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DOST-developed food processing equipment out in the market soon



Water Retort

About to be taken out and applied for actual food production and processing in various regions in the country are five equipment that were developed through the DOST's HITS (Department of Science and Technology – High Impact Technology Solutions) project – Design and Development of Process Equipment for Food Processing Firms. These are the water retort, vacuum fryer, vacuum packaging machine, spray dryer, and freeze dryer.

The five equipment prototypes will be launched in nine identified regions to promote and demonstrate their functionality leading to commercialization. This shall take place in Food Innovation Centers (FIC) that will be established by the DOST Regional Offices No. 7, 2, 5, 6, 8, 9, 10, 11, and NCR in their respective area. Intended nationwide, this is only the first leg of the project. Once in place, this will help a lot in improving the productivity of food processors in the regions and the quality of their products.

Working together to realize this goal are the DOST implementing agencies namely: the Industrial Technology Development Institute (ITDI) as lead implementer, in collaboration

Vacuum Fryer

with the Metals Industry Research and Development Center (MIRDC) and Project Management Engineering Design Service Office of DOST (DOST PMEDSO), and the DOST Regional Offices.

This undertaking is an offshoot of an earlier project of DOST that was implemented in 2011, the HITS

Vacuum Packaging Machine

project - Design and Development of Process Equipment for Food Processing Firms. This project aimed to locally design and fabricate food processing equipment and make our own technology work for our local industry needs. "We also hope to do away with imports, which are always expensive, espe-

ITDI shares food processing & preservation tech to Timorese

On July 9-12, 2013, food processing experts from ITDI went international to share valuable knowledge and expertise on Food Preservation and Processing technologies to the Timorese through a training at the Science Resource Center, Baucau, Timor Leste.

The ITDI training team namely Ms. Lourdes Montevirgen (SrSRS), Ms. Elsa Falco (SrSRS), and Mr. Oscar Magora, Jr. (SRA) of the Food Processing Division, and Ms. Teresa Herrera (SRSII) of the Technological Services Division, were able to overcome the language barrier and thanks to the assistance of



all concerned parties especially those from the religious sector, who served as interpreters or translators from English to the local language, Tetum.

The training program was made possible through the initiative of the Technical Cooperation Council of the Philippines (TCCP) of the



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From the Executive's Desk...

Giving the right and uplifting words at a time when we are still reeling from the aftermath of the recent disasters that has stricken our country is often difficult....for the right the words could hardly come by. Nevertheless, amidst all the pain and chaos, we are still thankful that we are up and about, hopeful that normalcy will soon come as we face the difficult task of rebuilding.

We all know that scientific and technological inputs have been the major drivers of growth and development in the countries around us. Here in our country, we are banking on the same premise and working hard to obtain promising results from our R&D investments, and be able to achieve a reasonable degree of resilience especially in times of natural calamities. While ours is basically an agriculture economy, our development, including all allied sectors is faced with various challenges as to the state of our natural resources, climate change, fragmentation and changes in land use, among others. We have to note also that such challenges are happening so fast than we could think of. And for us to address these challenges, we, in the scientific community must be able to foresee the challenges and formulate strategic/prioritized research programs so that the needs of our agriculture and industries are met most timely.

I therefore encourage every employee, researcher, and scientist of the ITDI-DOST to stand up to the challenge. And as we are about to start planning for next year, it would be a pleasure to see a document that would contain some interventions or programs that can help us contribute substantially in achieving this goal, as well as to the rebuilding efforts of our devastated areas and people in the Visayas.

Taking due cognizance of what needs to be done, our resources, and capabilities, let us clearly identify our goals and approaches strategically to produce timely and relevant interventions or innovations for the common good of our people. That alone is already a good gift to our brethren in the Visayas this holiday season. Merry Christmas and a Happy New Year!



