



BAGONG PILIPINAS



DOST



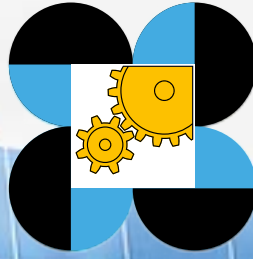
DOST-ITDI

2023

# ANNUAL REPORT

Department of Science and Technology  
**INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE**

INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE



## INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE

**The Industrial Technology Development Institute (ITDI) laid the groundwork for S&T in the country.**

As one of the DOST's R&D agencies that undertakes multidisciplinary industrial R&D, technical services, and knowledge translation or technology transfer/commercialization, DOST-ITDI harnesses know-how in new technology and product innovation, and through the years, has emerged as a credible and reliable industry and government partner in accelerating growth and development in the country.

## MANDATE

- Undertake applied research and development to generate new knowledge, technologies, and innovations in the field of industrial manufacturing, mineral processing, and energy.
- Conduct knowledge translation or technology transfer and commercialization.
- Provide technical services, tests and analyses, and metrology to ensure international traceability of the national units of measure.

## MISSION

“To contribute to making local industries globally competitive through research and development, transfer and commercialization of innovative and sustainable technologies, and provision of appropriate technical services”

## VISION

“By 2030, DOST-ITDI is the country's leading industry partner in Science, Technology, and Innovation”




# About the Cover

The predominantly blue and green color scheme of the cover design represents the ITDI technologies under the blue and green economies and its applications, which were among the primary research focus of the agency this year.

The gradient shapes of varying blue hues represent the dissemination and resonance of knowledge between ITDI and the industry and other stakeholders, converging in the middle to signify mutual understanding and collaboration.

The grid patterns symbolize our flexibility and reach across a wide array of industrial fields, while the graph patterns represent our Institute's performance amidst the challenges.



The bottom portion of the image shows the exterior of the Austral Technology Development Institute. A prominent blue canopy structure extends over the entrance, with the words "AUSTRAL TECHNOLOGY DEVELOPMENT INSTITUTE" printed in white capital letters on its front edge. The building's facade is a mix of blue and white panels. In the background, there are trees and a clear sky.



# Welcome to our Annual Report 2023

This year's annual report presents several impactful and innovative solutions that will bring significant changes to the conventional model of doing business transactions. Ranging from bioinspired technologies, alternative energy, blue and green technologies, food processing and packaging, 3D printing and nanotechnologies, among other R&D endeavors, ITDI offers several R&D innovations that will contribute hugely to the nation's economic success. Over the past 122 years, ITDI has explored and expanded science, technology, and innovation to improve the quality of lives of Filipinos. The following core values serve as its lifeblood, heart, and soul to drive its mission and vision in serving the Filipino people, achieving a remarkable and inclusive recovery, and creating long-term sustainability.

- **Innovativeness.** Fountain of creativity and new ideas fueling better products, services, and processes.
- **Technical competence.** Diverse pool of experts in different fields
- **Dependability.** Unwavering support and assistance to the public.
- **Integrity.** Diligence in striving to do what is right and just.

**WE ARE ITDI.**

**Inspired by Technology, Driven by Innovation.**



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# Message

of the Secretary

*Effective... Sustainable... Resilient...*

I wish to reflect on these words for ITDI this 2023, as I commend all its officials and staff for heeding the various challenges faced by the Institute, especially regarding promotions, partnerships, and research and development.

With its various innovations and technical services, the Institute made significant innovations in food processing, such as its version of *randang* sauce, ready-to-eat quail eggs, and new variants of its ready-to-drink tablea beverage. These technologies provide a unique twist to local and international foods, adapting to local taste buds.

ITDI has also developed and, following its launch during the first-ever NSTW held outside Metro Manila, deployed its first Mobile Modular Food Processing Facility, or MMFPF, from Iloilo City to Roxas City in Capiz. Also called the Food on-the-road Innovation and Processing Facility (FoodtrIP), it provides MSMEs with a well-equipped mobile facility for developing and processing their products, from preparation and cooking to packaging and storage. Three other trucks will be deployed initially: MIMAROPA, Region X, and the Zamboanga Peninsula.

