



BOOK OF ABSTRACTS

15-16 JANUARY 2021|ONLINE

INTERNATIONAL CONFERENCE ON
**AGRICULTURE,
FOOD SECURITY
AND SAFETY**

COVID-19: IMPACT AND CHALLENGES FOR GLOBAL AND NATIONAL
LEVEL FOOD SECURITY, NUTRITION AND HEALTH

Book of Abstracts

The 2nd International Conference on Agriculture, Food Security & Safety

(AgroFood 2021)

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MESSAGE FROM THE CONFERENCE CO-CHAIR AgroFood 2021



Dr. ASNA UROOJ
Professor & Chairperson
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Message

It gives me immense pleasure and pride to compose the foreword for the 2nd International e-conference on 'Agriculture Food security and safety ' Agro Food 2021 organized by iConferences, Colombo, Srilanka on 16 January 2021.

I am extremely happy and proud to be associated with the conference organizers as Co-chair of the event for the second time. The Department of Studies in Food Science and Nutrition, University of Mysore, Mysore, India is an academic partner for the event.

There is a need for academia and scientists from various disciplines like Agriculture, Nutrition, Public Health, Economics and Medicine to deliberate on the issues impacting the Nutrition and Health status of the community as a consequence of the pandemic COVID-19.

The theme of the conference is appropriately chosen "Impact and Challenges for Global and National level Food Security, Nutrition and Health" to discuss strategies to address issues related to the pandemic. This e-conference showcases the enthusiasm of the event organizers to connect the scientific fraternity despite the prevailing challenges.

Despite online mode, there has been a good response for participation in the event. Aspiring researchers from various countries are presenting their research work in three sessions - Food security issues, Agricultural practices and Food Science & Produce.

I extend a hearty welcome to all the participants and wish fruitful deliberations.

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VIRTUAL ORAL PRESENTATIONS SESSION (A)

FOOD SECURITY

A1

[01]

PREVALENCE OF OCCUPATIONAL HEALTH HAZARDS AMONG WOMEN IN AGRICULTURE-A STUDY IN BARGARH DISTRICT OF ODISHA

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Background: Agriculture is the basic strength of the Indian economy and the maximum population in India depends on their livelihood on agriculture only. The woman is the backbone of the agricultural workforce but worldwide her hard work is mostly been unpaid. As farm women involve both in household and farm activities, they are more prone to different illness. It poses many health hazards to workers such as physical, mechanical, chemical, ergonomic hazards etc. **Objectives:** The objective of the study was to find out the prevalence of common occupational health hazards among women in agricultural and their effects on their health. **Method:** The present study was conducted in three villages of Bhatli Block in Bargarh District of Odisha during 2018-2019. 110 agricultural workers were selected randomly as respondents and information was collected with the help of interview schedule. **Results:** The results of the study revealed that physical hazards such as body pain (86.36%) and fatigue (83.63%) were most common among respondents for all the agricultural activities. 77.24% respondents were suffering from different mechanical hazards i.e. injury occur due to farm tools and machinery. Chemical hazards like skin problems affected 39.09% workers and environmental hazards such as air-borne allergies (32.72%) and poisonous organism (21.81%) bites were found to be common among the respondents. A strong statistical association between their socio-economic levels in the relevance to prevalence of occupational health hazard among women in agriculture was found in this study. **Conclusion:** As women in agriculture play a significant role in tuning the economy of society at grass root level, focused attention should be given to preserve their health. They should be supplied with modern machinery to reduce their fatigue during work and educated to protect their health.

Keywords: Women, agriculture, occupational health hazards, physical hazards, mechanical hazards, chemical hazards

A2

[02]

