promotion in Sri Lanka. However, no data on descriptive studies on the number and type of health-related articles published in these newspapers are reported. Thus, the objective was to study health-related articles published in daily National Sinhala newspapers. The study was a descriptive cross-sectional study conducted in a randomly selected period of one month in 2018. The sample comprised of 404 newspaper articles from most selling daily Sinhala national newspapers in Sri Lanka. Articles with the heading including "name of any illness/name of directly noted health issue/name of category of health staff/name of health institute" were analyzed. Among the health-related articles 56% (n=244) was written by local reporters. The involvement of experts in writing the article was only 20.5 % (n=85). When compared to the amount of non-health related newspaper articles, the emphasis made on report writing related to different disease conditions and on the healthcare system of Sri Lanka is low. Of the total, maximum health related articles were published in Monday (n=104). Nearly 50% were in the main section and only 11% were in the Health section (n=45). Nearly 77% was written in inner pages (n=310), only 6.4% were located in the front (n=26). Nearly 55% of article headings were written in 28-72 font size (n=224). Nearly 50% were small articles (n=200). Local event reporting was observed to be very common (n=218, 54%). This study reveals that less emphasis has been paid on healthcare related report writing in national newspapers in Sri Lanka during the study period.

Keywords: Health, Newspapers, Articles, Experts

HOW DOES ANTIOXIDANT POTENTIAL VARY WITH PROCESSING? A STUDY WITH SELECTED TRADITIONAL RICE VARIETIES OF SRI LANKA

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Abstract

Rice brans are a potent source of naturally occurring antioxidants. However, total phenol contents (TPC) and antioxidant capacities of differently processed traditional rice varieties have not been studied. Therefore, the objectives of this study were to analyse TPC and antioxidant potentials of differently processed (raw under milled, raw polished (4%) and parboiled under milled) four red and two white coloured less commonly consumed traditional rice varieties namely, *Godaheenati, Batapola el, Dik wee, Dahanala, Unakola samba* and *Hangimuththan* respectively. Parboiling was by traditional method. In addition, both cooked and raw rice were assessed to determine the effect of cooking on the antioxidant potentials. Antioxidant activities (ABTS, DPPH and FRAP) and TPC were analysed using standard methods. Data were analysed using a statistical software (SPSS). Mean TPC of both uncooked and cooked, raw polished rice were the lowest (4.9-6.1 mg GAE/g) and the highest TPC was in raw (5.3-6.7mg GAE/g) rice. Mean ABTS activity of raw polished rice (0.8-1.9mg TE/g) was lowest followed by parboiled (1.2-2.3mg TE/g) and raw rice (1.3-2.1mg TE/g). Mean DPPH scavenging and FRAP activities followed the same pattern with uncooked rice having the highest in raw (4.5-6.2mg AE/100g;4.6-14.4mg AE/100g) followed by parboiled (4.4-5.1mg AE/100g;5.0-15.2mg AE/100g) and lowest in raw polished (4.0-4.6mg AE/100g; 5.1-18.5 mg AE/100g) respectively. White varieties showed least activities in all above assays. Phenolic compounds and antioxidant potential increased in the order of raw polished, parboiled and raw rice flour in both cooked and uncooked rice. However, cooking had reduced the antioxidant potentials in all differently processed varieties which may be due to the loss of antioxidant compounds during cooking. Rice grains with red coloured bran produced higher antioxidant activity compared to white varieties due to the presence of more anthocyanins in red rice bran.

***Keywords*:** total phenol contents, antioxidant capacities, traditional rice, parboiling, milling

IMPORTANCE OF EARLY DIAGNOSIS OF ACUTE AORTIC SYNDROME: A CASE REPORT

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Abstract

Aorta is a part of the body that at times can even be considered as a separate entity or as a "whole organ" by considering the diversity of the disease entities that it will give rise to. Acute aortic syndrome encompasses a collection of a few emergency conditions including aortic dissection. Clinical examinations and laboratory testing play a minor role in diagnosis of aortic diseases. On the other hand imaging techniques play an important role in diagnosing the condition. This is a case of a 63 year old male found dead soon after developing a back pain. He has received treatment for backache and raised blood pressure at the outpatient department of a hospital. The postmortem revealed an acute dissection of the thoracic aorta with left haemothorax of 975 ml. The aorta showed two large thoracic and abdominal aneurysms with mural thrombi. A sudden death is a known occurrence in acute aortic dissection and the survival depends on the early diagnosis and medical interventions. Identification of high risk patients during regular clinic visits through radiological studies is important along with simultaneous health education of patients about the existing risks of them. Conduct of further research on this is important to reduce incidence, morbidity and mortality due to this condition.

Keywords: aortic diseases, acute aortic dissection, risk assessment

KNOWLEDGE AND ATTITUDES ON MEDICAL LABORATORY ACCREDITATION AMONG THE MEDICAL LABORATORY TECHNOLOGISTS IN GALLE

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Abstract

Accreditation is a process, in which trained external peer reviewers evaluate the compliance of a healthcare organization with pre-established performance standards. The general objective of this study was to determine the knowledge and attitudes on quality laboratory essentials and accreditation among Medical Laboratory Technologists (MLTs) in both government and private sector laboratories in Galle. Sample size was calculated and purposive sampling technique was adopted to recruit participants. A descriptive cross-sectional study was conducted using self-administered, pre-tested questionnaires with the participation of 52 MLTs from main government hospitals and leading private sector laboratories in Galle. The results were analyzed using SPSS softwareversion 21. Among study participants, 59.6% were females, 86.5% of the participants worked in government hospitals and 13.5% in private sector laboratories. Study participants were categorized based on their knowledge score as follows:less than 50% - poor knowledge, between 50%-75% - average knowledge, between 75%-90% -good knowledge and more than 90% - excellent knowledge. The mean (SD) knowledge score among participants was 40.33%(±29.35). The knowledge score was significantly higher in graduates (57.05±25.15) compared to diploma holders (25.72±23.31, $p<0.001$).MLTs with less than ten years of experience had a significantly higher knowledge score (50.70±27.8) compared to MLTs with more than ten years of experience (26.18±25.71, $p=0.002$). MLTs' attitudes on medical laboratory accreditation were satisfactory. Among the study participants, 82.69%(n=43) believed that medical laboratories should be accredited. However, 42.31%(n=22) believed that accreditation increases workload, 48.0%(n=25) believed that accreditation will cause financial problems, and 50%(n=26) believed that accreditation will increase paper work. The study was conducted in and around Galle and we assume that knowledge scores could be poorer in MLTs who work at rural laboratories since they have less opportunities for continuous education compared to the urban set up. This study concluded that overall knowledge of MLTs on medical laboratory accreditation is not satisfactory. The overall attitudes of MLTs on accreditation are satisfactory. The value of educational and training programs on medical laboratory accreditation and evaluation of their effectiveness is emphasized.

Keywords: Accreditation, Attitude, ISO 15189, Knowledge, Medical Laboratory Technologists

KNOWLEDGE AND ATTITUDES TOWARDS THE ELDERLY AND ELDERLY CARE AMONG NURSING UNDERGRADUATES IN SELECTED UNIVERSITIES OF SRI LANKA

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Abstract

With increased number of people aged 60 years and older, the health and social systems will have to be prepared to ensure their health. Nurses being key personnel in health-care delivery, it is a vital requirement to prepare nursing undergraduates to promote health and wellness of the elderly and to deliver quality care. Previous studies have found deficiencies of knowledge on elderly care and negative attitudes towards elderly among nursing students. This study was aimed at assessing knowledge and attitudes towards elderly and elderly care among nursing undergraduates and determining the factors associated. A descriptive cross-sectional study was conducted using a convenience sample of 220 students from second, third and fourth academic years of the University of Sri Jayewardenepura (USJ), University of Jaffna, and Kothelawala Defence University. A pretested self-administered questionnaire was used to collect data. Ethical approval was obtained from the Ethics Review Committee, Faculty of Medical Sciences, USJ. Data analysis was done using SPSS (Version 25). Descriptive and inferential statistics were used. Participants had moderate level of knowledge while their attitudes were slightly negative. The overall knowledge score ranged from 7 to 17 with a mean of 13(SD=1.98). The mean overall attitude score was 104.9 (SD =8.06) ranging from 84 to 131. There was a significant association between the overall knowledge and overall attitudes of undergraduates ($p<0.05$). Nursing undergraduates should be provided with adequate knowledge and relevant clinical and community exposure with elderly clients to enhance favourable attitudes and thereby the provision of quality elderly care.

Keywords: Elderly care, knowledge, attitudes, nursing undergraduates, Sri Lanka

KNOWLEDGE, ATTITUDES AND PRACTICES AMONG PARENTS ON MENTAL HEALTH OF THEIR TEENAGE CHILDREN IN GAMPAHA DISTRICT, SRI LANKA 2019

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Abstract

Mental health is a state where an individual realizes their own abilities to cope with the stresses of life, to be productive and to make a contribution to their community. Sri Lankan parents bring up their children with constant monitoring and guidance. Therefore, it is essential to understand the knowledge, attitudes and practices towards mental health of children between the ages of 13-19 followed by their parents. A descriptive, cross sectional study design was used to conduct the study which included a conveniently selected sample of 250 parents of teenagers residing in Gampaha district only. Parents were prospectively recruited in the study. Data was collected by using a close-ended, self-administered questionnaire, which was an adaptation of previously published questionnaires and was distributed in both Sinhala and English languages. The collected data was descriptively analysed using the SPSS software where knowledge was assessed using case studies, while attitudes and practices were assessed using a series of practical questions on how they treat and interact with their teenage children and how parents would support and react if they identify any signs or symptoms related to a mental health condition. The research results indicated that 74% of parents were between the ages of 36-55 years. Nearly half of the study participants (48.8%) had completed advanced level examination as their highest educational qualification, and 14.6% had postgraduate qualifications. While 77.1% of parents lacked knowledge on teenage mental health, 68.7% neither held healthy attitudes nor followed good practices to ensure the mental health of their children. The study results pointed out that parents' use of negative practices, unhealthy attitudes and their lack of knowledge on mental health and related disorders which are prevalent among teenagers may affect them negatively. Hence, it is important to increase the awareness on mental health among teenage children's parents.

Keywords: Attitudes, Knowledge, Mental health, Practice.

MEDICO-LEGAL AND SOCIAL ISSUES IN REMOVAL OF TATTOOS: THREE CASE REPORTS

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Abstract

For a medico-legal expert tattoos are a fairly important entity. Tattoos have many medico-legal issues to deal with and very similarly the removal of tattoos also bears a significance. When considered as a nation most of the Sri Lankans are not rich enough to remove the tattoos using laser treatment methods, instead crude methods are still being used to remove tattoos. Even laser treatment is not hundred percent guaranteed as it depends on many factors such as the ink type, depth etc. Removal of the tattoo, in the case number one was achieved by keeping a hot hopper on tattoos in order to forget his past memories. In the second case, a mixture of burnt lime, soap and salt was kept on the tattooed skin to erode the skin as the patient felt that it was unnecessary. Laser treatment was employed in the third case in order to join the army. The paper discusses the permanency of a tattoo, once it was inflicted and the surrounding medico-legal, psychological and social issues.

Keywords: removal of a tattoo, medico-legal and social importance, permanency of tattoos

MYTHS AND BELIEFS RELATED TO DELAYED PRESENTATION WITH CHICKEN POX AMONG SRI LANKAN ADULTS

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Abstract

Chicken pox is a global disease caused by the virus, varicella-zoster. Many people practice traditional curative methods for chicken pox and delays seeking medical advice due to myths and beliefs regarding the progress of disease. Therefore, we decided to identify common myths and beliefs related to delayed presentation of chicken pox. A descriptive cross-sectional study was conducted at the Isolation Unit of National Institute of Infectious Disease (NIID), Angoda. Two hundred and fifty adult patients infected with chicken pox were recruited to the study using convenience sampling. An interviewer administered questionnaire was used to collect data and Statistical Package for Social Sciences (SPSS) was used to analyze the data. The majority of participants (90%, n=225) had not taken any medical advice prior to hospital admission with chicken pox. Most participants 85.6% (n=214) believed that chicken pox is given by God and it is necessary to give offerings to get rid of the disease (82.8%, n=207). More than half (58.8%, n=147) of the participants believed that it is not good to bathe during the first seven days when infected with chickenpox. Many (60.4%, n=151) believed that taking medication would suppress the disease while more than half (53.6%) believed that they should wait without taking medicine and allow the disease to recover spontaneously. The majority of Sri Lankan adults follow traditional treatments for chicken pox and most of them still adhere to myths and beliefs related to chicken pox which showed an influence for delayed seeking medication. Hence, it is highly recommended that awareness programmes enhancing the importance of early medication seeking behavior for chicken pox should be introduced to the community in order to improve their knowledge and minimize common myths/beliefs related to chicken pox.

Keywords**:** Myths, Beliefs, Delay in Seeking Medical Advice, Chicken pox, Sri Lankan adults

PREFERRED LEARNING STYLES AMONG SELECTED NURSING UNDERGRADUATES (USING VARK QUESTIONNAIRE) IN A NON-STATE SECTOR HIGHER EDUCATION INSTITUTE IN SRI LANKA: A PRELIMINARY STUDY

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Abstract

Every person has a unique way of learning. A thorough understanding of students' learning style in higher education is useful for curriculum development and implementation of different teaching methods. Therefore, the awareness of an individual's learning style is important to increase the efficiency of learning and academic performance of the students. Hence, the objective of this study was to identify the preferred learning styles among nursing undergraduates of KAATSU International University (KIU), Sri Lanka. A descriptive cross-sectional study was conducted among 50 nursing undergraduates studying at Department of Nursing, KIU using the simple random sampling method. Data was collected using a pre-tested, self-administered questionnaire which includes three parts: A- socio-demographic factors, B- learning related factors, and C- Visual, Aural, Read/write and Kinesthetic (VARK) questionnaire version 8.01 to identify their preferred learning styles. Descriptive statistics were used to analyze data. SPSS version 24 was used for data analysis. Ethical approval was obtained from the Ethics Review Committee of KIU. Among the nursing undergraduates, the majority were female (98%) and most belonged to the age group 21-30 years (74%). The unimodal learning style was predominant (84%) while the remainder had a multimodal learning preference (16%). The kinesthetic learning style was the most popular unimodal learning style (66%) followed by aural (14%), visual (4%) and no read/write learners. Among multimodal learners, the majority were quadrimodal (10%). Most quadrimodal learners belonged to VARK type 1. Most undergraduates preferred to learn in a calm environment. The kinesthetic learning style was the most predominant learning style among undergraduate nurses. Therefore, nursing curricula should incorporate more practical sessions, teaching strategies with real life situations, demonstrations, applications and simulation learning to enhance the learning of undergraduate nursing students. In addition to that, the learning environment should be designed with quiet personal spaces as most learners preferred a calm environment to learn.

Keywords: Learning style, Nursing undergraduates, Sri Lanka

PREVALENCE OF SYMPTOMS OF DEPRESSION, ANXIETY AND STRESS AMONG COMMUNITY DWELLING ADULTS IN NAGODA DIVISIONAL SECRETARIAT AREA, GALLE, SRI LANKA

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Abstract

Depression, anxiety and stress among the adult population of the general community has become a major public health problem in all regions of the world as the burden of mental disorders continue to grow with significant impacts on health. A community based descriptive cross-sectional study was conducted with the participation of 280 adults aged between 20-64 years, residing in the Nagoda Divisional Secretariat area, Galle, and were recruited using a cluster sampling method (sample size calculation was done using a standard formula without adding cluster effect), in order to determine the prevalence of symptoms of depression, anxiety, and stress. The short version of the Depression, Anxiety and Stress Scale (DASS 21) was interviewer administered as the participants had varied literacy levels to ascertain data related to depression, anxiety and stress symptoms. Descriptive analysis and chi square test were performed. Of the participants, 59.3% were females and 39.6% were aged between 35-50 years. Thirty-point seven percent had symptoms of mild depression while 2.5% had moderate depressive symptoms. A few (15.7% and 2.9%) of the participants had mild and moderate level symptoms of anxiety respectively. Nearly one third (32.1%) showed symptoms of mild stress while, a few of them showed moderate stress (16.8%) and severe symptoms of stress (0.7%). Symptom prevalence of depression (37.9%), and anxiety (21.7%) were significantly higher among females, while stress was more prevalent (52.6%) in males. Gender (p=0.042) and living arrangement (p=0.025) showed a statistically significant association with depression, while income (p=0.04) was significantly associated with anxiety. Community dwelling adults in the study showed significantly high prevalence of symptoms of depression, anxiety and stress that indicates the need for community-based mental health promotion programs to improve mental health among adults living in the community.

Keywords: Prevalence, depression, anxiety, stress, adults

PREVALENCE OF VITAMIN D DEFICIENCY AND ITS ASSOCIATED FACTORS IN WESTERN PROVINCE OF SRI LANKA

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Abstract

In most of the South Asian countries including Sri Lanka, vitamin D deficiency is a remarkable health problem. However, to date, only few studies have been conducted on vitamin D deficiency and its determinants in Sri Lanka. The aim of this study was, to determine the prevalence of vitamin D deficiency in a randomly selected population in the Western Province and investigate the associations between vitamin D status with age, gender, sun exposure, skin colour, and occupation. This study was a descriptive cross-sectional study where 262 participants above 20 years of age, attending medical clinics of the Medical Research Institute, and resided in Colombo (110), Gampaha (85) and Kalutara (67) Districts were randomly recruited. A structured interviewer administered questionnaire was used to collect information on socio-demographic data, medical background, and intake of vitamin supplements. Sun exposure was assessed using a sun exposure questionnaire by Cargill et al and skin colour was objectively determined using the Fitzpatrick Skin Colour Chart. Serum 25-hydroxyvitamin D was analysed by Enhanced-chemi-luminescence (ECL) method. Independent sample t-test, Pearson Chi-square and One-Way ANOVA tests were used for data analysis by SPSS version 22 software. High prevalence of vitamin D deficiency (35.88%) and insufficiency (46.92%) were revealed by the study. Furthermore, there was an association between vitamin D deficiency and skin colour ($p<0.05$), while dark skin people had high prevalence of vitamin D deficiency and insufficiency status while, the majority of light skin people presented with normal vitamin D levels. There was a significant association between vitamin D status and gender ($p<0.05$), as females (44.36%) had higher prevalence rates than males (26.36%). Further research are recommended to identify determinants of vitamin D deficiency among Sri Lankans.

***Keywords*:** vitamin D deficiency, 25-hydroxyvitamin D, gender, skin colour, Independent sample t-test

STUDY TO DETERMINE FACTORS CONSIDERED BY SPEECH AND LANGUAGE THERAPISTS IN DECISION MAKING FOR ORAL VERSUS NON-ORAL FEEDING IN, ACUTE POST STROKE PATIENTS

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Abstract

Speech and Language Therapists (SLTs)mainly focus on providing the safest effective feeding programme to patients with dysphagia. There have been no research studies regarding SLTs' common practices in decision making for oral and non-oral feeding in the Sri Lankan context. The aims were to identify assessment methods, challenges and assessment related findings that are predominantly considered by SLTs when deciding between oral and non-oral feeding methods for acute post stroke patients. A self-administered questionnaire was used to collect both quantitative and qualitative data. A purposive sampling method was used for recruiting 30 SLTs who provide dysphagia services in a government hospital setting. A mixed method was used to analyze the data (Statistic SPSS-22 Software for quantitative and thematic analysis for qualitative data analysis). The current study revealed that bedside assessment was used very often to decide the mode of nutritional intake by SLTs. To find the ten most important factors, participants were instructed to select 10 out of 48 factors. Based on frequency analysis and ranking, alertness (n=27), cough ability (n=24), history of pneumonia (n=22), ability to complete posture (n=21), oromotor control (n=21), silent aspiration(n=21), frequency of aspiration(n=15), secretion management (n=15), awareness(n=14) and nutritional status (n=13) were the most important ten factors considered by SLTs when deciding the mode of nutritional intake. Thematic analysis results indicated that "lack of caregiver support, lack of awareness of professional support, and lack of instrumental resource" were the challenges when SLTs make decisions on oral versus non-oral feeding. The current study explored most important 10 factors that are predominantly considered by Sri Lankan SLTs in decision making for oral versus non-oral feeding in, acute post-stroke patients. However, further studies are needed including a variety of clinical populations with dysphagia.

Keywords: Stroke, Speech and language therapists, oral feeding, Dysphagia

HUMANITIES & SOCIAL SCIENCES

A SOCIOLOGICAL STUDY ON THE RELATIONSHIP OF FOLLOWING THE BASIC PREVENTION METHODS OF CORONAVIRUS AND INDIVIDUALS

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Abstract

Coronavirus is one of the severe acute respiratory syndromes (SARS). There are some notable risks in this disease such as the mode of transmission and unavailability of treatments. The WHO has introduced prevention methods, such as: 1. Basic preventive methods, 2. Prevention at the marketplace, 3. workplace, 4. traveling, and 5. disposal of dead bodies. Basic prevention methods are the most salient. Prevention methods impact the individual who is part of the community and eventually society. The research problem was: is there any relationship between following the basic prevention methods of coronavirus and individuals? The major objective was to recognize the relationship between following the basic prevention methods of coronavirus and the individuals. Finding out positive/negative relationships among these, the impact of the basic prevention methods on individuals, and the possibility of controlling the spread of Coronavirus by following basic prevention methods were the specific objectives. Harispaththuwa divisional secretariat area was selected as the research population and 39 respondents were selected randomly as the sample. Both primary and secondary sources were used. Interviews were carried out via telephone calls. It was evident in the results that positive relationships were existing between following the basic prevention methods and individuals, which had an impact on social, cultural, and personality systems, and vice versa. Ignorance, negative image, and hast are the main causes of not following basic prevention methods, and the research has reinforced the need to control the spread of Coronavirus by following the basic prevention methods.

Keywords: Coronavirus, Socio-cultural system, Individual action, Prevention, Reinforcement

A STUDY OF GARDEN LANDSCAPE OF TAJ MAHAL

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Abstract

Landscape architecture is the art of manipulating the surrounding interacting with natural features by the man for his own interest to meet various requirements. Of these man-made landscapes, the Taj Mahal garden which was built by the great Mughal Emperor Shah Jahan in India (1628-1658 AC) can be highlighted as a remarkable garden landscape. The Research problem of this study is 'what are the landscape features of Taj Mahal?' and the objective is to identify how the Taj Mahal creator has manipulated the surrounding to satisfy his demands. Hence, the methodology adopted was the analysis of data collected from secondary literary sources including research papers and books of researchers who have conducted methodological excavations and field observations of the historical Mughal imperial gardens. These sources were studied focusing primarily on prominent landscape features of the relevant garden concerning the main elements including geographical features, man-made structures, garden layout, hydraulics, vegetation arrangements, and cultural and religious implications of the landscape. Data derived from the analysis indicates that the Taj Mahal garden landscape is comprised of a significant garden layout known as the 'Fourfold layout' laid through the vicinity of the landscape interacting with the natural surroundings, skilful hydraulic techniques built encompassing natural water sources, a selected geographical location ideal for a garden landscape, vegetation arrangements which add extra beauty to the landscape, various structures in the vicinity of the garden built for the usage of the man and the cultural and religious implications manifested along with the landscape features. So, it is clear that this prodigy of garden landscape embraces exquisite features highlighting the connection between the man and the nature.

Keywords: Mughal Imperial gardens, Fourfold layout, Mughal hydraulics, garden landscape

A STUDY OF THE EPOCHAL IMPACTS OF PROCESS-GENRE APPROACH TO TEACHING WRITING ON THE TERTIARY LEVEL STUDENTS

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Abstract

English as a second language (ESL) writing instruction has gained special attention and increasing interest particularly during the past few years. There were enormous changes in approaches to writing during the last two decades that have led to paradigm shifts in the field. In recent years, emphasis has been on the differences between three major approaches: the product-based approach, the process-based approach, and the genre-based approach. Several approaches to writing were used by the teachers and yet, one of the major concerns voiced by language teachers is that the strategies used for teaching writing were not fully effective in developing the students' proficiency in writing. Accordingly, this study discusses these approaches and proposes a synthesis, integrating two of the major approaches: the process approach and the genre approach. The objective was to find out epochal influences of using Process Genre Approach on tertiary level students' writing proficiency. To this end, a sample of 60 students were taken from the first year English Degree program at BLC Campus, Jaffna and were equally divided into the experimental group and the control one. They were given 10 sessions of treatment, 2 sessions per week, where the process-genre approach was administered for the experimental group writing sessions and general teaching strategies were handled for the control group writing sessions. Data has been collected using a pre and post writing assessments and a questionnaire for both groups. The data gathered was then analysed both quantitatively and qualitatively. An independent samples t-test was run to compare the mean scores of both groups. The control group's P-value was $0.651>0.05$. So, there is no significant difference in mean value of the pre and post-test. The experimental group's P-value was = $0.002<0.05$. Thus, it confirms the existence of a significant difference between both tests. The result showed that teaching writing using Process Genre Approach had epochal impacts on the students' writing mastery when compared to the general teaching strategies. Further, the findings suggest that it would be a remedy for both students and teachers to overcome the encountered writing difficulties such as organization of ideas and appropriate rhetorical styles.