DOST developed... from p. 1

cially among the small and medium food processors, and those starting to put up their own businesses.", ITDI Director Almanzor said. Seven equipment (water retort, vacuum fryer, vacuum packaging machine, spray dryer, freeze dryer, immersion freezer, and vacuum evaporator) were designed, fabricated, and performance-tested. Field testing with target cooperators was also conducted to monitor the actual operating performance of the equipment, and innovate or repair if needed, to improve their efficiency or performance.

To facilitate the launching of the equipment, FICs will be established in the identified regions. While the roll out is intended nationwide, this initial launching or first leg will take place in these FICs: DOST Region 2 Cagayan State University (SUC), DOST 5 - Bicol University (SUC), DOST 6 - DOST VI Office, Iloilo City, DOST 8 - Eastern Visayas State University (SUC), DOST 10 - Mindanao University of S&T (SUC), and DOST 11-Philippine Women's College (private), and those in regions 7, 9,

and NCR. The equipment will be introduced to food processors, SUCs (State University or Colleges), and other interested parties.

The FICs are being established in support of the local food processing industry which contributes more than 40 per cent of the country's total manufacturing output. It is envisioned that these FICs can enhance access to scientific and technical services of MSMEs in the regions. In these FICs, concepts can be turned or transformed into products, and technical experts can innovate and diversify to maximize adding value to our local and diverse agricultural and fishery resources. Spearheaded by DOST Region 8, it is a collaborative undertaking among concerned agencies such as the DOST regional offices, SUCs, and the private sector.

Among other activities and services, these FICs shall house the DOST-HITS equipment and serve as venue to promote and demonstrate to prospective clients, their use or application, and operational or performance efficiency. Designated operators in the regions will also be trained. These equipment were designed and fabricated at a competitive cost and were intended as substitute to imported equipment. The water retort was fabricated at a cost of P135,000 and can be used for retorting products packed in pouches, e.g., suman sa lihiya, ready-to-eatmeals; vacuum packaging machine at P110,000, for sealing of foods in flexible packages under vacuum condition, e.g., rice, monggo, corn, fish (dried), crispy pata; vacuum fryer at P650,000, for vacuum frying of fruits, vegetables, root crops, shellfish and other marine products; spray dryer at P850,000, for drying of food and herb extracts, fruit juices, dairy products into powder form, e.g., maltodextrin, milk (Carabao); and freeze dryer at P600,000, for freeze-drying high value food products and pharmaceutical products, e.g., carrots, potato, langka (jackfruit), and durian.

Meanwhile, the other two equipment, immersion freezer and vacuum evaporator will be launched at a later date. \Box

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DOST ceramic water filters up access to drinking water nationwide



Did you know that in the Philippines, current statistics (NSO) show that 20 per cent of our population have no access to potable water, 432 municipalities have less than 50% service coverage (waterless municipalities), and about 6,000 premature deaths a year are caused by water-borne diseases? And we are not alone in this situation for many people in various parts of the world have to contend with problems on water scarcity, pollution, and accessibility to potable drinking water. All these we have to experience despite the fact that the earth is made up of over 70 per cent water.

A directive from DOST (Department of Science and Technology) Secretary Mario G. Montejo could help address this scenario. He instructed all DOST regional offices and the ITDI (Industrial Technology Development Institute) to join hands and roll out nationwide, the DOSTdeveloped ceramic water filter. The roll out hopes to address problems on the increasing number of households having no access to potable water, especially those in the far flung areas of the country. Over time, this project could significantly contribute in attaining the Philippine Millennium Development Goal (MDG) of increasing the country's accessibility rate to potable water of 82.9% in 2007 to 86.6% in 2016.

To speed up the rolling out of the technology, 10,000 pieces of candle-type ceramic water filters will be produced. "We sought the cooperation of the LGUs, NGOs, and pottery owners who are now our partners in implementing this project", ITDI Director, Dr. Almanzor said. Communities with less access to potable drinking water will be the beneficiaries. The

project is spearheaded by DOST Region 1 and the ITDI with the support of all DOST regional offices.