IMPACT OF TRAFFIC LIGHT FOOD LABELING ON CONSUMER AWARENESS OF HEALTH AND HEALTHY CHOICES OF THE POINT - OF - PURCHASE

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Background: Sri Lanka introduced colour coding for sugar, salt & fat regulations which was enforced from 1st of June 2019. It is the latest food labelling regulation in Sri Lanka. Over the years of consumer studies, even though, few studies have studied on the impact of food labels on consumer purchase decisions, there are not enough evidence on traffic light food labelling system and its impact on health and healthy choices of the point of purchase. Hence, this research study on the impact of colour coding regulation on consumer's buying decision with special reference to Western Province, Sri Lanka. **Purpose:** The purpose of this research was to study the influence of colour code label system on consumer's buying decisions and analyze the consumer's knowledge on traffic light food labelling system. **Methodology:** A purposely developed online questionnaire was administered to 200 randomly selected samples in Western Province in Sri Lanka. The questionnaire had three separate parts. The first part of the questionnaire sought information on the socio-demographic profile of the respondent. The second part had few questions on basic knowledge and behavioral aspect of traffic light food labelling system. The third part of the questionnaire was questioned about further improvements in the traffic light food label from the consumers' perspective. IBM SPSS version 21 software was used for analyzing collected data with frequency analysis and logistic regression. **Results:** Results revealed that most of the consumers refer to the price label instead of other labels. Also, they are not giving special attention to traffic light food labels in the point of purchase. Among the consumers who considered traffic light food labelling system at the point of purchase, majority of the respondents had a clear idea about different colour codes and they would like to consume food products with low level of sugar and salt. Further, a fair number of respondents suggested to enlarge the size of the existing colour codes of the traffic light food labelling system. **Conclusion:** Based on the results obtained, it can be observed that still Sri Lankan consumers are not significantly consider traffic light food labels at the point of purchase and they are limited to seek the price tag at the point of purchase. Further, findings of this study will act as a guide for food regulators when assessing the outcome of new food labelling regulation of Sri Lanka.

Keywords: Consumer purchasing decision, Colour coding labels, Customer behaviours, Ready-to-eat foods, Sri Lanka, Traffic Light food labels

A3

[03]

COPING STRATEGIES ADOPTED BY URBAN SLUM DWELLERS TO MITIGATE FOOD INSECURITY: A CASE STUDY IN COLOMBO MUNICIPALITY, SRI LANKA

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Background: Due to poverty, many urban poor families in these slums struggle to meet their daily dietary needs and live with very minimum amenities. **Aims/Objectives:** As food security is a bigger priority of any nation, it is very critical to identify the vulnerable people to uplift their food security status. Since the urban poor slum dwellers still is a neglected community with a considerable food insecurity status, this case study was to identify the coping strategies adopted by urban slum dwellers in Colombo municipality against their food insecurity. **Method:** A total of 90 households from 9 slums were purposely selected for the survey from Colombo North and Central 2A administrative districts. A structured interview schedule was used to collect data on coping strategies along with group discussions and analyzed through descriptive statistics. **Results:** Relying on less expensive food (93%), food on credit from grocery shops (94%), and buying street foods (52%) are most frequently practicing financial coping strategies by slum dwellers. Early marriage of children (98%), drop out of children from school (78%), women go to work (77%), and borrowing food from neighbors (74%) are reported as minimally practiced social coping strategies against food insecurity. Due to inadequate income of the slum households, the majority are practicing dietary strategies as reducing food portion size (90%), utilization of poor-quality food (85%), and limiting the number of meals per day (60%) to mitigate to food insecurity. **Conclusions and Recommendations:** It is revealed that most of the slum dwellers (61%) collectively adopt several coping strategies to increase the short-term availability of food. The findings of the study recommend required actions as the provision of food subsidy for families with low income, improve the income generation methods through women empowerment, etc., and conducting public campaigns to promote low or no space agricultural activities to cope up with food insecurity.

Keywords: Food insecurity, coping strategies, urban slum dwellers, Colombo

A4

[04]

FOOD INSECURITIES: THE IMPACT OF UN SANCTIONS ON IRAQ'S FOOD SYSTEM*Teeba M.A**

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While the recent uprisings and conflicts in the Arab region have caused quite the stir in the academic field and occupied many scholars, this paper will revisit a decade of Iraq under the UN sanctions. The consequences of near-total financial and trade embargo may have caused long-lasting effects. One of which could be the impact on Iraq's food system. In order to examine that, I first take a brief look at different sanction regimes and what causes the Iraqi case to be different and make it the perfect case to study. Compare the agricultural production and trade during the 1960s to the late 1980s in Iraq to the above-mentioned decade and identify the pattern changes in the food system. This is an attempt in assessing the role of external political forces on Iraq's food system and macroeconomics, by revisiting a period with scarce and limited research about the impact of economic sanctions to causing food insecurities. Since Iraq's prospect nowadays lacks the probability to recover, the complicity of UN sanctions and military aggression in causing food shortages and insecurities requires serious contemplation of the foggy area it has created, for future reference, and it will also encourage future examination of the issue, through laying the foundation for further research.

