

## PRRD appoints Ignacio as DOST assistant secretary, first woman top appointee from ITDI

President Rodrigo Roa Duterte appointed Dr. Diana L. Ignacio, Deputy Director for Administrative and Technical Services (ATS) of DOST-ITDI, as DOST's new Assistant Secretary on January 8, 2020 at the Rizal Hall in Malacañan Palace.

Sworn to oath by the President together with hundreds of other government officials, Dr. Ignacio is the fifth officer and first woman appointee from ITDI to take one of the top posts in the Science Department in exactly a decade.

In 1978-1986, DOST, then known as the National Science and Technology Authority, appointed ITDI's (formerly the National Institute of Science and Technology) Deputy Director for R&D, Dr. Quintin L. Kintanar, as Deputy Director General of DOST. Dr. Filemon A. Uriarte and Dr. Rufino C. Lirag, both former directors, followed as the fifth Science Secretary and Undersecretary for R&D, respectively, from 1991 to 2001; Dr. Rogelio A. Panlasigui followed next as Undersecretary for R&D from 2001 to 2010.

Dr. Ignacio was sworn to office as assistant secretary by DOST Secretary Fortunato T. Dela Peña on January 15, 2020, two years after serving as Deputy Director for ATS of DOST-ITDI from January 23, 2018 to January 31, 2020.



With an educational background rooted in Chemistry, she honed her administrative skills with Master's and Doctorate degrees in Public Administration.

As the new Assistant Secretary, Dr. Ignacio will be indirectly serving the Philippine Cabinet as she performs advisory tasks to the Department Secretary on different science affairs of the state. **(AMGuevarra\ TSD)**

## CED winds up energy project

The energy audit team of the Chemicals and Energy Division (CED-ITDI) marked the closing of an Energy Efficiency and Conservation (EE&C) project for State Universities and Colleges (SUCs) in six regions on December 11, 2019 at the Crimson Hotel in Muntinlupa City. CED's OIC, Engr. Apollo Victor O. Bawagan, together with Engr. Patrick E. Montero of DOST-PCIEERD, led the closing and awarding ceremony for six schools.



These include Cagayan State University – Region II; Mindoro State College of Arts and Technology – Region IVB; Carlos Hilado Memorial State College – Region VI; Eastern Visayas State University – Region VIII; Xavier University – Region X; and Mindanao State College -- GenSan Campus.

A grant-in-aid project of PCIEERD, EE&C aims to cut energy wastage at source. It can aid businesses/manufacturing plants in energy benchmarking information. Through analysis of electricity consumption, users can save as much as 50 percent in energy costs.

Engineers Bawagan and Montero presented four awards. They conferred the Best Regional Coordinator citation to Engr. Tamano S. Sacar of DOST XII. The Most Promising

## PMISD talks green in Biobased Coatings APAC 2020

DOST-ITDI, through Engr. Mertella Lenie M. Ysulat of the Planning and Management Information Systems Division (PMISD-ITDI) served as plenary speaker during the Biobased Coatings APAC 2020 held in Bangkok, Thailand on January 15-16, 2020.

Talking about Materials from Nature: Pushing Sustainable Green Initiatives, Engineer Ysulat focused on the key drivers of biobased coatings market, bio-derived raw materials, and the application of lignin and sugar-derived monomers in paints and coatings.

More manufacturers are now planning to switch to lignin from plant residues. Free of raw materials from fossil fuels, lignin is a green substitute.

She also introduced DOST-ITDI and its areas of engagement to potential stakeholders and industry partners in the biobased coating global market.

The two-day conference gave holistic outlook on the coating industry's latest developments, major challenges and opportunities, updates and future forecasts on supply



and demand of the key world markets and insights on policy evaluations.

A total of 21 industry leaders and institutions were represented in the said event. **(RATCruz\ PMISD-ICOW)**

## TAPI grants ITDI Derwent Innovation Account

DOST-TAPI granted ITDI one user account to Derwent Innovation, a patent research platform, on January 30, 2020.

With the Derwent account, ITDI can now easily search and access prior art using Derwent's enhanced content of regularly updated and curated patent information known as the Derwent World Patent Index or DWPI.

