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17, 18 & 19 April 2013
Jaffna, Sri Lanka.

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Editor's Note

The Jaffna Science Association (JSA), which was established in 1991 by the founder president late Professor A.Thurairajah, has been functioning with the aim of disseminating scientific knowledge among the students and general public in the northern region. It has been carrying out various activities including School Science Programme, guest lectures, workshops, seminars, JSA annual session, and publication of journals and magazine.

The key objectives of the JSA annual sessions are to educate people on latest advancements in science and to encourage researchers in publishing their research findings . Further, a theme relevant to the region is identified every year focusing on a crucial issue. The seminars and popular talks are organised based on thus identified theme. Additionally, two research proceedings are published each year; one contains the presidential address, the chairpersons' address, popular lectures and theme seminar presentations that were conducted in the previous year, and the other contains the abstracts of research papers that were presented in the respective year.

The 20th Annual Sessions are scheduled to be held on the 17th to 19th April, 2013 by the twentieth executive committee of the JSA. Thirty (30) research papers will be presented by researchers from the disciplines of Pure Science, Applied Science, Medical Science and Social Science in these sessions. This proceeding contains the abstracts of the research papers that will be presented at the 20th annual session.

The abstracts complied in this proceedings have been reviewed by experts in the relevant fields and the comments and the feedbacks have been addressed. It is an honour as well as a pleasure to thank the reviewers for their valuable time and feedback, the researchers for their scholarly contributions, and the executive committee members for their valuable support. We strongly believe that this volume will be useful for researchers, students and general public.

Mr. K. Sarveswaran
Chief Editor / Jaffna Science Association
17 April 2013

Department of Computer Science,
University of Jaffna,
Sri Lanka.

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Table of Contents

Note: Abstracts included in this volume are accepted for the oral presentation at the 20th JSA Annual Sessions, these shall be considered as publications only if presented.

Global Optimality Conditions for ρ – Convex Minimization Problems with Mixed Continuous and Discrete Variables

B. Muraleetharan, S. Selvarajan, and S. Srisatkunarajah
Department of Mathematics and Statistics, University of Jaffna, Sri Lanka.

Development of global optimality conditions for non-convex programs has long been an important theme of global optimization. Gradual progress has been made by deriving global optimality conditions for different special classes of non-convex problems. In this paper, optimality conditions are established for a given feasible point to be a global minimizer of the following ρ – convex minimization model problem:

$$\text{(MP)} \quad \min_{x\in\mathbb{R}^n} g(x) = f(x) - \frac{1}{2}x^T Ax,$$

$$s.t\ x_i \in [u_i, v_i], \quad i \in I$$

$$x_i \in \{u_i, v_i\}, \quad i \in J$$

$$I \cap J = \emptyset, \quad I \cup J = \{1,2,\cdots,n\},$$

where $u_i, v_i \in \mathbb{R},\ u_i < v_i, i = 1,2,\cdots,n$ and $f: \mathbb{R}^n \longrightarrow \mathbb{R}$ is a convex function and $A = (a_{ij})$ is a $n \times n$ symmetric matrix. Let $D = \{x \in \mathbb{R}^n \mid x_i \in [u_i, v_i], i \in I,\ x_i \in \{u_i, v_i\}, i \in J\}$.

A necessary global optimality condition is derived. That is, a given feasible point $\bar{x}$ of (MP) is a global minimizer of (MP), only if

$$[NC] \quad \frac{1}{2}\tilde{c}_i(v_i - u_i) + \chi_i((\nabla f(\bar{x}))_i - (A\bar{x})_i) \le 0,\ \ i = 1,2,\cdots,n;$$

where for each $i = 1,2,\cdots,n$, $\max\{\partial^2 f(z)/\partial^2 x_i^2 \mid z \in D\} \le d_i$, for some $d_i \in \mathbb{R}$,

$$c_i = d_i - a_{ii},\ \ \tilde{c}_i = \begin{cases} \max\{0, -c_i\} & \text{if } i \in I \\ -c_i & \text{if } i \in J \end{cases} \text{ and } \chi_i = \begin{cases} +1 & \text{if} \quad \bar{x}_i = v_i, \\ 0 & \text{if} \quad \bar{x}_i \in (u_i, v_i), \\ -1 & \text{if} \quad \bar{x}_i = u_i. \end{cases}$$

Note that, necessary condition [NC] is stronger than the usual Karush-Kuhn-Tucker (KKT) condition: for each $i \in I$, $\chi_i((\nabla f(\bar{x}))_i - (A\bar{x})_i) \le 0$.

For identifying global minimizers among those points satisfying [NC], the following optimality condition is shown to be sufficient.

Given feasible point $\bar{x}$ of (MP) is a globally minimizer of (MP) if

$$[SC] \quad \tilde{\mu}(v_i - u_i) + \chi_i(\nabla f(\bar{x}) - A\bar{x})_i \le 0, \qquad i = 1,2,\cdots,n;$$

where μ is the first eigenvalue of $\dfrac{-A}{2}$. Numerical examples will be discussed to illustrate the significance of the derived optimality conditions.

Keywords: Nonconvex optimization, ρ –convexity, global optimization, Optimality conditions.

Antibacterial Properties of Various Extracts of Onion Against some Food- Borne Pathogens

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This study researched the antibacterial properties of different extracts obtained from onion on some common food-borne pathogens. The samples included raw onion juice, hot water extract, cold water extract and ethanol extract at various concentrations (0.1g/ml, 0.2g/ml, 0.4g/ml, 0.6g/ml and 0.8g/ml). The test micro organisms included *E.coli, Bacillus* sp, *Pseudomonas*, *Staphyllococcus* and *Klebsiella* sp. The objective of the present study is to find out the antibacterial effect of onion against different food-borne bacterial pathogens and how it is affected by different extraction methods. Hot water extract of onion showed remarkable inhibitory activity against *E.coli* and *Staphyllococcus*, moderate activity against *Pseudomonas* and *Klebsiella* and no activity against *Baciillus* sp. The cold water extract of onion had no activity against all the tested bacteria. Ethanol extract showed moderate activity only against *Bacillus* sp. Original juice of onion showed the highest inhibitory activity on *Klebsiella* sp compared to all other extracts and this value is even higher than that of erythromycin which is used as a positive control. The original juice showed moderate activity against *Bacillus* sp and *E.coli*. It was found that the different solvents of extraction and their varying strengths affected the degree of antibacterial activity of the extracts. Raw onion extract at 0.6g/ml and 0.8g/ml and ethanolic extract of onion at 0.8g/ml showed the highest antibacterial activity. Heat treatment also affects the antibacterial properties of onion. Therefore these factors should be taken into consideration when spices such as onion are used in the food preparations.

150

Keywords: *Bacillus* sp, *E.coli*, onion, spices, food-borne pathogen, antibacterial activity

In Vitro Antibacterial Activity of some Medicinal Plants Found in Jaffna Peninsula

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Medicinal plants are widely distributed in the world and the natural products found in these plants are healthy and harmless or safer than the synthetic ones. The present study was carried out to test the effectiveness of some medicinal plant extracts against some Gram (+)ve and Gram (-)ve bacteria. Six hundred mg/ml *of Adhatoda vasica* ('Aadathodha'), *Ocimum sanctum* ('VenThulasi'), *Cardiospermum helicacabum* ('Mudakkoththan'), *Solanum trilobatum* ('Thoothuvalai'), *Anisochilus carnosus* ('Katpooravalli') and *Eucalyptus globulus* ('Sanjeevi') were tested for their antibacterial activity against different characterized bacterial genera, *Staphylococcus aureus*, *Bacillus* spp, *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella* spp. Streptomycin and sterile distilled water were used as standard and control respectively. The one way analysis of variance (ANOVA) followed by Least Significant Difference (LSD) test were used for statistical analysis. This study demonstrated that the aqueous extract of *A.carnosus* exhibited significantly ($P<0.05$) higher inhibition on all tested bacteria compared to other tested extracts where maximum zone of inhibition was produced on *E.coli* and there was no significant ($P<0.05$) difference between the extracts of *C.helicacabum* and *E.globulus*. Furthermore *E.globulus* revealed antibacterial activity against four bacterial species out of five species, while the aqueous extract of *C.helicacabum* showed inhibitory effect against all tested organisms. On the other hand, *S.trilobatum*, *O.sanctum* and *A.vasica* were unable to inhibit the growth of any of the tested bacterial genera. The standard, streptomycin was effective on most of the tested bacteria except *P.aeruginosa*. Present study forms a primary platform for further identification of bioactive natural products which will lead to the development of new pharmaceuticals.