Keywords: process-genre approach, ESL teachers, general teaching strategies, product writing, process writing

AN ANALYSIS OF THE RELATIONSHIP BETWEEN ANXIETY AND COACHING BEHAVIOUR OF NATIONAL LEVEL CONTACT AND NON-CONTACT SPORTS MALE ATHLETES IN SRI LANKA

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Abstract

Anxiety and Coaching Behaviour can be explored as one of most important psychological factors that impact sports performance. Most coaches in the field may not be entirely aware of their behaviour. Coaches' behaviour affects players' anxiety level to rise or drop. Thus, the main objective of the study was to compare and contrast the Coaches' Behaviour and Anxiety of contact sports and non-contact sports male athletes in the Sri Lankan context. Contact sports are the sports in which physical contact occurs and non-contact sports are the sports in which no contact occurs among contestants during a competition. Athletes were selected by using Stratified Random Sampling Method. Selected athletes were instructed to complete Competitive State Anxiety Inventory-2 Questionnaire and Coaching Behaviour Questionnaire (CBQ). Independent Sample T-Test and Pearson correlation test were used to analyse data. The results concluded that there was a significant difference between contact sports and non-contact sports on Cognitive Anxiety, Self-Confidence and Supportiveness of coaches' Behaviour ($P<0.05$). There was no significant difference between contact and non-contact sports on Somatic Anxiety and Negative Activation ($P>0.05$). There was a positive significant relationship between Cognitive Anxiety and Somatic Anxiety ($P<0.05$) of both sports athletes. Further, a negative significant relationship was found between Somatic Anxiety and Self-Confidence ($P<0.05$) of both contact and non-contact sports athletes. Furthermore, a positive significant relationship was found between Somatic Anxiety and Negative Activation ($P<0.05$) of contact sports athletes. Findings highlighted the need of all coaches to understand their athlete's cognition and eliminate the harmful effects of Pre-Competitive Anxiety and help in optimize their performance.

Keywords: Cognitive Anxiety, Somatic Anxiety, Self-Confidence, Supportiveness, Negative Activation of Coaching Behaviour

AN ANTHROPOLOGICAL STUDY ON PERSONALITY CHANGES DUE TO SOCIO-CULTURAL IMPACTS IN WANATHAWILLUWA, PUTTALLAM DISTRICT

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Abstract

The study of human society immediately leads to study of its culture. Culture and society go together, and they are inseparable. Differences in characteristic patterns of thinking, feeling and behaving related to cultural and social pressures are controlled by personality. The main objective of this research was to find out the effect of socio-cultural aspects on the personality of a fishery sub-cultural society. This study was conducted based on three fishery villages; "Gangewadiya", "Serakkuliya" and "Karative" which are located in Wanathawilluwa in the Puttalam district of North Western Province, Sri Lanka. As a primary data collection method, an interview method was used with a structured questionnaire guide with open-ended and close-ended questions to collect data from a randomly selected sample of 15 households from the three villages. Mainly non-material, socio-cultural aspects such as family, kinship and social network, livelihood, religion and customs, language patterns, characteristic patterns of thinking and behaving related to socio-cultural pressures which controlled by personality were studied. This Kinship based society has cultural and spiritual relationships with the religion and cultural rituals like, 'rites of passage' customs define how culture has affected on social well-being of people which leads to their personality changes. Further, material cultural aspects; owning a house, land and fishing crafts have given social status and dignity within the society. The personality changes were measured based on the changing level of material and non-material cultural aspects of a particular person. Comparatively, their personality level has not reached to the level where the main society has reached since they still stuck with some facts like, poor knowledge in financial management which leads to poverty. In a society where the personality characteristics changed, and the cultural characteristics still remained unchanged; it cannot experience the maximum impacts of the changes of personality characteristics. Thus, this qualitative analysis has given information on how socio-cultural aspects have affected personality changes of people.

Keywords: Sub-culture, Material culture, Non-material culture, Human behaviours, Thinking patterns

ASSEMBLE THEORY: A METHOD TO DISMANTLE THE 'DEMOCRATIC DICTATORSHIP' AS SUGGESTED IN POP-CULT SEMIOTICS

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Abstract

Even though cinema had been perceived as a mere method of entertainment, academic discourses have already established its efficiency in disseminating political ideologies. However, the genre of superhero movies, which belongs to the popular cinema, has been paid considerably low attention, specifically to its philosophical and political content. Therefore, this qualitative study tends to comparatively analyse two film series; Avengers and Justice League (respectively by Marvel Studios and DC Comics) in order to understand their similarities in the process of defeating a common enemy. Thus, the analysis attempts to evaluate the validity of the research hypothesis, which posits the notion that the said genre symbolically presents a successful method to dismantle a powerfully established government. The study also examines the reception of these movies and argues that the immense popularity of these movies is a consequence of well meditated character development that has happened throughout several movies. In summarising the study, the researcher presents a concept called 'Assemble Theory' that can be utilised to challenge any authority. Assemble Theory consists mainly of two stages: firstly, there should be several individuals who rise to fame independently. Secondly, these now famous figures should form a union, which can gain extreme popularity of the public. In concluding, the study validates the proposed notion by referring to certain other pop-cult and real-life examples, such as: World Wrestling Entertainment (WWE) and independence movement in India.

Keywords: Assemble Theory, Film Studies, Government, Popular Culture, Superhero Movies

COVID 19: A STUDY ON THE ROLE OF A TRANSLATOR

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Abstract
The world, including Sri Lanka, has been combating an invisible yet an invincible enemy: The Novel Coronavirus or the COVID-19. Besides the virus itself, every nation is forced to overcome the challenge of proliferation of misinformation and hoax news. Although Sri Lanka has achieved a higher rate of success in curbing the virus compared to that of the most other developed countries, the country is still struggling with streamlining the information flow. In such a context, the present study focuses on the role of the translator at times of a national crisis, as translation aids in conquering communication barriers. The data were garnered by means of a qualitative approach which predominantly comprised of a Focus Group Discussion with ten final year undergraduates reading for Translation Studies degree in University of Kelaniya, Sri Lanka. Furthermore, a content analysis of the internet articles relevant to the study was conducted to augment the outcomes of the study. The group session was coordinated in an attempt to understand the perspectives of the undergraduates regarding the distribution of misinformation in social media and other much preferred platforms. The existing practices to curb the spread of fraud news and the extent of contribution a translator could facilitate to supply authentic information to the general public in their mother tongue were also considered during the session. The content analysis of the discussion suggested of the swift spread of misinformation, the gaps and lapses of the available systems and the magnitude of service a translator could provide with translation of daily news highlights, new updates as well as the medical findings. Publishing and circulating reliable information on social media and other popular platforms in tri languages with affable access could impede misinformation outflow and trepidation, indicated the outcomes of the study.

Keywords: COVID-19, Hoax news, Misinformation, Sri Lanka, Translation

EFFECTS OF GLOBALIZATION ON ENTREPRENEURIAL RISK IN THE APPAREL SECTOR

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Abstract

Globalization has become a more familiar topic which has caused overwhelming influence on every kind of business category of the world imparting with enormous opportunities, removal of trade and tax barriers while importing more risk to businesses. The objective of this study is to evaluate, the effects of globalization on entrepreneurial risk in the apparel sector. This research paper assesses the influence of the political, economic and technological factors which promulgates the risk of globalization on the apparel industry bringing focus to the Small and Medium (S.M.E) apparel companies in the Colombo District. S.M.E. classification criteria put forward by the Department of Industries were used to identify the small and medium enterprises. Apropos of previous research, it has identified the relationship of globalization and entrepreneurial risk using secondary and primary data with several models. A sample of 150 (N=150) was selected using the random sampling technique. Primary data was collected using face to face interview method with a comprehensive questionnaire as the data collection instrument while canonical correlation and Manova were employed to analyse the data using SPSS and MS Excel. As the prime finding of the study: there exists a positive correlation between globalization and entrepreneurial risk. As a reaction, entrepreneurs have to manage the risk because risk affects business in both positive and negative ways. Based on the research findings, author suggests maintaining continuous savings, joining ventures and issuing shares, as means to mitigate the risk of globalization.

Keywords: globalization, entrepreneurial risk, apparel industry, canonical correlation, small and medium enterprises

GLOBAL USE OF DATA TO COMBAT GENDER-BASED VIOLENCE AND DOMESTIC ABUSE

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Abstract
It is clear based on a study of global estimates that gender-based violence (GBV) has been experienced by about 70% of women worldwide while about 35% of all women have been affected by domestic violence or intimate partner violence. When faced with such abuse, access to legal and health services becomes essential to women. However, such access has been made nearly impossible by the global pandemic. Women have been shut in houses with the men who abuse them, with no recourse to the outside world. Thus, a contemporary requirement is new methods with which to connect women to service providers, researchers, policymakers, and officials. A global desk research was conducted to identify new methods and technology to be used to collect data and to provide services to abused women. The research showed that popular technology is increasingly being used by service providers and organisations such as the UN and CARE. Although mobile telephones were a preferred method, data collection went beyond text messages and telephone calls to applications on the phones and voice recordings, ensuring the women's safety and allowing them control of what was shared and when. Based on the findings, a model has been proposed for Sri Lanka that draw from global best practices. A cloud-based repository has thus been proposed where instances of GBV and domestic abuse can be logged in by regional police officers to avoid information tampering. To benefit from this system, information should first be collected of occurrences of domestic violence and GBV, which then assists in instances being mapped to predict where resources must be deployed. This may be used in both non-emergency and emergency situations. Such a database of information allows the healthcare and law enforcement officials ample opportunity to deploy resources and assistance in areas requiring the most help.

Keywords: Gender-based violence, intimate partner violence, use of data to combat gender-based violence, digitalization of data, mapping gender-based violence

HOW MUCH IS AN EMPLOYEE WILLING TO PAY FOR AN ON-SITE CHILDCARE FACILITY? A STUDY BASED ON THREE APPAREL FIRMS IN SRI LANKA

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Abstract

Economic changes in Sri Lanka have contributed to an increase in women's labour participation. Sri Lankan apparel industry is a women-dominated industry which gives a high contribution to the Sri Lankan economy. However, childcare has become a challenge for women's labour participation. Some firms in the apparel industry have implemented on-site childcare centers to overcome this problem. This study has used the open-ended contingent valuation method and regression analysis to evaluate employees' willingness towards the childcare facility. The study aims to measure how much an employee is willing to pay for an on-site childcare facility and to evaluate the factors affecting the willingness of employees towards the childcare facility. For this study, from a population of 2500, data was collected from 300 participants of three apparel firms through a survey-based questionnaire. The analytical software, STATA, was used for the analysis. Results illustrate that the mean willingness to pay is Rs. 1919.28 and Rs. 1657.93 per month in the two firms which do not have an on-site childcare facility. The mean willingness to pay in the firm, which has the childcare center, is substantially higher than the other two firms. It is Rs. 3750.34 per month. It indicates that the employees who have already received the facility have a higher preference for the facility. The data of the study depicts that an employee is willing to pay a higher amount when there is a higher preference for the facility. The newly hired employees in all three firms have a higher preference towards the childcare facility than the not newly hired employees. Moreover, the monthly income of employees has a negative relationship with the willingness to pay. 86.36% of the surveyed employees have a preference for implementing childcare facilities. Therefore, investing to render the childcare service will help to increase women's labour participation.

Keywords: Women employment, On-site childcare, Willingness to pay

LEVINASIAN CRITIQUE ON NĀGĀRJUNAIN ABSOLUTE NON-BEING

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Abstract

Emmanuel Levinas (1905–1995), a French Philosopher, who was well-versed in existentialism, ethics, phenomenology and ontology, argues that in case of ethics is searching for existential ground, prior to any deliberation on efficacy, virtue, or duty, it determines intersubjective enactment of responsibility, as declared in *Totality and Infinity: An Essay on Exteriority*, all ethics come from an encountering with an other, where the universal Other is denounced. For Levinas, irreducibility of the face-to-face encounter has to be taken into account; aligning to transcendence with exteriority, in the sense of what lies outside myself but eludes my comprehensive knowledge: the other person is with paramount importance. Nāgārjuna, is extensively considered one of the most significant Buddhist philosophers, who developed central concept around the notion of emptiness (*śūnyatā*) explicated that emptiness is always the emptiness of something, absence of its *svabhāva*. But Nāgārjuna endorses an absolute non-Being (in Heideggerian sense, in accordance with his conception on ontological difference, there is a concrete distinction between Being and beings); the negation of Being, which would be absolute nothingness. This absolute nothingness is unarisen and unstopping (*anutpannāniruddhā hi nirvāṇam iva dharmatā*) as per *Mūlamadhyamakakārikā*. At the same time, Nāgārjuna does not give up objective moral values. In Levinasian notion ethics begins in face-to-face experience, as his "beyond understanding" is still material with intersubjectivity, and not in a stereological dictum or reference to universality. Here, Nāgārjunian soteriological transcendence will be problematized in the lens of the Levinasian philosophy.

Keywords: Levinas, Nāgārjuna, Śūnyatā, Being, Intersubjectivity

STRATEGIES FOR IMPROVING RUBBER PRODUCTIVITY IN SMALLHOLDER RUBBER FARMING: A CASE STUDY IN MONERAGALA DISTRICT OF SRI LANKA

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Abstract

Rubber farming, in Moneragala District in Sri Lanka, plays a key role in national rubber production and still far behind the potential. This study was carried out to find the factors which determine the Productivity of Smallholder Rubber Farming (PSRF) and to find out the strategies for enhancement. A questionnaire survey was conducted in 2019, using stratified random sampling. Descriptive statistics and Spearman's correlation analysis were employed in data analyses. The average PSRF was 905 kg $ha^{-1}year^{-1}$ on dry rubber basis, which was far lower below the potential, of nearly 2500 kg $ha^{-1}year^{-1}$. The mean knowledge level of farmers on tapping, agronomic practices and processing was, 53%, 51% and 36%, while adoption level of them was 42%, 34% and 22% respectively. The trees in tapping per hectare (r=0.1776), the knowledge level on tapping (r=0.6430), mature up keeping (r=0.5788) and processing (r=0.2301), adoption level on tapping (r=0.5280), mature up keeping (r=0.6527) and processing (r=0.1988), self-tapping system (r=0.2961), tapping days per year (r=0.4782), advices given either by experienced rubber farmers (r=0.4795) or by rubber extension officers (r=0.3399), utilization of mass media (r=0.3399) and participation in training programmes (r=0.5063) were positively correlated with PSRF. The land extent (r=-0.4262) was negatively correlated with PSRF. The extension needs of rubber farming were highlighted by the farmers where the major drawback identified was the poor adoption of recommendations due to lack of awareness, where rubber is a new crop to most of the farmers in the area. It is also evident that effective strategic extension plans which include formulating appropriate policy measures, especially focusing on mature upkeep, tapping and processing practices of rubber farming would eventually improve PSRF.

***Keywords**:* Extension, Productivity, Rubber Farming, Smallholders

THE IMPACT OF FOREIGN DIRECT INVESTMENT INFLOWS ON PUBLIC DEBT IN SRI LANKA

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Abstract

Public debt is assumed to benefit a developing country like Sri Lanka to get extra funds to invest in economic growth. Foreign Direct Investment (FDI) is an important avenue to transfer technology, diversify exports, reserve foreign exchange, increase government revenue, resolve the public debt problem, and promote economic growth. Public debt is made more secure than FDI by buying government bonds, but the high level of public debt has resulted in harmful effects on the Sri Lankan economy. It is vital to reallocate FDI into productive investments that need to be undertaken. Sri Lankan government's debt to GDP was increased by 76.9% while FDI inflow was increased only by 17.3% in 2017. The relationship between FDI and public debt has not been explored in Sri Lanka. Hence, the main objective of this research is to analyse the impact of FDI on public debt in Sri Lanka using econometric techniques. Time series data from the period of 1978 to 2017 was used for the research. The two main variables FDI and public debt were measured in US dollars million while inflation rate and openness were measured as percentages. The study adopted Augmented Dickey-Fuller (ADF), Auto-Regressive Distributed Lag (ARDL), and Error Correction Model (ECM) tests to check the Stationarity, Long-run, and Short-run relationships respectively. According to test results, there is a significant positive impact of FDI on public debt at 1 % significance level in the long -run as well as in the short-run while inflation and openness do not have impacts on public debt. Therefore, the government of Sri Lanka should implement proper policies; to maintain the sustainability of public debt service and improve ways which are vital for attracting FDI to manage public debt at a desirable level while maintaining the inflation rate at a standard level to enhance FDI.

Keywords: Foreign Direct Investment (FDI), Public Debt, Inflation, Openness, Economic growth

THE INFLUENCE OF PERSONAL ATTITUDES ON JOB PERFORMANCE OF MANAGERIAL AND NON-MANAGERIAL STAFF DURING COVID-19 PANDEMIC: XYZ, COLOMBO

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Abstract

Employee job performance is important for an organization to overcome the challenges posed by COVID-19. Personal attitudes are particularly influential in a person's job. They are formed in the mind of the person and emerged from his/her behaviour. A very good relationship between personal attitudes and job performance must be maintained to prevent and address the problems and challenges posed by the COVID-19 pandemic during this period. The purpose of this study is to understand how personal attitudes affect the job performance of XYZ employees during COVID-19. This study includes attitude related factors (salary, training, leadership, motivation) to identify the impact of personal attitudes on job performance during this pandemic period. This was based on descriptive research design. In-depth interviews and observation tools were used under an adopted case-study strategy, with the 20 participants of sample being male and female managerial and non-managerial staff members. Thematic analyses were used to analyse the data. Results indicate that all attitude related factors have a positive effect on employee performance. Motivation, salary, rewards, training, and leadership have a significant impact on personal attitudes. Personal attitudes are direct cause of job-related attitudes as both positive and negative; job satisfaction, organizational commitment, and job involvement being the positive job-related attitudes, and absenteeism, lateness, and theft being the negative job-related attitudes. The company should appreciate their employees more often. An effective retention strategy can be formulated by offering competitive salaries and promotions. As a result, job performance can be improved. It can be concluded that employees' personal attitudes significantly affect job performance of XYZ during the COVID-19 pandemic period.

Keywords: Personal attitudes, Job-related attitudes, Job performance, Organizational commitment, Job satisfaction

උෆවේ ශාන්තිකර්මයන්හි භාවිත මණ්ඩප පුරාණ සාහිත්‍යයෙන් ප්‍රකට වන භරතමුනි නාට්‍ය ශාස්ත්‍රයේ මූලධර්ම

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ලලිත කලා අධ්‍යයනාංශය, මානවශාස්ත්‍ර පීඨය, කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

රටට ඇති වන උපද්‍රව දුරුකර සෙත් ශාන්තියක් ඇති කිරීම අරමුණු කර ගනිමින් උෆව පළාතේ පත්තිනි දෙවියන් මූලික කර පැවැත්වෙන ප්‍රධාන ශාන්තිකර්මයක් ලෙස ගී මඬු ශාන්තිකර්මය හඳුන්වා දිය හැකි ය. සූනියම නමින් ද ශාන්තිකර්මයක් උෆව ප්‍රදේශය ආශ්‍රිත ව පවත්වනු ලැබේ. එම ශාන්තිකර්මය පැවැත්වීමේ ප්‍රධාන පරමාර්ථය නම් මිනිසා විසින් මිනිසාට සිදු කරනු ලබන අන-විත කොඩිවින ආදි උපද්‍රව දුරු කිරීම ය. මණ්ඩප පුරාණය යනු පද්‍ය පන්තීන් ද්විත්වයකින් යුක්ත වූවකි. ශාන්තිකර්මයක් පැවැත්වීමේ දී එම රඟමඬල සකස් කළ යුතු ආකාරය පිළිබඳ පූර්ණ විස්තරයක් එහි අන්තර්ගත වේ. ගී මඬුව සහ සූනියම සඳහා එම පද්‍ය පන්තීන් භාවිත වනු දක්නට ඇත. මෙම පර්යේෂණයේ ගැටලුව වෙන් වන්නේ උෆවේ පැවැත්වෙන මෙම ශාන්තිකර්ම දෙකෙහි අන්තර්ගත මණ්ඩප පුරාණය නම් පද්‍ය සාහිත්‍යය මගින් භරතමුනිගේ නාට්‍ය ශාස්ත්‍රයේ අන්තර්ගත මූලධර්මයන් ප්‍රකට වේ ද? යන්න යි. මෙම පර්යේෂණයේ ක්‍රමවේදය ලෙස ප්‍රාථමික හා ද්විතීයික මූලාශ්‍ර පරිශීලනය කෙරිණි. ප්‍රාථමික මූලාශ්‍ර යටතේ සම්මුඛ සාකච්ඡා, නිරීක්ෂණ ක්‍රමවේද යොදා ගැනිණි. උෆව පළාතේ බෙරගල, දියතලාව, හල්පේ, කරදගොල්ල, බුත්තල, පැල්වත්ත, කොටගම, වැඳි කුඹුර, බූටාරාව, මල්ලැහැව, ගලඋඩ, ගෝඩුන්න යන ප්‍රදේශයන්හි වෙසෙන පාරම්පරික ශිල්පීන් සමග සම්මුඛ සාකච්ඡා පැවැත්වීමත් ඔවුන්ගෙන් ලබාගන්නා අත්පිටපත් පරිශීලනය කිරීමෙන් මෙම පර්යේෂණය සිදු කරන ලදි. ද්විතීයික මූලාශ්‍ර යටතේ පුස්තකාල අධ්‍යයනය මගින් කරුණු සොයා ගන්නා ලදි. ඒ අනුව භරතමුනිගේ නාට්‍ය ශාස්ත්‍රයේ අන්තර්ගත ප්‍රේක්ෂාගෘහ නිර්මාණය, ප්‍රේක්ෂාගෘහ ආරක්ෂාව, රංග පූජා පැවැත්වීම්, ප්‍රේක්ෂාගෘහ ප්‍රභේද, භූ පරීක්ෂා, තූල් එළීම, පදනම දැමීම, ස්ථම්භ ස්ථාපන, මත්තවාරණි යන රංග මණ්ඩපය ඉදි කිරීම පිළිබඳ මූලධර්ම උෆවේ මණ්ඩප පුරාණ සාහිත්‍යයේ ඇතුළත් මූලධර්ම හා සමාන වනු දක්නට ඇත. මෙම දත්ත විශ්ලේෂණය මගින් ගී මඬු සූනියම් ශාන්තිකර්මයේ අන්තර්ගත මණ්ඩප පුරාණය නම් පද්‍ය රචනා වීමෙහි ලා භරතමුනිගේ නාට්‍ය ශාස්ත්‍රීය මූලධර්ම පදනම් ව ඇති බව මෙතුළින් නිගමනය කළ හැකි ය.

මුඛ්‍ය පද: මණ්ඩප පුරාණය, නාට්‍ය ශාස්ත්‍රය, භරතමුනි, උෆව පළාත, පද්‍ය

කථාවත්‍ථුප්පකරණය අභිධර්ම පිටකයට අයත් ග්‍රන්ථයක් ලෙස සැලකිය හැකි ද යන්න පිළිබඳ අධ්‍යයනයක්

පූජ්‍ය සමිත හිමි ඕ.

