



BULLETIN

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Award winning trend continues; ITI scientist becomes the best presenter

Ms. Ilmi Hewajulige, Senior Research Officer attached to the Food Technology division of the ITI won the Best Presenter award at the Food Science and Nutrition session of the 18th Annual Congress of the Postgraduate Institute of Agriculture. This was held at the Plant Genetic Resource Centre, Gannoruwa from 16th to 17th November 2006.



In her award winning presentation she described a method to use chitosan, chitin extracted from prawn waste, to extend the shelf life of papaya.

Papaya (*Carica papaya* L.) is one of the four most popular fruits in Sri Lanka and also has a huge potential to be exported. Postharvest diseases cause massive postharvest losses of papaya during storage and transportation. Anthracnose is one of the postharvest diseases of papaya, which is caused by the fungus, *Colletotrichum gloeosporioides*.

There are several conventional methods to control it such as application of fungicide, hot-water-dip treatment and hot-water-dip treatment in combination with fungicides. However, these methods have many negative effects. Resistance development to the fungicides is one such effect. Developing an effective alternative to control the fungi is thus an urgent need.

Chitin in prawn and crab shells can be converted to chitosan through a chemical process.

Chitosan is the second most abundant naturally available, easily degradable bipolymer. It forms a semi permeable film, which modifies the internal atmosphere of the fruit and reduces the loss of moisture. It also induces a defense mechanism by delaying the ripening process and lowering the respiration rate.

Chitosan is reported to be an anti-fungal agent. These film forming and biochemical properties make chitosan an ideal preservative coating for fresh fruits and vegetables.

First the effect of different concentrations of chitosan on mycelial growth and spore germination of the fungi were determined. Then the effect of chitosan on papaya inoculated with *C. gloeosporioides* was evaluated. In this way, it was proved that chitosan has the ability to curb the damage done by the fungi on papaya. To assure the quality of the fruit does not affected, physicochemical parameters and overall quality of papaya treated with chitosan was determined. Finally a taste panel results further proved the high quality of chitosan treated papaya and concluded that chitosan will be a sound alternative for papaya exporters.



Chitosan treated papaya

Our Mission

To provide demand driven scientific industrial R&D and internationally competitive technical services to catalyse rapid industrialisation for the benefit of the people of Sri Lanka

Training in Metrology for Industrialists

The Industrial Metrology Laboratory which received SWEDAC accreditation for Mass and Thermometry, through a UNIDO funded project, organized a four day training programme on Industrial Metrology for fifteen senior and twenty technical staff members who are working in different centers of Loadstar (Pvt.) Ltd.

The theoretical training included the hierarchy and uncertainty of measurement, thermometry, pressure and dimensional metrology while the practical sessions were in the areas of thermometry, pressure and dimension. Both programmes were conducted at the Training Centre of Loadstar (Pvt.) Ltd.



The programme also included a visit to the Accredited Metrology Laboratory of ITI. This visit enabled the participants to obtain first hand information on the functioning of the Industrial Metrology Laboratory of ITI and the Quality Management System in accordance with ISO/IEC-17025 including the laboratory practical session in maintenance of reference standards. Certificates were awarded to all participants at the end of the training programme.

Handling Hazardous Waste Safely

On 5th September 2001 Sri Lanka signed the Stockholm Convention on Persistent Organic Pollutants (POPs) and under the convention, countries made a commitment to reduce and/or eliminate the production, use, and/or release of the 12 POPs of greatest concern to the global community. The convention was ratified on 22nd December 2005. Among the dirty dozen of POPs are the Polychlorinated Biphenyls (PCBs), DDT, Dieldrin, and Chlordane. Although Sri Lanka signed the convention we do not have a proper system to manage hazardous wastes, estimated to be 40,000 tons per year that are being generated in the country

In an attempt to upgrade the transformers in Kelanithissa Power Station in 1987, scientists of the then CISIR, were asked to assist in removing and disposing the transformer oil containing PCBs and decontaminating the transformers for re-selling.

According to The US EPA Toxic Substances Control Act (TSCA) PCB Incineration Criteria, PCB destruction requires 1200 °C, 2 seconds residence time and 3% residual oxygen. Since cement kilns meet the above conditions such kilns are used extensively in western countries to dispose PCBs and other organic hazardous wastes.