Keywords: Iraq, food shortages, food production, food system, agriculture, UN sanctions, food insecurities, trade

**ACHIEVING FOOD SECURITY THROUGH BETTER RESOURCES
ALLOCATION IN IRRIGATED AREAS***Singh A**

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Good quality soil and water resources are limited and they are becoming degraded. Agricultural production needs to be increased by using such degraded resources for providing food and fiber for the growing global population, which requires about 60% more food by 2050. This goal can be achieved by either expanding agriculture in new areas or increasing production per unit area of available land and water resources. Expanding agriculture in new areas is difficult, however, as a result of urbanization and a reluctance to disturb natural environments. Therefore, it is imperative to optimize the good quality available water and land resources to achieve maximum agricultural outputs. In the present study, a linear programming model was developed for the optimal land and water resources allocation in order to maximize net annual returns from a command area located in northern India. A groundwater balance constraint was imposed on the model, which mitigate the waterlogging problems, while making optimal allocation of land and water resources. The model results show a reduction in rice and mustard areas against an increase in cotton, sugarcane and wheat under optimal conditions. Under the optimal land and water allocation the groundwater use is increased, which in turn mitigated the waterlogging and salinity problems of the command area. The net annual return from the command area has increased by more than 16% under optimal allocations. State agencies and farmers involved in the actual agricultural production process are advised to practice conjunctive use of canal water and groundwater to maximize their farm income. This strategy could also mitigate further rise in the water table in the command area without installing expensive drainage systems, which is also not feasible because the groundwater quality is poor and drainage water may pose a serious disposal problem.

Keywords: Food security, soil and water conservation, optimal cropping, conjunctive use, water scarcity, waterlogging and salinity

A6

[06]

**CLIMATE AND SOCIOECONOMIC DRIVERS OF FARMING SYSTEM CHOICE
IN DEVELOPING COUNTRIES: A FRAMEWORK TO ASSESS POLICY OPTIONS
FOR FOOD SECURITY**

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Developing countries are among the most vulnerable to climate change, with devastating expected impacts on food security. Governments have been criticized for the ineffectiveness of their policies to address this issue. Increasing knowledge on factors affecting farmers' choices enhances policies tackling the challenges posed to farmers. In this sense, this paper aims to develop a framework, based on a farming system approach, that allows modelling the (biophysical and socioeconomic) drivers of farming system choice and its potential for estimating the effects of policy and climate scenarios at the region/country level, contributing to food security. The framework is applied to Mozambique, using the random forest model – considered an effective and accurate tool in prediction. Results indicate that both biophysical and socioeconomic drivers play an important role in explaining farming system choice. Climate variables (rainfall, temperature, and aridity) are emphasized, as they are expected to change in time due to climate change, diverting farmers' decisions in the choice of farming systems, with potential impacts on food security. Based on the proposed framework, better knowledge on the effects of socioeconomic drivers can be used to inform policy options aimed at adaptation to climate change and reducing its negative impact on food security among small farmers in developing countries. A significant advantage of the proposed approach, is that it can be easily replicated in other parts of the world, including developing countries, as it relies mostly on agricultural census data (an available and cost-effective source of information) and on worldwide climate data publicly available.

Keywords: Biophysical and socioeconomic drivers, farming system choice, climate change, food security, developing countries

A7

[07]