Reports say that waterborne diseases (e.g., diarrhea, dysentery) are often caused by contaminants such as microorganisms and

particulates (solid particles) present in tap and ground water. Often, to avoid getting contaminated, people are forced to buy commercially sold bottled water adding up to their expenses and causing more damage to an already very tight budget.

To address these concerns, the DOST through the ITDI developed the ceramic-based water filter that can remove microbial/particulate contaminants in drinking water. It is also suitable for home use. Three models were developed, two pot-type ceramic water filters of 6.5 and 1.5 L capacity; and the latest edition, the candle-type water filter.

"Made from red clay, we added nano (very, very small or minutest) antimicrobial agent that can eliminate water-borne microorganisms", said Sup SRS and lead researcher, Josefina Celorico. The ceramic filter is lodged in a plastic container and provided with a faucet at the bottom for collection of the filtered water. The ceramic filters are easy to install and maintain, and reasonably priced. According to Celorico, production cost per piece for the candle type water filter is P80.00, and one that is already lodged in a plastic container amounts to around P190.00. "At this point, we have established

the ceramic filters' flow rate at 2-3 L/hour", she added.

The developed water filters can purify tap water, deep-well water, and raw water (from ponds and spring); thereby making it possible to have safe, potable drinking water readily available and accessible even in remote areas. The filtered water also passed the Philippine National Standard or PNS for drinking water in both tests/counts for *Coliform* and *Escherichia coli*, the most common water-borne disease-causing-microorgnanisms.

The ceramic water filters have also undergone field testing at NHA households in Muntinlupa City and Cagayan de Oro City, and positive feedback/ comments were obtained.

Currently, roll-out activities in the regions are underway. Clay samples found suitable for ceramic water filters include those from Regions 1 (Ilocos Sur), 3 (Tarlac and Aurora), 5 (Camarines Sur and Sorsogon), 8 (Leyte, Aklan), 10 (Cagayan de Oro), and 12 (South Cotabato). Testing is still ongoing in other regions. Last June, a training on ceramic pot making using Tarlac clay was conducted at DOST Region 3 in Aravat. Pampanga where 250 pieces of 1.5 liter capacity filters were already produced and distributed to identified beneficiaries in the region.

Most recently, 100 pieces of ceramic pot filters were delivered in Tacloban to help make potable water available in the devastated areas. Continuous production of 10,000 pieces is also underway at ITDI which will be deployed in areas affected by the recent earthquake and typhoon Yolanda. Likewise, in Vigan City, on Dec. 6, 2013, 100 pieces of candle-type ceramic filters were distributed to various beneficiaries for performance testing in cooperation with the city government.



Vigan launch



ITDI-STD rallies for establishing Metrology in Chemistry

Accuracy, traceability, and reliability.

When it comes to quality, these are the factors to think about, especially when it comes to measurements. And not just physical measurements, but chemical measurements as well, as DOST's Industrial Technology Development Institute or ITDI advocates for the establishment of a Metrology in Chemistry (MiC) infrastructure in the Philippines.

The ITDI, supported under RA 9236. otherwise known as the National Metrology Act of 2003, is the national custodian for weights and measures. While the Act focuses mostly on physical measurements, ITDI seeks to establish a national measurement infrastructure for chemistry as well, so as to ensure comparability and traceability in the results of tests done in different laboratories, regardless of country, field of application, or time performed. This echoes the mantra of MiC, "Once tested, accepted everywhere."

In line with this, ITDI, through its Standards and Testing Division or STD, is implementing the program, "Development of National Stan-

ITDI shares... from p. 1

Department of Foreign Affairs (DFA). The DFA sought the technical assistance of ITDI to be able to extend or offer this type of program to developing and least developing countries (DCs and LDCs) through short-term courses. Such programs of the DFA aim to reach out to the poor and vulnerable communities/ society, enhance their capacity to produce goods or products, and improve their livelihood while maximizing the use of locally available resources.