Initially the plan was to use the Puttalam Cement kiln to burn the PCB containing transformer oil and for which an injecting facility was devised at ITI to introduce PCBs to the kiln. However, due to the privatization of Puttalam cement the incineration process did not proceed as planned. The transformer oil discarded from Kelanithissa Power Station was safely stored at CISIR since 1987 until a method was established to dispose POPs/ PCBs safely.

With time CISIR underwent several organizational changes, culminating in the name CISIR being replaced by ITI and Puttalam Cement became Holcim (Lanka) Limited after privatization.

In order to reduce fuel costs, in 2005 Holcim commenced co-processing, (incineration) of hazardous and other burnable wastes such as sawdust and tyres using their cement kiln. After the installation of special injectors to co-process liquid hazardous wastes Holcim agreed to carry out a test burn of PCBs stored at ITI with the concurrence of the regulatory bodies Central Environmental Authority and the Environmental Authority of the North Central Province.

After the test run with a small quantity of PCBs, evaluation of the efficiency of the incineration was carried out against international norm. As the laboratories in our country lack the facilities to analyze the collected air samples from the cement kiln, the samples were sent to two accredited laboratories in Australia and New Zealand. Results have indicated the destruction efficiency was greater than 99.99999 %.

This trial run has brought a wealth of experience and expertise to both the ITI as well as Holcim Co. The ITI will use this trial run to formulate a suitable system and assist the industries and the regulatory authorities to establish a proper system to manage the hazardous wastes that are being generated in Sri Lanka. Holcim will be benefited as they used this trial for the optimization of the co-processing of hazardous waste and expand their co-processing activities. Ultimately the success of this study will pave the way for the safe disposal of such hazardous material in the country in a cost effective manner.

Quality Matters

ITI Trains Vietnam Scientists

The ITI recently provided training to three scientists from Directorate for Standards and Quality Assurance and Testing Centre 1 & 3 and the National Fisheries Quality Assurance and Veterinary Directorate of Vietnam to enhance their knowledge on Laboratory Quality Management in Microbiological analysis. This provided an opportunity for ITI scientists to share the knowledge and experience gained over the years in establishing Internationally Accredited testing and calibration laboratories.

The ITI at present has laboratories, which are accredited by the Swedish Board of Accreditation & Conformity Assessment (SWEDAC) for Chemical & Physical analysis of water, Pesticide residue analysis of water and Microbiological analysis of water and fish & seafood and Calibration.

In 2004 & 2005, ITI conducted similar programmes for three groups of scientists from Pakistan. All these programmes are funded by UNIDO. ITI was supported by UNIDO to develop the laboratories to meet the International Standards to achieve laboratory Accreditation as per ISO 17025 by way of consultancy, training and equipment. The ITI is now sharing the expertise developed with other countries in the region to elevate their standards to the Internationally acceptable level.



ITI Ventures into New Areas in Quality Management

The Industrial Technology Institute having obtained International Accreditation since 2002 has now embarked in expanding their activities in Quality Management. As a first step, the Information Services Centre achieved ISO 9001:2000 Certification from SLSI.

ITI is now working towards establishing ISO 9001:2000 Quality Management System for the whole institute. In addition ITI has now developed expertise to provide consultancy to industries in establishing ISO 9001:2000 Quality Management System and Food Safety Management Systems as per ISO 22000 and HACCP.

The ITI having gained experience in establishing Laboratory Quality Management System in accordance with ISO 17025:2005, has now embarked on assisting other laboratories to establish Quality Management Systems.

Further ITI has initiated a programme of conducting Interlaboratory programmes as a support service to other Accredited laboratories and those seeking Accreditation. Recently ITI conducted the first round in Water Microbiology, which was co-ordinated by the Association of Testing Laboratories (SLATL). ITI has assisted the SLATL by carrying out the statistical analysis and report preparation for Tea Analysis Proficiency Testing Scheme (TAPAS) organized jointly by the SLATL and Sri Lanka Tea Board.

ITI Expands the Scope of Accreditation

The Industrial Technology Institute (ITI) recently reached another milestone in Quality Management when the Chemical & Microbiology Laboratory (CML) of ITI obtained ISO 17025:2005 Accreditation from the newly established Sri Lanka Accreditation Board for Conformity Assessment (SLAB) for chemical & physical analysis of water & waste water, analysis of fish for histamine and chemical analysis of tea, fertilizer and cashew.