160

Keywords: Medicinal plants, bacteria, antibacterial activity

Analysis of General Ernutritional Composition of Wild Rice Species *Oryza rhizomatis*

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Several wild rice species have been reported to have desirable nutritional attributes than the commercial rice cultivars. *Oryzarhizomatis* is an endemic wild rice species of Sri Lanka. A preliminary investigation was carried out on nutrition composition of *O. rhizomatis* seeds and the popular commercial variety Bg352 seeds were selected as control. Weight of each sample was recorded, milled and again the weight was recorded. All the analyses were done according to the standard protocols recommended by the Association of Analytical Communities (AOAC).

An unpaired *t*-test indicated that there was a significant difference between nutritional compositions of two samples at 0.05 significant level (P value < 0.05). According to the mean value, the mean protein content of *O. rhizomatis* was 12.300 g/100 g. It was approximately two times as high as the cultivated variety Bg352 (6.550 g/100 g) whereas Bg352 contained comparatively higher amount of carbohydrate (75.611 g/100g) than *O. rhizomatis* (69.354 g/100g).*O. rhizomatis* has relatively lower amount of fat (2.528 g/100 g) than Bg352 (3.068 g/100 g). The moisture and ash content of Bg352 were higher than *O. rhizomatis*.

*O.rhizomatis*possesses some desirable nutritional attributes thanBg352. Therefore, this variety could be considered as a healthy food source with respect to having lower fat and carbohydrate and higher protein contents than in Bg352.

Keywords: *Oryza rhizomatis*, Bg 352, nutritional composition, protein, carbohydrate, fat

Phytochemical Screening of Various Extracts of Root of *Withania somnifera* (L.) Dunal

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Withania somnifera (L.) Dunal (Solanaceae), commonly known as *Aswagandha*, is one of the most valued medicinal plants with a number of pharmaceutical applications. Root extracts of *W. somnifera* are commonly used as a remedy for variety of ailments and a general tonic for over all health and longevity in the Traditional medicine system. It is also reported to have anti-inflammatory, anti arthritic, antitumor, immunomoduatory and antioxidant effects. Although the phytochemical screening of *W. somnifera* has been already published, the aim of this study is to compile its phytochemical constituents in various extracts, which were carried out using standard laboratory procedures. Quantification of some of the active constituents like alkaloids, flavonoids and saponins were also carried out. The preliminary phytochemical screening of hot and cold ethanol, methanol and water extracts showed the presence of alkaloids, saponins, flavonoids, steroids, tannins, proteins, reducing sugar and coumarins and absence of quinones or anthraquinones. Cold and hot water extracts indicated the presence of fat and fixed oil. The total alkaloid and flavonoid contents were found to be 0.81 ± 0.01 % and 14.43 ± 0.40 % respectively, and total saponin content was (Foaming Index) FI < 100. The findings are consistent with the presence of biologically active constituents in the polar extracts of *W. somnifera*.

110

Keywords: Different extracts, phytochemical screening, root, *Withania somnifera*

Acknowledgment: HETC Project Funding, JFN/Sidda/N1

Resistant Starch Content of Commonly Used Legumes in Jaffna Peninsula

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Resistant Starch (RS) is a useful nutrient to our body and it has several benefits. The aim of this study is to evaluate the resistant starch (RS) content of different varieties of legumes which are commonly consumed in Jaffna peninsula. Different varieties of legumes like green gram [*Vigna radiata* (L.)], black gram [*Vigna mungo* (L.)], cowpea [*Vigna unguiculata*] and chickpea [*Cicer arietinum*] were analyzed. Among these legume varieties, black gram had the highest percentage of resistant starch content (as % of total starch basis) both in raw and boiled forms (61, 50% respectively) and which had the lowest percentage of non-resistant starch content both in raw and boiled sample (39, 50% respectively). Whereas, green gram had the lowest percentage of resistant starch content both in raw and boiled sample (23.5, 10.6% respectively) and which had the highest percentage of non-resistant starch content both in raw and boiled sample (76.5, 89% respectively). The mean total starch content of cooked chickpea, green gram, black gram and cowpea were 43.00(± 0.22), 42.25(± 0.45), 35.30(± 0.11), 42.74(± 0.17) g/100g dry sample respectively. During cooking, the RS content of all the legume sample has decreased with an increase in non-resistant starch content. Mean values of resistant starch, non-resistant starch and total starch contents of all the raw and cooked legume samples were varied significantly ($p<0.05$) from each other. High RS content foods are better choices for patients who are suffering from diabetes mellitus and coronary heart diseases while low RS foods are good for athletes.

Keywords: Resistant starch, Total starch, Non-resistant starch, Legumes

Antioxidant and Total Phenol Contents of Selected Spices Used in Jaffna Peninsula

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The aim of the study was to determine the antioxidant content and total phenol content of spices such as Onion (*Allium cepa*), big onion (*Allium cepa*), garlic (*Allium sativum*), green chilli (*Capsicum anum*), ginger (*Zingiber officinale*) and bell pepper (*Capsicum spp*) available in Jaffna. Total phenolics were measured using the Folin Cio-calteu reagent with gallic acid as standard. The antioxidant contents of spices were assayed by both phosphomolybdenum assay and reducing power assay with standards of ascorbic acid and butylated hydroxyl toluene respectively. Based on the phosphomolybdenum assay, highest antioxidant content was observed in garlic [897.26 (±0.51) mg/100 g dry samples and the lowest value in green chilli [253.54 (±0.37) mg/100 g dry samples. Based on the reducing power assay, highest antioxidant content was found in bell pepper [233.52 (±0.38) mg/100g dry sample], and lowest antioxidant content was detected in garlic [1.07 (±0.20) mg/100g dry sample]. Highest total phenol content was found in bell pepper [123.80 (±0.39) mg/100 g dry samples and lowest total phenol content was detected in ginger [8.6 (±0.45) mg/100g dry sample]. From this study, highest antioxidant content and total phenol contents were found in garlic while lowest amounts were found in green chilli. The present study shows that spices may contain a lot of antioxidants and total phenols to support human health.

110

Keywords: Antioxidant, total phenol, ascorbic acid, gallic acid, butylated hydroxyl toluene

Assessment of Soil Organic Matter and Other Dynamic Properties from Selected Vegetable Cultivating Fields in Jaffna

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Eighteen vegetable fields were identified over Jaffna peninsula according to vegetable cropping intensity for to investigate the present status of organic matter and chemical properties of traditional vegetable cultivated fields. Five auger holed were formed each field from the surface soil to maximum soil depth. At each 15cm depth samples were collected separately. The Texture, CEC, pH, EC, soil $CaCO_3$% , mineral N (NO_3^--N and NH_4^+- N) and soil total C and N content measurement were analyzed for the surface 30cm depth (top layer) and deepest 15 cm (bottom layer) soil. The top layer soil organic C content ranged from 1.2 g kg^{-1} soil to 10.8 g kg^{-1} soil (6.5 g kg^{-1} ± 2.4) hence the bottom layer average was 2.1 g kg^{-1} ± 1.5 . The soil N contents range of 0.22-0.66 g N kg^{-1}soil. The pH of these soils was neutral to mild alkaline except soils from Vidathalpali which was mild acidic. For the top layer, sandy soils' CEC were significantly ($p<0.05$) lower compared to other textural groups. Also Sandy clay loam soils had significantly ($p<0.05$) higher total N contents compared to other textural groups. The average C:N ratios of top layer (10.3± 3.7) was almost doubled compared to bottom layer (5.5± 2.6). Average soil mineral nitrogen of top 30cm depth and deep layers' as were follows as 14 (± 12.1 mg N Kg^{-1} soil) and 9.8 (± 6.8 mg N Kg^{-1} soil). However the mineral N content of top layer showed a higher variation (4-59 mg N Kg^{-1} soil) comparably smaller variation observed for deeper layers (2- 24 mg N Kg^{-1} soil). The result of this study confirms that the soils have less organic C content in study area. Adding recalcitrant organic matter to these soils may be a promising alternative option to improve the soil C.