පශ්චාද් උපාධි අධ්‍යයන පීඨය, බෞද්ධ හා පාලි විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
opathasamithathero@gmail.com

සාරසංක්ෂේපය

තෙවන ධර්ම සංගායනාවේ දී සිදු වූ ඓතිහාසික වැදගත් සිදුවීම් අතුරින් මොග්ගලීපුත්තතිස්ස තෙරුන් කථාවත්‍ථුප්පපකරණය රචනා කිරීම ප්‍රමුඛත්වයෙහි ලා සැලකිය හැකි ය. එමගින් කර්තෘත්වයක් හිමි එක ම අභිධර්ම කෘතිය බිහිවූවා පමණක් නොව පිටකයක් වශයෙන් ද අභිධර්මය පූර්ණත්වයට පත් විය. කථාවත්‍ථුප්පකරණය සුවිශේෂ ග්‍රන්ථයක් බවට පත්වන අනෙක් කරුණ නම් ථෙරවාද සම්ප්‍රදායට අභියෝගාත්මක ව නැගී සිටි මතවාදයන් තාර්කික ක්‍රමවේදයක් ඔස්සේ එහි ඛණ්ඩය කර තිබීම යි. එසේ පරවාද සාකච්ඡාවට ගැනෙන වාද කථා දෙසිය දාහතක් (217) කථාවත්‍ථුවෙහි සංගෘහිත ය. අනෙක් අභිධර්ම කෘති අතුරින් කථාවත්‍ථුප්පකරණය විශේෂ වන්නේ ද මෙම පශ්චාද් නිකායාන්තරික මතවාදයන් තාර්කික ක්‍රමවේදයක් ඔස්සේ එහි සාකච්ඡාවට බඳුන් කර තිබීමෙනි. ධම්මසංගණී ආදි සෙසු අභිධර්ම කෘති හයෙහි ම නිර්වාණ සාධනීය වූ ධර්මමය ප්‍රස්තුතයන් උපමා, උපමේය, රූපක, දෘෂ්ටාන්ත, අලංකාර, වක්ක්‍රෝක්ති, ගාථා බන්ධන ආදියෙන් බැහැර ව සංග්‍රහ කර තිබුණ ද කථාවත්‍ථුප්පකරණයෙන් එවැන්නක් අපට හමු නොවේ. කථාවත්‍ථුවෙහි වැඩි අවධානයක් ලබා දී ඇත්තේ වජ්ජීපුත්තක, රාජගිරික, සිද්ධත්‍ථික, අන්ධක, උත්තරාපතක ආදි නිකායාන්තරිකයන්ගෙන් ථෙරවාද සම්ප්‍රදායට එල්ල වූ අභියෝගයන් සඳහා පිළිතුරු ලබා දීමට ය. එම පිරිස් එල්බගත් දෘෂ්ටාන්ත අතර "තථාගත බල ශ්‍රාවක සාධාරණය,'' ''බුදුරදුන් විෂයෙහි දෙන ලද දානයේ ආනිසංස නොමැත," "සංඝයා විෂයෙහි දෙන ලද දානයේ ආනිසංස නොමැත," "රහතන් වහන්සේගේ අර්හත්වය පිරිහේ" ආදි බොහෝ කරුණු මූලිකත්වයෙහි ලා සැලකිය හැකි ය. ඒ අනුව මෙම ග්‍රන්ථය වැඩි වශයෙන් අවධානය ලබා දී ඇත්තේ ධර්මමය සංකථනයන් විග්‍රහ කර දැක්වීමට නොව බුද්ධ පරිනිර්වාණයෙන් පසු ව ඇති වූ විවිධ දුර්ලබ්ධීන් ඛණ්ඩනය කිරීම සඳහා බව ගම්‍යමය වේ. එහෙයින් කථාවත්‍ථුප්පකරණය අභිධර්ම පිටකයට නොව අන්‍යය පිටකයෙක්හි ලා සංග්‍රහ කිරීම ප්‍රාමාණික වූවකි. උක්ත කරුණු සියල්ල සලකා කථාවත්‍ථුප්පකරණය අභිධර්ම පිටකයෙහි ලා සංග්‍රහ කිරීම ප්‍රාමාණික වූවක් ද යන්න අධ්‍යයනය කිරීම මෙම පර්යේෂණයේ පරමාර්ථය වන අතර ඒ සඳහා ප්‍රාථමික හා ද්විතීයික මූලාශ්‍රය යොදා ගැනීමට අපේක්ෂිත ය. කථාවත්‍ථුප්පකරණයෙහි තාර්කික ක්‍රමවේදය පිළිබඳ යම් පර්යේෂණ කිහිපයක් සිදු වී තිබුණ ද එය අභිධර්ම කෘතියක් ලෙස කෙතෙක් දුරට ප්‍රාමාණික වේ ද යන්න පිළිබඳ කිසිදු පර්යේෂණයක් සිදු වී නොමැති නිසා මෙය ශාස්ත්‍රීය වටිනාකමක් සහිත වූවකි.

ප්‍රමුඛ පද: අභිධර්ම පිටකය, කථාවත්‍ථුප්පකරණය, බුද්දක නිකාය, මිලින්ද ප්‍රශ්නය

කෝවිඩ්-19 වසංගත තත්ත්වය හමුවේ ඩිජිටල්කරණය ශ්‍රී ලංකාවේ සමාජ මානයන් කෙරෙහි ඇති කළ බලපෑම පිළිබඳ ඩිජිටල් මානව විද්‍යාත්මක විශ්ලේෂණයක්

අභයසුන්දර පී.එන්.[1], විතානගේ ඩබ්ලිව්.කේ.එම්.[1,3]*, දිසානායක ඩී.එම්.කේ.ජී.කේ.[2], සහ ගනේආරච්චිගේ ඒ.එන්.එස්.[1]

[1]මානව විද්‍යා අධ්‍යයනාංශය, මානවශාස්ත්‍ර හා සමාජීයවිද්‍යා පීඨය,
ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[2]ඉතිහාස හා පුරාවිද්‍යා අධ්‍යයනාංශය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[3]පශ්චාද් උපාධි අධ්‍යයන පීඨය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

මානව සංහතියේ අනේකවිධ අංශ පිළිබඳ පෘථුල විද්‍යාත්මක පදනමකින් විපරම් කරන්නා වූ මානව විද්‍යා විෂය ක්ෂේත්‍රයේ, සාකල්‍යවාදී බව මනා ව පසක් කරන උපවිෂය පථයක් වන්නේ ඩිජිටල් මානව විද්‍යාව යි. සෛද්ධාන්තික දෘෂ්ටිපථයක් ඔස්සේ සිදු කරනු ලැබූ මෙම අධ්‍යයනය හරහා කෝවිඩ් සමයේ ලාංකේය සමාජ මානයන් ත්‍රිත්වයක් කෙරෙහි ඩිජිටල්කරණය නමැති සාධකය බලපෑ අන්දම පිළිබඳ විමසනු ලැබේ. එහි ලා සෞඛ්‍ය අංශය, අධ්‍යාපනය සහ සමාජ සම්බන්ධතා ආදිය කෙරෙහි ඩිජිටල් නමැති ප්‍රස්තුතය හේතුපාදක වෙමින් සිදු වූ සමාජ වෙනස් වීම පිළිබඳ අන්තර් සහ බහිර් ප්‍රවේශ (etic and emic approaches) ඔස්සේ හඳුනාගෙන තිබේ. ඩැනියෙල් මිලර් සහ හේදර් හෝර්ස්ට්ගේ ඩිජිටල් මානව විද්‍යා මූලධර්ම සය (ඩිජිටල් නිසා තීව්‍ර වන සංස්කෘතියේ තාර්කික (අපෝහක) ස්වාභාවය, මනුෂ්‍යත්වය යනු වර්ධනය වන ඩිජිටල් මැදිහත් වන අංශුමාත්‍රික දෙයක් පමණක් ම නො වන බව, සාකල්‍යතාවාදයට වන කැපවීම, සංස්කෘතික සාපේක්ෂතාව සහ ගෝලීය ස්වාභාවය, අවිනිශ්චිතතාවයේ සත්‍යතාවය, ඩිජිටල් ලෝකවල ද්‍රව්‍යමයභාවය) හරහා මානව හැසිරීමෙහි වෙනස්වීම් විමර්ශනයට ලක් කර ඇත. කොරෝනා වෛරසයේ ව්‍යාප්තියත් සමඟ ලාංකේය සමාජ-සංස්කෘතික වෙනස් වීම කෙරෙහි ලාංකේය පුරවැසියා හට අනුවර්තනය වීමට සිදු විය. එවැනි වෙනසක් සඳහා මග සකස් කළ ප්‍රධානතම අංශයක් වූයේ ඩිජිටල්කරණය යි. ඩිජිටල් මානව විද්‍යාව තුළ පවත්නා වූ පොදු සාධකයක් වන සාකල්‍යවාදී ගුණය තවදුරටත් ඔප්පු කිරීම සඳහා මෙම පර්යේෂණයේ ප්‍රතිඵල හේතු වෙයි. කෝවිඩ් සමය තුළ තථ්‍ය ලෝකයේ සිට අතථ්‍ය ලෝකය දක්වා ලාංකේය සමාජ යාන්ත්‍රණය යොමු වීමේ වර්ධනය අන්තර් හා බහිර් දෘෂ්ටිකෝණයන් ඔස්සේ නිගමනය කිරීමට හැකියාව ලැබුණි.

ප්‍රමුඛ පදඃ සාකල්‍යවාදී, ඩිජිටල්, කෝවිඩ්-19, සංස්කෘතිය, අන්තර් ප්‍රවේශය, බහිර් ප්‍රවේශය

නව කොරෝනා වෛරස ව්‍යාප්තිය හමුවේ ශ්‍රී ලංකාවේ විශ්වවිද්‍යාල සිසුන් මුහුණ දුන් ගැටලු පිළිබඳ අධ්‍යයනයක්

කෞශල්‍යා ජී.එන්.* සහ විජේරත්න වී.පී.අයි.එස්.

භූගෝලවිද්‍යා අධ්‍යයනාංශය, ශාස්ත්‍ර පීඨය, කොළඹ විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

කෝවිඩ්-19 වසංගතය හේතුවෙන් වර්තමානයේ ලෝකයේ බොහෝ රටවල අවිනිශ්චිත තත්ත්වයන් රැසක් උද්ගත වී ඇත. සෑම රටක ම පාහේ දේශපාලනික, ආර්ථික, සාමාජීය, සෞඛ්‍ය සහ පාරිසරික තත්වයන් වෙනස්වීම කෙරෙහි මෙම වසංගතයේ බලපෑම් එල්ල වී ඇත. මේ අතර කැපී පෙනෙන වෙනස්කම් රැසකට භාජනය වූ අංශයක් ලෙසට අධ්‍යාපන ක්ෂේත්‍රය හඳුනාගත හැකි ය. එහි දී, විශ්වවිද්‍යාල අධ්‍යාපනය අඛණ්ඩ ව පවත්වා ගැනීම උදෙසා විවිධාකාර වූ ක්‍රියාපටිපාටි අනුගමනය කිරීම ලෝකයේ බොහෝ රටවල මෙන් ම ශ්‍රී ලංකාවේ ද දැකිය හැකි ය. මාර්ගගත අධ්‍යාපනය, තාක්ෂණික ක්‍රමවේද හා සමාජමාධ්‍ය වැනි ක්‍රමවේදයන් භාවිතයෙන් අධ්‍යාපන කටයුතු අඛණ්ඩ ව පවත්වා ගැනීම මෙහි දී කැපී පෙනේ. කෝවිඩ්-19 වසංගතය සමඟ ශ්‍රී ලංකාවේ විශ්වවිද්‍යාල අධ්‍යාපනය තුළ සිදු වූ වෙනස්කම් විශ්වවිද්‍යාල සිසුන් සඳහා ධනාත්මක ව මෙන් ම ඍණාත්මක ව බලපෑම් කර ඇත. මෙම අධ්‍යයනයේ ප්‍රධාන අරමුණ ලෙස කොරෝනා වසංගත කාල සීමාවේ දී අධ්‍යාපන ක්ෂේත්‍රයේ සිදු වූ වෙනස්කම් සමඟ ශ්‍රී ලංකාවේ විශ්වවිද්‍යාල සිසුන්ට උද්ගත වූ ගැටලු හඳුනාගත් අතර අධ්‍යාපනික වෙනස්කම් හේතුවෙන් සිසුන්ට ඇති වූ ධනාත්මක සහ ඍණාත්මක බලපෑම් අධ්‍යයනය ද මෙම අධ්‍යයනයේ තවත් අරමුණකි. මේ සඳහා ප්‍රාථමික සහ ද්විතීයික දත්ත භාවිතයට ගත් අතර ප්‍රාථමික දත්ත ප්‍රමුඛ ව ම විශ්වවිද්‍යාල 6ක (කොළඹ, කැලණිය, ශ්‍රී ජයවර්ධනපුර, මොරටුව, ශ්‍රීපාලි මණ්ඩපය සහ සෞන්දර්ය කලා විශ්වවිද්‍යාලය) සිසුන් වෙත යොමු කරන ලද ගූගල් පෝරමයකට ප්‍රතිචාර දැක්වූවන් 50ක් මඟින් ලබාගෙන ඇත. ඒ අතරින් එක් විශ්වවිද්‍යාලයකින් සිසුන් දෙදෙනෙකු බැගින් අහඹු ලෙසට තෝරාගෙන සම්මුඛ සාකච්ඡා මඟින් වැඩිදුර තොරතුරු රැස්කරනු ලැබී ය. එසේ ම සාහිත්‍ය විමර්ශනය මඟින් ශ්‍රී ලංකාවේ මෙන් ම ගෝලීය වශයෙන් වසංගත ව්‍යාප්තිය සමඟ අධ්‍යාපන ක්ෂේත්‍රයේ ඇතිවූ ගැටලු සහ බලපෑම් හඳුනාගන්නා ලදි. ගැටලු ගසක් සහ SWOT විශ්ලේෂණ ක්‍රමවේදය මෙන් ම විස්තරාත්මක සංඛ්‍යානය යන ක්‍රමවේදයන් යොදාගනිමින් දත්ත විශ්ලේෂණය සිදුකරනු ලැබී ය. මෙහි දී විශ්වවිද්‍යාල සිසුන්ට ඇතිවූ ප්‍රමුඛතම ගැටලු ලෙසට අන්තර්ජාල සබඳතා සඳහා පහසුකම් නොමැති වීම, පුස්තකාල භාවිතයට ඇති අවස්ථාව ගිලිහීයාම සහ පර්යේෂණ කටයුතු පවත්වාගෙන යාමේ දී ඇතිවන ගැටලු කැපී පෙනේ. එය ප්‍රතිශතයක් ලෙසට පිළිවෙලින් 65%, 88%, සහ 79% යන අගයන් ගනී. එසේ ම SWOT විශ්ලේෂණයට අනුව, විශ්වවිද්‍යාල අධ්‍යාපනික කටයුතු අඛණ්ඩ ව පවත්වාගෙන යාමට විශ්වවිද්‍යාල සිසුන්ට පැවති ශක්තියක් ලෙසට නවීන අධ්‍යාපනික ක්‍රමවේද පිළිබඳ පැවති අවබෝධය ද, අවස්ථාවන් ලෙසට කාලය ඉතිරිවීම සහ දේශන නැවත නැවත නැරඹිය හැකි වීම දැක්විය හැකි ය. එසේ ම පුස්තකාල භාවිතයට නො හැකි වීම වැනි දුර්වලතාවන් ද, පර්යේෂණ කටයුතු අඩාල වීම සහ ශක්තිමත් දූරකථන සංඥා නොමැතිවීම වැනි තර්ජන ද පැවති බව පෙනේ. අධ්‍යාපන ක්ෂේත්‍රයේ ඇතිවන්නා වූ වෙනස්කම් සමඟ විශ්වවිද්‍යාල සිසුන් මුහුණදෙන ගැටලුකාරී තත්ත්ව හඳුනාගැනීම සඳහා සිදු කළ මෙම අධ්‍යයනය විශ්වවිද්‍යාල සිසුන්ගේ අධ්‍යාපනය නගා සිටුවීමට මහෝපකාරී වනු ඇත.

ප්‍රමුඛ පද: කෝවිඩ්-19 වසංගතය, අධ්‍යාපන ක්ෂේත්‍රය, විශ්වවිද්‍යාල අධ්‍යාපනය, SWOT විශ්ලේෂණය, මාර්ගගත අධ්‍යාපනය

නව යෞවනයන්ගේ ලිංගික දැනුම පිළිබඳ සමාජ විද්‍යාත්මක අධ්‍යයනයක්

සඳමිණි යූ.ඒ.එම්.

සමාජ විද්‍යා අධ්‍යයන අංශය, සමාජීයවිද්‍යා අධ්‍යයනාංශය,
කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

ලිංගිකත්වය යනු මිනිසාගේ මූලික අවශ්‍යතාවයක් වන අතර නව යෞවනය මානව ලිංගික ජීවිතයේ සුවිශේෂී සන්ධිස්ථානයක් ලෙස සැලකිය හැකි ය. ලිංගිකත්වය සහ නව යෞවනත්වය පිළිබඳ සැලකීමේ දී කායික සහ මානසික වශයෙන් විරුද්ධ ලිංගිකයන් කෙරෙහි ආකර්ෂණයක් ඇති වීමේ ප්‍රාරම්භක අවධිය සහ ප්‍රජනන ක්‍රියාකාරීත්වයට සූදානම් වන්නා වූ අවධිය වන නිසාත් නව යෞවනය සහ ලිංගිකත්වය අවියෝජනීය සම්බන්ධතාවයකින් යුතු වේ. මේ නිසා නව යෞවනයන්ට නිසියාකාර ලිංගික සමාජානුයෝජනයක් පැවතීම අතවශ්‍ය කරුණකි. ශ්‍රී ලංකාව වැනි ආසියාතික රටවල්වල ලිංගිකත්වය පිළිබඳ කතිකාවන් සඳහා එතරම් නම්‍යශීලී ප්‍රතිපත්තියක් අනුගමනය නො කිරීම දරුවන්ගේ ලිංගික දැනුම අවිධිමත් වීමට මෙන් ම ගබ්සාව වැනි මහා පරිමාණ සමාජ ගැටලු ඇති වීමට හේතු වී තිබේ. මෙම නව පර්යේෂණයේ මූලික පරමාර්ථය වන්නේ නව යෞවනයන්ගේ ලිංගික දැනුම කෙබඳු ද? යන්න අධ්‍යයනය කිරීම යි. මෙම පර්යේෂණයේ අරමුණු ලෙස නව යෞවනයන්ගේ ලිංගික දැනුම පිළිබඳ අධ්‍යයනය කිරීම, නව යෞවනයන් ලිංගිකත්වය පිළිබඳ දැනුම ලබා ගන්නා ආකාරය පිළිබඳ විමසා බැලීම, නව යෞවනයන්ගේ ලිංගිකත්වය පිළිබඳ ගැටලු මොනවා ද යන්න විමසා බැලීම සහ නව යෞවනයන් ලිංගික අරක්ෂණ උපක්‍රම පිළිබඳ ලබා ඇති දැනුවත්භාවය විමසා බැලීම ආදිය පෙන්වා දිය හැකි ය. මෙම පර්යේෂණයේ පර්යේෂණ විධික්‍රමය ලෙස සමීක්ෂණ විධික්‍රමය යටතේ ප්‍රශ්නාවලි ක්‍රමය භාවිතයට ගනු ලැබූ අතර එහි දී ගම්පහ දිස්ත්‍රික්කයේ කිරිබත්ගොඩ ප්‍රදේශයේ උසස් අධ්‍යාපන ආයතනයක වයස අවුරුදු 17 සහ 18 යන වයස් සීමාවන්ට අදාළ උසස් පෙළ හදාරන සිසු සිසුවියන් 30 දෙනෙකුගෙන් යුතු නියැදියක් භාවිතයට ගන්නා ලද අතර එය සමස්ත සංගහනයෙන් 10%කි. මෙම පර්යේෂණය මගින් අනාවරණය කරනු ලැබූ කරුණු වන්නේ නව යෞවන වියෙහි පසු වන ගැහැනු දරුවන්ගේ ලිංගික දැනුවත්භාවය පිරිමි දරුවන්ගේ දැනුවත්භාවයට වඩා අවම මට්ටමක පවතින බවත් අදාළ දෙපිරිස ම ස්වකීය ලිංගික දිශානතීන් පිළිබඳ ව දැනුවත්භාවයක් ලබා තිබුණ ද උපත් පාලනය වැනි ලිංගික ආරක්ෂණ ක්‍රමවේදයන් පිළිබඳ ව අවම වූ දැනුවත්භාවයක් ඇති බවත් ආදාළ නියැදියෙන් 88%ක් ලිංගික දැනුවත්භාවය ලබා ගන්නේ සමවයස් කණ්ඩායම් සහ සමාජ මාධ්‍ය මගින් බවත් පාසල හෝ පවුල තුළින් ලැබෙන ලිංගික දැනුම ඉතාමත් අවම මට්ටමක පවතින බවත් ය. මේ අනුව ශ්‍රී ලංකාවේ නව යෞවනයන්ගේ ලිංගික දැනුම තවදුරටත් විධිමත් ලෙස වර්ධනය විය යුතු මට්ටමක පවතින බව නිගමනය කළ හැකි ය.

ප්‍රමුඛ පද: නව යෞවනයන්, ලිංගිකත්වය, ලිංගික දිශානතිය, ලිංගික සමාජානුයෝජනය, ලිංගික දැනුම

බ්‍රිතාන්‍ය යටත්විජිත යුගයේ ශ්‍රී ලංකාවේ පොදු සුසාන ස්මාරක පිළිබඳ පුරාවිද්‍යාත්මක හා මානව විද්‍යාත්මක අධ්‍යයනයක් (බොරැල්ල පොදු සුසාන භූමිය හා මහයියාව සුසාන භූමිය ඇසුරෙන්)

ජයතිලක කේ.කේ.පී.එම්.

පුරාවිද්‍යා අධ්‍යයන අංශය, සමාජීය විද්‍යා අධ්‍යයනාංශය,
කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

මානවයා පරිණාමය වීමේ සුවිශේෂී ම ජයග්‍රහණයක් ලෙස ශිෂ්ටාචාරගත වීම දැක්විය හැකි ය. මෙම ශිෂ්ටාචාර ගතවීම තුළ ආගම, සංස්කෘතිය හා මිත්‍යා විශ්වාසයන් පදනම් කරගනිමින් ඉපදීම මෙන් ම මරණය පිළිබඳ ව ද විවිධ අභිචාර විධි, නිර්මාණ ගොඩනගා ගනු ලැබිණි. එසේ බිහිවූ සුවිශේෂී අංගයක් ලෙස ''සුසාන'' පෙන්වාදිය හැකි ය. 1815 කන්ද උඩරට රාජධානිය අත්පත් කර ගැනීමත් සමඟ ලංකාව බ්‍රිතාන්‍යයේ යටත් විජිතයක් බවට පත් විය. ඔවුන්ගේ දේශපාලන, ආර්ථික, සංස්කෘතිය හා ආගමික සංකල්ප පදනම් කරගත් සමාජයක් මෙරට ගොඩනැගීම දක්නට ලැබේ. ඒ යටතේ බටහිර ආගමික සංකල්පයන් පදනම් කරගත් සුසාන ස්මාරක හා සුසාන භූමි සම්ප්‍රදායක් මෙම සමාජ පෙරළියට සමගාමී ව ගොඩනැගුණි. පසුකාලීන ව ශ්‍රී ලාංකික මධ්‍යම පන්තියක් බිහි වූ අතර මොවුන් ද බ්‍රිතාන්‍ය සංස්කෘතිය අනුගමනය කළ පිරිසක් විය. මෙම පර්යේෂණයේ දී ශ්‍රී ලංකාවේ පවතින බ්‍රිතාන්‍ය සමයට අයත් බ්‍රිතාන්‍ය ජාතිකයන්ගේ සුසාන ස්මාරක ආකෘතින් හා එම කාලයට අයත් ශ්‍රී ලාංකිකයන්ගේ සුසාන ස්මාරක ආකෘතීන් අතර පවතින සමාන-අසමානතා හා පුද්ගල සමාජ තත්ත්වයන්හි ඇති වෙනස්කම් සුසාන ස්මාරකයන් තුළින් හඳුනාගත හැකි ද? යන පර්යේෂණ ගැටලුව ප්‍රධාන කරගනිමින් බ්‍රිතාන්‍ය යටත්විජිත සමයේ ශ්‍රී ලංකාවේ ඉදි වූ සුසාන ස්මාරක ආකෘතීන් අතර පවතින සමාන-අසමානතාවයන් හා මියගිය පුද්ගලයන් පිළිබඳ මානව විද්‍යාත්මක අධ්‍යයනයක් කිරීම හා ඔවුනගේ සමාජ තත්ත්වයන්හි වෙනස්කම් පිළිබිඹු වේ ද යන්න පිළිබඳ ව අධ්‍යයනය කිරීම මෙහි අරමුණු වේග මෙහි දී අධ්‍යයන ක්‍රමවේදය ලෙස ක්ෂේත්‍ර අධ්‍යයනයල ක්ෂේත්‍ර නො වන අධ්‍යයනය හා සම්මුඛ සාකච්ඡා යන ක්‍රමවේද ප්‍රධාන වශයෙන් භාවිත කරන ලදි. ප්‍රධාන වශයෙන් ම සුසාන ස්මාරක නිර්මාණයේ දී බ්‍රිතාන්‍යයන් සුසාන ස්මාරක ආකෘතින් කිහිපයක් ම භාවිත කර ඇති අතර ඔවුන් තම ආගමික විශ්වාසයන් මත ස්මාරක ප්‍රතිමාල සංකේත නිර්මාණය කිරීම මෙන් ම සමාජ තත්ත්වය මත භාවිත අමුද්‍රව්‍ය වෙනස් වී ඇති අතර ස්මාරකයන්හි ප්‍රමාණයන් හා නිර්මාණ තාක්ෂණයෙහි වෙනස්කම් සිදු වී ඇත. එසේ ම මෙකල මියගිය ශ්‍රී ලාංකිකයන්ගේ සුසාන ස්මාරකයන් ගත් විට ආකෘතිකමය වශයෙන් බ්‍රිතාන්‍ය අභාසය ගෙන ඇති අතර තම ආගමික සංකේත භාවිත කරමින් දේශීය හුරුවක් ලබාදීමට උත්සාහ කර ඇත. බ්‍රිතාන්‍ය යටත්විජිත සමය තුළ මෙරට ඉදි වූ සුසාන ස්මාරක ආකෘතීන් තුළින් හා මානව විද්‍යාත්මක අධ්‍යයනයක් මඟින් එකල සමාජයේ පැවති සමාජ තත්ත්වයන්හි වෙනස්කම් මනා ව පිළිබිඹු වේ.

ප්‍රමුඛ පද: බ්‍රිතාන්‍ය යටත්විජිත යුගය, පොදු සුසාන භූමි, සුසාන ස්මාරක, සමාජ තත්ත්වය, ආකෘතිය

වර්තමාන සමාජ අභියෝග හමුවේ පුද්ගල මනෝචිකිත්සාව කෙරෙහි බෞද්ධ කලා ශිල්පයන්හි උපයෝගීතාව

උපාලි එම්.එම්.ආර්.