Further, ITDI was granted an Analyst-level account, which grants it access to additional data analysis tools such as ThemeScape mapping and Text Clustering, functions that are not available in free-access databases.

Using a ThemeScape map, an interactive two-dimensional map, will enable ITDI researchers to visualize trends in specified research landscapes. Here, higher concentrations of research are represented by peaks and islands and areas with lower concentrations or a total dearth are represented by valleys.

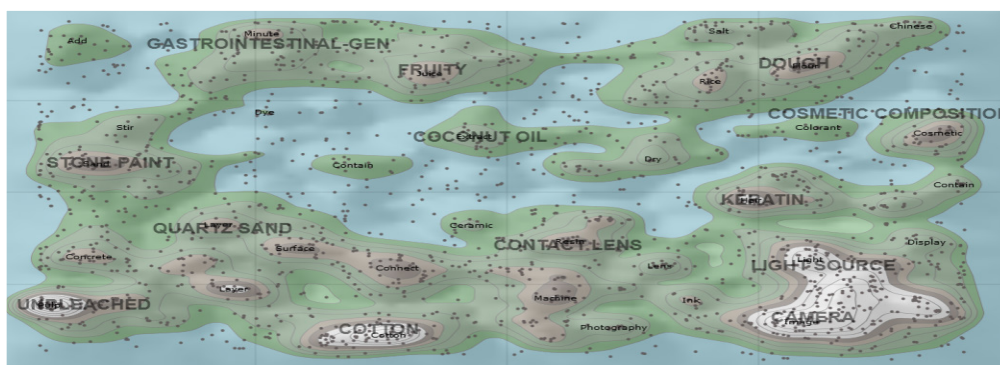
ITDI can use the platform in developing sectoral R&D roadmaps and in identifying patent utilization approaches.

Using Text Clustering, on the other hand, according to Clarivate Analytics, will enable one to see how competitors describe their inventions and understand their portfolios, find new terms of art, get a better understanding of the market, and discover emerging technologies.

Currently, TAPI granted ITDI a one-year trial period. After this, it will assess how ITDI has made use of the account. Among the outputs that TAPI will review are patent searches, patent maps, policy drafts, and consultancy reports.

In support, ITDI is working on draft of utilization guidelines on use of the Derwent Account. Research and development, as well as, technical services divisions will be given access to the platform. A training of sectional focal persons will follow implementation and use of the guidelines.

Meanwhile, those interested in accessing the platform, may get in touch with their Office of the Chief, PMISD or TSD for the identified focal persons. **(JRM Cuevas\ TSD-ICOW)**



Sample ThemeScape map generated using the key words "monascus" and "colorant"



# ITDI, KLT Fruits to develop vegan meat foods

KLT Fruits, Inc., one of the Philippines' largest tropical fruit product manufacturers, has inked an agreement with DOST-ITDI to develop vegan meat products on February 12, 2020 at the Executive Office of ITDI in Bicutan.



ITDI Director Annabelle V. Briones and KLT Fruits CFA Director Peter Martin Sia, CPA agreed to collaborate on development of sausages, nuggets, burgers, and meatballs using vegan recipes or plant-based materials.

Other signatories included FPD Chief Dr. Norberto G. Ambagan with Project Leader Elsa M. Falco, and PMISD Chief Dr. Zorayda V. Ang for ITDI. KLTFI was also represented by Maria Carmina D. De Guzman, R&D Supervisor and other staff.

Founded in 1984, KLT Fruits, Inc. has been producing such products as frozen fruits, fruit preserves, fruit preparations, sweetened puree, fruit fillings, fruit solids, dried fruits, fruit flour, and natural fruit powder, for the local and global markets. **(RRUDelaCruz\ TSD-ICOW)**

## Three MSD women listed in TECHNICOM's Women Leaders in Innovation

While the ravaging effects of the COVID-19 pandemic continues unabated, the Technology Application and Promotion Institute (DOST-TAPI) went on to work to honor women in science last March.

In its website TeKnowLohiya, which contains promising local innovations and their generators under its TECHNICOM [Technology Innovation for Commercialization] program, its Women's Month postings listed Women Leaders in Innovation for 2020. (The TECHNICOM program offers funding for start-ups to validate their business models.)