Before conducting the training, Engr. Melchor Valdecañas, OIC Deputy Director, conducted an onsite technology/training needs assessment last April 12-19, 2013. Based on the result of the TNA, training on the following food preservation and processing technologies was offered and conducted: Vegetable



dards for Chemical Measurements" that aims to: establish internationally recognized national measurement standards in chemical analysis, develop traceability and comparability of analytical test results, and disseminate the chemical measurement accuracy to the users in the country and other stakeholders.

The goals of the said program, which began in July 2012 with the renovation of the laboratory, included establishing a clean room as well as conducting study and enhancement tours of the established MiC infrastructures in other countries for the purpose of benchmarking and possible collaborations. This includes visits to Korea Research Institute for Science and Standards (KRISS). Health Sciences Authority (HSA)

Singapore, National Measurement Institute of Australia (NMIA), and National Institute of Metrology Thailand (NIMT). NIMT also played host to two staff members from the project as they trained in reference material preparation.

Also, among the MiC project's initiatives is the conduct of Proficiency Testing services for contaminants in food and metals in water. This PT program aims to assist laboratories in evaluating their quality control measures and improving their measurements through interlaboratory comparisons. In accordance to ISO/IEC 17025 accreditation requirements, PT is being done to gauge the laboratory's competence based on pre-established criteria to ensure traceability and accuracy in measurements.

To prepare themselves and ensure competency in providing PT services, MiC staff, along with monitoring agency Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD), consultant statistician Maiellia Vegafria, and Manuel Ruiz from ITDI's National Metrology

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and Rootcrops Processing [powdered sweet potato, malunggay, squash, monggo (produced cakes, polvoron, vegetable burger); pickled vegetables (cabbage and chili)]; Fruit Processing [fruit juice: readyto-drink papaya juice, sweetened orange juice concentrate, tropical fruit mix (papaya and condol), banana chutney, jam (orange), candied and dried kamias]; Fish processing [sardines in oil and extra hot bottled sardines, smoked fish]; and Essential Oil Extraction from Lemon Grass.

The training was implemented through the TCCP-DFA (headed by Ambassador Jose Maria Cariño), which also provided the financial resources for the training and all other requirements. Full support from the Philippine Embassy in Baucau, Timor Leste, through the leadership of Ambassador Maria Aileen Bugarin, and the indispensable

assistance, dedication, and noble service of the Filipino Priests (Fathers Palomo and Rolando), and Sister Ligaya greatly contributed to the success of the training, especially in translating English to the local language, Tetum; along with the cooperation and willingness to learn of the people of Baucau that consisted of thirty seven (37) participants from Non-Government Organizations (NGOs).

The training program was formally closed through the awarding of training certificates to the participants, and a turn-over ceremony for the various processing and analytical equipment used in the training with a Deed of Donation by the TCCP-DFA representative to the Science Resource Center in Don Bosco, Baucau headed by Father Palomo. (CCandelaria, based on the reports from the training team) \Box

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Drumming up for "Metrology in Daily Life" at 2013 World Metrology Day

May 20. World Metrology Day Believe it or not, the science of measurements or metrology permeates all facets of life daily, without us realizing it. Thus, on May 20, the world celebrates metrology to let people know that this science is part and parcel of our daily life, and create awareness on its importance as we go about our business.

This day "celebrates the signing by representatives of seventeen nations of the Metre Convention on 20 May 1875. The Convention set the framework for global collaboration in the science of measurement and in its industrial, commercial and societal application. The original aim of the Metre Convention - the worldwide uniformity of measurement - remains as important today as it was in 1875".

For 2013, the event carries the theme "Metrology in Daily Life". This was chosen by the BIPM (Bureau International des Poids et Mesures) and OIML (Organisation Internationale de Metrologie Legale) because they believe, it is "a wide-ranging topic which concerns everyone in a multitude of situations."