In collaboration with DOE, DOST has launched its Fuel Cell R&D and Testing Center, aimed at developing energy

alternatives in fuel cell technology – the first of its kind in the country. Though still young in its research on fuel cell technology, with much optimism, the facility will be a suitable venue for developing fuel cell batteries. It is a sustainable and efficient alternative energy source for powering electric vehicles, devices, homes, and offices.

The Virology and Vaccine Research Program likewise gained ground by establishing the plant virology laboratory at the ADMATEL Building. The project has procured vital equipment for its research in plant viruses, such as a Level 2 biosafety cabinet, centrifuge, incubators, plant growth chambers, PCR machines, and refrigerators.

ITDI, through its Standards and Testing Division, has also finished upgrading its Laboratory Animal Facility or LAF, which aims to be its venue for advancing health-related research through the ethical treatment of laboratory animals in compliance with RA 8485 or the Animal Welfare Act of 1998.

Lastly, the Technological Services Division launched its Knowledge Management for Science, Technology, Innovation, Culture, and Arts, or KM-STICA, as its KM hub for



promoting STI and a venue for exhibits, events, meetings, workshops, training, and creative expression.

ITDI also went beyond boundaries as it took part in various exhibitions, from local such as the NSTW and RSTWs, the first ever NYSTIF, International Ecotourism Travel Mart (IETM), and the Handa Pilipinas Luzon, Visayas, and Mindanao legs, to foreign exhibits such as COEX Food Week and the Seoul International Invention Fair 2023, both in Seoul, South Korea.

These are just a taste of all the efforts done by ITDI, from R&D to technical services to techno transfer and promotion. I am optimistic and grateful for all the hard work and expect more quality outputs this coming year. May we always put our hearts into our work, as our love for science, technology, and innovation must radiate to all our partners and stakeholders.

Keep it up, DOST-ITDI, and MABUHAY!



**RENATO U. SOLIDUM, JR., PhD**  
Secretary



# Message

of the Director

2023 was a stimulating and inspiring year for us at DOST-ITDI. Our dedication and hard work have enabled us to meet our vision as the country's leading industry partner in Science, Technology, and Innovation.

Our strategic alliances, state-of-the-art infrastructure, and commercially viable technologies have harnessed cutting-edge scientific advancements and catalyzed significant growth in the local industry. This growth has been instrumental in fostering economic development and enhancing the quality of life in the community.

DOST-ITDI's notable achievements include successfully installing the Power Back-Up System in Bataan, ensuring uninterrupted power supply during emergencies. Inaugurated as well in collaboration with the Department of Energy was state-of-the-art Fuel Cell R&D and Testing Center that accelerates the development of clean and efficient energy solutions. Moreover, two distribution centers were inaugurated and installed with a packaging line and cold storage chambers, namely, Benguet Cold Chain (BCC) in La Trinidad, Benguet, and Agrizkaya Cooperative Federation in Bambang, Nueva Vizcaya, respectively, under the project "Upgrading of Capability of Existing Distribution Centers/Trading Posts in the Delivery of Fresh and Semi-Processed Agricultural Products in the Supply Chain Focusing on Packaging Technology and Logistics" of the DOST Smart Food Value Chain Program, a testament to our shared commitment to improving the agricultural sector.

Also through the DOST Smart Food Value Chain Program, we developed the first Food on-the-road Innovation and Processing Facility (FoodtrIP), or the Mobile Modular Food Processing Facility that seeks value-added agri-fisheries production and extended product shelf life. Inaugurated and launched during

National Science and Technology Week (NSTW) in Iloilo City, it marked a significant step forward in our mission to revolutionize the food industry. Stationed at Capiz State University-Dayao Satellite Campus, the FoodtrIP is a 32-foot customized truck equipped to process agriculture and fishery by-products. It offers conventional and vacuum frying technologies, providing farmers and fisherfolks a solution to reduce losses from quickly spoiling products. It also aims to give them value-added products while reducing food wastage and contributing to a more sustainable food chain, a vision we are excited to share with you.