Keywords: soil organic matter, soil organic C and N, soil mineral N and CEC

Productive and Reproductive Performance of Goats Rearing in the Valikamam Area of Jaffna District

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This study was carried out in the Valikamam area of the Jaffna district which includes the veterinary divisions of Sandilipay, Chankanai, Kopay, Uduvil and Tellipalai. Period of study was November to April 2012. The objectives of the study were to study the socio-economic status of the goat farmers, goat breed distribution and performance of goat breeds in the study area. Out of 5000 goat farmers 500 farmers (10%) were randomly selected for the study using Table of random numbers. Information on background information, breed distribution and performance and management aspects of goats were obtained using a structured questionnaire. Data was processed using Microsoft Excel and summarized using SAS. Majority of the farmers in the study area was married (89%). Most of the farmers had the family size of 'up to 3' and '4-5' (84.5%). Sixty nine percentages of farmers fell under the age group of 19 -65 years. 95.5% of the farmers were literate of different levels. In the study area percentages of farmers involved in livestock rearing as primary and secondary occupation were 3.04 and 96.74, respectively. Around 98.04% of the farmers stated meat production as one of the purposes of rearing goat. The average herd size of goats in Sandilipay, Chankanai, Kopay, Uduvil and Tellipalai veterinary divisions were 3.75, 3.02, 3.14, 4.01and 3.11, respectively. Goat breeds found in the study area were Sannen, Jamnapari, Jaffna Local and their crosses. Systems of management adopted for goat rearing were intensive (52.14%), extensive (2.36%) and semi intensive (45.49%). Ground housing was adopted by 83.40% of the farmers. Women's contribution for goat farming was 68.27%. The productive and reproductive traits of Sannen, Jamnaperi, local and crosses were as follows: milk yield in Litres:0.69,0.64,0.20 and 0.63,respectively; age at first kidding in months: 17.38,17.07,14.68 and 15.76, respectively; lactation length in months: 3.64,3.19,2.09 and 3.47, respectively; kidding interval in months: 12.24,11.76,11.01 and 11.70, respectively. For breeding goats natural service (93.38%) was preferred over artificial insemination. In all veterinary divisions higher percentage of farmers sold their goats to middlemen (42.80%) and whole sale buyers (46.53%).

160

Keywords: Sannen, Jamnapari, Local goat, Valikamam, Breeding, Production.

Economic Viability of Goat Production in the Valikamam Area of the Jaffna District

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This study was carried out in the Valikamam area of the Jaffna district during the period of November to April 2012. The objective of the study was to find out the economic viability of goat production in the Jaffna district. Out of 5000 farmers 500 farmers (10%) were randomly selected for the study using Table of random numbers. Information on expenses incurred and income generated through goat farming was gathered. Based on the information collected a cost benefit analysis was performed using SAS and the economic viability of the goat farming was worked out. Though income generated was significantly higher for intensive system of management(LKR13328±13385) than extensive(LKR 3521± 2349)and semi- intensive(LKR 6061±6081) system there was no significant different among the profit made through intensive(LKR 4719±13614) ,extensive(LKR 2380± 1910)and semi intensive(LKR 4114± 6801) system of management. Valikamam area included five veterinary divisions viz. Sandilipay, Chankanai, Kopay, Uduvil and Tellipalai; profit made through different veterinary divisions did not differ significantly. Herd size had significant influence on profitability. With increase in herd size profit per animal increased significantly (Herd size - greater than eight: LKR 25876±32169, five to eight: LKR 9224±10958 and less than five: LKR 2940±7900). It could be concluded that increasing herd size coupled with intensive management system will transform the goat farming into a profitable venture.

Keywords: Goat, Valikamam, Income, Cost, Profit

Preliminary Study on the Influence of Palmyrah Distillery Spent Wash on Root-Knot Nematode *Meloidogyne incognita*, Infestation and Growth of Tomato

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Root-knot nematode, *Meloidogyne incognita* is a prime hidden enemy of tomato (*Lycopersicon esculentum*), causing millions of dollars of economic loss worldwide and thousands of rupees in Sri Lanka. Application of organic amendments is cheaper, economically viable and environmentally safer method for the management of nematodes as compared to more toxic synthetic nematicides. Screen house experiment was conducted to test the efficacy of the Palmyrah Toddy Distillery Spent Wash (PTDSW) on the root-knot nematode infestation and growth of tomato (height and biomass). Four concentrations of PTDSW, (100%, 75%, 50% and 25%), were treated to potted tomato plants and compared with untreated control. Treatments were as replicated four times in an organized complete randomized design. At the time of 50% of blooming, mean number of galls, gall changing factor were measure. Application of PTDSW at 75% and 100% resulted significant ($p<0.05$) reduction in number of gall by formation, 40.25 and 42.75 respectively, by *M. incognita* compared to other all treatments. Gall changing factor was significantly differed with control in all treatment in increasing trend. Application of PTDSW at 75% and 100% were significantly ($P<0.05$) improved plant growth 33.625 cm, 33.55 cm respectively. Whereas, total biomass production was, 100 g, 110g in 100% and 75% PTDSW treated plants as compared to the untreated control. The results confirmed that organic amendments stimulated plant growth, increased the productivity and reduced the nematode infestation. According to the gall changing factor, repeated application of PTDSW can suppress the nematode population buildup after two to three cultivation cycles.

130

Keywords: Distillery spent wash, Tomato, Root-knot nematode, gall index

Effect of Three Types of Charred Biomass on Important Soil Properties of Vaddukoddai Series

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Experiment was carried out at the Department of Agricultural Chemistry, University of Jaffna to find the effect of different charred biomass addition on soil properties on a selected soil of Jaffna peninsula. This is a part of a long term study to investigate the effect of charred biomass on yield of different crops and soil fertility. Application rate of different charred biomass and dried cow dung were 20 tons/ha, 10 tons/ha respectively, Treatments were T_1 (coconut char + dried cow dung), T_2 (Palmyra char + dried cow dung), T_3 (Rice husk char + dried cow dung), T_4 (Coconut char + inorganic fertilizers), T_5 (Palmyra char + inorganic fertilizers), T_6 (Rice husk char + inorganic fertilizers), T_7 (Inorganic fertilizers + dried cow dung), T_8 (Inorganic fertilizers alone), T_9 (Dried cow dung alone) and T_{10} (control). The design was RCBD with three replicates. The soils were analyzed after harvesting the onion crop. Selected soil was moderately alkaline (pH 7.54), very high salinity (EC 2.86 dS/m), very low organic matter content (0.73%) and low CEC (6.3 cmol(+)/Kg). Results indicate that all the three types of charred biomass tested increased CEC and organic matter content of soil compare to control of fertilizer alone without negative impact on nutrient availability in soils. However, differences were observed in the effects on properties among types of biochars.

Keywords: Biochar, Charred biomass, Rice husk char, Palmyrah char, Coconut char, Dried cow dung, NPK fertilizers.