FOOD SECURITY AND CLIMATE CHANGE IN MALAYSIA*Akhtar R**

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To mitigate the negative effects of climate change and food security, it is essential to enhance farmers' adaptive capacity level and adaptation practices for sustainable agricultural management. Climate change can alter the availability of food, reduce access to food and affect the quality of food. Presently, the level of rice self-sufficiency (SSL) in Malaysia is 71%. By 2022, SSL is expected to grow to 80%. However, there is a lack of empirical evidence of how barriers constrain food security and adaptive capacity level. This study identifies various adaptation barriers and their negative influence on farmers' adaptive capacity and food security. To achieve the research objectives, a survey questionnaire was used to collect the data, and Structural Equation Modelling (SEM) was employed for analysis. The study revealed that economic, social, natural, technological and institutional barriers play vital roles in weakening farmers' adaptive capacity level and food security. The study also finds that farmers' adaptive capacity has a positive and significant impact on adaptation behaviour and food security with a mediating effect between explanatory variables and adaptation practices. The findings contribute to developing a national adaptation plan which has yet to be developed. It could facilitate the implementation of the 2011-2020 National Agri-Food Policy (NAP) to increase the competitiveness and production capacity of the entire agri-food industry value chain and ensure food security in Malaysia. This study will provide policymakers with new insights to surmount adaptation barriers and establish appropriate adaptation policies for sustainable agricultural management.

Keywords: Food security, adaptation practices, adaptive capacity, barriers, sustainable agriculture management

VIRTUAL ORAL PRESENTATIONS SESSION (B)

AGRICULTURAL PRACTICES

B1

[08]

**EFFECT OF DIFFERENT FERTILIZER MANAGEMENT ON WATER QUALITY
IN THE PADDY FIELD**

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Agricultural intensification is one of the major causes of water pollution. In recent decades, agriculture water quality degradation became more severe, emphasizing the importance of improving and implementing sustainable agriculture practices. Precision agriculture of variable rate fertilizer application technology is seen as a strategy to reduce environmental pollution caused by the excessive fertilizer usage. Fertilizer input rate is altered within field in response to factors affecting the optimal application rate. The objective of this study was to investigate the effect of uniform rate and variable-rate (N) fertilizer management on surface water quality. Various physical and chemical water quality parameters at the water inlet, paddy field, irrigation canal and drainage canals were also examined to evaluate seasonal water quality trend. Water sampling was carried out twelve times between September 2018 and July 2019, involving two cultivation seasons within 60 hectares of paddy field in Blok L3A FELCRA Seberang Perak, Malaysia. During the monitoring period, results indicated that variable rate N application resulted in lower Nitrate and Ammonia concentrations in both seasons. All water quality falls within class II-IV Malaysian National Water Quality Standards (NWQS) with the exception of Phosphate, Al and Fe. In season one, 64% of Phosphate, 46% of Al and 18% of Fe concentrations were found to exceed NWQS Class IV, however the percentages were lower compared to season two. Furthermore, in the two planting seasons, temperature, DO, BOD, COD, pH, Cu, Fe, K and Mn were significantly different.

Keywords: Surface runoff, precision farming, nutrient management

B2**[09]****AGRICULTURAL SUSTAINABILITY THROUGH AGRITOURISM IN OMAN AND POTENTIALS FOR ADOPTION***Al Hinai A¹*, Jayasuriya H¹*

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Most Mideast countries are geographically located in arid or semi-arid climatic conditions and achieving agricultural sustainability is a challenging task. With the changing geopolitical undercurrents, these countries are facing fluctuating economies as the oil price has become fragile and unstable. Most Mideast countries are now looking for other potential revenue generation options such as investments in business oriented developmental activities. Oman's economy is based on crude oil sales, the contribution from agriculture is comparatively insignificant, but owns explicit and diversified arid cropping systems unique to the country, these agricultural production activities are done with unique cultural practices and would be attractive to tourists. Oman possesses world-heritage nature tourism sites spread around the country. The tourism industry will be considered a potential economy boosting option aligned with Oman Vision 2040 strategy. Although the agritourism has not yet been expertly practiced in Oman, the aim of this paper is to study the world scenarios in agritourism, and to investigate the potentials for the adoption of this new venture in Oman. Efforts were made to recognize potential sites in Oman, products and activities, and predict potential revenue generation as a projection from that of the tourism sector. The study recognized auxiliary advantages of agritourism; such as technology transfer and capacity building, empowerment of women and youth, enhancement in value-addition industry and production export quality products. It was recommended that efforts should be made to make sound collaboration among academic institutions, relevant ministries and other public and private sector stakeholders.