The SLAB was established in 2006 under the Ministry of Science & Technology. Establishment of this national body as per the Act No. 32 had been a long felt need in meeting the country's demands to keep up with the requirements of the global trade.

The CML obtained accreditation initially from ASTEL, a scheme operated by the Sri Lanka Standards Institute. With the establishment of SLAB, the ASTEL scheme ceased to operate and assessments were carried out the SLAB in July 2006.

The CML also holds accreditation from Swedish Board for Accreditation & Conformity Assessment (SWEDAC) for physical & chemical analysis of water & wastewater along with microbiological analysis of water and fish since 2002.

In the year 2007, ITI successfully faced the assessment by SWEDAC for reassessment and extension of the scope of accreditation to testing of rubber based products, calibration of dimension, volumetric and electric and food analysis and is now awaiting the final confirmation from SWEDAC.

MCP; The Most Effective Way to Clean Up Oils in Water

Coir pith, (CP) is the naturally occurring binding material present in the coir surrounding the coconut shell, designed by nature to act as a natural shock absorber for the protection of the coconut. Coir itself found many commercial uses, and the extraction of coir has been carried out through the ages, using traditional extraction processes. These processes however, did not give much importance to the coir pith, and consequently this went to waste. However, in recent times, its potential was recognized, and was used as a growing medium in agriculture, as a heat insulator and a bottle packing material.



A group of scientists at the Materials Technology Section (MTS) of the ITI has found further uses for this material, and a modified coir pith (MCP) to be used in environmental pollution remediation was produced. Natural coir pith absorbs water being hygroscopic. The modified coir pith was so designed that it absorbs more oil than water. But the group of scientists at the MTS, has modified the CP that it absorbs more oil than water.

When oil is mixed with water the separation becomes tedious. Accidental oil spills, water from vehicle service stations and even domestic wastewater are few of the scenarios where oil is mixed with water. Recently Sri Lanka had a bitter experience of an oil spill in its shores and the environmental pollution that it caused. Suitable methods to remove oil in water are indeed a dire need.

In the modification process the hygroscopic nature of the coir pith is changed to being more oleophilic or hydrophobic. This makes the pith absorb more oil when it is incorporated into a mixture of water and oil. An added boon was the revelation that the MCP could also remove heavy metals ions in water. This makes MCP a good candidate for cleaning highly polluted water. Further experiments carried out at the MTS demonstrated that the MCP can absorb ethylene as well. Removal of this gas in air surrounding bananas, delays the ripening process. This property is important in reducing post harvest losses. For this invention the group has obtained a Sri Lankan patent for the modification process and a Japanese institution, which has obtained the legal rights from ITI to produce MCP, has applied for an international patent.

The group involved in this research project consists of Dr. M.G. M.U Ismail, Mr. Saman Weeraratne, Ms. Sepa Nanayakkara and Mr. Dineth Samarawickrama.

Equipment Corner

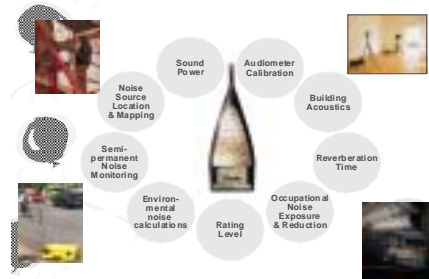
Bruel & Kjaer Type 2260 Investigator Sound Level Meter

Bruel & Kjaer Type 2260 Investigator sound level meter is a programmable equipment based on a standard PC architecture and file system. If an acoustic specialist is equipped with this and a full set of application software, he can highlight most of the sound problems and find effective solutions. 2260 investigator is one hardware platform for most of the sound problems.

2260 investigator is a Class 1 sound level meter including real time displays of frequency analysis, 1/3-Octave spectra and statistical distributions, long term data logging facility with various applications software such as Noise profile, Building Acoustic, Sound intensity, Enhance Sound Analysis, Room Acoustic and FFT analysis. Charge Injection Calibration facility enables regular monitoring of the microphone's condition and hence confirm the calibration reliability.

The unique Multi-D™ analysis technique of the 2260 saves time and improves data consistency by concurrently measuring broadband, spectral and statistical parameters.

ITI offers comprehensive solutions to all kinds of sound problems relating industrial, commercial & national projects. For further details Contact: Mr. A.S.Pannila, pannila@iti.lk Tel: 2682936-ext 372; Mr.Saman Hapuarachchi, samanha@tit.lk 2682936-ext 377



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