Preliminary Investigation on Chemical Parameters of Karuthacolomban Mangoes (*Mangifera indica* L.) in Jaffna

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Karuthacolomban mango from Thenmaradchy division of Jaffna district is very popular among the consumers. But there is no consistency in the physico-chemical characters of the fruit among these Karuthacolomban cultivars. Therefore, a study was carried out to evaluate the chemical parameters of mango fruits from three Grama Niladhari divisions in Thenmaradchy division of Jaffna district namely Manthuvil, Kachchai and Madduvil and the fruits were labeled as MAN, KCH and MAD respectively. Fruits were harvested at proper maturity stage and allowed for ripening. Total Soluble Solid (TSS), Titratable acidity (TA), Total Sugar content (TS), Crude fiber (CF) and Ascorbic Acid Content (ASC) were measured from the fruit pulp. Principle component analysis was carried out to characterize the chemical properties. Cluster analysis was performed on tabulated data set to group the plants based on their similarities and separated from the dendrogram. Mango fruits with higher mean value with total soluble solids (>15° Brix value), total sugar (>13.5 g/100g of flesh), titratable acidity (<0.4%), ascorbic acid (>34 mg/100g of flesh) and fiber content (<4.5%) were considered for plant selection. Cluster II showed promising chemical characters of high total soluble solids, moderate acidity and ascorbic acid content with acceptable sugar and fiber content. The mango trees labeled as MAN2, KCH1 and MAD5 from the cluster II were selected as better trees could be used as mother palnts. Further molecular marker assisted studies are required to confirm these differences before using these plants as mother plants.

130

Keywords: Chemical parameters, Cluster, Dendrogram, Variety, Variability

Effect of Three Types of Charred Biomass on Important Soil Properties of Calcic Red Yellow Latosols

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An experiment was conducted to find the effect of three types of charred biomass namely coconut char (CC), palmyra char (PC), and paddy husk char (PHC) in combination with organic and inorganic fertilizers on important soil properties. This is a part of the long term study. Soil analysis was done after harvesting of the first crop *Capsicum annum*. Randomized Complete Block design was used with three blocks and eight treatments. The treatments were, Department Recommended Fertilizer (DRF), Farmers' Practice Fertilizer (FPF) and each three types of charred biomass with either DRF or FPF. According to that the treatments were T_1 (DRF+CC), T_2 (DRF+PC), T_3 (DRF+PHC), T_4 (DRF), T_5 (FPF+CC), T_6 (FPF+PC), T_7 (FPF + PHC) and T_8 (FPF). Application of charred biomass with fertilizer has improved available nutrients (N, P and K) compared to fertilizer application alone. PC has improved important soil properties followed by CC and PHC when apply with DRF. In treatment T_2 (DRF+PC), availability of N, P and K and CEC were increased by 66%, 41.7%, 52.2% and 84.9% respectively compared to treatment T_4 (DRF). Likewise PHC has improved important soil properties followed by PC and CC when apply with FPF. In treatment T_7 (FPF+PHC), availability of N, P and K were increased by 45.5%, 60.9% and 28.6% respectively compared to treatment T_8 (FPF). A proportion of carbon present in biochar is easily degradable and provides food for micro organisms. PHC may have more labile carbon than CC and PC which can be utilized by microbes therefore microbial population will increase consequently increase the demand for soil nutrients. This results in reduction of nutrient availability. Amount of fertilizer applied to the treatments related to FPF is 2.5 times higher than that of the treatments related to DRF. Therefore nutrient supply for microbial activity is sufficient in FPF treatments hence the nutrient availability has been increased. This may be the reason for different effect observed when PHC is applied with DRF and FPF. Compare to control treatment (T_0), reduced soil pH in FPF treatments and increased soil pH in DRF treatments was recorded even in same charred biomass applied treatments. All treatments have increased organic matter content except the treatments without charred biomass compared to T_0 (Control). Therefore PC has higher potential to improve soil properties when apply with DRF while paddy husk char performs best when applied with farmer practice fertilizer. However, coconut char and palm char has the potential to improve soil properties with both DRF and FPF.

Keywords: Charred biomass, Available nutrients, Organic matter

Analyzing Improved Traditional Authentication Systems to Adopt them on Web Based Applications

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Traditional authentication mechanism, which requires username and password, is widely used on web applications for authenticating users. However, since many attacks have already been successfully proved on it, computer experts keep revealing that traditional authentication mechanism is not secured enough anymore although its usability is extremely appreciated by its users. The experts, eventually, have come with several improvements on the traditional system. Some of the improved mechanisms, such as state-based authentication, federal identity management and dynamic password system, have already been successfully used with several applications. A research is conducted to study proposed improvements on the traditional system and focus on their security and usability to know whether they can be adaptable on web based applications nowadays. Dynamic authentication, federated identity management, state based authentication, persuasion, passdoodle and graphical based authentication were recognized as popular improvements on the traditional authentication system for the research and feedbacks on their usability were gathered from ninety-two people who belong to different age groups, professions and environments through a questionnaire. Moreover, several computer security experts were interviewed in order to understand the security issues on them. Even though the proposed improvements on the traditional system add the security at least a bit, they are not able to provide enough security to the traditional system to use on serious web applications and also, they possess significant drawbacks on their usability. However, dynamic password mechanism comparatively provides better security than the traditional system to some extent for web based applications. It would be even much better to increase the dynamism on dynamic password system in real-time based on the users' confidence on their password.

Keywords: Authentication, Traditional, Security, Usability, Improvements

A Preliminary Study on the Cardiovascular Disease Risk among Overweight & Obese Adolescents Attending National Schools in Jaffna Zonal Division

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Cardiovascular disease (CVD) risk factors are present to a significantly greater degree in the subset of overweight and obese individuals. This study assessed the cardiovascular disease risk factors among overweight and obese adolescents aged 10-19 years attending National schools (*n*4) of Jaffna zonal division. A cross sectional study was carried out and 120 overweight & obese students were selected. Among the 120 students, 45 (37%) have responded. Anthropometric measurements (height, weight and waist and hip circumference) were measured. The Body Mass Index (BMI)-for-age was used to derive overweight (BMI-for-age >+1SD) and obese (BMI for age >+2SD) adolescents. Fasting plasma glucose, insulin, triacylglycerol (TAG), Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL) and Total Cholesterol (TC) level were measured. Insulin resistance test was performed by using HOMA-IR calculator. Of the total of 45, 19 (42.2%) were males. The mean (±SD) values of waist circumference for males and females were 92.92 (±5.89) and 87.48 (±8.36) cm respectively with significant difference ($p<0.05$). Mean (±SD) value of the insulin resistance was 2.86 (±1.54) {[2.76 (±1.28) in males and 2.93(±1.72) in females] ($p<0.05$)}. Among the 45 students, 8 (26.67%) students had high insulin resistance (≥3.25) [5 (26.32%) males and 7 (26.92%) females]. Mean value of TAG was significantly high in females [99.51 (± 44.88) mg/dL] than in males [77.81(±38.14) mg/dL] (>0.05). Among them, 7 (15.6%) had hypertriglycerolaemia [1(5.26%) males and 6 (23.8%) females]. Females [108 (±51.8) mg/dL)] had significantly high LDL levels than males [76.8 (±36.8) mg/dL)] (<0.05). High LDL levels were observed in 4 (8.9%) students [1(5.26%) male and 3(11.54%) females] while Low HDL levels in 8 (17.8%) students [4(21.5%) males and 4(15.38%) females]. Total cholesterol level was high in females [222.4 (±26.7)] than in males [185.5 (±27.5)]. Among the students, 3 (6.67%) had hypercholesterolaemic level. This study revealed that, CVD risk factors are high in overweight and obese adolescent students who attending National schools of Jaffna zonal division. Female students have shown more CVD risk than male students.