Among those featured were three women researchers from the Materials Science Division (MSD-ITDI), as follows:

Dr. Blessie A. Basilia, MSD chief, developed ceramic water filters to provide clean water solutions to underdeveloped communities;

Josefina C. Celorico, head of Special Materials Section, works mainly on ceramics, construction materials, mineral processing, nanomaterials, and their industrial uses. TECHNICOM supported her project on nano-sizing zeolite, a naturally-occurring mineral in the Philippines; and

Dr. Marissa A. Paglicawan who has been recognized by the Asian Scientist Magazine in 2019 as one of the 100 top scientists in Asia for her work on abaca as an engineering material. **(DDGotis\ TSD; Source: TeKnowLohiya)**



## CED winds up... *from p. 1*

Regional Energy Audit team was given to auditors who emerged as top implementers of energy audits and best practices in energy efficiency and conservation.

The DOST XII received the award with DOST IVB as runner-up. Two from DOST XII and DOST VIII were cited as the Most Promising DOST Energy Audit Technical Service Providers for having initiated activities to strengthen their energy auditing capabilities.

Finally, among the schools, the Best EE&C Options Implementer was awarded to Carlos Hilado Memorial State College - Talisay City Campus for their outstanding efforts to implement energy efficiency and conservation options in their school. **(FEdelPozo, Jr.\ CED; AMGuevarra\ TSD)**

# COVID-19 Update at DOST-ITDI

## ITDI joins frontliners

### Brings RTE foods, drinks to 9 cities, regions

Corona virus disease or COVID-19, now pandemic in magnitude, is an infectious disease caused by a newly discovered coronavirus; as of March 29, 2020, 4:00 PM PST, the Philippines has 1,418 confirmed cases, 71 deaths, and 42 recoveries.

But, at a time when most of us are staying at home for safety due to COVID-19, a team from the Packaging Technology Division (PTD-ITDI) breached their safe confines on several occasions.

On March 26, 2020, they delivered more than 20,000 pouches of Ready-To-Eat Chicken Arroz Caldo called "Pack of Hope" to cities in Manila and Davao.

Five Disaster Risk Reduction and Management Offices in Taguig, Pasig, Manila, San Juan, and Quezon City augmented their community food supply with 3,000 pouches each of RTE Chicken Arroz Caldo; while Davao City received more than 5,000 pouches of RTE chicken arroz caldo and smoked fish rice meal.

This was followed by a delivery of 3,000 pouches of RTE smoked fish rice meals to DSWD Region IVA on April 1.

Five days later PTD-ITDI then distributed 4,000 pouches of RTE Chicken Arroz Caldo in Isabela Province in Region II. It tapped one of the province's disadvantaged and remote barangays and DOST II's CEST (Community Empowerment thru Science and Technology) Program beneficiaries.

Produced by Kai Anya Foods International, an ITDI technology adopter, PTD's RTE foods may be used as an alternative food choice to relieve hunger pangs.

On its own, the food treat relies on its nutritional value plus its features of being a no-cook, no-drinkables, no preservative chicken or rice meal that can be stored in homes or stores for a year.

Further, ITDI donated on April 7 more than 1,000 mungbean-coconut milk beverages in stand-up pouches to LGU Pasig City and LGU Plaridel in Bulacan through the Ang-Hortaleza Foundation of the Hortaleza Group of Companies in Valenzuela City.



Developed by the Food Processing Division (FPD-ITDI) led by Dr. Norberto E. Ambagan, the beverage is made from protein-rich green mungbeans and creamy coconut milk.

No different in taste and mouthfeel from soy milk, it can be enjoyed as an everyday healthy drink or as alternative to dairy milk.

Lactose intolerant individuals can use it for other food preparations such as coffee, tea, breakfast cereals, shakes, and smoothies. Mungbean-coconut milk is also shelf-stable for a year.

Meanwhile, ITDI Director Dr. Annabelle V. Briones has offered use of its Food Innovation Center-Main located at the DOST Complex in Bicutan, Taguig City to interested small-scale food processors whose processing operations are affected by the enhanced community quarantine.

Here, interested parties may avail themselves of free use of a vacuum fryer, spray dryer, water retort, and freeze dryer.