In line with this celebration, the ITDI through its National Metrology Laboratory (NML) which is also the country's National Metrology Institute or NMI that is tasked by law to establish, maintain, and disseminate the national measurement standards in physical quantities, conducted a seminar aimed to introduce the importance of metrology to professors/teachers from different universities and colleges around the Metro. This was in consonance with the realization that educating our country's young minds is of utmost importance.

The program started with SupSRS Manuel Ruiz of NML delivering the welcome remarks for ITDI Director Dr. Nuna Almanzor, who was then attending the ASEAN Committee on S&T Meeting in Tagaytay. In her message, Dr. Almanzor emphasized the importance of the Metre Convention and mentioned a number of daily situations, from simple to complex, wherein the importance of metrology is inherent but, often, unnoticed. She then pointed out the



importance of the education sector/academe in raising awareness about metrology. According to her, "the academe is an esteemed partner in promoting metrology in the country".

Further emphasizing the importance of metrology in everyday life was the presentation given by Mr. Michael Jason Solis. He talked about the use of metrology in government functions such as in law enforcement (speed guns used for moving vehicles), consumer pro-tection and fair trade (weighing scales for various goods and calibrating buckets for petroleum products), as well as in health and safety (blood pressure gauges and clinical thermometers for health monitoring), among others. Basic concepts in metrology as the Science of Measurement were also presented. Reliability, accuracy vs. precision, measurement standards, measurement uncertainty, calibration, traceability, measurement result, and the SI units were just some of the matters discussed.

A two-part lecture was also given by NML Chief, Ms. Aurora V. Kimura. In the first part of her lecture, Ms. Kimura tried to test the participants' level of awareness of the International System of Units (SI). Rules in writing the SI unit symbols and names were initially discussed. Then, a series of examples were shown ranging from pictures of'everyday' or common products to various signages found in the streets. In the process, the group learned that a lot of errors are being committed in product labeling, common road signs, and printed advertisements that more or less involve metrology, such as errors in spacing or use of space, improper use of capital letters, use of non-SI



units, and incorrect symbols.

In the second part of Ms. Kimura's lecture, she cited incidents involving confusion between units or systems of measurement. Various case studies were presented. Some were really costly (such as the destruction of the Mars Climate Orbiter) while some could be dangerous to health (medical dose error) or even fatal (crash of Korean Air Cargo Freighter), and at times, hilarious and amusing (The Big Lobster of Australia). But one thing is certain, proper or correct measurement should be practiced at all times to avoid problems and inconveniences.

Lending more meat to the knowledge that was shared during this occasion was an introduction on the concept of the National Metrology Infrastructure given by Dr. Clemens Sanetra, PTB Consultant and an international expert on metrology. In his talk, he deliberated on the importance for a country to have its own metrology infrastructure. He underlined the role of the National Metrology Institute and its interplay with various sectors in the industry and other major stakeholders. He stressed the importance of the education sector that multipliers of knowledge, teachers, he said, "can play a vital role in encouraging a mindset among young people and scientists towards having a harmonized knowledge and terminology in metrology, as in promoting interdisciplinary understanding". "The education sector can also serve as impartial advisers to both private and public sector, provide valuable contributions to future technical committees, and disseminate a culture of guality to students in various levels and fields of study", Dr. Sanetra added.

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ITDI Biomass-Fired Steam Kettle Concentrates Coconut Water to Make Coconut Beverage

Maximum utilization of the nutritional benefits inherent in our natural resources to develop more products is a must for an institution like ours. Thus, ITDI expert researchers and engineers, after realizing the many benefits that can be derived from a natural source such as coconut water, specifically its nutritional value, joined efforts and wasted no time to develop ways to preserve and prolong its usefulness.

The Food Processing Division (FPD) together with the Technological Services Division (TSD) has completed a PCIEERD-GIA-funded project on the fabrication of a biomassfired kettle for the production of concentrated coconut water as an intermediate material for coconut beverage. This project aims to address problems on coco water wastage and to preserve and maximize consumption of coconut water and to extend its shelf life.