160

Keywords: Insulin resistance, HOMA-IR, Lipid profile, BMI-for-age, Adolescents

A Preliminary Study on the Prevalence of Obesity and Assessment of Insulin Resistance in Overweight and Obese Adolescents

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The increase in the trend of chronic diseases linked to the nutrition transition and associated dietary & lifestyle changes are of growing concern in Sri Lankan adolescents. Aim of this study was to determine the prevalence and assessment of insulin resistance in overweight and obese adolescents attending National Schools (*n*4) in Jaffna zonal division of Education. This was a cross-sectional descriptive study and a total of 1659 adolescents [754 (45.4%) males] were selected. Anthropometric measurements (height and weight) were measured. The Body Mass Index (BMI)-for-age was used to derive overweight (BMI-for-age >+1SD) and obese (BMI for age >+2SD) adolescents. Fasting plasma glucose and Insulin were measured. Insulin resistance test was performed by using HOMA-IR calculator. The prevalence of overweight was 7.23% (n=120). The trend in prevalence of overweight was significantly increased with age (the Pearson's correlation, $p<0.05$). Of the total of 120 students, 45 (37%) have responded for further biochemical assessments. Among the 45 students, 19 (42.2% %) were males. The mean (±SD) fasting plasma glucose, fasting plasma insulin and insulin resistance were 77.45 (±11.84) mg/dL, 13.88 (±5.86) μIU/mL, 2.705 (±1.27) for males and 104.19 (±15.41) mg/dL, 16.89 (±9.43) μIU/mL, 2.98 (±1.75) for females respectively. Of the 45 students, 13.34% of the students were affected with impaired Insulin sensitivity and 42.22% had high insulin resistance. The mean fasting plasma glucose level was significantly lower in males (77.45 mg/dL) than in females (104.19 mg/dL) ($p<0.05$). Mean fasting plasma insulin level was contrastingly higher for females (16.89 μIU/mL) than the males (13.88 μIU/mL) ($p<0.05$). The mean insulin resistance was higher in females (2.9) than in males (2.7). In this study, the prevalence of overweight and obesity was high in adolescent students attending National schools, Jaffna. The overweight and obese adolescents showed higher insulin resistance and the females showed higher value than the males.

160

Keywords: Insulin resistance, Obese, Body Mass Index-for-Age, HOMA-IR, Plasma glucose

Communication between the Musculocutaneous Nerve and Median Nerve – A Case Report

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Musculocutaneous(MC) and Median (MN) nerves are branches from the brachial plexus. Communication between these two nerves was described from nineteenth century. Also classification of these communications has been reported by some authors. We observed a communication between MC and MN in a 50 year old Sri Lankan male cadaver during the Anatomy dissection.

We examined the course and type of communication between MC and MN. Both sides MC pierces the Coracobrachialis and divided into muscular branches and a communication branch. Later joined the Median nerve at the middle of the arm in left side and lower 1/3rd of the arm in right side

We observed the following things:

1. Presence or absence of MC
2. (when MC nerve is present) Whether Mc pierces the Coracobrachialis muscle
3. Presence of communications in between the MC and the median nerve or other variations
4. Relationship of the communications with the point of entry of the MC in to Coracobrachialis muscle

In our study, there was bilateral single communication between MC and MN, distal to Coracobrachialis muscle. Communication was directed lateral to medial (from MC higher level to lower level MN). Course of these nerves in forearm was normal. Different types of communication have been reported in many articles. Most frequent variation arises from MC nerve. Clinical practitioners should be aware of this communication.

Keywords: Brachial plexus, Musculocutaneous nerve, Coracobrachialis, Median nerve, Single Communication

Anomalous Origin of the Left Vertebral Artery - A Case Report

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The vertebral artery is the first branch of the ipsilateral subclavian artery. During its cervical course, the artery presents a prevertebral segment and enters the foramen transversarium of the sixth cervical vertebra. We present an anomaly found during routine dissection where the left vertebral artery originated from the arch of aorta in between the origins of left common carotid artery and the left subclavian artery in a 50 year old Sri Lankan male cadaver. In its cervical course the vertebral artery ascended anterior to the seventh to fifth cervical vertebra and entered the foramen transversarium of fourth cervical vertebra. The right vertebral artery was normal, originated from right subclavian artery. Anomalous origin of the left vertebral arteries is not very common; most types have been published in a few case reports. In large autopsy series, the reported prevalence of origin of the left vertebral artery directly from the aortic arch varies from 2.4 – 5.8 %. To the best of our knowledge this is the first report of anomalous origin of vertebral artery from aorta in a Sri Lankan. The arch of aorta has a composite origin; it develops from the aortic sac, left 4th aortic arch and part of the left dorsal aorta. In the present case the stem of the 7th cervical intersegmental artery also has been incorporated to form part of the arch of aorta, which ended in the origin of left vertebral artery from the aortic arch. Even though vertebral artery origin variants are mostly incidental findings, knowledge of these variations appears to be mandatory for planning aortic arch surgery and endovascular interventions and for conventional angiography.

Keywords: Anomalous origin of left vertebral artery, Arch of aorta, Foramen transversarium

Effect of Rotavirus Toxin NSP4 on the Intestinal Microvasculature of Infant Rats – An Electron Microscopic Study

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Diarrhoea due to rotavirus infection is one of the common causes of morbidity and mortality in young children. The intestinal microvascular endothelial cells are the common targets in many diarrhoeal diseases. The action of rotavirus toxin non structural glycoprotein 4 (NSP4) on endothelial cells has not been evaluated yet. The aim of this study is to identify the changes in intestinal microvasculature of infant rats developed diarrhoea when infected with rotavirus toxin NSP4 using electron microscopy. Twenty one, five-day-old Wistar rats were injected intraperitoneally with 150 μg of NSP4, SA11 Δ86 and fifteen were given sterile saline as control. Rats were observed for diarrhoea at different time points. Two rats were sacrificed at different time-points of post infection. Tissue samples were taken from proximal and distal small intestine, caecum and colon and processed for electron microscopy. Blood vessels of mucosa and sub-mucosa in each site were studied. Morphological changes of endothelium such as ruffling of luminal membrane, vacuolation of cytoplasm, swelling of endothelial cell, mitochondria and rough endoplasmic reticulum, rarefaction and disruption of cytoplasm were noted and photographs were taken in the electron-microscope. Diarrhoea began after 2 hours post infection and persisted till 24 hours. Sixty three percent of rats had diarrhoea at 24 hours post infection. Endothelial cell changes were more prominent in the arterioles of colon, capillaries of caecum and venules of proximal small intestine. The morphological changes of endothelium in the present study would further help in the understanding the pathogenesis of rotavirus infection.

Keywords: Rotavirus toxin NSP4, Electron microscopy, Endothelium, Infant rat

A Comparison of Two Different Instruments for Measuring Peak Expiratory Flow: Asma PLAN Peak Flow Meter Versus Micro Quark Electronic Spirometer

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Measurement of Peak Expiratory Flow (PEF) is widely used in diagnosis and management of asthma and in identifying the air flow limitation in epidemiological and occupational studies. Asma PLAN Peak Flow Meter (PFM) is easy to be used at home. Micro Quark Electronic Spirometer (MES) measures PEF along with other lung function tests in laboratory setting. This study was carried out to assess the agreement between PEF values obtained by these two methods. Ninety six non smoking healthy volunteers (65 males, 31 females) among the students at Jaffna medical faculty were included in this study. Written consent was obtained from each participant. Three readings were obtained from each subject for both methods and the highest value was taken for analysis. The differences between both methods were compared by paired T test. Agreement between both methods was checked by Bland Altman model. The mean PEF was 428.49±90.053, 414.63±119.51 l/min by PFM and MES respectively. The mean difference was 13.85±70.92 l/min (P=0.059). There was a strong positive correlation of 0.807 between both methods. Ninety five % confidence limit for the differences between both methods (d±1.96s) suggested unacceptable wide range of -125.16 l/min to152.85 l/min. Differences in the working principles of the instruments and slight difference in the instruction to the subjects and procedures, specified by the manufacturers may have contributed for the lack of agreement between both methods. Both methods cannot be used interchangeably at home and in clinics. Same instrument and same procedure must be used in continuous monitoring of PEF.