මානවශාස්ත්‍ර අධ්‍යයනාංශය, සමාජ විද්‍යා හා මානවශාස්ත්‍ර පීඨය,
රජරට විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

කලාව වනාහි මානව ශිෂ්ටාචාරයේ මානවයාගේ චින්තනමය හා භාවමය හැකියාව පෙන්වනු ලබන මූලාශ්‍රයක් වැනි ය. බෞද්ධ චින්තනය තුළින් හැඩගැසුණු නානාවිධ සංස්කෘතිකමය දායාදයන් බෞද්ධ කලාව ලෙස හැඳින්වේ. පුද්ගල පෞරුෂයේ සහ චර්යා රටාවන්හි ධනාත්මක වෙනසක් ඇති කළ හැකි සහ පුද්ගලයා ජීවත් වන පරිසරයට අනුවර්තනය කිරීම සඳහා කරන ඕනෑ ම මනෝවිද්‍යාත්මක ශිල්ප ක්‍රමයකට මනෝප්‍රතිකාර යැයි කිව හැකි ය. වර්තමාන සමාජ අභියෝග හමුවේ බෞද්ධ කලා ශිල්ප මගින් මානවයාගේ චිත්ත සංයමය හා රසාස්වාදය ඇති කිරීමත්, චිත්ත ව්‍යාධීන් දුරු කිරීමටත් උපයෝගී වන බව හඳුනාගැනීම මෙම අධ්‍යයනය තුළින් අපේක්ෂිත අරමුණ වන අතර මෙහි දී පර්යේෂණ ක්‍රමවේදය වශයෙන් සාහිත්‍යමය හා පුරාවිද්‍යාත්මක මූලාශ්‍ර තුළින් ප්‍රාථමික දත්ත හා ද්විතීයික දත්ත ලබාගැනීම සිදුකරන ලද අතර එමෙන් ම සමාජය තුළ විවිධ කායික හා මානසික අභියෝගයන්ට මුහුණ දෙන සහ මුහුණ දුන් පුද්ගලයන් පස් දෙනෙකු සමග පවත්වනු ලැබූ සම්මුඛ සාකච්ඡා ක්‍රමය මගින් ද තොරතුරු ලබාගැනීම සිදුකරන ලදි. ශ්‍රද්ධා භක්තිය පෙරදැරිව කලා නිර්මාණයන් දෙස බලන කවර පුද්ගලයෙකුට වුව ද සිත් යහපත් මඟකට නැඹුරු කරගත හැකි ය. චිත්ත පීඩාවන් දුරු කරගත හැකි ය. මනෝ ව්‍යාධීන් සමනය කරගත හැකි ය. මිනිසා තුළ ස්වාභාවයෙන් ම චිත්ත සන්තානයෙහි භය, ක්‍රෝධය, ඊර්ෂ්‍යාව, අසන්තෘෂ්ටිය, තරහව, මානය හා අසහනශීලිත්වයට බෞද්ධ කලාව ඖෂධයකට සමාන ය. බෞද්ධ කලා ශිල්ප මගින් ඇති කරවන පැහැදීම හා සංයමය තුළින් ශ්‍රද්ධාව ඇති කරගෙන එය භාවනාවක් ලෙස සමථය වඩා අස්සාද, ආදීනව හා නිස්සරණ වශයෙන් සියලු ධර්මතාවන්ගේ අනියත බව පසක් කර චිත්ත විමුක්තිය ලබා ගැනීමට ද මඟ පාදයි. ඒ අනුව බෞද්ධ කලා ශිල්ප මගින් මිනිසාගේ චිත්ත සංයමය හා රසාස්වාදය ඇති කිරීමත්, චිත්ත ව්‍යාධීන් දුරු කිරීමටත් සමත් වී ඇති බව පෙනේ.

ප්‍රමුඛ පද: කලාව, බෞද්ධ, මනෝචිකිත්සාව, පුද්ගල, ශිල්ප

ශ්‍රී ලංකාවේ කෞතුකාගාර පද්ධතිය ආශ්‍රිත ව කෞතුක භාණ්ඩ අනුරූ අලෙවිසැල් ප්‍රවර්ධනය කිරීම සම්බන්ධ අධ්‍යයනයක්

දිසානායක ඩී.එම්.කේ.ජී.කේ.[1]*, ගනේආරච්චිගේ ඒ.එන්.එස්.[2],
අභයසුන්දර පී.එන්.[2] සහ විතානගේ ඩබ්ලිව්.කේ.එම්.[2,3]

[1]ඉතිහාස හා පුරාවිද්‍යා අධ්‍යයනාංශය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[2]මානව විද්‍යා අධ්‍යයනාංශය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[3]පශ්චාද් උපාධි අධ්‍යයන පීඨය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

මානවයා අතීතයේ පටන් කුතුහලය මත පදනම් ව පෞරාණික භාණ්ඩ තමන් සතු කොට ගෙන, ඒවා ප්‍රදර්ශනය කිරීමෙන් තෘප්තියක් ලබා ගත්තේ ය. මෙම මානව චර්යාව වර්තමානයට ද පොදු වන අතර මුල් කෞතුක භාණ්ඩ ලබා ගත නො හැකි අවස්ථාවල දී එයට සමාන අනුරුවක් හෝ තමන් සතු කොට ගෙන ප්‍රදර්ශනය කිරීමට පෙලඹී සිටියි. අන්තර්ජාලයේ දියුණුවත් සමඟ කෞතුකාගාර අද වන විට ගතානුගතිකභාවයෙන් නිදහස් වී ඇති අතර තාක්ෂණය සමඟ මුසු වෙමින් ජනතාව වෙත වඩාත් සමීප වී ඇති නිසා කෞතුකාගාරවල ඇති නිෂ්පාදන, වෙනත් සංස්කෘතික අලෙවිකරණ උපායමාර්ග සමඟ, සේවා කළමනාකරණ මට්ටම පිළිබඳ ව වැඩි අවධානයක් යොමු කර ඇත. මේ තත්ත්වය යටතේ කෞතුකාගාර තමන් සතු කෞතුක භාණ්ඩවල අනුරූ තනවා සංචාරකයන්ට මිලට ගැනීමට ඉඩ සලසා දී ඇත. මෙමඟින් ලාභය අරමුණු කර නො ගත්, සමාජ සුබසාධනය සඳහා කැප වූ කෞතුකාගාරයන්ට මූල්‍යයමය පිටිවහලක් සපයන අතර කෞතුක අනුරූ ජාත්‍යයන්තරයට මුදා හැරීමෙන් මුල් කෞතුක භාණ්ඩය පිළිබඳ ව දැනුමක් හා ප්‍රචාරණයක් ද වක්‍රාකාර ව ලබා දේ. ගෝලීය කෞතුකාගාරවල කෞතුකාගාර අලෙවිසැල්වල මාර්ගගත විකුණුම් විමසා බැලීමේ දී එම කෞතුකාගාරවල ආභරණ නිෂ්පාදන අංශයට ප්‍රමුඛ ස්ථානයක් වෙන් කොට ඇත. ශ්‍රී ලංකාවේ ද මධ්‍යම සංස්කෘතික අරමුදල යටතේ බටලීයේ ඇති අනුරූ පාසල මඟින් මෙරටට අවශ්‍ය අනුරූ නිෂ්පාදනය කරන නමුත් කෞතුක ආභරණ අනුරූ නිෂ්පාදනයට තවමත් නැඹුරු වී නොමැති බව දක්නට ලැබේ. මෙම අධ්‍යයනයේ දී ශ්‍රී ලංකාවේ කෞතුකාගාර අලෙවිසැල්වල වර්තමාන තත්ත්වය සාකච්ඡා කොට එය නගා සිටුවීමේ වැදගත්කම පිළිබඳ ව අවධානය යොමු කෙරේ. ඊට අමතර ව ගෝලීය ප්‍රවණතාවයක් වන කෞතුක ආභරණ නිෂ්පාදනය කෙරෙහි රාජ්‍ය අවධානයක් ලබා දීමේ අවශ්‍යතාව සම්බන්ධයෙන් සාකච්ඡා කරනු ලැබේ. අධ්‍යයනය සඳහා මධ්‍යම සංස්කෘතික අරමුදලේ බටලීය අනුරූ පාසලේ නිලධාරි මහතුන්ගෙන් සම්මුඛ සාකච්ඡාවන් සහ ලෝකයේ කෞතුකාගාර වර්ගීකරණය යටතේ ප්‍රමුඛස්ථානය ගනු ලබන ප්‍රංශයේ ලූවර් කෞතුකාගාරයේ ඇති මාර්ගගත වෙළෙඳපොළ වෙබ් අඩවිය සමඟ ශ්‍රී ලංකාවේ ඇති එක ම රාජ්‍ය මට්ටමේ කෞතුක අනුරූ මාර්ගගත වෙළඳපොළ වන මධ්‍යම සංස්කෘතික අරමුදල වෙබ් පිටුවෙහි අන්තර්ගත මාර්ගගත වෙළඳපොළ සැසඳීම මෙම පර්යේෂණයේ ප්‍රධාන ක්‍රමවේදය වී ය. මීට අමතර ව කෞතුක අනුරූ නිර්මාණය පිළිබඳ ව අවශ්‍ය තොරතුරු අධ්‍යයනය කිරීම සඳහා සාහිත්‍යය මූලාශ්‍ර අධ්‍යයනයක් සිදු කරන ලදි.

ප්‍රමුඛ පද: කෞතුකාගාර සාප්පු, ඊ-වෙළඳපොළ, එම්-වෙළඳපොළ, කෞතුකාගාර විද්‍යාව

ස්වාභාවික පරිසරය හා එහි වෙනස්වීම් අනුව තීරණය වන සංස්කෘතිය පිළිබඳ මානව විද්‍යාත්මක අධ්‍යයනයක් (හංවැල්ල ප්‍රාදේශීය ලේකම් කොට්ඨාසයට අයත් 435 - කහටපිටිය ග්‍රාමසේවා වසම ඇසුරිනි)

වික්‍රමනායක ටී.වයි.ඩී.* සහ සමරසේකර එස්.

මානව විද්‍යා අධ්‍යයනාංශය, මානවශාස්ත්‍ර හා සමාජීයවිද්‍යා පීඨය,
ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

මිනිසා ස්වභාවධර්මයේ කොටසකි. සමාජ සංස්කෘතික පරිණාමයේ මුල් අවධි නියෝජනය කළ මිනිසුන් පරිසරය පිළිබඳ මනා අවබෝධයකින් සිටි අතර ජීවත් වූයේ පරිසරයට අනුකූල ව ය. නමුත් වර්තමානය වන විට තමන්ට අවැසි ලෙස පරිසරය ගොඩනඟා ගැනීමට මිනිසා යොමුවීමත් සමඟ ස්වාභාවික නියමයන් මිනිසාට එරෙහි වී ඇත. ඒ අනුව ඇති වන ස්වාභාවික විපර්යාසයන් 'ස්වාභාවික ආපදා' නමි. අද වන විට ලංකාව මුහුණපාන ස්වාභාවික ආපදා තත්ත්වයන් දිනෙන් දින ඉහළ යයි. පහත්බිම් ආශ්‍රිත ව වර්ෂා කාලයේ ඇති වන ජලගැල්ම ද එවැන්නකි. ආපදා තත්ත්වයක් වුව ද ජීවිතය සමඟ නිරන්තරයෙන් ගැටීමේ දී එය නිතැතින් ම සංස්කෘතික අංගයක් බවට පත්වෙයි. එම ගැටලුවට විසඳුම් සොයනවා වෙනුවට ඒ මත රඳා පවතිමින් එය තම ජීවිතවලට ආශිර්වාදයක් බවට පත් කරගන්නට ජනතාව පෙළඹීම, ඒ ආශ්‍රිත නව ජීවන රටාවේ ස්වරූපය පර්යේෂණ ගැටලුව ලෙස ගෙන මෙම අධ්‍යයනය සිදුවිණි. පර්යේෂණ අරමුණ වනුයේ ස්වාභාවික පරිසරය හා එහි වෙනස්වීම පුද්ගලයාට සිදුකරන සමාජ සංස්කෘතික බලපෑම පිළිබඳ අධ්‍යයනය යි. කොළඹ දිස්ත්‍රික්කයේ හංවැල්ල ප්‍රාදේශිය ලේකම් කොට්ඨාසයෙහි 435-කහටපිටිය ග්‍රාමසේවා වසමට අයත් වන ගෘහස්ථ ඒකක 344න් 12%ක් වන පරිදි ගෘහස්ථ 40ක් නියැදිය වශයෙන් තෝරා ගෙන අධ්‍යයනය කරනු ලැබිණි. මෙහි දී විනිශ්චය නියැදිය, ස්තරායන නියැදිය සහ අහඹු නියැදිය යන නියැදුම් ක්‍රම යටතේ නියැදිය තෝරා ගැනිණි. අධ්‍යයන නියැදියේ පවුල් ඒකක 40න් 85%ක් ප්‍රදේශයේ මුල් පදිංචිකරුවන් විය. එමෙන් ම 65%ක් අතීතයේ කැලණි ගඟ ආශ්‍රිත වෘත්තියක් සිදුකළ ද වර්තමානයේ ඒවා වෙනස් ව ඇත. ආපදා තත්ත්වයෙන් තම ජීවිතවලට විශාල බලපෑමක් වන අතර එහි දී රජය හා විවිධ පෞද්ගලික ආයතන ද මැදිහත් වන බව ජනමතය යි. ස්වාභාවික විපතක දී රංවල දෙවියන්ට භාරවීම, ආපදාවන්ට ඔරොත්තු දෙන පරිදි නිවාස ඉදිකිරීම ආදිය ස්වාභාවික පරිසරය මානව සංස්කෘතිය අතර පවතින සබඳතාවය ප්‍රකට කරනු ඇත. මෙම තත්ත්වය සාමාන්‍යයෙන් පහත්බිම්වාසීන්ට මුහුණපාන්නට සිදුවන සංසිද්ධියක් බව නියැදියෙන් 58% මතය විය. කෙසේ වෙතත් ගඟේ ඉවුරු බාදනය වීම අවම කිරීමට ගල් වැටියක් බැඳීම, ආපදා කමිටුවක් පිහිටුවීම, රැඳවුම් මධ්‍යස්ථානයක් සකස් කිරීම සහ රාජ්‍ය නිලධාරීන් විනිවිදභාවයකින් යුතු ව කටයුතු කිරීම ආදිය පර්යේෂණය අවසානයේ ඉදිරිපත් කළ හැකි යෝජනා කිහිපයකි. ස්වාභාවික පරිසරය, ස්වාභාවික ආපදා එම භූගෝලීය තත්ත්වය යටතේ ජීවත් වන ජනතාවගේ සමාජ තත්ත්වය මෙන් ම සමස්ත සංස්කෘතික පසුබිම කෙරෙහි ද විශාල බලපෑමක් ඇති කරන බව මෙම අධ්‍යයනයේ නිගමනය වේ.

ප්‍රමුඛ පද: සංස්කෘතිය, ස්වාභාවික පරිසරය, ස්වාභාවික ආපදා, ජලගැල්ම

සංස්කෘතික විසරණය නූතන ලාංකේය කාපිරි ජනතාවගේ සංස්කෘතික වෙනස් වීම කෙරෙහි බලපෑ ආකාරය පිළිබඳ මානව විද්‍යාත්මක අධ්‍යයනයක් (සිරම්බිඅඩි ප්‍රදේශය ඇසුරෙන්)

අභයසුන්දර පී.එන්.[1], අමරකෝන් ඒ.ඒ.සී.එන්.[1*], විතානගේ ඩබ්ලිව්.කේ.එම්.[1,3], දිසානායක ඩී.එම්.කේ.ජී.කේ.[2] සහ ශ්‍රී ශාන් ජී.ඒ.ඒ.එන්.[1]

[1]මානව විද්‍යා අධ්‍යයනාංශය, මානවශාස්ත්‍ර හා සමාජීයවිද්‍යා පීඨය,
ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[2]ඉතිහාස හා පුරාවිද්‍යා අධ්‍යයනාංශය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[3]පශ්චාද් උපාධි අධ්‍යයන පීඨය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

ශ්‍රී ලංකාව තුළ සිංහල, දෙමළ, මුස්ලිම් සහ බර්ගර් යනුවෙන් ප්‍රධාන ජනවර්ග හතරක් දැකිය හැකි අතර සුළු ජන කොට්ඨාස කිහිපයක් ද වර්තමානය වන විට ලංකාවෙහි නිත්‍ය සාමාජිකයින් බවට පත් වී අවසන් ය. යටත් විජිත සමයන්හි දී යටත් විජිත පාලකයන්ගේ අවශ්‍යතාවන් සපුරා ගැනීම සඳහා විවිධ ජන වර්ගයන් මෙරටට රැගෙන එන ලදි. ඒ අනුව 1505 දී පමණ පෘතුගීසීන් විසින් යුධ භටයන් හා වහලුන් ලෙස මෙහි රැගෙන ආ අප්‍රිකානු ජනයා ලාංකේය කාපිරි ජනයාගේ ආදි මුතුන්මිත්තන් බව සැලකේ. පෘතුගීසී පාලන සමයේ පමණක් නොව ලන්දේසීන් හා ඉංග්‍රීසීන් යටතේ ද අනුග්‍රහය ලද ඔවුහු විවිධ වෘත්තීන්හි නිරත වෙමින් දිවයිනේ බොහෝ ප්‍රදේශවල ව්‍යාප්ත වූහ. අද වන විට මෙම ජනයාගේ විශේෂතා හා අනන්‍යතා සියල්ල සංස්කෘතික විසරණය හේතුවෙන් වියැකී යමින් පවතී. ඒ අනුව සංස්කෘතික විසරණය යනුවෙන් අප හඳුනාගනුයේ විවිධ හේතු නිසා සමාජ දෙකක සාමාජිකයන් අතර ඇතිවෙන අන්තර් සම්බන්ධතා අවස්ථාවල දී එක් සමාජයක පවතින සංස්කෘතිකාංග අනෙක් සමාජයේ සාමාජිකයින් විසින් තම සංස්කෘතිය වෙත ඇද ගැනීම යි. එලෙස නූතන ලාංකේය කාපිරි ජනතාවගේ සංස්කෘතික වෙනස්වීම කෙරෙහි සංස්කෘතික විසරණය බලපෑ ආකාරය අධ්‍යයනයට වයඹ පළාතේ පුත්තලම් දිස්ත්‍රික්කයේ සිරම්බිඅඩි ප්‍රදේශය යොදා ගැනුණි. ඒ සඳහා ප්‍රශ්නාවලි ක්‍රමය, සම්මුඛ සාකච්ඡා ක්‍රමය සහ නිරීක්ෂණ ක්‍රමය යොදා ගත් අතර එහි දී අහඹු ලෙස තෝරා ගත් කාපිරි පුද්ගලයින් 50 දෙනෙකු දත්තදායකයින් ලෙස යොදා ගන්නා ලදි. අද වන විට ලාංකේය කාපිරි ජනයාගේ අනන්‍යතාවයන් ඔවුන් තුළින් ගිලිහී යමින් පවතින අතර නුහුරු සංස්කෘතියකට අනුගත වීමට ද සිදු වී ඇත. කෙසේ නමුත් ලාංකේය කාපිරි ජනතාවට අන්‍ය වූ වටිනා මෙන් ම විචිත්‍රවත් සංස්කෘතික උරුමයක් පැවත තිබුණ ද වත්මනෙහි බොහෝ අවස්ථාවන්හි දී ඔවුන්ගේ රූපානුදර්ශයේ ඇති වෙනස්කම් මත ඔවුන් හඳුනාගත හැකි වුව ද සංස්කෘතිකමය වශයෙන් මොවුන් සිංහල සහ දෙමළ මහා සමාජයන්ට බොහෝ සමානකම් පෙන්නුම් කරයි. ඒ අනුව මෙලෙස සංස්කෘතික විසරණය හේතුවෙන් කාපිරි ජනයාට ම ආවේණික ව පැවතියා වූ සංස්කෘතිකාංග අනෙකුත් ජන කණ්ඩායම්වල සංස්කෘතිකාංග සමඟ මිශ්‍ර වීමත් ඇතැම් සංස්කෘතිකාංග සදහට ම තුරන් වීමත් හඳුනාගත හැකි ය.

ප්‍රමුඛ පදඃ කාපිරි ජනතාව, සංස්කෘතිය, සංස්කෘතික විසරණය, පෘතුගීසීන්

සංස්කෘතික විසරණය හා සංවර්ධන ව්‍යාපෘතීන්ගේ බලපෑම හමුවේ අහිකුණ්ඨික ජනතාවගේ උපසංස්කෘතියෙහි වත්මන් තත්ත්වය පිළිබඳ මානව විද්‍යාත්මක අධ්‍යයනයක් (තඹුත්තේගම කුඩාගම ප්‍රදේශය ඇසුරින්)

ශ්‍රී ශාන් ජී.ඒ.ඒ.එන්.[1*], විතානගේ ඩබ්ලිව්.කේ.එම්.[1,3], දිසානායක ඩී.එම්.කේ.ජී.කේ.[2], අමරකෝන් ඒ.ඒ.සී.එන්.[1] සහ දෙව්මිණී ඩබ්ලිව්.ජේ.ඊ.[1]

[1]මානව විද්‍යා අධ්‍යයනාංශය, මානවශාස්ත්‍ර හා සමාජීයවිද්‍යා පීඨය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[2]ඉතිහාස හා පුරාවිද්‍යා අධ්‍යයනාංශය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
[3]පශ්චාද් උපාධි අධ්‍යයන පීඨය, ශ්‍රී ජයවර්ධනපුර විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

උපසංස්කෘතීන් මගින් සමාජයක පවතින මහා සංස්කෘතිය විචිත්‍රවත් කරයි. මහා සංස්කෘතිය තුළ සිටිමින් විවිධ වූ සාධක පදනම් කොටගෙන බිහි වන කුඩා කණ්ඩායම් තුළ උපසංස්කෘතීන් නිර්මාණය වෙයි. උපසංස්කෘතීන් පිළිබඳ ව අධ්‍යයනය කිරීමේ දී ශ්‍රී ලංකාවේ අහිකුණ්ඨික ජනතාව හොඳ නිදසුනකි. ඔවුනට ම ආවේණික සංස්කෘතික අනන්‍යතාවයක් පවතින මොවුන්ගේ සුවිශේෂී ම චර්යාවක් වන්නේ එක් ස්ථානයක සත් දිනකට වඩා ලැගුම් නො ගැනීම යි. ජීවනෝපායන් ලෙස රිලවුන් නැටවීම, නයි නැටවීම හා සාස්තර කීම යනාදිය සිදු කළ ද, මහා සමාජයේ බලපෑම නිසා ඇති වූ සංස්කෘතික විසරණය සහ සංවර්ධන ව්‍යාපෘතීන් හේතුවෙන් මොවුන්ගේ සංචාරක ජීවන රටාව හා ජීවනෝපායන් වර්තමානයේ දී වෙනස් වී තිබෙන ආකාරය විමසීම මෙහි දී අරමුණු කොටගෙන තිබේ. අධ්‍යයන ක්ෂේත්‍රය තුළ අහිකුණ්ඨික ජනතාවට අයත් දත්තදායකයින් 30ක් සමඟ සම්මුඛ පර්යේෂණ උපලේඛනයක් අධාරයෙන් සම්මුඛ සාකච්ඡා විධික්‍රමය යටතේ මෙම පර්යේෂණය සිදුකර තිබේ. මුල් කාලීන ව සංචරණ ජීවිතයක් තිබූ මොවුන්ට ස්ථිර වාසස්ථාන නො තිබුණු අතර හමුවන භූමියක කුඩාරම් අටවාගෙන ජීවත් විය. බූරුවෙකු පිටේ බඩු බාහිරාදිය ප්‍රදේශයෙන් ප්‍රදේශයට රැගෙන යාම මොවුන්ගේ සිරිත විය. නමුත් 1982 රජය විසින් මොවුන් තඹුත්තේගම කුඩාගම ප්‍රදේශයේ පදිංචි කිරීමත් සමඟ මෙම පදිංචි කරවීම හේතුවෙන් මොවුන්ගේ උපසංස්කෘතියට අනන්‍ය වූ ලක්ෂණ බොහෝ ප්‍රමාණයක් වෙනස් විය. වත්මනෙහි මොවුන් සාම්ප්‍රදායික ජීවන වෘත්තීන් වෙනස් කර පොත් විකුණුම් හා කුලී වැඩ සඳහා යොමු ව තිබේ. පහළ මට්ටමක තිබූ අධ්‍යාපනය වත්මනෙහි සාධනීය ලක්ෂණ පෙන්නුම් කරන බව මෙහි දී පැහැදිලි විය. මොවුන්ගේ ආගමික පරිසරය වෙනස්වනසුලු එකකි. එනම් ඉන්දියානු සම්භවයක් ඇති මොවුන්ගේ මුල් කාලීන ආගම හින්දු ආගම විය. පසු ව බෞද්ධාගම ඇදහූ නමුත් අද වන විට සියල්ලන් ම පාහේ ක්‍රිස්තියානි ආගම වැළඳ ගෙන ඇති බව පෙනේ. තෙලිඟු භාෂාව මව් භාෂාව වූවත් වර්තමානයේ සිංහල, ප්‍රධාන භාෂාව වශයෙන් භාවිත කරයි. වැඩිහිටියන් තෙලිඟු භාෂාව එදිනෙදා ජීවිතයේ දී භාවිත කළ ද තරුණයන් හා දරුවන් සිංහල බස මනා ව හසුරුවනු ලැබේ. මේ අනුව අහිකුණ්ඨික ජනතාවගේ උපසංස්කෘතියේ අනන්‍ය වූ ලක්ෂණ ඔවුන් අතින් ම ගිලිහෙන බවත් හා මහා සමාජයේ සංස්කෘතික ලක්ෂණ විසරණය වීමෙන් ඇති වන්නා වූ වෙනසට වත්මනෙහි අහිකුණ්ඨික ජනතාව සිය කැමැත්තෙන් ම එකතු වන බව පැහැදිලි විය.