As well, Director Briones has made available through the ITDI web portal 'How To' learning materials on hand sanitizer and other technology videos.

With innovative thinking, and application of research and development advances, the science community can serve the people, help save lives, and impact change. **(AMGuevarra\ TSD)**

## MATDEV-MSD develops respirator, ventilator parts for COVID-19 patients

The fight against the COVID-19 pandemic has been a struggle for most Philippine hospitals as need for respirators and ventilators continues to increase.

With confirmed cases reaching 5,453 as of April 15, 2020, MATDEV Team Leader and Materials Science Division Chief Dr. Blessie A. Basilia, delivered two prototypes of 3D printed respirator venturi valves to the National Children's Hospital in Quezon City on April 14 to test fit in their existing respirator.

The MATDEV (Multiple Materials Platform for Additive Manufacturing Project) Team, using Fused Deposition Modeling and Markforged Mark Two 3D printers developed the prototype to assist hospitals as they easily run out of respirator valves.

These valves connect patients in intensive care to breathing machines. Respirator venturi valves are commonly used by hospitals worldwide because these can be used for a maximum of eight hours at a time.

MATDEV is also working on 3D printing prototypes of parts of the Multiple Patient Ventilator Splitter and Mechanic Ventilator-Mini-War Zone.

Also listed by DOH as one of badly needed equipment for COVID-19 treatment, ventilators are machines that help to get more oxygen into the lungs and take carbon dioxide out. It is designed to breathe for somebody who is unable to breathe effectively on their own. Five hospitals in Metro Manila were listed to receive their 3D printed prototypes of ventilator parts.

Further, the Team is improving nebulizer mask design. They developed a 3D printed filter attachment for use in commercially available masks such as the Modified Oxygen Concentrator Mask. The attachment allows for a more efficient way for patients to breathe in medications.

Meanwhile, ITDI donated 100 3D printed frame and face shield assemblies to the Perpetual Help Medical Center in Las Pinas City on April 14. This augmented an initial donation of 100 of the shield assemblies to the Philippine Heart Center on March 30.

Through innovative thinking and application of research and development advances, the science community can serve the people, help save lives, and impact change. **(AMGuevarra\ TSD)**

## ITDI joins focus group on research potential of NWFP

DOST-ITDI joined 25 researchers and experts in a Focus Group Discussion on research potential of Non-Wood Forest Products (NWFP) held on March 2, 2020 at the Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) in Bicutan, Taguig City.

Noting the diverse Philippine forest ecosystem, the group took to task themselves on exploring these renewable resources.

With previous studies on gums, resins, oils, and other extractives (GROEs) from NWFP as bases, the group tapped the research potential of materials such as medicinal and aromatic plants, fibers, seeds, and animal products. As well, they looked into their potential in cosmetics and medicinal applications.

With ITDI being more than a decade ahead in research on NWFP, Maricar B. Carandang and Danielle Camille P. Canillo of CED (Chemicals and Energy Division) and STD (Standards and Testing Division), respectively, presented completed projects.

Moving forward, PCIEERD will next meet different players from the private sector to get industry insights and to address current challenges in processing GROEs.

The FGD was attended by representatives from DOST's Research and Development Institutes, other national government agencies, and State Universities and Colleges. *(MLMYsulat\ PMISD-ICOW)*

## ITDI trains every Juan in the country

The DOST-ITDI Training Program continues to be an in-demand service around the country as various sectors of the industry upgrade their knowledge and skills sets.

For the first quarter of the year, a total of 19 trainings were implemented. These include in-house regular training (RT) courses, regional training (RGT) courses offered to customers by the Regional Offices, and customized training (CT).

Some 414 participants coming from LGUs, private companies, national government agencies, foundations, NGO, and MSMEs have attended these training courses as follows:

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## COVID-19 Update... *from p. 4*

### Filipino doctors develop SARS CoV-2 PCR Detection Kit

Local medical doctors at the University of the Philippines-National Institute of Health (UP-NIH) have developed a technology to detect SARS CoV-2 PCR.

Led by Dr. Raul V. Destura, the technology on the PCR (polymerase chain reaction) test kit is intended to detect nucleic acid from the SARS-CoV-2 found in the upper and lower respiratory systems of patients.