Continuing our commitment to enhancing service quality and modernizing our offerings, we proudly inaugurated the newly refurbished Laboratory Animal Facility (LAF). Designed to provide a conducive and ethical environment for research animal welfare, it is crucial in fostering breakthroughs in disease treatment. In addition, we introduced the Knowledge Management in Science, Technology, Innovation, Culture, and Arts (KM-STICA) Platform, a pioneering center for knowledge aggregation and exchange.

With the implementation of the vaccine and virology research program, a plant virology laboratory was established through the DOST-GIA-funded projects "Biological Control Potential of Bacteriophage Cocktails for Bacterial Diseases of Papaya" and "Generation of a Plant Virus Vector for Protein Expression and Functional Gene Analysis for Abaca and Banana."

Our dedication to meeting the evolving needs of our stakeholders was shown through proactive measures and continuing education initiatives. The DOST-ITDI Intellectual Property (IP) Management team was pivotal in conducting training sessions, focusing on customer discovery, inventorship, and IP valuation, equipping our stakeholders with the necessary



skills and knowledge to navigate the complex world of IP. Additionally, comprehensive Gender and Development training sessions empowered over 300 researchers and staff to integrate gender inclusivity into project creativity and execution, enhancing our capacity for inclusive innovation.

In 2023, DOST-ITDI made significant strides in expanding our research program. A total of 52 projects have been completed, 42 of which are General Appropriations Act (GAA) projects and 10 of which are Grants-in-Aid (GIA) funded. Eighteen technical papers have been published in various refereed journals. 38 scientific papers and 28 posters have been presented in multiple local and international forums, symposiums, and conferences.

DOST-ITDI's Industry Advisory Committee (IAC), which includes industry experts and business leaders from private and public sectors, expanded by adding more members from different associations. This demonstrated a commitment to enhancing collaboration and a comprehensive approach to industry challenges.

This report comprehensively illustrates ITDI's impactful contributions as the department's premier industry research and development arm. It encapsulates various activities, from inception and execution to partnership cultivation, geographical outreach, and product dissemination.

As the vanguard of Philippine industry advancement, DOST-ITDI remains steadfast in its mandate. It is poised to champion science-driven methodologies to elevate productivity to global benchmarks, ensuring sustained progress in the years ahead.

We remain committed and dedicated to our mandate and mission to emerge from the challenges of 2023 more vigorously and impactfully than ever.

I extend my heartfelt gratitude to the ITDI Execom members and the entire ITDI family. Your unwavering commitment, dedication, and passion have propelled us to these heights. Our collective effort and strong operational performance, which you have been an integral part of, have been instrumental in achieving our goals, milestones, and deliverables.



**ANNABELLE V. BRIONES, PhD**  
Director

# Highlights of the Year



## Establishment of Fuel Cell R&D and Testing Center

This year, the Industrial Technology and Development Institute (ITDI) through the ongoing project on the Establishment of Fuel Cell Research and Development (R&D) and Testing Center marked a significant milestone with its inauguration last July 6, 2023. Comprised of specialized laboratories such as the Material Synthesis Laboratory, Material Characterization Laboratory, and Fuel Cell Assembly and Testing Laboratory, this facility is at the forefront of cutting-edge research and innovation.

In partnership with the Department of Energy (DOE), the primary goal of this project is to contribute vital research and testing solutions to develop localized fuel cell technology. This facility will address the barriers to its mass commercialization to reduce cost and improve performance. It will also address environmental problems such as air pollution, greenhouse gas emissions, and energy security.



## Establishment of Plant Virology Laboratory

Under the Virology and Vaccine Research Program, projects titled *“Biological Control Potential of Bacteriophage Cocktails for Bacterial Diseases of Papaya”* and *“Generation of a Plant Virus Vector for Protein Expression and Functional Gene Analysis for Abaca and Banana”* have led to the establishment of the plant virology laboratory located at the ADMATEL Building. The project has acquired some necessary equipment, such as biosafety cabinet level 2, centrifuge, incubators, plant growth chambers, PCR machines, and refrigerators.