1240

Keywords: Peak Expiratory Flow, Lung function tests

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Nutritional Sequelae and Associated Factors in Children Who were the Low Birth Weight Infants in Jaffna District

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Low birth weight (LBW), <2500g, remains a significant public health problem and is associated with a range of both short and long term adverse consequences in children. The objective of this study was to determine the effect of LBW on nutritional status of children aged 1 to 5 years in Jaffna district. A Multistage cluster sampling method was used and a total of 846 children were selected. Child Health Development Records (CHDR) book was used to derive birth weight in grams. Birth weight (BW) was categorized into 5 groups as Extreme LBW (ELBW) (<1000g), Very LBW (VLBW) (<1500g), LBW (<2500g), Normal Birth Weight (NBW) (2500-4500g) and High Birth Weight (HBW) (>4500g). Interviewer administered questionnaire was used to derive the socio-economical status, data on Exclusive Breastfeeding (EBF) and disease pattern. Weight and height were used to derive the malnutrition based on age and sex specific WHO standards. Blood was used to derive the haemoglobin concentration. Data were analyzed in SPSS version 16.0. The association between LBW and its association were tested using the Pearson's Chi-squared test, and a measure of the strength. Among 846 children, 414 (48.9%) were males and the mean age was 34.73 months [95 % CI (33.84, 35.62)]. The mean birth weight was 2942.9g [95% CI (2476.2, 3414.6)]. Prevalence of LBW, VLBW, NBW and HBW were 14.3 (*n*121), 0.1 (*n*1) 85.5 (*n*723) and 0.1% (*n*1) respectively. Prevalence of LBW was significantly high in rural children [16%, (*n*103)] (OR=2.001; 95% CI= 1.18-3.39) than urban children [8.8%, (*n*18)] (P=0.018). Among the LBW group 49.6% (*n*60) of children were affected by anemia whereas, 34.2% (*n*247) were affected by anemia among NBW and it was significant (p=0.005). Prevalence of wasting (OR=5.04; 95% CI= 3.36-7.55), underweight (OR=4.51; 95% CI= 3.01-6.75) and stunting (OR=1.95; 95% CI= 1.3-2.9) were significantly high in LBW children [50.4 (*n*61), 63.6 (*n*77) and 38.0% (*n*46) respectively] than those were in NBW children [17 (*n*123), 28.2 (*n*204) and 24.3 (*n*176) respectively] (P<0.001). Sector, type of house, household income, EBF, disease and toilet facility were significant association with LBW (p<0.05). In the present study, LBW children had high prevalence of under nutrition and it was a contributing factor to nutritional risk. Poor socio-economic status influences the LBW children to remain below the children with normal birth weight throughout their early life. Good sanitary practices with proper breastfeeding practices may result in catch up growth to normal growth standards.

210

Keywords: Low birth weight, Socio-economical status, Wasting, Stunting, Underweight

Relationship between Anthropometric Indicators and Blood Pressure Levels among Adults in Jaffna District

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Cardiovascular diseases are becoming more common in Jaffna population. Hypertension is a risk factor for cardiovascular diseases. The evaluation of the relationship between blood pressure and anthropometric measurements is important to evaluate the health among adults. The aims of this study were to determine the relationship between anthropometric measures and blood pressure and to identify the risk factor of blood pressure based on the gender, age, religion, and sector. This was a community based cross sectional descriptive study among adults (above 18 years). A multi stage stratified cluster sampling was used to obtain a sample that represents the adult population of the district of Jaffna by geographical area. Anthropometric measurements and Blood Pressure (BP) were measured based on standard methods. Ethical clearance was obtained from the Ethical Review Committee, Faculty of Medicine, University of Jaffna. Written consent was obtained from each participant. Age was considered as a group categorical variable and those categories were 18-34, 35-49, 50-64 and ≥65 years. The subjects were classified according to WHO classification of Body Mass Index (BMI) for Asians (2006). Central adiposity was determined as Waist Circumference (WC) ≥ 90 cm for men and ≥ 80 cm for women, and Waist-Hip Ratio (WHR) of ≥ 0.90 in men and ≥ 0.85 in women (WHO, 2002). Raised BP was considered according to International Diabetic Federation criteria (2006). Data entry and statistical analysis were done using the SPSS Version 16 statistical package. The probability level was set as $P< 0.05$. Subjects who are under weight (odds= 0.146, 95% CI: 0.056; 0.383), normal weight (odds= 0.243, 95% CI: 0.106; 0.558) and overweight (odds= 0.36, 95% CI: 0.151; 0.859) had less risk of developing hypertension comparing with the obese subjects. Subjects who do not have central adiposity were less likely to develop hypertension compare to the subjects who have central adiposity (odds= 0.458, 95% CI: 0.303; 0.693). Subjects who have normal WHR were less risk of getting hypertension compare to the subjects who have higher WHR (odds= 0.642, 95% CI: 0.447; 0.922). People living in the rural area had 0.84 times less likely to develop hypertension compare with people living in the urban sector (95%CI: 0.525; 1.345). But the association was not significant at 95% confidence interval level. Males were 1.824 times likely to develop hypertension than that of the females (95% CI: 1.189; 2.797). Subjects who are in categories of 18-34 years (odds= 0.067, 95% CI: 0.029; 0.154) and 35-49 years (odds= 0.225, 95% CI: 112; 0.450) were less likely to develop hypertension than that of the age category of ≥65 years. People who follow Hinduism had 0.019 times less likely to develop hypertension compare with people who follow Christian/ Roman Catholic (95%CI: 0.309; 0.9). Obese subjects have risk of developing hypertension. Subjects having central adiposity and high WHR have high risk of developing hypertension. Males are more likely to develop hypertension than that of the females. Aged subjects have a risk for developing hypertension. People who follow Hinduism are less likely to develop hypertension compare to people who follow Christian/ Roman Catholic.

Keywords: Body Mass Index, Waist-Hip Ratio, Central adiposity, Systolic blood pressure, Diastolic blood pressure

To Determine the Incidence of Congenital Hypothyroidism in Jaffna MOH Area

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The aim of the study is to determine the incidence of congenital hypothyroidism (CH), newborns born in Teaching Hospital and other private hospitals in Jaffna Medical Officer of Health (MOH). The study was undertaken in Jaffna MOH division. A systematic sampling technique was used to identify a sample that represents the population of newborns delivered in Jaffna MOH in 2012. Ethical clearance was obtained from ethical review committee, Faculty of Medicine, University of Jaffna, Jaffna, Sri Lanka. Written consents of the mothers of newborns were obtained to participate in this CH screening program. A total of 200 infants were screened during the study period (from 1st of June to December 31st 2012) in which 109 were females and 91 were males. Before mothers were discharged from the hospital, blood spots were taken from newborns by heel-prick and collected on a special filter paper (Schleicher and Schuell No 903). Air dried blood spots were stored and processed for thyroid stimulating hormone (TSH) measurement by radioimmunoassay. Neonates with blood spot TSH concentration of 20 mU/L or above in the whole blood after 72 hours of birth considered at risk for CH and were recalled for serum confirmation. The cut-off value for TSH in the blood spots collected prior to 72 hours of life was at 40 mU/L. Mean blood spot TSH value was 15.70 mU/L (95% CI; 11.55-19.85). Only one true positive case of hypothyroidism (very high TSH value- 360.9 mU/L) was identified among them. Newborn was recalled for serum TSH estimation and confirmed to have CH and referred to paediatrician for management of CH. Based on this study, the incidence of true CH was 1:200.

Keywords: Newborn, Congenital hypothyroidism, Abnormal, Neonatal, Radioimmunoassay, Thyroid stimulating hormone

தமிழ்க் கவிதைகளில் ஈழத்தமிழ் அடையாளப் புனைவு ஒரு மீள்வாசிப்பு

(1980களுக்குப் பிற்பட்ட ஈழத்துத்தமிழ்க் கவிதைகளை அடிப்படையாகக் கொண்ட ஆய்வு)

க. அருந்தாகரன்

தமிழ்த்துறை, கலைப்பீடம், யாழ்ப்பாணப் பல்கலைக்கழகம், இலங்கை.