Funded by the Philippine Council for Health Research and Development (DOST-PCHRD), the new technology was recently granted FDA approval.

It may now be used for immediate diagnosis of COVID-19 cases in the country.

Further, while foreign-made kits cost Php8,500/test, it is 85 percent cheaper at Php1,320. *(DOST; MVAtienza\ TSD-ICOW)*



### AMCen-MATDEV: Electrostatic filters better than HEPA filters

A joint study of the AMCen-MATDEV Team of MSD-ITDI and the University of Sto. Tomas Hospital shows that electrostatic filters are better than high-efficiency particulate air (HEPA) filters in respirators used by COVID-19 patients.

A critical part, an air filter in a respirator is designed to protect wearers from inhaling hazardous fumes and particulate matter such as airborne microorganisms.

Dr. Meyvell G. Atanoso, a certified anesthesiologist at the UST Hospital at the Sampaloc District in Manila, explains that they usually use a bacterial/viral filter known as a heat and moisture exchange (HME) filter, in their ventilators and respirators.

However, the difficulty of acquiring HME filters amidst the health crisis has prompted them to look for an alternative filter that can provide benefits similar to HME filters.



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# World Metrology Day at NML, Opens Water Flow System Facility

2020 is a specially eventful year as the World Metrology Day or World Met Day is celebrated around the globe.

Another equally important event is WMO's (World Meteorological Organization) celebration of Climate and Water on its World Meteorological Day. It acknowledges the force behind all living things - water.

As well, it reminds us of the water challenges that humanity faces. Its theme encourages us to "Count Every Drop, Every Drop Counts."



**120 L and 1 200 L Collection Tanks mounted on weighing scales.**

Using water as reference liquid, the Automatic Flowmeter Calibration System can calibrate flowmeters with sizes ranging from DN (nominal diameter) 25 to DN 100. It has two test lines that can accommodate at most two units under test depending on size and type of flowmeter.

The Flow Laboratory started operation early this year providing calibration services to the land development and subdivision industry, concessionaires of water utilities, including the manufacturing, petroleum, and construction sectors.

Fully trained technical staff on Liquid Flow Measurement and Calibration are now preparing for accreditation of the facility's flow calibration service under the terms of ISO/IEC 17025:2017.  
**(LNAbian & JAGTrillana \ NML)**

With water stress comes floods and drought, which exacerbates delivery and access to clean water supplies especially in citified areas like Metro Manila.

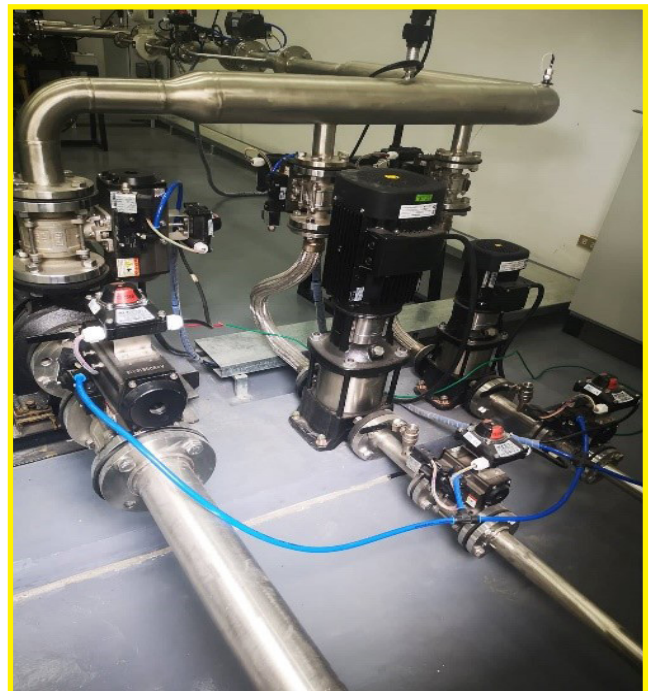
Thus, in celebration of World Met Day, the National Metrology Laboratory (NML-ITDI) announced opening of its Water Flow Calibration Facility.

The Php18 million infrastructure, acquired through a project on Strengthening Physical Metrology Capabilities of NML, aims to assist the country's water concessionaires in improving their forecasting, monitoring, and management of water supplies.