Coconut water nutritional benefits

Since the ancient times, coconut water has been revered as a natural source of nutrition, wellness, beauty, and hydration. In times of famine and war, coconut water was used as an intravenous fluid and saved many lives. It was then the only natural substance that can be safely injected into the human blood stream.

Modern science has validated its effectiveness, especially as a natural sports drink. It contains the five essential electrolytes that give our body every-thing it needs to stay hydrated and perform at its best. Coconut water has more potassium than banana - 15 times more than most sports drinks - better in preventing cramping. Coconut water is taken before or during a workout for the natural energy boost needed for optimal performance. After a strenuous physical activity, coconut water serves as a replenishing and rehydrating agent for speedy recovery.

Why the need for an appropriate processing method?

An appropriate processing technique and equipment are necessary to avoid wastage. Since most coconut water is consumed fresh in tropical coastal areas, once exposed to air, the liquid rapidly loses most of its organoleptic and nutritional characteristics, and begins to ferment. In copra proces-sing, the coconut water is normally discarded as waste material.

In order to extend the shelf life of coconut water, an appropriate method is by concentration. The concentrated coco water can then be transported in small volumes and used as an intermediate material for further processing into other value-added products like coconut beverage.

The lack of knowledge of appropriate processing methods and inefficient machineries are the two major problems faced by the small coconut processors. A lot of byproducts have been thrown away like coconut water from making copra which could have been converted or integrated as value-added product to maximize profit and increase their income.

The coconut farming sector comprises 90% of the coconut industry, while the other 10% is on manufacturing, 20% of which represents the large-scale enterprises (oil milling, refining and oleo-chemical manufacturing companies), while 80% comprises the medium-small-and micro-scale enterprises (MSMEs). The coconut farmers still remain suppliers of raw materials and only earn an income of P10,000.00 annually.

The viability of processing cocowater is site specific. There are limiting factors to be considered due to the short shelf life of the raw material. These are appropriate technology, equipment, electricity, and distance from farm to the nearest processing plant, and also the lack of government financial support and promotion of their product.



The fabricated biomass-fired steam kettle

The Institute has developed a simple open-type evaporator pan suitable for concentrating coco-water for small farmers. The evaporator is basically an open pan in which the liquid is boiled. Heat is supplied through a steam jacket using biomass as fuel. It is designed in such a way that keeps the smoke away from the surface of the pan thus preventing the coco water from getting a smoky odor and flavor. The evaporator is very simple to operate, cheap, and can be used in the coconut plantation even without electricity.

To disseminate these developments, trainings were conducted in Catanauan and Malugay, Quezon as part of TSD's techno transfer activities.

Conclusion and Recommendations

• Water must be collected from mature coconuts and husk must be removed within at least two days.

 Based on the field trials, the minimum load per batch of coconut water for cooking is 60 kg and maximum load is 75 kg.

Results obtained from the processing of concentrated coconut water during the field tests using biomass-fired steam kettle were not conclusive. More field trials should be conducted in order to attain reproducible results.

 There are some sediments at the bottom of the product after cooling.
Further filtration is needed to remove the sediments.

• Antioxidant may or may not be added to the coconut water.

□ Compliance to Good Manufacturing Practices (GMP) is a must to avoid contamination during the processing of Concentrated Coconut Water. (DDGotis w/reports from EMFalco) □

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ITDI's ECC paves way for in-house environmental clean up

Having been issued its Environmental Compliance Certificate or ECC, the ITDI is now implementing measures to clean up its environs and ensure that provisions in the ECC are carried out.

As an R&D institution, the ITDI conducts R &D activities and technical services and as a consequence of this function, hazardous wastes are generated in its various laboratories. Both the generation and how to properly dispose these hazardous wastes had become a substantial concern within the Institute, due to the risks these may pose to the researchers, community, and environment.