தமிழ் இலக்கியம் பற்றிய ஆய்வில் ஈழத்தமிழ் அடையாளம் ஈழத்தமிழ் இலக்கியம் என்பது மிகவும் முக்கியமான கருத்தாடல் வெளியாகவுள்ளது. ஆனால் இந்த விடயம் குறித்து முழுச் சாத்தியப்பாடுடைய ஆய்வுகள் எதுவும் மேற்கொள்ளப் படவில்லை. இதனால் இது குறித்து ஒற்றைப்படையான வாசிப்பு முறையும் கருத்து நிலைப்பாடுகளுமே பிரதானப்பட்டு வந்துள்ளன. உடனிகழ்காலத்தில் இலக்கியம் பற்றிய ஆய்வுகள், கருத்தாடல்கள், பெரும்பாலும் அடையாளம் பற்றியதாகவே நிகழ்ந்து வருகின்றன. இலக்கியத்தில் அடையாளம் என்பது ஒரு நிலைப்படுத்துகை (Positioning)யாகவும் கால, இட வரையறைக்குள் தொடர்ந்து மாறிக்கொண்டும் இயங்கிக்கொண்டும் இருக்கும் ஒன்றாகவும் விளக்கப்படுகின்றது. இதனை இலக்கியம் சார்ந்த காரணிகளும், இலக்கியம் சாராத காரணிகளும் தீர்மானிக்கின்றன. நிறுவனங்கள், போசிப்பு, சமூகபண்பாட்டுச்சூழல், விநியோகம், விமர்சனத் தொழிற்பாடுகள் மற்றும் கருத்தாடல்கள் முதலியன முக்கியமானவை. ஈழத்துத்தமிழ் இலக்கியத்தில் ஈழத்தமிழ் அடையாளம் பற்றிய சிந்தனைக்கான அடிப்படையினைத் தேசிய இலக்கியம் மற்றும் அது தொடர்பான கருத்தாடல்களில் காணமுடிகிறது. எனினும் 1980களுக்குப் பின்னரே அது ஒரு பிரக்ஞைபூர்வமான சிந்தனையாக, அனுபவமாகப் படைப்புக்களில் பதிவாகத் தொடங்குகின்றது. ஆனால், யதார்த்தத்தில் ஈழத்துத்தமிழ் இலக்கியத்தில் அடையாளப் படுத்துகை என்பது விமர்சகர்களினதும் ஆய்வாளர்களினதும் இடையீட்டால் கட்டப்பட்ட ஒன்றாகவும் கருத்துநிலைச் சார்புடையதாகவும் புனையப்பட்டுள்ளது. இதனை இன்னொரு வகையில் கூறுவதானால் அது ஒரு தேசியவாதக் கருத்தாக்கமாகவே கட்டப்பட்டுள்ளதை அவதானிக்க முடிகிறது. ஆகவே இத்தகைய ஒற்றைப்படையான வாசிப்பிலிருந்து விடுபட்டு, அடையாளப்படுத்துகை என்பதை தேசியவாத சட்டகத்துக்கப்பால், அனுபவ நிலைப்பட்ட யதார்த்தமாக மீள்வாசிப்புச் செய்யவேண்டியது மிகவும் முக்கியமான ஒரு புலமைப் பணியாகவுள்ளது.

1980களுக்குப் பிற்பட்ட ஈழத்துத்தமிழ்க் கவிதைப் பிரதிகளை மீள்வாசிப்புக்கு உட்படுத்துவதனூடாகவும் இக்கவிதைப்பிரதிகள் தொடர்பான விமர்சனங்களைக் கட்டவிழ்ப்பதனூடாகவும் அடையாளம் பற்றிய மேற்படி கருத்தாக்கங்களைக் கேள்விக்குள்ளாக்குதல். அதாவது, அடையாளம் என்பது புவியியல் சார்ந்ததா, மொழி வழக்குச் சார்ந்ததா, கருத்துநிலை சார்ந்ததா, போரிலக்கியம் சார்ந்ததா, ஈழத்தமிழர் வாழ்க்கையின் பிரச்சினை மற்றும் சிக்கற்பாடு சார்ந்ததா என்பதை விளங்கிக்கொள்ளுதல். இதன் பின்னால் தொழிற்பட்ட அரசியல் மற்றும் கருத்து நிலைச்சார்புகள் எவை, பிரதானப்பட்டு நிற்கின்ற அழகியல் சட்டகங்கள், கொள்கைகள், வரையறைகள் எவை என்பது குறித்தும் பல்பரிமாண நோக்கில் மீள்வாசிப்பதுமே இவ்வாய்வின் பிரதான நோக்கமாகும்.

இலக்கியம் பற்றிய ஆய்வென்பது அடிப்படையில் அடையாளம் பற்றியதாக மாறிவந்திருக்கிறது. இலக்கியத்தில் அடையாளம் என்பது ஒரு, 'நிலைப்படுத்துகை' ஆக விளங்கிக் கொள்ள முடிகிறது. இது கால, இட வரையறைக்குள் தொடர்ந்து இயங்கிக் கொண்டும் மாறிக்கொண்டும் இருக்கின்ற ஒன்று என்பது உணரப்படுவதோடு இதனை இலக்கியம் சார்ந்த காரணிகளும், இலக்கியம் சாராத காரணிகளும் தீர்மானிக்கின்றன என்பதையும் அவதானிக்க முடிகின்றது. ஈழத்தைப் பொறத்தவரை தேசிய இலக்கியம் தொடர்பான கருத்தாடல்களில் வேர்விடத் தொடங்கும் அரடயாளம் பற்றிய சிந்தனையானது 1980 களுக்குப்பின் முனைப்புப் பெற்று பல்பரிமாண வெளியில் இயங்கத் தொடங்குகிறது. ஆனால் அடையாளம் என்பது பன்மைப்பாடான ஒன்று என்பது மறுதலிக்கப்பட்டு ஒற்றைப்படையானதாக வாசிக்கப்பட்டும் கருத்தாடப்பட்டும் வந்துள்ளதென்பதையும் அவதானிக்க முடிகின்றது. ஈழத்துத் தமிழ்க் கவிதைகளை முன்னிறுத்தி அவற்றை ஆழ்நிலை வாசிப்புக்குட்படுத்தும் போது, போரைப் பிரதானமானப் படுத்திப் பேசும் அதே வேளை பிற உள்ளடக்கங்களும் - பிற அடையாளங்களும் பதிகை செய்யப்படுகின்றன. அரச அதிகாரத்தைக் கேள்விக்குள்ளாக்கும் அதேவேளை பிற அதிகாரங்களும் கேள்விக்குள்ளாக்கப்பட்டுள்ளன. மேலாதிக்கக் கருத்தியலுக்கு மாற்றாக மாற்றுக் கருத்தியல்களும் இருப்புச் செய்யப்படுகின்றன. பால், சாதி, பிரதேசம், புலம் என்பன ஒன்றுபட்டுள்ளது. ஊடாடிக் கொண்டும் தொடர்ந்து மாறிக்கொண்டும் மற்றொன்றை வரையறுத்துக்கொண்டு உள்ளது என்பதும் இனங்காணப்பட்டுள்ளது. இவை யாவற்றையும் ஒன்றிணைத்து நோக்குகின்றபோது அடையாளம் என்பது ஒரு கட்டமைப்பு. விமர்சகர்களினதும் ஆய்வாளர்களினதும் மற்றும் படைப்பாளிகளினதும் இடையீட்டால் கட்டப்பட்ட ஒன்றாகவும் சுய தேவைக்கேற்ப மாற்றியமைக்கக்கூடிய, கட்டி எழுப்பக்கூடிய ஒன்றாகவும் உள்ளது. உண்மையில் அடையாளம் பற்றிய பிரச்சினை படைப்பினதோ, படைப்பாளிகளினதோ பிரச்சினையாக அல்லாமல் விமர்சகர்களினதும், ஆய்வாளர்களினதும் பிரச்சினையாகவேயுள்ளது. படைப்பாளி மற்றும் படைப்பினது கருத்து நிலைப்பாடு குறித்துப் பார்க்கும் அதேவேளை, அவை பற்றிய வாசிப்புகளுக்குப் பின்னணியிலுள்ள அரசியல் மற்றும் கருத்து நிலைப்பாடு குறித்து கருத்தில் கொள்ளப்படவில்லை என்பதையும் அவதானிக்க முடிகிறது.