Keywords: Agritourism, sustainability, potentials, cultural practices, value addition

B3

[10]

**PROSPECTS OF TRANSGENIC CROP DEVELOPMENT TO MEET THE FUTURE
FOOD DEMAND OF BANGLADESH**

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Bangladesh is an overcrowded country bearing a population density of more than 1200/km²; and it ranks 8th in the world. To feed the continuously increasing mouths there's a big challenge ahead in the agricultural sector. Therefore, climate change is another important concern to sustain crop production. To face the unavoidable natural calamities scientists are working restlessly to develop new crop varieties which can cope up with the imminent stressors. Thus, they are trying to build super crops; which are mostly genetically engineered (GE). Regarding the above circumstances an overview was done to address the suitability, limitation and acceptance of transgenic crops and their interaction with Bangladesh environment. Transgenic or genetically modified organism (GMO) are organism whose genome has been engineered within the laboratory so as to favor the expression of desired physiological traits. It was found that, USA, Brazil, Argentina, India, Canada, China are producing over 90% of GM crops and rest of the world is below 10%. GE crops are less input requiring with higher yield and tolerant to biotic and abiotic stresses. Possibility of GM crops were observed as, brinjal (resistant to BSFB), potato (late blight resistant), tomato (slowing down ripening with natural color, flavor and savor unchanged), rice (golden rice rich in β carotene), cotton (resistant to cotton bollworm). Presently, only some of the GM brinjal varieties (BARI Bt Brinjal-1, BARI Bt Brinjal-2, BARI Bt Brinjal-3 and BARI Bt Brinjal-4) developed by BARI (Bangladesh Agricultural Research Institute) is under cultivation and adoption by farmers. Rest crops are in confined trial and soon be released. Major hindrances of GM crops were marked as, unproven technology, violation of natural boundaries, market control by large corporates, unrevised side effects to humans, lethal to beneficial insects, loss of genetic resources, super weeds and pests etc. Bangladesh is 29th country to approve of GM food. Present status of GMO food is favorable among the South Asian countries but, perception of consumer is still unclear. We should effectively and safely use this technology such a way that's acceptable to the general public.

Keywords: Bangladesh, GMO, agriculture, crops

B4

[11]

GROUND WATER QUALITY ASSESSMENT IN ANURADHAPURA FOR DOMESTIC PURPOSES

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North central provinces play a main agriculture role in Sri Lanka as a developing agriculture base economy country in the world. Excessive amount of nitrate and fluoride in groundwater consumption is becoming a crucial issue on human health in Sri Lanka especially in the North Central part of the country. Dental fluorosis and Skeleton fluorosis are the major health impacts based on excessive amount of fluoride as well as presumption on causing chronic kidney disease (CKD). On nitrogenous compounds in groundwater for drinking have been considered as a possible risk factor for oesophageal cancer and blue baby syndrome. Groundwater has been polluted by human activities and natural processes. Having lack of understanding on the actual need of fertilizer, farmers usually tend to apply surplus amount increasing nitrogen pollution. Accordingly, this research was conducted to deepen the understanding on distribution of fluoride and nitrate in groundwater in the Anuradhapura area geological and anthropogenic influences. Well water samples were collected from intensive agricultural activity areas in Anuradhapura. Physical and chemical parameters were analyzed to identify that the higher nitrate and fluoride or any compound of mixture of heavy metals such as Cadmium and/ or Arsenic is the actual cause for kidney and other health related issues among the community. Water samples pH was in the range of 6.7-7.7. All the wells can be categorized as low salinity water. Turbidity average of 3.51 NTU range of 1-8 NTU was found polluted groundwater by nitrate at the average of 8.725 mg/l, ranged from (1-131) mg/L as NO₃⁻. In addition fluoride was found high in Anuradhapura as average 0.8 mg/L ranged from (0.2 - 1.7) mg/L. Sulphate level also high average of 78mg/l ranged from (8-572 mg/l).No significant in effect of heavy metals Cadmium, Arsenic, Iron, Copper concentrations are below the permissible level of 0.01mg/L. The research clearly indicates the abundance of Nitrate and fluoride in groundwater especially in the dry zone. The major sources are fluoride bearing minerals in bedrock and soil zone. In addition to that, influence of agriculture, excessive nitrate levels in groundwater is apparent irrespective to climatic zones.