ප්‍රමුඛ පද: උපසංස්කෘතිය, අහිකුණ්ඨික, මහා සමාජය, වෙනස් වීම, සංවර්ධන ව්‍යාපෘති

සේනාසනක්ඛන්ධකයෙන් හෙළි වන ස්වස්ථතාව පිළිබඳ අධ්‍යයනයක්

රතනසාර හිමි ඩබ්ලිව්.

පාලි හා බෞද්ධ අධ්‍යයනාංශය, මානව ශාස්ත්‍ර හා සමාජීය විද්‍යා පීඨය,
රුහුණ විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

කායික-මානසික ස්වස්ථතාව පූර්ණ වශයෙන් පවත්වා ගැනීමට බුදුදහම පුද්ගලයා හා සමාජය යොමු කරවන්නේ බුදුදහමේ මුඛ්‍ය අරමුණ වන නිර්වාණ සාක්ෂාත්කරණය සිදුකරගැනීමට යහපත් සෞඛ්‍යය ඉවහල්වන බැවිනි. ස්වස්ථතාව යනු රෝග ඇතිවීම වළක්වාගැනීම වෙනුවෙන් අනුගමනය කරනු ලබන ක්‍රියාවලිය වේ. බාහිර සමාජය හෝ පරිසරය සමග නිවැරදි සබඳතා පවත්වා ගැනීම, භෞතික භාණ්ඩ පිරිසිදුව තබාගැනීම හා ක්‍රමවත් ව නිසි ලෙස භාවිත කිරීම ස්වස්ථතාව රැකගැනීමට ඉවහල් වන කරුණු ය. විනය පිටකයට අයත් චුල්ලවග්ගපාළියේ සේනාසනක්ඛන්ධකය තුළ අන්තර්ගත විනය පැනවීම් ස්වස්ථතාව අරමුණු කරගනිමින් බුදුරදුන් පනවා තිබෙන බව අක්ෂි රෝග ඇති නොවීමට හිරු එළිය නිසි පරිදි ලැබෙන සේ සේනාසනයක වා-කවුළු තැබීමට පැන වූ ප්‍රඥප්තිය වැනි නිදසුන් මගින් සනාථ වේ. මෙපමණක් නොව වාස්තු විද්‍යානුකූල ඉදිකිරීම් ආදිය ස්වස්ථතාව අරමුණු කරගනිමින් සිදුකළ යුතු බව ද සේනාසනක්ඛන්ධකයෙන් පැහැදිලි වන කරුණකි. චුල්ලවග්ගපාළියේ සේනාසනක්ඛන්ධකයේ විනය ප්‍රඥප්තීන් මගින් පුද්ගල-සමාජීය ස්වස්ථතාව ආරක්ෂා කරගැනීමට ලැබෙන අනුබලය විමර්ශනය කිරීමේ අරමුණ යටතේ චුල්ලවග්ගපාළියේ සේනාසනක්ඛන්ධකයෙන් හෙළි වන ස්වස්ථතා දර්ශනය කෙබඳු ද? යන පර්යේෂණ ගැටලුව මත ග්‍රන්ථ සංධාර අධ්‍යයන ක්‍රමවේදය යොදාගනිමින් මෙම පර්යේෂණය සිදුකරන ලදි. ඒ අනුව පුද්ගලයාගේ කායික-මානසික ස්වස්ථතාව වෙත මූලික අවධානය යොමු කරමින් කායික-මානසික සෞඛ්‍ය පවත්වාගැනීමට අවශ්‍ය විනය ප්‍රඥප්ති පැනවීම් සේනාසනක්ඛන්ධකයේ සිදුකර ඇති බව පැහැදිලි විය. එසේ ම භෞතික භාණ්ඩ කළමනාකරණය කිරීම හා ගෘහ නිර්මාණ ඉදිකිරීම නිවැරදි ක්‍රමවේද අනුව සිදුකිරීම තුළින් කායික-මානසික සෞඛ්‍ය යහපත් ව පවත්වාගැනීමට උපයෝගී වන බව තහවුරු විය.

ප්‍රමුඛ පද: ආධ්‍යාත්මික, ස්වස්ථතාව, සේනාසනක්ඛන්ධකය, සෞඛ්‍ය, ප්‍රඥප්ති

හෘදයාබාධ වැළඳීමේ අවදානම සඳහා නාගරික ජීවන රටාව සිදුකරනු ලබන බලපෑම අධ්‍යයනය කිරීම

ආරච්චි ආර්.

භූගෝලවිද්‍යා දෙපාර්තමේන්තුව, ශාස්ත්‍ර පීඨය, කොළඹ විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
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සාරසංක්ෂේපය

නාගරීකරණය හමුවේ පුද්ගල ජීවන රටාව පරිභෝජනවාදී ආර්ථික රටාවකට යොමු වී තිබේ. යම් පුද්ගලයකු ජීවත් වන පරිසරය එම පුද්ගලයාගේ චර්යාත්මක සාධක සඳහා බලපෑමක් සිදුකරනු ලබයි. පුද්ගලයාගේ එම ජීවන රටාව රෝගාබාධ ගණනාවකට හේතු වන අතර වර්තමානය වන විට බෝවන රෝගවල සිට බෝනොවන රෝග දක්වා රෝග සංක්‍රාන්තියක් හඳුනාගත හැකි වේ. මෙම අධ්‍යයනයේ මූලික පරමාර්ථය නාගරික ජීවන රටාව හඳුනාගැනීම හා එම ලක්ෂණ හෘදයාබාධයක් වැළඳීමේ දී පුද්ගලයකුට බලපෑම් කරනු ලබන ආකාරය පිළිබඳ ව හඳුනා ගැනීම වේ. අධ්‍යයන ප්‍රදේශය ලෙස ගම්පහ මහනගර සභා සීමාව කලාපකරණයකට ලක් කර එම කලාපවල වැඩි ම ජන සංඛ්‍යාවක් සිටින ග්‍රාම නිලධාරී වසම් 4ක් තුළින් අහඹු ලෙස තෝරාගත් ගෘහ කුටුම්භ 90ක් සඳහා ප්‍රශ්නාවලි භාවිත කර තිබේ. අධ්‍යයන ප්‍රදේශයේ නාගරික ජීවන රටාව හඳුනාගැනීමේ දී නාගරික ජනසංඛ්‍යාව, ජනඝනත්වය, ආර්ථික ක්‍රියාකරකම්, සේවා ස්ථාන, මාර්ග හා ඉදිකරන ලද ප්‍රදේශයන්ගේ ව්‍යාප්තිය යනාදි කරුණු ප්‍රධාන වශයෙන් අධ්‍යයනය කර තිබේ. හෘදයාබාධ වැළඳීමේ සාධක ලෙස ආහාර රටාව, ශරීර අක්‍රියතාවය, පරිසර ක්ලමථකාරක, ශරීර ස්කන්ධ දර්ශකය හා වෙනත් බෝනොවන රෝග පිළිබඳ ව පමණක් අවධානය යොමුකරනු ලැබී ය. මෙම අධ්‍යයනය සඳහා සිතියම් විද්‍යාත්මක ක්‍රම ලෙස ආසන්න අසල්වාසී විශ්ලේෂණ ක්‍රමය, උණුසුම් ස්ථාන විශ්ලේෂණය හා බහුවලයන් සහිත සීමාන්තරික කලාපකරණයත් භාවිත කර ඇත. නාගරික ජීවන රටාව හා හෘදයාබාධ වැළඳීමේ අවදානම් සාධක අතර පවතින සම්බන්ධය විශ්ලේෂණ සඳහා ප්‍රමාණාත්මක ක්‍රම යටතේ ප්‍රධාන සංරචක විශ්ලේෂණ ක්‍රමය, ප්‍රතිපායන විශ්ලේෂණය හා සහසම්බන්ධතා සංගුණකය යොදාගන්නා ලදි. අධ්‍යයනය කරන ලද ගෘහ කුටුම්භ අනුව බලපාන ලද ප්‍රධාන සාධක අතර ආහාර රටාව හා පාරිසරික ක්ලමථකාරක හෘදයාබාධයක් වැළඳීමේ දී වැඩි බලපෑමක් සිදුකර තිබේ. ආහාර රටාව හා ශරීර ස්කන්ධ දර්ශකය අතර සම්බන්ධය ප්‍රතිලෝම සම්බන්ධයක් (P=0.3679 (ස්ත්‍රී)/0.153 (පුරුෂ)) ද ශරීර ස්කන්ධ දර්ශකය හා ශරීර අක්‍රියතාවය අතර අනුලෝම සම්බන්ධයක් (P=0.02819) පවතින බව හඳුනාගත හැකි ය. නාගරික කේන්ද්‍රයේ සිට නාගරික පරිධි කලාපවලට ගමන් කිරීමේ දී හෘදයාබාධ වැළඳීමේ සාධක හා දුර අතර සෘණ සහසම්බන්ධයක් පවතිනු ලැබේ. කාලීන හා ක්ෂේත්‍රීයව නාගරීකරණය මූලික කරගෙන පුද්ගලයින්ගේ ජීවන රටාව බෝනොවන රෝග වැළඳීමේදී බලපෑමක් සිදුකරනු ලබන බව මෙම අධ්‍යයනය තුළින් හඳුනාගත හැකි විය.

ප්‍රමුඛ පද: ජීවන රටාව, හෘදයාබාධ, නාගරීකරණය

MANAGEMENT, COMMERCE & INDUSTRY DEVELOPMENT

CORPORATE SUSTAINABILITY: A BIBLIOMETRIC ANALYSIS USING THE SCOPUS DATABASE

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Abstract

The main objective of this study is to perform a bibliometric analysis on the trends and other important meta-data on research publications related to the concept of "corporate sustainability". There is a noted dearth on this area and this study could be considered to be a pioneering attempt to conduct a bibliometric analysis on this area. The present paper applies bibliometric and network analysis to examine research publications trends, citations, country of publications, top journals, top authors, top publishers and top cited papers related to concept Corporate Sustainability over the past 20 years from the year 1989 in the Scopus database, where empirical evidence suggest that Scopus has a comprehensive coverage of publications in the social science discipline. Standard bibliometric indicators including the growth rate of publications, analysis of the citations, and research productivity were used in order to evaluate bibliometric data, which were analyzed using standard *Publish or Perish* and *Vos Viewer* software. 105,725 references in 1,950 source publications were analysed. In terms of findings, in 1989, the first publication was noted in the Scopus database on corporate sustainability and it is indicated that the publications related to this field has tremendously increased continuously within the last two decades. Furthermore, findings suggest that the highest number of publications and number of citations are related to three countries (i.e., United States, the United Kingdom, and Australia) and leading journals in this area included the *Journal of Cleaner Production*, *Sustainability Switzerland*, *Business Strategy and the Environment, Journal of Business Ethics*, and the *Corporate Social Responsibility and Environmental Management*. Moreover, researcher, Isabel Schaltegger, S et al. published the highest number of articles (sixteen) on Corporate Sustainability and second highest publications were by Searcy, C. (twelve). Additionally, the findings indicated that the highest cited article was the "Beyond the business case for corporate sustainability" by Dyllick, T. & Hockerts, H. in 2017 with 1,432 citations and the second highest cited publication is done by Marrewijk, M. in 2003 with 950 citations. Finally, it was found that the areas of sustainable development and environmental sustainability are the main key areas focused by the researchers. Based on the findings, we propose that future researchers could investigate on the areas such as environmental management, environmental impact, corporate-sustainability, corporate strategy and environmental economics.

Keywords: Bibliometric Analysis, Corporate Sustainability, Environmental Management, Environmental Economics, Trends

COVERAGE OF ETHICS IN ACCOUNTING EDUCATION IN SRI LANKAN TERTIARY EDUCATION SYSTEM

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Abstract

The main objectives of this study were to examine the perceived level of coverage, i.e., contents, delivery, and assessment methods of ethics in accounting curriculums in the Sri Lankan tertiary education system and to evaluate the adequacy of such contents as against the theories and frameworks of such degree programs. Accordingly, the target population of this study was undergraduates and recently passed out graduates in accounting degree programs of the Sri Lankan tertiary education system. This study used a quantitative approach and responses were gathered via a self-administered structured questionnaire, which was constructed based on extant literature, and refined via expert opinions and a pilot survey. The frequency analyses and mean raking performed indicated most popular content elements included: Explanation of the nature of ethics, Application of the fundamental ethical principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behaviour to ethical dilemmas and determine an appropriate approach, Explanation of the concept of public interest with its importance for professional accountants; delivery elements included: Lectures, Group activities, Using case studies; and assessment elements included: Written exams, Formal presentations, Completion of case studies. On the other hand, the least popular content elements were Explanation of moral development theories, Explanation of methods to translate ethical values to business settings, Application of models in ethical decision making; delivery elements were: Writing reflective journals, Video training using actual fraud cases, Role playing; and assessment elements were: Critical incident diaries, Reflective records, Personal development portfolios, in accounting curriculums in Sri Lankan tertiary education system. Next, in terms of the coverage of ethics as against the ethical theories and frameworks, the mean and one-sample t-tests performed indicated that all these three aspects, i.e., contents, delivery, and assessment methods were inadequate in the accounting curricula. These findings are expected to have significant policy implications for educators, policymakers, and educational institutions, and revisions based on these findings are suggested.

Keywords: Accounting Curricula, Contents, Delivery, Assessment, Ethics education

COVID-19 AND SUSTAINABILITY OF SRI LANKA

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Abstract
As a country, now it is necessary to manage the economy and look after the society while ensuring the sustainability of the country with fighting against the corona virus. The aim of this research paper is to examine the role of Sri Lanka towards defining a sustainable setup while identifying the best methods to establish a strong sustainable culture within the country. Some of studies have been included in which strategies of some countries have identified to curb the negative impacts of COVID-19. The qualitative method has been utilized for the research in different ways such as focus group discussions with professionals and refer some of perspectives of HRM and Sustainability. It is found that as a country, there should be sustainable strategies to manage the economy and look after the community. This study found some of strategies and recommendations that could be considered as lessons from the COVID-19 pandemic, and it will be helpful to manage and balance the economy and the community in Sri Lanka. Enabling the Innovative and Creativity Practices, design a Manufacturing based Economy, look after Agriculture industry with giving more facilities, creating more opportunities for Education and Research & Development, set up a Strong Health System, increase the productivity level, effective public service, sustainability and contingency management, creating more job opportunities for female and maintaining the Political Stability are the areas which can be developed to uplift the country economy and ensure the sustainability of the country while facing to future challenges.

Keywords: COVID-19, Economy, Sustainability, Challenges, Strategies

DIFFERENCES BETWEEN FACILITIES AVAILABLE FOR PLAYERS AT INTERNATIONAL CRICKET STADIUMS IN SRI LANKA AND AUSTRALIA

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Abstract

Sports facilities available in Sri Lanka for cricket are higher in number compared to facilities available for other sports. It is appropriate to have a higher number of cricket facilities, especially for the men and women who have earned fame internationally to Sri Lanka. As important as the number of facilities, the features offered to the cricketers in these facilities are even more significant. Accordingly, the main aim of the study is to identify the differences between facilities available for players at International Cricket Stadiums in Sri Lanka as compared with Australia. As specific objectives, the study looks into the identification of facilities available for players at R. Premadasa Cricket Stadium and Optus Stadium separately. These facilities was selected as they are the two sites that the researcher had most access interms of collecting information. To successfully explore the differences, the study was conducted using a qualitative research approach. Data were gathered primarily through interviews and observations. Photo-elicitation was the data analysis technique used and two sites: Optus Stadium in Western Australia and R. Premadasa Cricket Stadium in Sri Lanka were focused under this study. In total. seven managerial level interviewees took part in the study. The analysis revealed that at Optus Stadium, there is an area assigned for players to be physically active indoors. This space was specially designed to accommodate the shoes of the cricketers. Apart from the basic features of a team dressing room, Optus Stadium offers facilities such as a seminar room, attached medical room, ice and hot bath rooms. It was revealed that facilities offered to the players at R. Premadasa Cricket Stadium are similar to Optus Stadium but differred in quality. This reflects a gap between facilities available for players at International Cricket Stadiums in Sri Lanka and Australia.

Keywords: Team Dressing Room, R. Premadasa Cricket Stadium, Optus Stadium, Cricket Stadium, International Cricket Council

FACTORS INFLUENCING THE ADOPTION OF TELEWORKING IN SRI LANKA: PERSPECTIVES FROM IT PROFESSIONALS

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Abstract
Teleworking is a flexible work arrangement where employees can work from any location which is out of their traditional office locations using information technology. This has become so popular throughout the world because of its advantages to the employees as well as employers. Though some of the IT companies currently provide teleworking facilities, teleworking is not much popular in the Sri Lankan context. Most of the employees have a negative perception on teleworking. Therefore, the objectives of this study are to identify factors that affect IT professionals' adoption of teleworking, and how those factors are related. Technology Acceptance Models provided the theoretical explanation for this research. Data were collected from IT professionals through an online questionnaire. Based on data collected from randomly selected 74 IT professionals, a conceptual model was tested against the research objectives. The findings provide important contributions to both research and practice by demonstrating the relative impact of each factor on the adoption of teleworking. Study concludes that credibility, perceived risk, self-efficacy, perceived usefulness, and perceived ease of use are the factors that affect IT professionals' adoption of teleworking.

Keywords: Teleworking, TAM, IT Professionals

IMPACT OF WOMEN ENTREPRENEURS' FAMILY COMMITMENT FOR THEIR BUSINESS SUCCESS: AN EXPLORATORY STUDY OF VIDATHA PROGRAM, SRI LANKA

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Abstract
Current trend of economic and political situation in the world paved the way for women to running a business. Even though women contributed large portion to the national economy by heading a business, they have problems for balancing family commitments with business. Hence, they unable to utilized their full capacity and expected outcome would not achieve. Fact that studying relationship between women entrepreneur's family commitment and their business success is timely requirement. Therefore, this research investigated the impact of family commitments for the success of women entrepreneurs' in Sri Lanka. Women entrepreneurs selected from the VIDATHA program, Central Province, which was initiated by the Ministry of Science, Technology and Research in mid-2000. During the 2015 there were 125 women entrepreneurs registered with the above program and 65 among them was selected through Stratified Random Sampling method. According to the results, Women entrepreneurs face problem with balancing a role as fulfilling parental responsibility and role as a homemaker. During the start-up pace they have problem with inadequate capital for investing their business. Further on going period they faced cash-flow problem which is difficult to manage working capital. They have barriers for investing money for their business. All the respondents' success due to their hard work which done on behalf of their business and good family support other than the Children because most of women entrepreneurs were having children who were schooling and it is a barrier for them. Among the all respondents most of them were created/pull entrepreneurs. Moral support, financial management training, and training on commercialization is necessary for them.

Keywords: Women Entrepreneurs, Work-family Commitments, Business Success, Business Start-up

THE IMPACT OF FINANCIAL LITERACY ON BUSINESS PERFORMANCE IN SMALL AND MEDIUM ENTERPRISES: EVIDENCE FROM KEGALLE DISTRICT IN SRI LANKA

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Abstract

This study has been conducted to achieve the objectives of examining the level of financial literacy based on demographic factors and identifying the relationship between the Financial Literacy and Business Performance of Small and Medium Enterprises (SMEs) in the Kegalle district of Sri Lanka. Thus, a quantitative study has been conducted based on Prospect Theory, and Exchange theory. There is a dearth of studies related to the Financial Literacy and Business Performance of SMEs in Sri Lanka. This study is carried out as a solution to the empirical gap. The sample size was 100 SMEs in the Kegalle district, and the representative purposive sampling method was used to collect the required data. This study has been used primary data through questionnaires after conducting factor analysis, reliability and validity test. The objectives have been achieved through descriptive analysis, correlation, and regression analysis since the past empirical review suggested using this analysis to examine the relationship. The findings of the study revealed that there is a positive relationship between financial literacy and business performance. Accordingly, independent variables such as technical financial knowledge, financial market knowledge & financial management skills have a positive impact on the business performance of SMEs and among these variables, technical financial knowledge and financial management skills are the most influential factors which affect the business performance. As the explanation of prospect theory, this study also concluded that there should have good financial knowledge among owners to make decisions. This study also concluded that owners or employees should have higher education level. As the explanation of exchange theory, it should exchange information or knowledge among employees and recruit more skilled employees. The research provides insight into the business owners of SMEs & policymakers that how they can make better decisions to improve business performance through financial literacy. Accordingly, the business owners and policymakers should arrange training programs to improve the knowledge of financial literacy.

Keywords: Financial Literacy, SME's, Business Performance

THE PROCESS OF PROCUREMENT DURING THE COVID-19 PANDEMIC PERIOD: A CASE STUDY OF SABARAGAMUWA UNIVERSITY

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Abstract

Health can be recognized as a main factor, which directly governs the overall economy and development of a nation. The current global crisis of Corona (COVID-19) pandemic has also provided better evidence to that. Based on a pilot study, the monthly progress of the procurement process during the COVID-19 pandemic period at many of the government institutes in Sri Lanka was identified as below the average level. Accordingly, this study was conducted as a case study concerning the Sabaragamuwa University of Sri Lanka in identifying the ways of continuing the procurement processes in government sector institutes during the COVID-19 pandemic, and then to provide recommendations. Fifty individuals were randomly selected as respondents that included procurement officers, administrative officers related to the procurement in the university, project coordinators, and activity coordinators of the projects within the Sabaragamuwa University of Sri Lanka. According to the findings of this study, it was found out that there is a possibility to continue the procurement process as usual with the help of technology (i.e., e-procurement) within any institute during a crisis like the COVID-19 pandemic as done in many countries in the world. As a recommendation, this study suggests developing the infrastructure related to Information and Communication Technology within government sector organizations in Sri Lanka, while enhancing the capacity of using digital technology and making the employees familiar to cope with technology to go ahead with entirely electronic procurement in the future.

Keywords: COVID-19, procurement, e-procurement, Technical evaluation

THE RELATIONSHIP BETWEEN SELECTED CORPORATE GOVERNANCE MECHANISMS AND LEVEL OF FIRM RISK WITH THE MODERATING IMPACT OF THE LEVEL OF CORPORATE SOCIAL RESPONSIBILITY IN SRI LANKAN LISTED COMPANIES

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Abstract

The main aim of this research is to investigate the relationship between selected board characteristics and the level of firm risk with the moderating impact of the level of corporate social responsibility in Sri Lankan listed companies during the period 2016 to 2019. Based on extant literature, ten vital board characteristics, i.e., the board size, non-executive independent directors, duality, board meetings, audit meetings, audit committee size, presence of a nomination committee, presence of a remuneration committee, diversity, and total skill base of the board were considered; and for firm risk, alternative measures of the standard deviation of monthly stock returns *and* the idiosyncratic risk - firm-specific risk - *beta* were utilized. Further, three control variables, i.e., growth, leverage, and return on assets (ROA) of firms *and* corporate social responsibility (CSR) index as the moderator, were used. This study first assessed the level of chosen board-related corporate governance mechanisms and level of firm risk; and then examined how these selected characteristics impacted such firms' risk level. Finally, the study examined the moderating effect of corporate social responsibility on the relationship between corporate governance mechanisms in terms of board characteristics and firms' risk level. In terms of findings, it was noted that the majority of the listed companies had adhered to the baseline requirements of best practices of corporate governance; and the risk measures indicated lower levels compared to countries such as the United Kingdom and the United States of America. In terms of relationships, the board size indicated a negative relationship (under correlation analysis) with firms' risk level, while the existence of audit meetings, CEO-Chair duality, and total skills base of the board of directors showed an unexpected positive association (under correlation and OLS multivariate regression analyses) with firms' risk level, indicating an increased level of firms' risk. However, it was noted that other selected board characteristics did not impact to the level of firms' risk level. Finally, the findings indicated no moderation (i.e., interaction) effect of corporate social responsibility (CSR) on the relationship between selected board characteristics and firms' risk level. These findings are anticipated to have substantial policy implications.