320

Is Sri Lankan English Really "A Language Without Metaphor"?: Considering the Question of Language in Sri Lankan Poetry

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In the arena of Sri Lankan poetry in English there has been a remark made by Godfrey Goonetilleke in 1954 which has significant impact on the history of Sri Lankan literary criticism. His remark was that the English language used by Sri Lankans in poetry is an inadequate and impoverished medium which is only used to refer things and does not function to express feelings and emotions. In short, according to Goonetilleke Sri Lankan English is a language that lacks metaphor. The debate goes on among the scholars regarding the kind of language that is to be used for the creative expression whether it is the 'standard' varieties of English or the native varieties of English. In this paper, the researcher intends to bring forth how the contemporary Sri Lankan poets differ among themselves regarding the kind of language used in poetry. There are different strategies in which the poets try to negotiate the native and Standard English discourses. Some of them preach the fusion of native and standard varieties and constructing an alternative effective discourse which goes far enough to satisfy the native aspirations and at the same time aims to gain a wide international readership. This paper also weighs down the different views put by the scholars and critics regarding the kind of language used in poetry. The researcher intends to find out the possibility of evolving a new idiom to express authentic Sri Lankan experiences and accommodating Sri Lankan imagery in English.

Keywords: Discourse, Native variety, Standard English, Aspirations, Medium

இடைநிலை வகுப்புக்களில் தமிழ்மொழி கற்றல் கற்பித்தலில் உருபனியல் சிக்கல்களும் தீர்வுகளும்
- தீவக வலயத்தை அடிப்படையாகக் கொண்ட ஓர் ஆய்வு

சி. சிவமூர்த்தி
மொழியியல்துறை, கலைப்பீடம், யாழ்ப்பாணப் பல்கலைக்கழகம், இலங்கை.

இவ்வாய்வுக்கட்டுரையானது தீவக வலயத்தில் தேர்ந்தெடுக்கப்பட்ட பாடசாலைகளில் இடைநிலை வகுப்புக்களில் தமிழ்மொழி கற்றல் கற்பித்தலின் போது அவதானிக்கப்பட்ட உருபனியல் சிக்கல்களையும் அவற்றிற்குரிய காரணங்களையும் கண்டறிவதோடு தீர்வுகளை முன்வைப்பதாகவும் அமைகின்றது. மொழி கற்றல் கற்பித்தல் துறையில் ஆசிரியர்களின் பங்கு அதிகம் செல்வாக்குச் செலுத்துகின்றது. தமிழ்மொழி கற்பித்தலில் குறிப்பாக இலக்கணப் பரப்பில் ஆசிரியர்களின் பூரணமான விளக்கம். மாணவர்கள் அதிகம் பிழைகளை ஏற்படுத்துவதை தவிர்க்கின்றதுடன் சரியான மொழி அறிவையும்பெற வழிவகுக்கின்றது. இவ் ஆய்வானது விளக்கமுறை ஆய்வுமுறையியல் (Descriptive Research Methodology), பிரயோக ஆய்வு முறையியல் (Applied Research Methodology) என்ற ஆய்வு முறைகளைப் பயன்படுத்தி மேற்கொள்ளப்பட்டதுடன் ஆய்வுக்கான தரவுகள் பங்குபற்றும் அவதானம், (Participant Observation) மாணவர்கள் ஆசிரியர்களுடனான கலந்துரையாடல் போன்றவற்றின் மூலம் பெறப்பட்டன. மாணவர்களிடம் இனம் காணப்பட்ட உருபனியல் சிக்கல்களுக்கு மாணவர்கள் மட்டுமல்ல ஆசிரியர்களின் வகிபங்கு, கற்றல் சூழலில் பாதிப்புக்கள், பொருளாதார நிலை, போன்ற காரணிகளும் தாக்கம் செலுத்துகின்றன. ஆய்வுக்குரிய காலம் ஆறுமாதங்களை அடிப்படையாகக் கொண்டுள்ளது.

100

வழிகாட்டும் சொற்கள்: மொழிகற்றல் கற்பித்தல், உருபனியல், மொழி அறிவு, வேற்றுமை உருபு, எண் பயன்பாடு.

Demographic Factors and Their Influence on Micro Credit and Empowerment of Vulnerable People – A Special Reference to Jaffna

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Sri Lanka has been suffered from a conflict over last three decades. Economic, civil, political, social and cultural devastations are the results of that conflict situation. The access to financial services of Microfinance Institutions facilitates the poor people to boost their household income, make assets, and cut their vulnerability. This study presents regarding personal demographic factors influence on microcredit and empowerment of vulnerable people in Jaffna. Quantitative method has been used for gathering information and purposeful sampling method has been used to collect data. The survey instrument in the form of close-ended questionnaire was developed for the purpose of collecting the main data for the study. Independent sample one-way Anova (f-test) and independent sample t-test (t-test) were used to identify the significant mean different between the level of micro credit and empowerment of vulnerable people across the personal demographic factors. The results revealed that the demographic factors of sex, age, education, job, experience influence on micro credit and empowerment of vulnerable people. Based on the findings, it has been concluded that there is no significant mean difference between the levels of microcredit and empowerment across the education level, job category and years of experience.

Keywords: Demographic factors, Micro credit, Empowerment, Vulnerable people

Sex, Violence and Gender Issues Presented in Literature with Reference to Hardy's '*Tess of the D'Urbervilles*' and Hawthorne's '*The Scarlet Letter*'- A Comparative Study

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This project focuses on how women have been marginalized in patriarchal societies. Nathanial Hawthorn and Thomas Hardy present the sufferings of women due to the oppressive nature of the patriarchal society in '*The Scarlet Letter*' and '*Tess of the D'Urbervilles*'. Both novels trace the women's sufferings caused by men's sexual violence and these sufferings lead them to take revenge. I thus attempt to compare these novels on the basis of sex, gender and violence while sexual violence occurs throughout the world even today. The main objective of this research is to examine how sex, violence and gender issues are presented and how female oppression is constructed and is justified in these two novels. I have planned to use analytical and comparative methods. Data collected from books, journals, articles, interviews and related documents are used for this research. This research will help those who are interested in the field of comparative literature and to develop the ability in this field. This kind of research work will contribute to the better understanding of how women are suppressed and oppressed in the patriarchal society.

Keywords: Patriarchal society, Adulteress, Marginalized, Morality, Punishment, Gender issues, Violence

Employees' Stress and Its Impact on Their Performance in District Secretariat – Jaffna

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The level of stress is an important factor that may have impact on the employees' behavior. Undesirable level of stress affects overall performance of the organization. In order to getting the work done effectively, organization or manager should properly manage the level of stress. In this research, the main problem is that whether employees' stress affects their work performance. In order to analyze this problem, data was collected from the employees of District Secretarial Jaffna by questionnaire, records and observation. The gathered data was analyzed based on the statistical tools such as correlation analysis, regression analysis and percentage analysis. In this research, three factors were viewed that determine the stress level of employees such as, job related factors, organizational factors and individual factors. According to the analyzed data, it was proved that there is negative relationship between employees' stress and their performance. That is when employees' stress level increase their work performance will decrease and vice- versa. Hypotheses were tested by correlation, regression and percentage analysis. According to the testing of hypotheses, Both H1 and H2 have been accepted. This research clearly shows that, stress level of employees should be managed cleverly at an optimum level. The optimum level of stress will lead to high level of performance.

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Please read the names of authors of the abstract (A15) titled '**Comparison of Two Methods for Determining Lipid Content of *Scomberoides commersonianus* from the Jaffna Lagoon**' in the order given below. This correction has been done on the request of all the authors of the abstract.

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