Keywords: Groundwater, chronic kidney disease, heavy metal

VIRTUAL ORAL PRESENTATIONS SESSION (C)

FOOD SCIENCE & PRODUCE

C1

[12]

**DEVELOPMENT AND CHARACTERIZATION OF CHEESE PRODUCED USING
Lactic acid bacteria (LAB) FROM STINGLESS BEE HONEY**

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Stingless bee have been highlighted and focused due to their ability to produce honey which highly prized due to its popularity for traditional medicine purposes. The acidic properties of the honey have suggest good possibilities to be explored for the use in food production purposes. This research shows the possibilities to produces cheese using Lactic Acid Bacteria (LAB) which was obtained from stingless bee honey. The Lactic Acid (LAB) bacteria was isolated from stingless bee honey sourced locally from Terengganu and Perak in Malaysia. Optimization of the incubation time to obtain best cheese was done to obtain optimum amount of cheese. Early characterization shows that the LAB was a strain from *Lactobacillus brevis*. Characterization and comparison was done using pH, moisture content, fat and protein. Results show that the moisture and protein content of the cheese from isolated LAB was higher if compared to the commercial cheese. However as for the fat content results shows that the amount of fat was lower than that in the commercial cheese. This is also the case with pH value. The sensory evaluation done on the cheese shows that overall the panel shows higher acceptance on the cheese produces from the LAB from stingless honey if compared to the commercial cheese. These findings suggest the strain isolated from stingless bee honey have the potential to be utilized as potential starter culture in food preparation and food processing, envisaging its potential therapeutic role in food industry

Keywords: Cheese, characterization, stingless bee honey, lactic acid bacteria

C2

[13]

ENSILED FRUIT PEELS OF PINEAPPLE (*Ananas comosus*) AND PAPAYA (*Carica papaya*) AS AN ANIMAL FEEDWimalasiri K.S.S¹, Somasiri S.C^{1*}.

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A silage has been prepared using pineapple (*Ananas comosus*) and papaya (*Carica papaya*) fruit peels obtained from a fruit processing factory in Sri Lanka. Ensiling was done either fruit peels only or in different combinations of fruit peels and chopped Hybrid Napier (CO-3 *Pennisetum purpureum* × *Pennisetum americanum*) grass. The experimental design was Completely Randomized Design having ten treatments (T1 to T10) with two replicates per each. The treatments were T1 Papaya 100%, T2 Pineapple 100%, T3 Grass 100 %, T4 Pineapple 75%+ Papaya 25%, T5 Pineapple 50%+ Papaya 50%, T6 Pineapple 25%+ Papaya 75%, T7 Pineapple 20%+Papaya 70%+ Grass 10%, T8 Pineapple 30%+ Papaya 50%+ Grass 20%, T9 Pineapple 70%+ Papaya 20%+ Grass 10%, and T10 Pineapple 50%+ Papaya 30%+ Grass 20%. The fruit peels and grass were dried under shade, chopped and mixed according to the different treatments. After 21days, representative silage samples from each treatment were analyzed for nutrient content, colour, odour, pH and Ammonium Nitrogen (NH₃N) content. The colour of all silages ranged from olive green to orange. All the treatments had a fruity smell. The pH values ranged from 3.41 to 4.04 in all treatments. The highest ($p<0.05$) crude protein (CP) content was in T3 and lowest ($p<0.05$) was observed in T4 and T5. The highest ($p<0.05$) acid detergent fiber (ADF) contents were in T3, T8, and T10 and lowest ($p<0.05$) was in T5 and T6. The highest ($p<0.05$) neutral detergent fiber (NDF) content was in T9 (44.00±0.02%) and the lowest ($p<0.05$) in T2. The NH₃N content was not present in any treatments. Based on CP, ADF and NDF contents T1, T7, T8, T9, and T10 were selected for further studies with animals to select the best treatment.