Use of the facility hopes to address the problem of too much water or too little water. Further, it realizes one of the country's commitments in Legal Metrology to establish a metrological infrastructure for testing of water meters in the country.

With this, buyers of water are protected from sellers of water.

NML is thus enjoining concessionaires of water utilities and water metering regulatory agencies of our government to harmonize their verification test procedures with the international standards.



**Pumps at the inlet section operating at 1 m<sup>3</sup>/hr (low), 12 m<sup>3</sup>/hr (medium) and 160 m<sup>3</sup>/hr (high).**

## COVID-19 Update... *from p. 5*

Recalling how ITDI assisted key government groups in analyzing particulates ejected by the recent eruption of Taal Volcano, Dr. Atanoso thus sought research assistance from the MATDEV Team.

Led by Senior Science Research Specialist Marianito T. Margarito, the Team conducted optical microscopy to compare particulate matter (PM) 2.5 filter, HEPA filter, and the common surgical mask.

Results showed that HEPA filter is the most effective in filtering air among the three. However, based on further study, an electrostatic filter is an even better alternative to HEPA filter due to its electrostatically charged fibers.

To check, the UST Hospital acquired a supply of electrostatic filters and submitted these for evaluation by MATDEV. In the meantime, it is using HEPA filters but intends to switch to electrostatic filters based on results of the characterization analysis. **(RRUDelaCruz \ TSD-ICOW)**

# FPD develops plant-based protein concentrate for sports nutrition



Under growing huge piles of agricultural wastes from coconut, rice, and vegetables is untapped wealth.

Called by some as 'green gold', the global functional proteins market is projected by MarketsandMarkets Research Private Ltd. based in Pune, India to reach US\$5.73 billion by 2022.

At FPD-ITDI, Food Safety Section Head Lourdes S. Montevirgen and her team will thus be working to tap into that market. Their focus is primarily to increase usage of protein concentrates from local plant and vegetable sources, which otherwise end up as wastes or are underutilized.

Funded under the DOST Grant-In-Aid program, the Team will recover protein from processing by-products such as pressed coconut meal and rice bran, and local vegetables like cow pea (paayap) and pigeon pea (kadyos).

Current functional protein concentrates and their other forms are seeing increased global demand because of consumer awareness and needs for food products with improved functionalities such as infant formula, sports nutrition, functional beverages, dietary supplement, and animal nutrition.

More than these, however, Montevirgen is looking at alternative material sources that would not compete with currently more

important usage, e.g., protein from coconut meat instead of pressed meal, or protein from animal sources instead of rice bran.

These are sources which offer functionality for other higher value products like copra and their derivatives, and milk and milk products.

The Team will thus develop protein concentrates that can be applied in sports nutrition like high-protein drinks, animal meat alternative like textured vegetable protein (TVP) products, and in liquid food as stabilizers or emulsifiers.

To recover protein from these sources, the project will develop and modify existing methods of pretreatment, extraction and recovery. These will maximize factors such as productivity, reliability, and efficiency of methods to recover the protein especially for commercial production of food-grade protein concentrates.

Hence, while the growth of the proteins market is driven by consumer awareness and needs for functional foods, the Team is riding on healthy diet, increasing instances of chronic diseases, and technological upgrades in food to shift demand from plain functional to healthy and functional foods. **(AMGuevarra\ TSD; MCMManabat\ FPD-ICOW)**

## RCTS-TSD launches Webinar Series on TekPinoy.biz

With life temporarily on hold because of the COVID-19 pandemic and community quarantines in Luzon, many have been looking for alternative means of livelihood.

To encourage more people to learn new knowledge and start their own businesses while on quarantine, the Regional Cooperation and Training Section at the Technological Services Division (RCTS-TSD) launched its first of a series, online, live, educational event or Webinar featuring technologies for Pinoy businessmen, otherwise called "Webinar on TekPinoy.biz." Here, businesses and other interested parties engage online to hear a speaker deliver a presentation. Meanwhile, audiences of Webinar on TekPinoy.biz submit questions which the speaker answers.

For its first technology feature, more than 700 participants from different parts of the country logged in on May 14, 2020 for a lecture-demonstration on Calamansi Processing.