Keywords: Board Characteristics, Colombo Stock Exchange, Corporate Social Responsibility (CSR), Firm's Risk

THE ROLE OF GENDER ON INCLINATION TOWARDS ENTREPRENEURSHIP: SPECIAL REFERENCE TO THE SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

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Abstract

Today, there is a rising phenomenon of female entrepreneurship worldwide. However, many researchers confirm feminine entrepreneurship remains limited than masculine in the globe which is not explored in Sri Lankan context hitherto. This study has focused to identify the role of gender in entrepreneurship inclination with the determinant for feminine entrepreneurship development in Sri Lanka and provide new directions in policymaking. The investigation was conducted in Advanced Technological Institute, *Gampaha* which is under Sri Lanka Institute of Advanced Technological Education. We focused the stream of Agriculture for the study. All the students (133) who followed 'Higher National Diploma Technology in Agriculture' diploma program were considered for the study. Mainly, primary data was considered for the study. A pre-tested survey questionnaire was used to collect data, which consisted with two parts; first, socio-demographic variables of the respondents; next, fifteen statements to explore entrepreneurial inclination focusing three dimensions of Attitude towards behaviour, Subjective norms and Perceived behavioural control in accordance with the Theory of Planned Behaviour. Descriptive and inferential statistical methods were employed to analyze data. Among the respondents, there were only 32.3 per cent males while one-third of were having self-employed parents. The descriptive statistics demonstrated all three dimensions of Attitude towards behaviour, Subjective norms and Perceived behavioural control were quite similar and at a high level between male and female students. Mean separation results showed subjective norms impact the most on entrepreneurial inclination. The results of independent sample t-test between male and female confirmed a significant difference between males and females towards entrepreneurship where compared to males, female students were less willing to start their own businesses ($t=0.325$, $p<0.05$). Further, entrepreneurial attitude, experience, income, education, female network were found as determinants of entrepreneurship according with the results of Pearson correlation coefficient. These findings could be utilized by educators and policymakers to design effective entrepreneurship programmes and understand gender-specific needs and empowerment for removing obstacles related to stereotyping.

Keywords: K Entrepreneurship, Entrepreneurship inclination, Female, Gender

THE SCOPE OF TALENT MANAGEMENT PRACTICES IN DIVERSE GLOBAL INDUSTRIES: A CRITICAL REVIEW

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Abstract

The concept termed, "Talent Management Practices" is one of the inspiring aspects in ultra-modern phase's HRM practices and established principally consisting with a noteworthy underlying concept termed, "Talent Management". Talent management is growing popular among both researchers and practitioners in numerous global contexts. However, the concept termed, "Talent Management" had conceptual confusions and there was a severe deficiency of clarity on its definition, the scope and the overall goal. Different global manufacturing and service industries are operating numerous talent management practices. There are two main objectives of this research. The first objective is to resolve existing conceptual confusions and establish the working definition for the underlying concept called, "Talent Management". The second objective is to explore the different "Talent Management Practices" operated in numerous global contexts including both manufacturing and service sectors. The archival method was adopted by the researchers and the reviewing process has covered empirical research on talent, talent management and talent management practices which has been published between 1997 and 2019 in academic journals and published books. Talent Management can be defined as a collection of functions, practices and activities categorized into talent acquisition, talent development, talent retention, career management and succession management of talent pool and talent generically in implementing the business strategies in fruitful mode. The global manufacturing industries namely, cement manufacturing, steel case manufacturing, coal and mining industry, energy, automotive and service sectors namely, healthcare, hospitality, fast food service, banking, education, telecommunication and IT services are operating numerous talent management practices in attracting, acquiring, developing and retaining high performing talents. Talent acquisition, talent development, talent retention, career management and succession management are the key noteworthy talent management practices in global contexts. The findings of this research is enormously significant in exploring further avenues for context specific talent management practices relevant to global industries.

Keywords: Talent Management Practices, Talent Management, Global Industries

NATURAL & LIFE SCIENCES

A COMPARATIVE STUDY ON ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITY OF AQUEOUS AND ACETONE EXTRACTS OF *Plumeria obtusa* AND *Plumeria rubra*

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Abstract

When the balance between production and neutralization of reactive oxygen species in the body is disturbed, it leads to oxidative stress, which cause certain pathological conditions. As a treatment for such conditions, exogenous antioxidants are recommended. The plants have been recognized as sources of natural antioxidants. The current study was carried out to evaluate the antioxidant and anti-inflammatory activity of extracts of *Plumeria rubra* and *Plumeria obtusa*. DPPH scavenging activity, ferric reducing antioxidant power (FRAP), nitric oxide scavenging activity, total flavonoid and phenolic content, and effect of protein denaturation were evaluated, in acetone and aqueous extracts of flower and leaves of two plants. The results of the study revealed that all the extracts acted as antioxidants. The maximum DPPH scavenging activity was observed in the aqueous extract of flowers of *P. rubra* and the acetone extract of the leaves of *P. obtusa*, with the percentage inhibition of 90.81 % and 91.49 % respectively. Dose-dependent nitric oxide scavenging activity and FRAP was seen in all the extracts. The highest nitric oxide scavenging activity was exerted by acetone extract of the leaves of *P. obtusa* with 8.63 mg of gallic acid/g of the extract while the maximum FRAP was exhibited by aqueous extract of the flowers of *P. rubra* with a reducing power of 0.82 mg of ascorbic acid/g of the extract. The extracts also showed considerable inhibition of bovine serum albumin denaturation compared to the standard, acetylsalicylic acid. The highest inhibition was exhibited by the acetone extract of leaves of *P. obtusa* (0.85 mg/g) and P. *rubra* (0.80 mg/g). Many of the tested extracts showed a relatively low amount of total phenolic and total flavonoid content. The extracts of both plant species possess high antioxidant activity which suggests that the parts of these plants can be used as natural resources of antioxidants.

Keywords: *Plumeria rubra*, *Plumeria obtusa*, antioxidant, anti-inflammatory

ACTIVITY OF PROTEINACEOUS TRYPSIN INHIBITORS IN SELECTED CEREALS GROWING IN SRI LANKA

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Abstract

Proteinaceous trypsin inhibitors isolated from different natural resources are reported as effective therapeutic agents against cancers, inflammatory diseases, etc. The current study was designed to evaluate the presence of proteinaceous trypsin inhibitors in some selected cereals which were collected from field crop research and development institute, Mahailuppallama, Sri Lanka. A concentration gradient of the seed extract of each selected members of Family Poaceae were quantitatively analyzed for the trypsin inhibitory activity and protein content. The extractions with considerable trypsin inhibitory activity were subjected to ammonium sulphate precipitation and the products were dialyzed in order to partially purify the proteinaceous trypsin inhibitors. Among different varieties of Sorghum, Millets, Rice and Maize, the variety known as MI Sweet Sorghum (MISS) showed the highest trypsin inhibitory activity (40.06 ± 2.07 %) as well as the highest protein content (0.87 ± 0.02 mg/ml). Although two traditional rice varieties called Pachchaperumal (0.96 ± 0.05 mg/ml) and Pokkali (0.93 ± 0.05 mg/ml) showed comparatively higher protein content, they did not exert significant trypsin inhibitory activity. Comparatively the protein content of improved rice varieties was lower than traditional rice varieties and none of them showed trypsin inhibitory effect. Among MISS fractions, proteins precipitated using 30 % of ammonium sulphate possessed the maximum inhibitory activity (14.30 ± 3.14%) and dialysis of the fraction revealed that the proteinaceous trypsin inhibitors present in MISS are larger than 8 kDa. The results of the present study revealed that the tested cereals do not contain proteinaceous trypsin inhibitors except Sorghum varieties. Further studies are recommended to purify and identify the potential therapeutic trypsin inhibitors from Sorghum seeds.

Keywords: Proteinaceous, trypsin, inhibition, cereals, Sorghum

AN ALTERNATIVE SUBSTRATE FOR LAWN SOD/MAT PRODUCTION OF *Axonopus compressus* 'DWARF'

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Abstract

Lawn establishment is a lucrative industry around the globe and popular for its instant effect for the landscapes. Sods and lawn mats are commonly used for this purpose in the Sri Lankan context. Both require coir dust in media, hence the cost of production is high as coir is expensive and freely unavailable. Hence, this study was conducted to introduce an alternative substrate for the production of lawn sods/mats using *Axonopus compressus* 'Dwarf'. Five different substrates were used as treatments including four replicates in each treatment, and fresh rooted grass were used for propagation inside a net house (12,000 lx). Plots were arranged in Completely Randomized Design (CRD) and data were collected after ten weeks of planting. The data were analysed by General Linear Model. Fresh weight of lawn mats, growth performance of grass and quality of lawn mats were evaluated. The mean weights of fresh lawn mats were significant among the treatments and substrates consisted of 100% coir and coir dust: sawdust (1:1) showed the lowest values ($P<0.05$). Higher pore spaces in both coir dust and sawdust, contribute to the light weight of substrate. The growth of grasses and quality of lawn mats in all treatments showed a better performance leaving no any significant difference. Rolling ability and integration of substrate were different among the treatments. Substrates associated with coir dust recorded better rolling ability compared to the substrates incorporated with topsoil. The best mat was recorded with 100% coir. In order to overcome the problems associated with production using 100% coir, coir dust: sawdust (1:1) can be recommended as the alternative substrate and sawdust is an economical substitute, as it is a waste product. Further research could be carried out on cost-benefit analysis of this alternative solution.

Keywords: *Axonopus compressus* 'Dwarf', Lawn mat, Rolling ability, Coir dust, Sawdust

ANALYSIS OF RESPONSIBLE GENES IN THE BIOSYNTHESIS OF GEOSMIN AND 2-MIB IN LABORATORY CULTURED CYANOBACTERIA

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Abstract

Geosmin and 2-MIB are common, earthy and musty-smelling sesquiterpenes, produced by *Actinomycetes* and cyanobacteria. These compounds result in objectionable and unpleasant tastes and odours (T & O) in drinking water. This is a common and recurrent problem in global municipal water supply. Hence, the current study was focused on the determination of genes responsible for biosynthesis of Geosmin and 2-MIB in cyanobacteria. Cyanobacteria were isolated from drinking water reservoirs and were cultured in the laboratory. Exponentially growing cultures were subjected to extraction of Geosmin and 2-MIB following Solid Phase Micro Extraction (SPME) and quantification was done using the Gas Chromatography Mass Spectrometry (GC/MS). Polymerase chain reaction (PCR) screening was carried out to confirm the presence of Geosmin and 2-MIB producing three major gene clusters; Geosmin synthase gene (*geo A*), SAM dependent methyl transferase gene (*mtf*) and monoterpene cyclase gene *(mic)*. Out of four cyanobacteria species, *Pseudanabaena* sp., *Nostoc* sp., *Lyngbya* sp. and *Oscillatoria* sp., the highest concentrations of 2-MIB (532.5 ± 2.1 ng/L) was recorded by *Pseudanabaena* sp. after four weeks of cultivation whereas *Nostoc* sp. (162.6 ± 1.8 ng/L) recorded the highest concentration of Geosmin. Both *Pseudanabaena* sp. and *Nostoc* sp. cultured showed significantly high Geosmin and 2-MIB production compared to all other cyanobacteria species tested and the lowest Geosmin (10.8± 2.8 ng/L) and 2-MIB (50.8± 2.2 ng/L) production was recorded in *Lyngbya* sp. culture. All four species harbored '*geo A'* gene at 905 bp reconfirming Geosmin synthesizing ability. However, only *Pseudanabaena* sp. and *Nostoc* sp. showed presence of '*mtf"* gene at 870 bp confirming 2-MIB synthesizing capability. None of four species showed the presence of *'mic'* gene at 726 bp. This may open path to understand a new synthesizing pathway to 2-MIB and further research are on progress.

Keywords: Biosynthesis, Geosmin, 2-MIB, *Pseudanabaena* sp., *Nostoc* sp., PCR analysis

ARE COLOMBO GREEN WALLS ACTUALLY GREEN? THE SINCERITY OF VEGETATED BUILDING FACADES AND THEIR CONTRIBUTION TOWARDS ENVIRONMENTAL SUSTAINABILITY

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Abstract
The Number of people who are affected by urbanization has radically increased. However, the economic boom over the past decades has escalated potential environmental catastrophe. Among other solutions, environmentalists proposed vertical greening as a response. Vertical greening refers to a structure that allows vegetation to spread on the vertical surface of a building. With other sustainability-oriented strategies, vertical greening is thought to help fight current environmental issues, and current health issues prevent the cities from being unbearable during locked downs, which impacts human's mental health due to social distancing measures. A Green wall is an option for cities for people to engage with nature. Known for their pleasing to the senses and earthy qualities, boosting human health and improving air quality, plants thrive on walls, making it a popular trend globally and welcomes antidotes to stress and isolation. Plants that contain anti-germ characters could incorporate with green walls and a growing day-to-day supply of nutrition. However, more knowledge is needed to reap the potential benefits from it. With the demand for sustainability, the green wall is increasingly appearing on clients' requirements list but mostly as a visual and aesthetic representation of sustainability. This sensibility of clients, what architects provide, and what is eventually built, questions whether the true representation of vertical garden delivers the intended benefits. Are these walls really environmentally-friendly or just a trend that takes advantage of the environment's concern and human fondness to nature? Employing the understandings that have been brought to bear in academic work and precedence, through literature review, this research investigates whether there is a gap between what is actually proposed and what is practiced in Colombo. Observations, interviews, specific measurements were used to assess selected cases for the above opening. The study identified the gaps and what each individual needs to improve to curtail the shortcomings.

Keywords: Environmental Sustainability, vegetated façade; green wall; plant scraping

ASSESSMENT OF THE KEEPING QUALITY OF DISASTER RESILIENT FOOD PRODUCT FORMULATED FROM RICE BASED COMPOSITE FLOUR

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Abstract
During disaster situations, particularly pandemic situations like Covid19, people become self-isolated within their dwelling premises for months. Thus a continuous supply of secure and nutritional foods has become an eye opening aspect recently. Hence, purpose of the current study is to assess the storage stability of baked crumb samples prepared from rice based composite flour with a view to develop a nutritious, safe and affordable disaster resilient food product. Therein, a rice based composite flour mixture was formulated, made a dough and subjected to fermentation at 1kgcm^{-2} initial air pressure condition in an enclosed fermentation chamber. Thereafter the fermented crumb samples were subjected to gelatinization while releasing the pressure inside the chamber in parallel to the starch gelatinization. The gelatinized crumb samples were sliced and baked to obtain baked crumb samples, similar to the biscuits. The storage stability of the baked crumb samples were evaluated monthly for a period of six months in terms of moisture content, texture properties and growth of micro-organisms. Results revealed that the developed product has a lower moisture content (Initial: 1.12±0.16%, after 6 months: 3.90±0.24%), acceptable texture properties and a low susceptibility for microbial spoilage. Hence, the baked products out of gelatinized crumb samples can be recommended as a nutritious, safe and affordable food product for natural calamities along with higher storage stability.

Keywords: Disaster, Food safety, Moisture content, Storage stability, Total plate count

AVIFAUNAL DIVERSITY IN KANDY LAKE, SRI LANKA

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Abstract

Urbanization is a complex socioeconomic process that massively contributes to the loss of biodiversity and biotic homogenization around the world. While some species have been adapting to the continuous changes, others are being threatened. Making ourselves aware of the existing biodiversity would be helpful towards sustainable development in urban planning. Kandy is one of the major cities situated in the central hills of Sri Lanka which holds a prominent place in tourism. This study was conducted to determine the avifaunal diversity in the Kandy city where there were no previous studies recorded. Birds who were perched within the 20 m distance towards the lake, along the 3 km path around the lake (which was considered as the transect) were recorded according to their species name and abundance. Data was collected from January 2019 to March 2019, three days per month (one in the morning from 6 a.m to 8 a.m , one in the afternoon from 12.00 to 2 p.m and one in the evening from 4 p.m to 6 p.m). In total, 3044 individuals belonging to 42 bird species, 23 families and 16 orders were recorded. Shannon – Weiner diversity index was 2.4650 whereas Simpson's diversity index was 0.8711. The total Dominance Index was 0.1289 while the total Evenness was 0.2868. The most abundant bird species were Little cormorant (*Microcarbo niger*) with a relative abundance of 26.18% followed by House crow (*Corvus splendens*), Indian cormorant (*Phalacrocorax fuscicollis*) and Black crowned night heron (*Nycticorax nycticorax*) with relative abundances of 14.58%, 11.72%, and 10.84% respectively. Spot-billed pelican (*Pelecanus philippensis*) who is considered to be globally nearly threatened was also recorded. The above results stipulate that, suitable measures such as taking opinions of an environment scientist into consideration in urban planning, making policy adjustments from a biological conservation perspective and enlightenment of the community on the importance of protecting avifauna should be implemented immediately to establish a more resilient ecosystem.

Keywords: Urbanization, Diversity, Kandy, Lake, Avifauna

COMPARISON OF GENE CODING SEQUENCES OF BETAINE ALDEHYDE DEHYDROGENASE AND FERRITIN ENCODING GENES IN SEVERAL CROPS USING BIOINFORMATICS TOOLS

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Abstract

Improving abiotic stress tolerance traits in crops using transgenic techniques has been highlighted in the recent years. Identification of the potentially hidden regulatory signals within the coding sequences of genes is important in the transfer of such genes via genetic engineering. Identification of short motifs in coding sequences those probably important for gene regulation was the major aim of the study. The bioinformatics analysis was used to study coding sequences of two genes related to drought response which encode Betaine aldehyde dehydrogenase (*BADH*) and Ferritin, in nine different crops including monocots (rice, foxtail millet, sorghum and maize) and dicots (chick pea, pigeon pea, adzuki bean, mung bean and cowpea). Coding Sequences were retrieved from the National Center for Biotechnology Information (NCBI). ClustalW multiple sequence alignment program was performed using $MEGA_5$ software. Phylogenetic trees following maximum likelihood approach with 100 bootstrap analysis and pairwise distances were obtained using $MEGA_5$ software. The $DnaSP_5$ software was used to analyze the conserved regions of two genes. *BADH* and Ferritin genes showed seven and six conserved regions respectively with significant ($P \leq 0.05$) conservation and homozygosity values. Phylogenetic tree of *BADH* showed three distinct clusters whereas only two clusters were observed for Ferritin gene. There was a significant evolutionary divergence among CDS of *BADH* (0.017 - 0.406) and Ferritin (0.009 - 0.509) genes. The observed conserved regions for *BADH* and Ferritin CDS can be considered as the sequences with functional potential. The results indicated that some highly conservative sequences obtained from *BADH* and Ferritin CDS could be used in the phylogeny study to reconstruct the phylogenetic tree of some far related species in the taxonomy. Furthermore, the results of this study suggest that *BADH* and Ferritin encoding genes can be useful sources for genetic engineering of drought tolerance in plant species.

Keywords: Coding Sequences (CDS), conserved regions, phylogenetic relationships and evolutionary divergence

DETERMINATION OF INDOLE ACETIC ACID PRODUCING AND ANTAGONISTIC POTENTIAL OF ENDOPHYTIC FUNGAL SPP. PRESENT IN TWO RICE VARIETIES IN SRI LANKA

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Abstract

The health problems caused by extensive use of agrochemicals in rice cultivation in Sri Lanka necessitates investigations on alternative, less harmful methods of maintaining productivity and for disease management. Endophytic fungi (EF) of many plant spp. have been reported to have the ability to enhance plant growth through the synthesis of Indole Acetic Acid (IAA) and to possess mechanisms of fungal pathogen control. Therefore, the present study was carried out to evaluate the levels of IAA production by the EF isolated from two rice varieties Bw 367 and Suwandel with the aim of using them for increased crop productivity. Preliminary screening of growth inhibition of two rice pathogens by the EF was also carried out as a means of using them in disease management. Healthy plant samples of rice varieties Bw 367 and Suwandel were collected during the Yala and Maha seasons (2019) from Anuradhapura, Kurunegala, Gampaha and Kalutara districts, in Sri Lanka. Endophytic fungal spp. were isolated onto 2 % Malt Extract Agar medium. The isolates were identified based on morphological features and molecular characterization of the ITS region of rDNA. A total of 256 isolates belonging to 30 fungal genera were isolated from the two rice varieties and IAA production by these fungal isolates was then evaluated using Salkowski's assay. The effect of the isolated EF on the growth of *Rhizoctonia solani* and *Bipolaris oryzae*, the causative agents of Sheath blight and Brown spot diseases of rice respectively was also tested under *in-vitro* conditions using the dual culture assay. Amongst the tested isolates, *Microdochium fisheri* and *Dendryphiella* sp isolated from Suwandel produced IAA at significantly high levels of 12.7 µg mL^{-1} and 10.0 µg mL^{-1} respectively ($P<0.05$). Dual culture studies revealed that *Penicillium oxalicum* and *Fusarium falciforme* isolated from Bw 367 inhibited the colony growth of *R. solani* by 65.3 % and 53.5 % respectively whilst the growth inhibition of *B. oryzae* was less at 36.9 % by both. The study indicated that some of the EF associated with the selected rice varieties have the ability to produce the growth promoting phytohormone IAA whilst some others have the means to control the growth of two common rice pathogens and have the potential to be used for increased productivity of rice as well as for the control of the two rice diseases after further testing.

Keywords: Endophytes, Rice, IAA, Phytopathogens, Antagonism

DEVELOPMENT OF ACRYLAMIDE HYDROGEL HAVING FAST RESPONDING TIME AND HIGH MECHANICAL STRENGTH

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Abstract

Porous polymer hydrogels existed in nature as a unique material since life on earth. Among them, acrylamide hydrogels are affirming materials as unique biomaterials since they intrinsically possess high biocompatibility, flexibility and large water content owing to their hydrophilic, three-dimensional network structures. Hydrogels generally are having an enormous potential to be utilized as prime candidates for various applications including biosensors load-bearing engineering tissues, and drug delivery vectors. In spite of being the most prominent biomaterials for various biomedical applications, their weak mechanical performance is a considerable drawback for apply in particular applications that require excellent mechanical properties. This work highlighted a novel approach on developing highly porous, fast swelling hydrogels having high mechanical performance by twisting the traditional double network concept. A hydrogel was developed using acrylamide as the monomer, and N,N-methylenebisacrylamide (N-[(Prop-2-enoylamino)methyl]prop-2-enamide) as the cross-linker, and potassium persulphate as the initiator. The developed hydrogel structure consists of micrometer size pores while having an ultimate compressive strength of 7.070 ± 0.135 MPa, swelling ratio of 13.40 ± 0.83 times with respect to the dried hydrogel within the first 30 minutes and the initial swelling rate of 3.945 ± 0.23 min^{-1} in the first two minutes. While single network hydrogels display an ultimate compressive strength of 0.387 ± 0.19 MPa, swelling ratio of 11.52 ± 0.64 times with respect to the dried hydrogel within the first 30 minutes and the initial swelling rate of 0.86 ± 0.015 min^{-1} in the first two minutes. Such enhanced properties of the developed double network hydrogel are due to the surface roughness of interconnected capillary channels. The developed hydrogel could swell faster than single network hydrogel via efficient capillary action. The unique coalition of mechanical properties of highly porous double network hydrogel may initiate novel explorations of hydrogels in various biomedical applications.

Keywords: Biomaterials, porous, swelling, strength, hydrogel

DROUGHT TOLERANT MICROORGANISMS TO PROMOTE THE GROWTH OF *Sorghum bicolor* UNDER DROUGHT CONDITIONS

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Abstract

Sorghum (*Sorghum bicolor*) is an important food crop mostly grown as a rain fed crop in semi-arid and arid regions of Sri Lanka under adverse soil and climatic conditions like nutrient deficiency and drought. Although drought is identified as the major abiotic stress that leads to growth reductions and yield loss, sorghum performs better compared to other cereal crops under extreme environmental conditions such as inadequate soil moisture levels. Plant growth-promoting rhizobacteria and fungal species show beneficial effects towards plant growth and stress defences of crop plants. The objective of the study was to investigate whether enhancement of growth of sorghum can be achieved under drought conditions by inoculating with microbial consortia prepared from characterized drought tolerant, Indole Acetic Acid (IAA)-producing, phosphate-dissolving and nitrogen-fixing rhizosphere bacterial and fungal species. Rhizosphere inhabiting bacteria and fungi were isolated from sorghum plants growing in the dry zone of Sri Lanka. Their Plant growth-promoting abilities were investigated by screening for drought tolerance, nitrogen-fixing, phosphate-solubilizing and IAA-producing ability *in vitro*. Rhizosphere of sorghum plants were inoculated with prepared bacterial and fungal consortia. One phosphate-solubilizing *Penicillium* sp., three IAA-producing drought tolerant *Rhizopus* spp. and seven nitrogen-fixing drought tolerant bacterial species were isolated from the rhizosphere of drought tolerant sorghum plants. Under soil moisture deficit conditions, inoculation of rhizosphere of sorghum plants with drought tolerant plant growth-promoting bacterial and fungal consortia resulted in increased average shoot height, shoot thickness, flag leaf width, root length, number of green leaves per plant and early inflorescence compared to the non-inoculated control sorghum plants. The results suggest the beneficial effects of inoculating fungal and bacterial consortia towards drought tolerance in sorghum plants.