To address this concern, an environmental impact assessment (EIA) was conducted by the Waste Management Section (WMS) of the EBD (Environment and Biotechnology Division) led by Dr. Carmel C. Gacho. In the said EIA, all significant impacts of ITDI's operations, whether positive or negative, were identified. Along this line, the adverse effects were addressed through appropriate mitigating measures, while the positive impacts on the other hand, were further enhanced. These measures or strategies were reflected in a document called "Environmental Performance Report and Management Plan" or the EPRMP of the ITDI.

The EPRMP was then submitted to the Environmental Management Bureau of DENR for which an Environmental Compliance Certificate



(ECC) was issued to ITDI. The ECC is a planning tool that the Institute must implement to ensure that its operation will not cause any adverse impact on the environment, and to the health and welfare of the researchers/staff, and neighboring community. Annual training seminar/workshop for ITDI researchers/ staff were then conducted to disseminate the findings and recommendations of the EPRMP.

In line with this objective, since April of this year, the Waste Management Section (WMS), EBD headed by Dr. Carmel C. Gacho, has been holding a series of Chemical and Hazardous Waste Management (CHWM) seminars and assessment as well, in each Division of ITDI. To date, CHWM seminars have already been conducted in all eight divisions.

During the seminar, findings and recommendations on the chemicals and chemical wastes assessment previously conducted by the WMS team in the respective divisions were discussed, along with the ITDI's Environmental Performance

Report and Management Plan (EPRMP) that was earlier prepared in compliance with the requirements of the DENR. The employees were also briefed on the proper management of chemicals and chemical wastes in the ITDI laboratories and facilities. They also learned about Philippine Environmental Laws. Health and Safety in the Laboratory or Workplace, (GHS) of Classification and Labeling Globally Harmonized System of Chemicals, Hazardous Waste Classification System as mandated by the Department of Environment and Natural Resources (DENR), and proper Hazardous Waste Management practices.

To comply with our ECC, hauling of the accumulated hazardous wastes already started last June which Dr. Gacho supervised. Initial hauling and treatment of the wastes were contracted to All Waste Services, Inc. (AWSI), a DENR-registered transporter and treater of hazardous wastes.

With the implementation of the EPRMP and ECC, several benefits could be derived for the Institute such as: less penalty on environmental compliance, minimal hazardous waste disposal and wastewater treatment costs, reduced medical expenses to the researchers/ staff and the community, safe and clean workplace/environment for the researchers, and good corporate image. (w/ reports from GRE-chavia, EBD)

ITDI-STD rallies... from p. 4

Laboratory, attended a training workshop on June 24-26, 2013, on ISO/IEC 17043:2010 procedures, under the guidance of metrology experts from the Department of Science Service of Thailand's Ministry of Science and Technology and Germany's Physikalisch Technische Bundesanstalt (PTB).

As of now the MiC program conducts PT on samples for benzoic acid in mango juice and metals in water. IUPAC (International Union of Pure and Applied Chemistry) criteria are being used to conduct between-bottle and within-bottle homogeneity on the samples. Short and long-term stability evaluation via linear regression is also being done using the classical approach at storage temperatures of 40°C and 300°C.

With all these initiatives and developments, undoubtedly MiC is finally all systems go in the Philippines! (RRdelaCruz w/ reports from IUbando, STD) \Box

Drumming up... from p. 5

The last presentation of the day was from Mr. Manuel M. Ruiz who discussed why the country needs the National Metrology Laboratory as the National Metrology Institute (NMI) of the Philippines. He also emphasized the various roles and responsibilities of the NML.

An open forum followed thereafter giving way for an exchange of ideas between the participants and experts. Positive responses as well as concerns (or issues) were gathered and noted for future action. The participants were then toured at select laboratories. (JTrillana, NMD) \Box

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proFile

GLORY ROSE M. ECHAVIA Ph.D. in Environmental Science

Seen a petite lovely lady whose lips projects a smile at all times even as she works for hours in the lab? Well, this "monalisa" clothed in white lab gown takes the stage on 'Profile' and agreed to putting her professional and personal facts on the limelight.