Keywords: Ammonium Nitrogen (NH₃N), ensiled fruit peels, nutrient content, physical characteristics

C3

[14]

**EFFECT OF LOW TEMPERATURE STORAGE ON FRUIT QUALITY OF
WILLARD AND AMBALAVI MANGOES IN JAFFNA***N. Krishnapillai**

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The mango fruit is considered to be a rich nutrient source and recommended to be included in the daily diet. It can provide significant amount of biotic compounds with antioxidant activity. However, Postharvest losses of mangoes are high in Jaffna and storage life of mangoes is restricted due to its perishable nature. Low temperature storage is widely used technology to reduce postharvest losses and extend storage life of mangoes. However storage conditions varied with different mango varieties. Thus this study was aimed to find suitable storage conditions for popular Willard and Ambalavi mangoes without affecting quality. More than 120 mature Willard and Ambalavi mangoes with 4-5cm stalk were harvested and brought to the laboratory. These mangoes were washed and air dried after removal of stalk carefully. Fruits of both varieties were allocated for low temperature storage (16° C with 75% RH) separately by using completely randomized design. 27 fruits with 3 replicates were used in treatment and control (ambient conditions (28-34°C) separately. Storage life of control Willard and Ambalavi fruits were observed by 6 and 7 days respectively and it was extended by 12 days in Willard and 10 days in Ambalavi mangoes by low temperature storage. Antioxidant activity was measured by using DPPH and no significant difference ($p=0.05$) was observed in control and fruits stored in cold chamber. Willard mangoes showed highest brix value (23°Brix) than Ambalavi mangoes. These values were slightly reduced by low temperature storage. However There was no significant difference ($p=0.05$) observed for the fruit quality parameters of total soluble solids, pH, and antioxidant activity. Firmness, colour, taste and marketability were acceptable for marketing. In cold chamber, 16°C and 75% RH were found to be suitable temperature and RH for both varieties without showing chilling injury and affecting fruit quality. This finding is important for anyone going to start mango industry in northern region for fresh fruits or processing products of mangoes in large scale.

Keywords: Mangoes, low temperature storage, quality, antioxidant activity, storage life extension

C4

[15]

DETERMINE THE TOMATOES VOLUME*AL-Badri S.B.S**

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The temperature was an important factor impact the shelf life of tomato which is affected on the rate of the biological processes. That including the change tomatoes softening and weight loss, which is reflected in the tomato shape. Tomato's shape and size are different because of their nature. That is common for all fruits and vegetables except the Japanese square watermelon. Weight loss on the tomatoes is the most common methods to determine the shelf life, which is between 5-7%, within this range the tomatoes still edible. This research tried to find a relationship based on the tomatoes volume of an elliptical spheroid. The samples included 15 tomatoes choose randomly and weighted, then the height and width were measured. Tomatoes weight in water then water high with tomatoes were measured then the different calculated, which was represented the volume. The results illustrated that the liner regression model was explained 80% of the data. The tomato shape that may help on the weight loss and firmness of the tomatoes during the storage for the further studies.

Keywords: Tomatoes, weight loss, shape, size, and storage

C5

[16]

FOUR INJECTION–SINGLE DETECTOR MERGING ZONE CONTINUES FLOW INJECTION ANALYSIS FOR DETERMINATION OF ASCORBIC ACID IN BELL AND CHILI PEPPERSMuhamad Y.H¹, *Al-Badri S.B^{1*}*¹Dep. of Chemistry, College of Science, University of Baghdad, Iraq*Email: s.b.albadri@sc.uobaghdad.edu.iq

Presently, vitamin C can be adopted to improve immunity system and chronic inflammation diseases. A significant proportion of the ascorbic acid can be obtain from fruits and vegetables, and food products. The selection of bell and chili peppers samples was made according to increasing use at the present time due to COVID-19 .This paper deals with merging zone (MZ based on four hand mead injection/single detection, with spectrophotometer. Merging zone (MZ) system resulting from different reaction via flow injection analysis (FIJ) would be beneficial for identify the simultaneous of reaction faster and low cost. Specifically focusing on MZ area and ferroin complex which are result from reaction between Fe (III), ascorbic acid (AA) and 1, 10-Phenanthroline under acetic acid conditions. The system of MZ was modelled under continues FIJ and determination of AA. The method performed AA at rang of $(1 \times 10^{-3} - 32 \times 10^{-3} \mu\text{L})$, with a correlation coefficient 0.9822 and D.L 12.5ng. The obtained results from bell and chili peppers shows excellent agreement with the result from *SCİO* analysis.

Keywords: Peppers, Ascorbic acid, merging zone, flow injection, *SCİO*analysis