Keywords: Drought stress, Growth, Microbial consortia, Rhizosphere, Sorghum

EFFECT OF POSTHARVEST TREATMENTS ON POSTHARVEST BEHAVIOUR AND SHELF LIFE OF *Jasminum grandiflorum*

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Abstract

Jasminum grandiflorum has attained importance in commercial cultivation out of 200 species of genus Jasmine. It is a fragrant flower and cultivated commercially for fresh flowers used in aesthetic utilities and industries. Even though the flowers have potential in market, postharvest studies have not been carried out to maximize its shelf life at low cost in Sri Lanka. The present study was conducted to determine the best harvesting time and to maximize the shelf life of *J. grandiflorum* with the use of pre-treatments and storage temperatures without losing its floral quality. Flowering phenology was monitored with two selected climbers via tagging flower buds from initiation stage to fully bloomed stage. The distilled water and chemical solutions viz., citric acid (350 mg/l), boric acid (4%) and sucrose (4%) were used as pre-treatment solutions by quick dipping method. After pre-treatment the flower buds packed in polyethylene bags (200 gauges) and stored in four different temperatures (29±2˚C, air-conditioned temperature 24˚C, refrigerated temperature at 10˚C and 18˚C). The periodical observations were recorded every 24 hrs from bud stage to senescence. Physical weight loss and bud opening index were calculated using a formula. Colour, appearance and fragrance were assessed using a scale as indicators of flower quality. Flower buds between 10 - 12 days after initiation can be recommended as the best stage for harvesting. Among the different pre-treatments, boric acid (4%) had the significant effect in enhancing the keeping quality of harvested buds. It was found that treating the flower buds with boric acid (4%) followed by stored under refrigerated temperature at 10˚C were recorded the lowest physical weight loss, bud opening index and better colour retention. Hence, this treatment could be recommended as the best postharvest treatment to enhance the shelf life of *J. grandiflorum.*

Keywords: Boric acid, *Jasminum grandiflorum*, Postharvest treatments, Shelf life, Storage temperature

EFFECT OF SELECTED WATER QUALITY PARAMETERS ON THE PREVALENCE OF *Poecilia reticulata* (GUPPY) POPULATION IN SRI JAYEWARDENEPURA CANAL SYSTEM

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Abstract

Present study was carried out to determine the effect of some selected water quality parameters on the prevalence of *P. reticulata* population in Sri Jayewardenepura canal system which is a heavily polluted urban water body where *P. reticulata* is abundant. Fish and water samples were collected once a month in 6 sampling locations from January 2016 to December 2017. Water quality parameters investigated were pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Electrical Conductivity (EC), Temperature, Hardness, Alkalinity, Nitrate-Nitrogen (NO_3-N) and Phosphate (PO_4^{3-}). Water flow rates and water depths of all sampling points were recorded. Total lengths (mm) and total weights (g) of all specimens (n-520) were measured and their relative densities were calculated. *P. reticulata* was the most abundant species in all investigated sites but high densities were recorded at slow moving and stagnated shallow waters (mean flow rate 0.011 ± 0.009 - 0.056 ± 0.064 m/s and mean depth 1.02 ± 0.48 - 0.34 ± 0.10 m). Environmental parameters revealed that all the sites were subjected to moderate or high pollution and most conspicuous were the low DO (ranged between 0.83±0.12-4.84±0.76 mg/l) and high BOD (1.78±0.4-9.10±0.6 mg/l) levels. While DO has reached levels potentially harmful for fish, BOD levels indicated organic pollution. Polluted water quality of studied locations were further confirmed by high values for NO_3-N (3.9±0.8-11.5±1.2 mg/l), PO_4^{3-} (1.9±0.4-3.9±0.3mg/l), EC (257.6±12.8-801.6±42.0µs/cm), Hardness (80.0±10.4- 113.3±13.1 mg/l) and Alkalinity (70.7±11.5 - 179.6±20.4 mg/l). Despite the fact that the locations were polluted, relative densities (32.7±27.7 - 85.7±22.9) of *P. reticulata* were considerable in all locations indicating their ability to breed and survive even in extremely adverse environmental conditions. The results of the study showed that the relative densities of *P. reticulata* significantly varied with some of the environmental factors; decreasing with increasing DO, NO_3^- N, PO_4^{-3} levels ($P \leq 0.05$) as well as with water depths and flow rates of water and increasing with increasing pH, BOD and Alkalinity of water. Significant sexual dimorphism (2 females :1male) in terms of both body weight and length ($p = 0.000$) were found. The study recorded that the average adult sizes of fish were smaller (Female-35 mm, Male-25 mm) than previous records (i.e. Female- 60 mm, Male- 40 mm) in the present study area. This study concludes that, although the adverse environmental conditions are affecting their growth rates and relative densities, they are able to survive and breed in such ecosystems.

Keywords: Guppy, Water quality parameters, Polluted water, Fish density

EFFICACY OF PACLOBUTRAZOL ON REDUCING PLANT HEIGHT OF *Crotalaria retusa* L. TO INTRODUCE AS A POTTED PLANT

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Abstract

Sri Lanka is a country with an outstanding biodiversity including a rich native flora. Some of these native plants have the potential to be introduced to the landscape industry as ornamental plants with minor improvements. *Crotalaria retusa* L. is one such plant with beautiful yellow colour flowers which attract butterflies in large numbers. However, architecture of the plant, mainly natural plant height narrows its suitability to be introduced as a potted ornamental plant. Paclobutrazol (PBZ), an efficient plant growth retardant which inhibits synthesis of sterols and gibberellins in plants resulting a reduced internodal growth, could be used successfully to develop dwarf plants. Hence, the objective of the present study was to identify the best PBZ level to produce dwarf potted plants and to determine the customer satisfaction for overall appearance of the treated plants. Four PBZ levels (3, 4, 5 and 6 mg/100 ml) were applied as a soil drench to seedlings. Control plants were treated similarly with distilled water. Complete Randomized Design (CRD) was used with 12 plant replicates. All plants treated with PBZ showed a reduced height compared to the control plants. Plant height and flower size were reduced with increasing PBZ concentrations. Significantly shorter internodal distances and heights were recorded in plants treated with 6 mg /100 ml PBZ. The highest dwarfness was observed in plants treated with 6 mg /100 ml PBZ but with no flowers. According to the customer satisfaction survey the customers were not satisfied with plants treated with the highest PBZ level as there were no colourful flowers and the plants were extremely dwarf. Highest preference was received from the customers for plants treated with 4 mg/100 ml PBZ level. Therefore, the present study confirmed that 4 mg/100 ml PBZ as the best level to develop dwarf ornamental potted plants of *C. retusa*.

Keywords: *Crotalaria retusa,* Dwarf plant, Native, Paclobutrazol, Potted plant

EVALUATION OF THE POTENTIAL OF POLY- β -HYDROXYBUTYRATE (PHB) PRODUCTION BY THE NATURAL CYANOBACTERIAL BLOOMS IN BEIRA LAKE

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Abstract

Petroleum based plastics impose a critical hazard to the environment. Hence, it is of utmost importance to enhance and optimize the production of biodegradable alternatives such as Polyhydroxyalkanoates (PHAs). Poly-β-hydroxybutyrate (PHB) is the most widespread and completely characterized PHA that is biosynthesized by many microorganisms. Cyanobacteria has been identified as the most feasible autotrophic prokaryote for the commercial biosynthesis of PHB. The present study aimed on direct utilization of naturally existing cyanobacterial blooms to extract biodegradable PHB, concurrently providing a considerable remedy to both hazardous cyanobacterial blooms and plastic pollution. The attempt was focused on minimizing the production cost by eliminating the growing of cyanobacterial monocultures. Fresh cyanobacterial bloom samples were collected in to sterilized plastic bottles from the hypereutrophic Beira Lake, Colombo. Microscopic identification confirmed that *Microcystis aeruginosa* was the dominant species followed by the cyanobacteria *Microcystis incerta* and *Spirulina platensis*. PHB production in collected bloom sample was enhanced by providing 12/12 hours light/dark cycle in the laboratory for a period of 4 days, without adding nutrient supplements. Sudan black B staining procedure was followed for the Microscopic visualization of PHB granules. Freeze dried bloom samples were pre-treated with 100% methanol followed by the extraction of PHB into 99.8% boiling chloroform. PHB derived Crotonic acid was quantified using the spectrophotometer at 235 nm. Fourier transform infrared spectroscopy (FTIR) results confirmed the presence of functional groups; C–H, –C-O-C-, C=O, OH and -CH3 group of PHB. The Raman spectrum of the crude extract showed an irrefutable similarity to that of the standard PHB. The yield which was calculated as the mean percentage weight of PHB extracted was found to be 7.129 ±0.12% w/w. Thus, the results of the present study suggest cyanobacterial blooms as a promising potential source for the production of biodegradable alternatives for PHB production.

Keywords: Biodegradable Plastics, Polyhydroxyalkanoates (PHAs), Beira lake Poly-β-hydroxybutyrate (PHB), Cyanobacteria

GENETIC CHANGES AND BIOMARKERS ASSOCIATED WITH DIFFERENT MORPHOLOGICAL AREAS FOUND IN OTHERWISE CONVENTIONAL PAPILLARY THYROID CARCINOMA

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Abstract

Existing literature suggests that conventional Papillary Thyroid Carcinoma (cPTC) with minor proportions of different morphological patterns (such as tall cell/ hobnail) can have aggressive behaviour than expected. This study focuses on establishing molecular profiles of such morphological areas and compare those with the molecular profiles of the background conventional morphological pattern to help in accurate risk stratification of patients with PTC. The presence of the *braf*V600E and the *nras*Q61R mutations were examined and expression levels of TSHR (thyroid-stimulating hormone receptor) and MnSOD (manganese superoxide dismutase) were analyzed to generate molecular profiles. Formalin-fixed, paraffin-embedded tissue samples were subjected to genotype the *braf*V600E and the *nras*Q61R mutations using PCR-RFLP assay while quantitative real-time PCR was carried out to quantify the expression levels of TSHR and MnSOD in the test areas containing tall cell, hobnail, and invasive follicular morphology compared to the control areas with conventional morphology. The test and control areas in all the samples tested positive for the *braf*V600E mutation and negative for the *nras*Q61R mutation. In the quantification of mRNA, all the test areas showed reduced levels of MnSOD and TSHR compared to the control areas. These results indicate the morphological patterns of tall cell, hobnail, and invasive follicular types showing reduced levels of some of the molecular markers associated with aggressive cancer progression. Hence, further studies on analyzing molecular profile to understand the aggressive behaviour of otherwise cPTC would ensure precise diagnosis.

Keywords: *braf*V600E, TSHR, conventional PTC, aggressive behavior, morphological patterns

IN-VITRO INHIBITORY EFFECTS ON ALPHA-AMYLASE AND ALPHA-GLUCOSIDASE AND MODES OF INHIBITION OF *Vateria copallifera* SEEDS

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Abstract

The objective of present study was to determine the inhibition capacity and modes of inhibition of fresh and debittered *Vateria copallifera* seed extract against alpha-amylase and alpha-glucosidase enzymatic reactions. In vitro assessment of alpha-amylase and alpha-glucosidase enzyme inhibition capacity was evaluated for 80% ethanol, 80% methanol and aqueous extract of fresh and debittered *V. copallifera* seeds. Modes of inhibition (Kinetic analysis) were identified using Michaelis Menten and Lineweaver-Burk (double-reciprocal) plots. Results revealed that, 80% ethanol extracts showed the significantly ($p<0.05$) highest alpha-amylase enzyme inhibition capacity (fresh IC_{50}: 36.97±1.28 μg/mL, debittered IC_{50}:98.58±0.55 μg/mL) followed by aqueous extract (fresh IC_{50}: 258.14±12.41 μg/mL, debittered IC_{50}: 410.44±1.24 μg/mL) compared to positive control Acarbose. The highest alpha-glucosidase enzyme inhibition capacity is given by 80% ethanol extract of fresh *V. copallifera* seeds (IC_{50}: 1469.10±10.01 μg/mL). Kinetic analysis revealed that, 80% ethanol extract inhibited the alpha-amylase competitively although extract displayed a non-competitive mode of inhibition towards alpha-glucosidase. Thus, *Vateria copallifera* seeds can be considered a good natural resource for the management of Type 2 diabetes with postprandial hyperglycemia due to their traditional acceptability as a healthy food ingredient, availability and low costs with the necessity of further investigations on its active components.

Keywords: *V. copallifera*, enzyme inhibition activity, Type 2 diabetes mellitus

IN-VITRO CYTOTOXIC ACTIVITY OF CRUDE METHANOL EXTRACT AND ITS FRACTIONS OF SRI LANKAN MARINE BROWN ALGAE *Choonospora minima* AGAINST HUMAN RHABDOMYOSARCOMA (RD) CELL LINE

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Abstract

Seaweeds are an important source of bioactive metabolites in drug development and nutraceuticals. The aim of this study was to investigate the *in vitro* cytotoxic activity of de-polysaccharide methanol extract and partition fractions of hexane, chloroform, ethyl acetate (EtOAc) and aqueous fractions of brown algae *Choonospora minima* against human rhabdomyosarcoma (RD) cell line. The selected fractions and crude methanol extract were subjected for MTT and neutral red uptake assay to determine the cell viability. Apoptotic morphological features were observed using crystal violet and fluorescence dye Hoechst staining methods. The results of both MTT and neutral red assay showed that the decrease of the percentage of cell viability in dose dependent manner as signified by cell death. The hexane and chloroform fractions of *C.minima* showed potential cytotoxic activity with IC_{50} of 93.98±1.33 µg/ml and 106.94±1.68 µg/ml against human rhabdomyosarcoma (RD) cell line compared to the standard cycloheximide (IC_{50}: 36.17±1.78 µg/ml). In addition, a significant cytotoxic activity was observed between total crude extract and fractions of *C.minima* against RD cell lines ($P>0.05$). Further, potential cytotoxic activity of hexane (133.13±4.50 µg/ml) and chloroform (142.09±0.64 µg/ml) fractions of *C.minima* was confirmed by neutral red assay compared to the standard cycloheximide (32.78±0.91µg/ml). Gas chromatography-mass spectrometry analysis of the hexane fraction revealed the presence of several anti-cancer compounds. In addition, apoptotic morphological features such as cell membrane blebbing, formation of membrane bound vesicle, nuclear fragmentation and micro nuclei formation, cellular shrinkage, cellular aggregation and formation of cell clumps and chromatin condensation were observed both in hexane and chloroform fractions of *C.minima* when stained with crystal violet and florescence dye Hoechst stain. The results suggest that the hexane fraction of *C. minima* is a potential source of natural compounds to combat as anti-cancer therapy. The research grant (ASP/01/RE/SCI/2017/50) by University of Sri Jayewardenepura is acknowledged.

Keywords: *Choonospora minima*, Anti-cancer, Rhabdomyosarcoma, MTT, Neutral red, Morphology

ISOLATION AND OPTIMIZATION OF CELLULASE PRODUCING BACTERIA FOR SECOND-GENERATION BIO-ETHANOL PRODUCTION

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Abstract

Cellulase is an inducible enzyme through medium optimization since there is a complex relationship between bacterial growth and enzyme yields with a variety of environmental factors. Thus, to obtain the maximum yield of cellulase, optimization is a cost-effective important aspect. In the present study, efficient cellulolytic bacteria were isolated and screened from compost soil, cow dung and termite gut content. Gram's iodine staining on Carboxy Methyl Cellulose (CMC) agar plates and Dinitrosalicylic acid (DNS) assay were performed, as primary and secondary screening tests, for isolates to evaluate the potential for cellulase production. In addition, the process parameters (nitrogen source, phosphorus source, CMC%, and temperature) were optimized to get maximum cellulase production and the isolates were identified using the 16S r-RNA gene sequencing analysis. During the study, two strains were isolated and identified from compost soil (*Nocardiopsis* sp.) and termite gut (*Bacillus* sp.) which showed higher potential for cellulase production. Average Diameter (AD) of clear zones for *Nocardiopsis* sp. & *Bacillus* sp., were 19.33±0.06 mm and 33.67±0.057 mm respectively with Gram's iodine stain. Further, total cellulase activity for *Nocardiopsis* sp. & *Bacillus* sp., were 0.93±0.012 U and 0.35±0.021 U respectively for DNS assay and both species showed the same optimum conditions with all parameters for maximum cellulase production; peptone as a nitrogen source, 0.2% K_2HPO_4 as phosphorus source, 1.2% CMC, 37 ˚C temperature.

Keywords: Carboxy Methyl Cellulose, Cellulase producing bacteria, Optimization of cellulase production

$KMnO_4$ IMPREGNATED ZEOLITE TO REDUCE ETHYLENE AND INCREASE POSTHARVEST LIFE OF FRUITS AND VEGETABLES

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Abstract

Covid 19 pandemic made a catastrophic plight in the food supply chain leading to many losses. Keeping extra quantities by local households or small scale vendors was not effective as there were no extra cooler rooms or any other way to reduce ripening and deterioration of fruits and vegetables. Therefore, the present study was aimed to optimize the quantity of potassium permanganate ($KMnO_4$) impregnated zeolite in reducing ethylene in a small volume and to increase postharvest shelf life of fruits and vegetables. In the first experiment quantity of $KMnO_4$ impregnated zeolite was optimized with two systems (I= 5 g of $KMnO_4$_zeolite+ 1 g of moisture adsorbent, II= 10 g of $KMnO_4$_zeolite +1 g of moisture adsorbent) and with control without ethylene absorbents. For all experiments 10 L airtight polypropylene box was used. Ethylene gas was injected into the container to reach 20 ppm inside the box and then ethylene concentrations were tested for 150 minutes using an ethylene meter. In the second experiment banana (Cavendish), tomato and chili were tested for the postharvest prolonging with system II and with control without ethylene absorbent. Moisture losses and visual parameters (firmness, colour, appearance, and pathogen attack) were tested. In experiment one system I reached 44 (± 5) % reduction in ethylene concentration while system II reached 62 (± 5) % of ethylene reduction. After respective days in storage chili and banana were severely affected in the control than the treatment with system II. After 10 days no significant visual parameter changers were observed for tomatoes in both systems. Significant weight loss was observed for chili in control than the system II. Ten grams of $KMnO_4$ impregnated zeolite is effective in increasing postharvest shelf life of chili and banana where this system can be used for small scale distributors and households.

Keywords: ethylene, fruits, $KMnO_4$, postharvest

MESO-MAMMAL CARNIVORE ABUNDANCE AND ACTIVITY PATTERNS IN HORTON PLAINS NATIONAL PARK

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Abstract

Meso-mammal carnivores represent an important guild of forest vertebrates that have not attracted much research attention. This study was conducted to investigate the meso-mammal carnivore abundance and activity patterns in Horton Plains National Park (HPNP). Camera trap surveys were conducted from January 2019 to June 2020 establishing 40 camera stations with a cumulative sampling effort of 1530 trap days. Camera station locations were spatially arranged in a semi-random approach and camera locations were changed after operating 24 hours for a period of <30 days to increase the spatial coverage. Cloud forest, grassland and riparian habitats present in HPNP were represented by the spatial distribution of the camera stations. Time stamped camera trap data were utilized for the analysis of abundance and activity patterns. Seven of the 12 meso-mammal carnivores present in the island were recorded in HPNP which was a relatively lower richness value. With a capture frequency of 38 and a recording rate of 2.48 (per 100 camera-trap days) Brown mongoose (*Herpestes fuscus*) was the most abundant species followed by Ring-tailed civet (*Viverricula indica, n=33*). Rusty-spotted Cat (*Prionailurus rubiginosus, n=2*) and Fishing cat (*Prionailurus viverrinus, n=3*) were the rarest species with a recording rate of 0.07 and 0.20 respectively. Based on the activity pattern analysis Brown mongoose (*H. smithii*) and Stripe-necked mongoose (*H. viticollis*) were observed to be diurnal. Golden palm civet (*Paradoxurus zeylonensis, n=20*) and Ring-tailed civet were highly nocturnal. Both Fishing cat and Rusty-spotted Cat were recorded in early morning between 0600-0700 hrs. Meanwhile Eurasian otter (*Lutra lutra, n=6*) was active mostly in the evening time period (1600-1700 hrs). The study reveals the coexistence of meso-mammal carnivores in HPNP and its facilitation by the temporal variation in activity patterns of different carnivore species.

Keywords: Activity patterns, Montane wet zone, Camera trapping, Species abundance, Species Co-occurrence

MICROBIAL COMMUNITY COMPOSITION OF HOT SPRINGS IN SRI LANKA

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Abstract

Natural flora and fauna are drastically affected by the chemical waste released by the industrial settings. Production of chemical waste can be considerably minimized using microbes. Thermophilic microbes and microbial products can be used as biocatalysts in industrial process, to reduce the usage of chemical catalysts. Hot springs are a vital habitat for thermophilic microbes which can tolerate extreme temperatures. Characterization and identification of microbial community in hot springs provide an initial platform for identification of thermophilic microorganisms useful in biotechnological prospects. In this study, microbial community composition of four hot springs (Madunagala, Mahaoya, Wahava, Kivlegama) was studied through 16s rDNA amplicon sequencing on Illumina MiSeq platform. Samples were collected from hot springs in Southern and Eastern province in Sri Lankaduring May 2018. Resulted sequencing data was analyzed using Mother V. 1.42 software. Temperature, conductivity, pH, and Dissolved Oxygen (DO) levels were measured at the site itself using portable standard meters. The microbial community of the hot springs were mostly comprised with Bacteria and Achaea while Bacteria (99%) were the major component. *Proteobacteria, Chloroflexia, Firmicutes, Actinobacteria, Deinococcus-thermus,* and *bacteroidetes* were the major bacterium phyla presence in the hot springs. Unclassified bacteria (3%) were found in all hot springs suggesting that there are some unidentified and novel bacterial species are present in the springs. As expected 7% of the hot spring microbial community was *Deinococcus-thermus* which have ability to produce extremozymes while surviving in extreme environmental conditions. According to the water quality analysis the temperature of the springs were rangedfrom33.7˚C to 55.4 ˚C where conductivity, pH and DO levels were recorded from 801 to 1507 µS/cm, 7.20 to 8.27 and 1.05 – 3.5 mg/L respectively. The results revealed that hot springs are rich source of thermophilic bacteria which can be used for industrial prospects and further studies are in progress.

Keywords: Hot spring, Microbial Community, Extremophiles, Thermophilic bacteria

NON-BREEDING BEHAVIOUR OF THE LESSER ADJUTANT STORK AND ITS NICHE PARTITIONING WITH OTHER SPECIES IN FAMILY CICONIIDAE AROUND MADURU OYA RESERVOIR

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Abstract

Lesser Adjutant Stork (*Leptoptilos javanicus*) is a large wading bird in Southeast Asia. The study was aimed to identify behavioural patterns of the Lesser Adjutant Stork and to investigate the niche partitioning of Lesser Adjutant Storks with other storks. Behavioural data and niche partitioning data of this species were collected using focal animal sampling from January to December 2019 around Maduru Oya reservoir for three consecutive days in each month between 0600h to 1800h in the morning, afternoon and evening time slots for a total of twelve hours per day. Birds were observed keeping more than a 50m distance without disturbing their natural behaviour. Species of Family Ciconiidae foraging with Lesser Adjutant Storks in a radius of 10 m were considered to share the same foraging niche. Niche breadth and niche overlap were calculated. Time spent on foraging, locomotion, resting, comfort and maintenance differed significantly among the time slots of the day time (One Way ANOVA, $p < 0.05$). In the morning, Lesser Adjutant Storks spent more time for foraging (39.73 ± 15.26 %) and comfort and maintenance (41.14 ± 18.04). In the mid-day more time was spent on locomotion (60.64 ± 37.84 %). In the evening more time was spent on resting (36.62 ± 23.24 %) and foraging (36.33 ± 13.15). No significant differences in behaviour were shown monthly and a high proportion of diurnal activity budget was spent on foraging and resting activities. Lesser Adjutant Stork's participation in mixed species foraging flocks was rare and only formed flocks with Painted Storks. Niche overlap with Painted Stork was at a higher degree but achieved coexistence most preferably due to differences in bill morphology. Present study provides detailed information on the variation of diurnal activity patterns of Lesser Adjutant Storks and its resource partitioning, which is useful in environmental monitoring, evaluation of habitat suitability and population management in order to conserve this Vulnerable species.

Keywords: Behaviour, Non-breeding behaviours, Resource partitioning, Lesser Adjutant Stork, Maduru Oya National Park

NUTRITIONAL EVALUATION OF SELECTED UNDERUTILIZED WILD EDIBLE PLANTS IN SRI LANKA

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Abstract

Underutilized Wild Edible Plants (UWEP) in Sri Lanka plays an important role in the diets of residents. Nevertheless, there is insufficient data of their nutritional values even they have been used for food and medicinal purposes. In this paper, tender leaves of five selected UWEP species: *Coccinia grandis*, *Acrostichum aureum*, *Polyscias scutellaria*, *Talinum triangulare* and *Commelina diffusa* were studied. The proximate nutritional composition ash, moisture, crude protein and crude fat were determined. For different selected species moisture and ash content ranged between 85.56% - 88.74% and 1.25% - 2.01% respectively of fresh weight. Crude protein and crude fat content ranged between, 0.14%-0.23% and 2.8%-8.5% respectively, as a percentage of dry weight. The results reinforce the growing awareness that UWEP of the Sri Lanka can contribute useful amounts of nutrients to human diet. Anti-oxidant potential of selected species was measured using DPPH radical scavenging assay and the Total Antioxidant Capacity (TAC) was measured using ABTS radical. *Coccinia grandis* showed the highest antioxidant potential as determined by both methods (IC_{50} value of 0.62 mg mL^{-1} and TAC of 93.1%). Since selected species licit high nutrient content and high antioxidant potential, these species could be good alternatives to other commonly consumed plant foods.