Dr. Glory Rose M. Echavia, fondly called "Rose" by friends and colleagues is currently a Senior Science Research Specialist of the Environment and Biotechnology Division (EBD). Her 16 years of work experience makes her an expert in research and development of environmentally-sound technologies, including conceptualization and preparation of project proposals, project management and implementation, and write up of technical reports and scientific papers. She possesses strong technical and academic background on photo-catalytic treatment process and environmental technology impact assessments; has been involved in local and international technical committees for policy development; and has extensive experience as resource person on laboratory and chemical waste management.

Dr. Echavia is a graduate of Bachelor of Science in Chemistry from the Centro Escolar University (CEU), Manila in 1994. Her passion for higher learning drove her to pursue, specialize, and earn two Master degrees in Environmental Science from Griffith University, Queensland, Australia in 2002, and University of the Philippines, Diliman, Quezon City in 2010.

With her passion still unquenched after this feat, that inner drive to excel further moved her to climb a notch higher, so that in 2012, she earned her Doctorate degree in Environmental Science from the University of the Philippines, Diliman, Quezon City. While pursuing her program, she studied the photo-catalytic degradation of C.I. Basic Blue 41 dye in wastewater using immobilized TiO² titanium dioxide) under artificial and Solar UV-A (ultraviolet, long-wave) irradiation. Through her study, she found out the feasibility of using natural sunlight as an alternative source of UV-A radiation in the photo-catalytic degradation of recalcitrant organic compounds in water. Likewise, the result of her study showed the potential use of *Chlorella ellipsoidea*, a microalga that is abundant in Laguna Lake, as a promising test organism for toxicity testing in

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tropical environments. She now applies her knowledge and skills in TiO² photo-catalysis to develop photo-catalytic reactors for treating wastewater contaminated with difficult-to-degrade organic water contaminants such as textile dyes and petroleum products.

Dr. Echavia's interest in TiO² photo-catalysis grew out of her training as a JICA (Japan International Cooperation Agency) participant under Dr. Nobuaki Negishi in 2007 to 2008 at the National Institute of Advanced Industrial Science and Technology (AIST) in Tsukuba, Japan. With Dr. Negishi's supervision, she investigated the photo-catalytic destruction of pesticides in pure water. The results of her research was published in July 2009 in Chemosphere (Vol.76, Issue 55, 579-726), with Dr. Echavia as the main

author. In 2012, Dr. Echavia and Dr. Negishi, together with other Japanese and Thai researchers published another paper on the photo-catalytic detoxification of aqueous organo-phosphorus pesticides (Applied Catalysis B: Environmental, Vol. 128, 105-118).

In 2011 to 2012, Dr. Echavia was awarded a research grant by the International Center for Environmental Technology Transfer (ICETT) of Japan, to develop a visible light/ sunlightactive photo-catalytic TiO² thin film for water purification at the Physical Chemistry Laboratory of Osaka Prefecture University in Osaka, Japan. The study was a big challenge for her. "I didn't have previous knowledge on photo-catalyst synthesis and nano material characterization. But doing the research had been a good learning experience for me", she said.

Outside her 'intellectual-scientific' world, Rose describes herself as simple, low profile, and also passionate in her beliefs. She spends her leisure time reading good books, seeing action-thriller movies and TV series, and cooking. She likes engaging in muscle and cardio exercises like cycling, hiking, travelling, and museum hopping.

At the time of this interview, her single status was about to change. After long years of "waiting", she finally found her "Mr. Right", whom she describes as a God-fearing, sweet, gentle and humble man.

And before this issue got released, bells did ring and sumptuous tables set for a wedding. Our best wishes to you and congratulations to the lucky groom, Mark Gregory Cirineo! And as the Bible says, go out and multiply!!!! - (DDGotis)

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