Rose Ann H. Bonto, of RCTS-TSD, discussed how to process calamansi into concentrate and ready-to-drink calamansi juice. She provided tips on basic Good Manufacturing Practices (GMP)

on calamansi processing including proper packaging and storage of calamansi products before selling.

Further, Bonto discussed how to product cost ready-to-drink calamansi juice to ensure return on investment.

For the second installment of TekPinoy.biz held on June 4, businesses were treated to a lecture on Taho Processing, a healthy snack and dessert that every Filipino household loves.

This time Una Grace M. Dollete of the Food Processing Division (FPD-ITDI) joined Bonto and more than 1,200 registered participants.

Bonto discussed basic GMP and an easy to follow taho recipe. A business opportunity plan was also presented to give viewers an idea of the investment costs and returns.

Up next on Webinar on TekPinoy.biz is the Hand Sanitizer technology from the Chemicals and Energy Division (CED-ITDI).

Re-runs of Webinar on TekPinoy.biz may be viewed at ITDI's official YouTube channel <https://www.youtube.com/channel/UCScU3tVz-zT83v84CEPrOCw/videos>. **(MVAtienza\ TSD-ICOW)**

# ITDI trains... *from p. 5*

## TRAININGS CONDUCTED, January to March 2020

Training	Region/Venue	Participants
<b>Solid Waste Management Technologies</b>		
Dual Drum Composter Technology	NCR /Brgy. Pasolo, Valenzuela City	13 participants from LGU
	NCR /Brgy. Hall, Don Bosco, Parañaque	63 participants from LGU
	I /E-Kawayan Center, Alaminos City, Pangasinan	59 participants from LGU
Bioreactor (500-kg cap)	IX /LGU Sergio Osmeña, Zamboanga Del Norte	26 participants from LGU and government office
Styro-Plastic Densifier	IX /LGU Sergio Osmeña, Zamboanga Del Norte	26 participants from LGU and government office
Waste Analysis and Characterization Study (WACS) Plan Preparation	NCR /Manila Zoo, AdriaticSt., Manila	44 participants from LGU
	I /Anda, Pangasinan	25 participants from LGU and government office
	CALABARZON /Robinsons Mall, Gen. Trias, Cavite	23 participants from private and NGO
	CALABARZON /Lancaster New City, Gen. Trias, Cavite	28 participants from private
<b>Livelihood Technologies</b>		
Rootcrops Processing	III /Abelling Community, San Jose, Tarlac	25 participants from LGU and government office
Banana in Syrup and Dried Banana	NCR /ITDI-FPD	4 participants from private (See's Int'l. Food Mfg., Davao City)
Soymilk Processing	NCR /ITDI-FPD	3 participants from private (Manulife and BDO, Makati)
Formulation of Personal Care Products (lotion, liquid handwash, hand sanitizer, shampoo)	NCR /ITDI-CED	12 participants from private, government, LGU, foundation
Proper Bottling of Meat Products (Basic Thermal Processing)	NCR /ITDI-FPD	2 participants from private (Edel's Best, Pasay)
<b>Metrology</b>		
Pressure Metrology and Calibration of Pressure Gauges	CALABARZON /Incalsys, Inc., Ortigas Ave., Ext., Antipolo City, Rizal	15 participants from private (Incalsys Inc.)
Calibration of Weights based on OIML R 111	CALABARZON /Incalsys, Inc., Ortigas Ave., Ext., Antipolo City, Rizal	15 participants from private (Incalsys Inc.)
Calibration of Digital Multimeter	CALABARZON /Incalsys, Inc., Ortigas Ave., Ext., Antipolo City, Rizal	15 participants from private (Incalsys Inc.)
Introduction to Mass Metrology	NCR /NMD-ITDI, Taguig City	13 participants from PDEA (various regional offices)
Calibration of Liquid-in-Glass and Digital Thermometer	CALABARZON /Incalsys, Inc., Ortigas Ave., Ext., Antipolo City, Rizal	15 participants from private (Incalsys, Inc.)
Introduction to Measurement of Uncertainty	NCR /NMD-ITDI, Taguig City	14 participants from PDEA (regional offices)

(Candelaria \TSD-ICOW)

### Our Business Is Industry



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