Keywords: Underutilized Wild Edible Plants, Nutrition Value, Proximate Analysis, Antioxidant Value

OCCURRENCE AND DISTRIBUTION OF ANTIBIOTIC RESISTANCE BACTERIA ISOLATED FROM SHRIMPS (*Penaeus monodon)* IN AQUACULTURE PONDS IN NEGOMBO AREA

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Abstract

Aquaculture farms are one of the major antibiotic users which facilitate the spread of antibiotic resistance. The objective of the study were isolation and characterization of antibiotic resistance bacteria from *Penaeus monodon* and determination of Multiple Antibiotic Resistance (MAR) index of isolated resistance bacteria against Tetracycline (TET), Ampicillin (AMP), Amoxicillin (AMX), Sulfamethoxzole (SMX), Erythromycin (ERM), Cloxacillin (CLOX), Azithromycin (AZY) and Ciprofloxacin (CIP). The resistance of 48 bacteria to 8 different antibiotics were investigated by agar diffusion and agar dilution method from intestines of shrimps. Antibiotic-resistant bacteria were identified to genus level using 16s rRNA sequencing and the Minimum Inhibition Concentration (MIC) was determined using agar dilution method. MAR was determined using 96 well plate method in order to calculate the MAR index. The most common resistance bacterial strains were recorded as *Aeromonas hydrophila* (43.7%), E.*coli* (23.4%) and *Bacillus* (22.6%). There was a high incidence of resistance to TET (87%), AMX (44%), ERM (38%) and a low incidence of resistance to CLOX (3%), AZY (2%) and CIP (1%). The 61% of all bacteria isolated from shrimps were resistance to 3 or more antibiotics. More than 50% of the total resistant isolates showed their MIC greater than 540 ppm for tested antibiotics except CIP (1%), CLOX (3%) and AZY (2%). The recorded MAR index ranged from 0.23 to 0.62 for the isolated bacterial species. The occurrence of antibiotic resistance bacteria in shrimp is a potential health threat bacteria as they acquire the ability to develop resistance through resistance transfer methods. An increase of antibiotic resistant strains in the natural environment will be a challenging task to future aquaculturists. Thus, the results of the present study suggest that shrimps in aquaculture systems might be a reservoir of antibiotic resistant bacteria which lead to major health risk in aquaculture field.

Keywords: Antibiotic, Resistance, Tetracycline, Multiple Resistance Index

OPTIMIZATION OF Ag NANOPARTICLES TOWARDS THE DETECTION OF MICROCYSTIN-LR IN AQUEOUS MEDIUM BY SURFACE ENHANCED RAMAN SPECTROSCOPY

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Abstract

Cyanobacterial blooms pose a major threat to the drinking water treatment industry due to their ability to produce different congeners of Microcystins (MCs). Microcystin-LR (MC-LR) has recorded as the most potent microcystin which is fatal to humans, livestock, pets, and aquatic life even at very low concentrations. Current cyanotoxin detection methods base on ELISA, HPLC and LC-MS analysis that require─expertise. Molecular detection techniques are conventionally based on optical, electrochemical, electronic or gravimetric methodologies. Among these methodologies, Surface Enhanced Raman Spectroscopy (SERS) is considered as one of the most reliable, ultra-sensitive and cost-effective method. It has become a selective and label free technique for non-destructive molecular analysis through the amplification of electromagnetic fields and/or creation of charge transfer states between the chemisorbed species and SERS active platform. Metal nanoparticles (eg: Au, Ag and Cu) have been commonly exploited as SERS active platforms. The present study reports the use of SERS to detect MC-LR as a novel method. In this study the obtained Raman peaks for MC-LR along with silver nanoparticles were boosted using $MgSO_4$ as an enhancement reagent. According to results of UV analysis, observed λ_{max} for synthesized Ag nanocolloid was at 408 nm. Qualitative and semi-quantitate determination of ubiquitous MC-LR was carried out under various conditions and the method was optimized by changing the matrix parameters to develop a better calibration plot by changing the nanoparticles to MC-LR ratio for different aggregation agents. 1:4 nanocolloide to MC-LR ratio gave the best enhancement along with the $MgSO_4$. Currently, concentrations of 1 ppb level were sensed with this optimized technique. But, with further optimizations, this method could be served as a cost-effective novel technique in ultra-low detection and quantification of MC-LR in various environmental samples.

Keywords: Silver nanoparticles, Microsystin-LR, SERS, Ultra-low concentrations

PHYTOCHEMICAL SCREENING, PROFILING AND EVALUATION OF ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF SELECTED AYURVEDIC MEDICINAL PLANTS USED IN RHEUMATOID ARTHRITIS MEDICATIONS

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Abstract

Rheumatoid Arthritis (RA) is an inflammatory disorder that mainly affects human's diarthrodial joints of hands and feet. Traditionally, in Ayurvedic medicine, some plant parts including the root of *Boehmeria nivea,* the barks of *Gmelina arborea* and *Oroxylum indicum* are used in the several herbal preparations which are used to treat RA. Therefore, this research was focused on qualitative and quantitative analysis of phytochemicals followed by the determination of antioxidant and anti-inflammatory activities of above-mentioned selected plant parts. Methanol extracts of selected plant parts were prepared using Soxhlet extraction. Qualitative and quantitative analysis of phytochemicals, and evaluation of antioxidant and anti-inflammatory activities were performed using standard methods. Phytochemical screening of three plant extracts confirmed the presence of phytochemicals in different quantities. Among the three plant extracts analysed, bark extract of *Gmelina arborea* demonstrated the highest total alkaloid content of 108.81 ± 0.54 mg caffeine equivalent per 100g of fresh weight of plant materials (FW) whereas *Oroxylum indicum* indicated the highest total flavonoid content of 268.94 ± 12.62 mg catechin equivalent per 100g FW. The root of *Boehmeria nivea* extract indicated the highest total condensed tannin content and total phenolic content of 529.34 ± 30.51 mg catechin equivalent per 100 g FW and 640.34 ± 64.58 mg gallic acid equivalent per 100g FW, respectively. Furthermore, the bark of *Gmelina arborea* indicated the highest antioxidant activity with IC_{50} value of 30.82 ± 2.49 mg L^{-1} and the highest anti-inflammatory activity with IC_{50} value of 119.44 ± 0.25 μg mL^{-1}. Ascorbic acid and diclofenac sodium were used as reference compounds for the evaluation of antioxidant and anti-inflammatory activities, respectively. The results of the study showed that potent phytochemical contents together with antioxidant- and anti-inflammatory activities in the plant extracts could be used to explore new drugs to treat RA.

Keywords: Anti-inflammatory, Phytochemicals, *Gmelina arborea, Boehmeria nivea, Oroxylum indicum*

PHYTOCHEMICAL SCREENING, QUANTITATIVE ANALYSES AND CYTOTOXIC POTENTIAL OF *Aerva lanata* LEAVES EXTRACTS *IN-VITRO*

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Abstract

Plants are the most important source of medicines as well as dietary supplements for living organisms. The medicinal plants play a beneficial role in treating many health problems in humans throughout the world and extensively utilized in the South Asian region. *Aerva lanata* is one of the widely used medicinal plants in Ayurveda both in Sri Lanka and India. The present study mainly focuses on the identification, quantification of phytoconstituents in the crude extracts and cytotoxicity *in vitro* of *A. lanata*. Leaves of *A. lanata* plant were collected from the dry zone in Sri Lanka. Ethanol, hexane and water extracts (EE, HE and WE) were prepared using 1g of powdered fresh leaves which were dissolved in 25 mL of 100% ethanol, hexane and distilled water, separately in triplicates. A qualitative analysis based on phytochemical screening was carried out. Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) were determined by following the Folin-Ciocalteu assay and aluminum chloride colorimetric assay, respectively. The WE of *A. lanata* was examined for cytotoxicity using 3T3-L1 cells by MTT assay in order to identify possible consumable concentration levels of the extract. The phytochemical screening confirmed the presence of flavonoids, tannin, alkaloids and coumarins irrespective of the different extracts. TPC in the WE was 3-fold higher than the HE, and marked as the highest. The highest level of TFC was found in the EE which was 3-fold higher than the WE. The WE showed no toxicity at concentrations below 300 µg/mL against 3T3-L1cells. The presence of coumarins, flavonoids, and alkaloids are highly potential to be utilized in treating diabetes, obesity, rheumatoid arthritis, and cancers. These results provide referential information to identify the medicinal value of the plant towards the utilization of screening novel compounds to treat various diseases.

Keywords: *Aerva lanata*, Phytochemical Analysis, Medicinal Plant, TFC, TPC, 3T3-L1

POLLINATION REQUIREMENTS OF WATERMELON (*Citrullus lanatus*) IN SRI LANKA

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Abstract

Watermelon (*Citrullus lanatus*) is a popular home garden crop among rural farmers as with a less investment and a more profit. Hence, it is considered as an economically important fruit crop, which completely depends on the insect pollination. The low abundance of pollinators is a major cause for the insufficient pollination resulting a low yield. Therefore, the present study was conducted to evaluate the effect of wild bee pollination and hand pollination on fruit set and quality of watermelon. The experiment was carried out at the Wayamba University at Makandura, where three plots were established (20 plants per plot) for two pollination trials. Two sets of flower buds (n=10) were tagged in each trial for five days. One set was kept for the natural pollination by wild bee visits and another set was pollinated by hand and covered with a fine mesh bag. Pollinators were observed daily for 14 days. *Apis cerana* and *Tetragonula iridipennis* carried pollen and nectar, while *A. florea* and *A. dorsata* visited flowers to collect only nectar. The period of pollen availability and stigma receptivity coincided with the highest activity of *A. florea* from 7.00 a.m. to 12.20 p.m. Hand pollinated fruits showed the highest percentage of fruit set (62%) compared to the natural pollinated fruits (40%). In addition, the results obtained from the two-sample t test indicated the highest significant mean values of weight, length, circumference, number of seeds and the total weight of seeds in hand pollinated fruits over the natural pollinated fruits. The study provided evidence that hand pollination is more effective to enhance fruit set and to produce quality fruits of watermelon.

Keywords: *Apis florea*, Pollen, Pollination, *Tetragonula irridipennis*, Watermelon

PRELIMINARY STUDIES ON EXTRACTION OF UREASE ENZYME FROM SELECTED, SRI LANKAN VARIETIES OF *Cucurbita* sp. PUMPKIN SEEDS

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Abstract

Urease is one of the highly efficient metalloenzyme that catalyzes the hydrolysis of urea into ammonium and carbonate ions. This study was aimed to extract urease from Sri Lankan pumpkin seeds (*Cucurbita* sp.). The significance of extracting urease from different varieties of same pumpkin species is to determine the highest efficient urease variety compared to commercial urease. The enzyme was extracted and then purified using ammonium sulphate precipitation and dialysis. Three varieties of pumpkin seeds (Padma, Dubai and Malbaro) found in Sri Lanka were compared with each other using urease activity and kinetics constants (K_m and V_{max}). Colorimetric analysis from indophenol method was used to determine kinetic constants. Maximum urease activity was achieved at the optimum conditions of 40° C and pH 7.4 after 40 min of incubation. The apparent K_m values for Padma, Dubai and Malbaro pumpkin urease enzymes were estimated by Lineweaver-Burk plot and found to be 22.89 mM, 20.89 mM and 42.28 mM respectively, when the maximum reaction rate (V_{max}) of urease were at 1.409, 1.360 and 1.974 mM min^{-1}. Obtained results of enzyme from Padma and Dubai were better compared to the Jack bean urease in which the K_m was 23.903 mM and V_{max} was 1.416 mM min^{-1}. The literature reported K_m value for Jack bean urease is 29.40 mM and it was higher than the reported value in this study. The effects of pH, concentration of substrate and storage period on urease activity were examined. Out of all the varieties, only Padma urease elicited substrate inhibition at higher concentration of urea. As an application, this kinetic study of enzyme can be used for the analysis of urea content in urine samples using indophenol method.

Keywords: Urease, *Cucurbita* sp., Pumpkin Seeds, Kinetics Constants, Indophenol Method

PREPARATION AND CHARACTERIZATION OF MALEINATED OIL BASED BANANA FIBER INCORPORATED GREEN COMPOSITE

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Abstract

During the past few decades consumerist society has identified consequences of petrochemical products and hence the interest of scientists has been drawn towards the renewable, bio-derived products. In this effort a green composite was developed using banana fibers. The crosslinked polymer matrix was developed by using maleated castor oil (MACO) and linseed oil (LO) by free radical polymerization. The polymer matrix was reinforced with NaOH treated banana fibers (BF) which was extracted by water retting method. The effect of varying fiber load and resin composition was analyzed to obtain the optimum strength and thermal stability of the composite within a range of temperature, by performing dual-cantilever flexural test using Q800 Dynamic Mechanical Analyzer (DMA). The water absorptivity and chemical resistivity of the composite was also explored by allowing the composite to be drenched in water, saline water, an acid and a base for 24 hours. The swelling of the composites in acid and saline water showed a similar behavior while the samples were not resistant to alkaline solution. With the increase of the fiber content the swelling of the composites increased. Optimum properties were shown by the composite with 50% (w/w) fiber load and the composite was 2780 g m^{-2}. The optimized composite can be used in household utilities as in packaging, impact bearing within a wide range of temperature. The composite can be further optimized to be used in industrial scale applications.

Keywords: Green Composites, Renewable Resources, Castor Oil, Linseed Oil, Banana Bast Fibers

PREVALENCE OF CHRONIC KIDNEY DISEASE OF UNKNOWN AETIOLOGY (CKDu) WITH SPECIAL REFERENCE TO WATER HARDNESS AND FLUORIDE IN DRINKING WATER WELLS

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Abstract

The prevalence of Chronic Kidney Disease of Unknown aetiology (CKDu) has increased alarmingly over recent decades in Sri Lanka. North Central Province is the area which is most affected by CKDu (Anuradhapura 18.9% and Polonnaruwa 13.9%). Among the hypothesis which related to CKDu, the existing evidences favors a multi-factorial aetiology. However, synergistic effect of fluoride and hardness has not been studied yet. The present study was conducted to determine synergistic effect of fluoride and hardness of drinking water in selected CKDu high-prevalence, low-prevalence and non-prevalence areas. Water samples were collected from Padaviya, Galnewa and Angunukolapelessa during July,2020. Water Temperature, pH, Electrical Conductivity(EC), Dissolved Oxygen(DO) and Turbidity were measured at the site itself and concentration of Fluoride, $N\text{-}NO_3^-$, $N\text{-}NO_2^-$, $N\text{-}NH_3$ and Total Phosphate(TP) were analyzed using standard spectrophotometric methods. Total Hardness(TH) was measured using standard titrimetric method. The results showed the concentration of Fluoride in water was ranged from 0.193 to 2.410 mg L^{-1} while TH was varied from 92 to 416 mg L^{-1}. The highest fluoride and hardness levels (1.97,390.33 mg L^{-1} respectively) were recorded in Padaviya where is the high CKDu prevalence area while lowest fluoride and hardness values (0.37,147.00 mg L^{-1} respectively) were detected in Agunukolapelessa where is a CKDu non prevalence area. Moderate fluoride and hardness levels (1.00,298.67 mg L^{-1} respectively) were recorded in Galnewa where is a CKDu low prevalence area. The values given for Fluoride and TH by Sri Lankan Standard Institution (SLSI) are 1.0 mg L^{-1} and 250 mg L^{-1} respectively. Other studied ground water quality parameters; Water Temperature, pH, EC, DO, Turbidity, $N\text{-}NO_3^-$, $N\text{-}NO_2^-$, $N\text{-}NH_3$ and TP were recorded within the values given for drinking water by (SLSI). Since there may have synergistic effect of fluoride and hardness on CKDu and further studies are being progressed along with an animal model.

Keywords: CKDu Prevalence, Fluoride, Total Hardness, Water Quality

SPECIES DIVERSITY OF BUTTERFLY FAUNA IN MADURU OYA NATIONAL PARK, SRI LANKA

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Abstract

The butterflies are an extremely diverse group of enticing insects in Sri Lanka, comprising 248 known species, of which 26 are endemic species. Present study was conducted from January 2019 to December 2019 around the Maduru Oya Reservoir in the Maduru Oya National Park with the main objectives of estimating the butterfly diversity and its temporal variation throughout the year. The field method was based on standardized "Pollard walk" method. Line transects of about 1000 meter were applied in length in each habitat types and each transect was divided into five segments of 200 meters for the convenience of identifying butterflies by direct recording and capturing photos. Survey was carried out three days per month in the microhabitat types of Vegetated Cover (mainly composed of *Heliotropium indicum*, *Lantana camara* and *Stachytarpheta jamaicensis*), Open Grassland (mainly composed of *Panicum maximum*) and Non-vegetated Area (comprised of roads and water banks) during 0700 to 1700 hours of the sunny days. Shannon Diversity index was used to estimate the butterfly diversity of each microhabitat types. During the survey 5040 butterfly count, consisted with 5 families and 33 species, including two endemics were recorded from the park. Butterfly density was high in October 12.74% and lower in June 09.07% (n=457). Species richness was high in February (n= 31), May (n= 28), June (n= 27), November (n= 28) and December (n= 27) months. The main reasons for monthly fluctuations of both mentioned parameters were the seasonal changes with weather fluctuations and the affect of flowering and fruiting season. Papilionidae 24.25% (n=1222), Pieridae 29.46% (n=1485), Nymphalidae 26.43% (n=1332), Lycaenidae 18.49% (n=932) and Hesperiidae 1.37% (n=69) counts were recorded in each family. The highest species richness was observed in Vegetated Cover 42.86% (n=33) and the lowest was recorded in Non- Vegetated Area 25.97% (n=20). The present study discloses the fact that Maduru Oya National Park is a hidden paradise for butterflies and encourages more research studies of butterfly fauna to be conducted in national parks as this is the second study which has been carried out in a national park of Sri Lanka and first study in the Maduru Oya National Park.

Keywords: Butterflies, Maduru Oya National Park, Diversity, Temporal variation

STUDY OF BIOELECTRICITY GENERATION POTENTIAL OF A MICROBIAL FUEL CELL; UTILIZING DOMESTIC WASTEWATER AND CYANOBACTERIA

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Abstract

Microbial fuel cells (MFCs) generate bio-electricity as an alternative green energy source by consuming waste compounds. Subsequently, there is a great opportunity of use cyanobacteria as catholyte in the MFC systems for wastewater treatment along with power generation. The present study records the bioelectricity generation potential of a MFC, utilizing domestic wastewater and cyanobacteria. Pure culture of *Chroococcu*s sp. used to fill the cathode compartment and rice washed wastewater to the anode compartment. Zinc $(4\times4)cm^2$ for cathode and graphite rod $(2\times4)cm^2$ for anode were placed in compartments and two chambers were separated using cation exchange membrane (CMI-7000S). The external resistor (0.33Ω) was connected to the electrodes. Distilled water was used in the cathode to maintain the control setup of the MFC. Physico-chemical parameters; Nitrate, Nitrite, Chemical Oxygen Demand (COD) and Orthophosphate concentrations in anode compartment of both experimental and control setups were measured for six hours at one hour intervals. The voltage and current were measured, and power density and current density were calculated at each sampling in experimental and control setups. The maximum voltage generated by the MFC was 880± 0.5mV with a current of 2666.67mA, where the calculated maximum current and power densities were 1799.37mA cm^{-2} and 1583.45mW m^{-2}, respectively. The results reveled a significant reduction of COD by 52.52%, N-Nitrate by 22.13%, N-Nitrite by 17.64% and Orthophosphate by 17.19% in the wastewater treated in MFC compared to the control with an increase of the optical density in the cathode compartment by 12.1%. Therefore, the laboratory scale MFC employed in this study could treat domestic wastewater while generating bio-electricity as alternative power for future energy crisis as a cost-effective green microbial solution.

Keywords*: Chroococcu*s sp., Graphite electrodes, Microbial fuel cell, Rice washed wastewater, Wastewater treatment

SYNTHESIS OF CARBOXYMETHYL CELLULOSE AND ACRYLIC ACID HYDROGEL WITH ZnO NANOPARTICLES

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Abstract

Hydrogels are three-dimensional polymer network made of hydrophilic synthetic or natural polymers. Their high water retention ability affords many of the desirable properties of a wound healing process such as promoting a moist environment and debridement, good gaseous exchange, low tissue adhesion and good patient comfort through cooling and soft texture. This research emphasizes the development of a Zinc oxide nanoparticle incorporated interpenetrating polymeric hydrogel as a potential candidate for wound dressings. IPN hydrogels were synthesized by carboxymethyl cellulose (CMC) and acrylic acid (AA) using citric acid (CA) and N,N′- methylene bisacrylamide (BIS) as the crosslinking agents. CMC was selected as the main walls of the hydrogel, AA was incorporated to gain mechanical strength, CA used to crosslink CMC and was selected due to its own antibacterial activity, BIS functioned as a hydrophilic crosslinker for AA, and ZnO nanoparticles were incorporated to gain cost effective efficient antibacterial effect. SEM analysis revealed that the incorporated Zinc oxide nanoparticles were spherical in shape and the average size was 80 nm. Hydrogels were tested for swelling ratio and antibacterial properties. The developed hydrogels exhibited a wide range of swelling ratio of 5-16. Antibacterial properties were analyzed against *Pseudomonas aeruginosa*, *Escherichia coli* and *Bacillus subtilis.* A noticeable antibacterial activity towards these three microorganisms could be observed by the developed hydrogel.

Keywords: IPN hydrogel, ZnO nanoparticles, Antibacterial properties, Swelling ratio

USES AND AWARENESS ABOUT FRESHWATER PLANT SPECIES IN UVA PROVINCE, SRI LANKA - A PRELIMINARY STUDY

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Abstract

Nearly 370 freshwater plant species are found in Sri Lanka, of which 12% are endemic. While certain freshwater plant species have been identified taxonomically, the uses of most of the species have not been fully studied. Hence, a pilot survey was conducted with randomly selected 110 individuals from four age groups (below 18; 18-35; 35-55 and above 55) and seven occupation categories (student, teacher, ayurvedic doctor, farmer, private sector, Other government and other) in Uva Province from August to January in 2019. The main objective of the study was to identify the awareness and uses of the aquatic plants in Uva province, Sri Lanka. The collected information included the utilization (human food, medicine, ornamental plants in fish keeping tanks, ornamental plants in gardens, fertilizer, soil conservation, water purification, religious activities, handicraft production, and beauty therapy activities) of 41 selected freshwater plants. Descriptive statistics and probit regression were used to analyze the data quantitatively. The result showed that 58% of the plants were utilized as ornamental plants in gardens, 46% for medicinal purposes, 44% as human food, 38 % as ornamental plants in fish keeping tanks, 24% for fertilizer production, and 16% for water purification. It was found that some of the aquatic plants were misidentified with other species' names. The identification ability and use of exotic species were more prevalent with the lower age groups (below 35 years). In contrast, endemic aquatic plant species (such as *Cyrptocoryne* spp, *Lagenandra* spp, and *Aponogeton* spp.) and indigenous species (such as *Rhynchoglossum notonianum*) were more familiar with the higher age groups. Following this pilot study, it is recommended that this type of survey be extended to all the provinces in Sri Lanka to understand the awareness among different age groups and the importance of freshwater aquatic plants at the national scale.

Keywords: Biodiversity, Sustainable utilization, Conservation, Aquatic plants, Freshwater

WATER BIRD DIVERSITY IN AND AROUND MADURU OYA RESERVOIR

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Abstract

Wetlands of Maduru Oya National Park (MONP) have been identified as areas of high water bird density. Maduru Oya Reservoir (MOR) is the largest reservoir located in MONP which harbours several water bird species. However, limited research studies have been conducted on birds in MONP. Therefore, in order to fulfil the research gap, the current study was conducted monthly to study the water bird diversity in and around MOR from January to December 2019 during the dry season and the wet season. Point transect method was used to survey the birds for three consecutive days in each month from 0600h to 1000h when visibility and bird activity were high. To calculate the Shannon's diversity index, the number of species and individuals in each species were used. Relative abundance and commonness were calculated for each species. A total of 30 water bird species belonging to 15 families and 7 orders were recorded. These included two globally threatened species; Lesser Adjutant Stork (*Leptoptilos javanicus*) and Asian Woollyneck (*Ciconia episcopus*), two locally threatened species including Little Ringed Plover (*Charadrius dubius*), three locally near threatened species including Great Cormorant (*Phalacrocorax carbo*) and Black-crowned Night-heron (*Nycticorax nycticorax*) and three winter visitors; Common Sandpiper (*Tringa hypoleucos*), Common Greenshank (*Tringa nebularia*) and Whiskered Tern (*Chlidonias hybridus*). Twenty five species were common and one species was rare. Species richness was 27 for the dry season and 28 for the wet season. The diversity index was 1.073 and 2.033 for the dry season and wet seasons respectively. Year around diversity index for the MOR was 1.491. Little Cormorant had the highest relative abundance while Asian Woollyneck had the lowest. Present study concludes that the reservoir supports a high water bird diversity. As a preliminary study this can be used for future research on water birds and to compose management and conservation plans to conserve them. By promoting the diverse water bird assemblage inhabiting MONP, bird watchers and tourists can be attracted to the park which will directly and indirectly uplift the socio-economy of the area.

Keywords: Maduru Oya National Park, Aquatic avifauna, Wetlands, Conservation

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