## Upgrading of ITDI-Laboratory Animal Facilities in Support of *Tuklas Lunas* and Other DOST Programs and Industry Needs

The DOST-ITDI inaugurated its newly upgraded Laboratory Animal Facility (LAF) last December 4, 2023. It plays an important role in advancing health-related research through the ethical treatment of laboratory animals in compliance with RA 8485 or the Animal Welfare Act of 1998. In strict compliance with this Act, the ITDI LAF aims to protect and promote the welfare of all animals by supervising and regulating the establishment and operations of the facility for breeding, maintaining, keeping, and treating all animals used for testing.



## Upgrading the Capability of Existing Distribution Centers/ Trading Posts in the Delivery of Fresh and Semi-Processed Agricultural Products in the Supply Chain: Focusing on Packaging Technology and Logistics



Under this project, two distribution centers were inaugurated on March 21 and April 19, 2023, and installed with a packaging line and cold storage chambers, namely, Benguet Cold Chain (BCC) in La Trinidad, Benguet, and Agrizkaya Cooperative Federation in Bambang, Nueva Vizcaya, respectively. In Benguet, applying postharvest and packaging technologies established the shelf life of broccoli, cauliflower, and lettuce. Ongoing studies are being conducted for cabbage, carrots, and mixed fresh-cut vegetables. In Nueva Vizcaya, the shelf life of two varieties of citrus (Satsuma and Ponkan), red onion and ginger, were established, and studies on sweet peas are still being conducted.

## DOST-ITDI Knowledge Management Platform for Science, Technology, Innovation, Culture, and the Arts (KM-STICA)



DOST-ITDI marked a new milestone as it inaugurated its latest facility on December 18, 2023, the Knowledge Management Platform for Science, Technology, Innovation, Culture, and the Arts (KM-STICA). The new building housed the Institute's Knowledge Bank, a conference room, and an e-learning hub/mini-theater for gatherings, meetings, training, tours, and other activities. The exhibit hall can also be used for art installations or exhibits.

The DOST-ITDI KM-STICA platform functions as an immersive learning space that captures organizational knowledge and integrates modalities for the sharing and dissemination of knowledge in one location, encouraging collaboration and networking.



## Development of Mobile Modular Food Processing Facility (MMFPF)

Under the DOST Smart Food Value Chain Program for the New Normal, the DOST Mobile Modular Food Processing Facility (MMFPF) was conceptualized during the height of the COVID-19 Pandemic primarily as a deployable processing facility to address wasted commodities or harvest surplus. For its mobile and modular features, the MMFPF can also be used for training purposes, to showcase and demonstrate the different aspects of food processing, to produce shelf-stable emergency foods, and as a Model Facility for GMP. Last September 12-14, 2023, the DOST-ITDI organized a workshop on crafting the Mobile Modular Food Processing Facility (MMFPF) operations guide. This workshop brought together representatives from the MIMAROPA, VI, IX, and X regions and the ITDI Food Processing Division and MMFPF process leads.

ITDI developed the Food on-the-road Innovation and Processing Facility (FoodtrIP), known as the MMFPF, which seeks value-added agri-fisheries production and extended product shelf life. FoodtrIP is a 32-foot customized truck with frying technology to create agriculture and fishery by-products stationed at Capiz State University-Dayao Satellite College. It offers conventional frying and vacuum frying technologies. The facility can produce vacuum-fried mussels and fried camote chips and has a product packaging area. It also aims to reduce losses by farmers and fisherfolks from products that quickly spoil through frying and gives value-added products to farmers and fisherfolk while reducing food wastage.

# List of 2023 Completed Projects

For this year, a total of **52 projects** has been completed of which **42** are **General Appropriations Act (GAA)** projects while **10** are **Grants-in-Aid (GIA)**-funded.

## GAA Projects

Project Title	Project Duration	Project Leader
Development of Microcontroller & Minicomputer Applications for Selected Equipment units of the MMIC and a Bench-Scale Hydrothermal Carbonization Equipment of the CED Laboratory	January 2021- March 2023	JLHerrera
Screening of Biological Activities and Secondary Metabolites from Two (2) Endemic Species of <i>Vanoverberghia</i> ( <i>Zingiberaceae</i> ) and their Application as a Topical Product	August 2022- December 2023	RZMLWalde
Production of Fish Oil from by-products of Local Fish Processors and its Application in Personal Care Products	January- December 2023	CAGBilbao
Optimization Study on the Co-production of Activated Carbon and Bio-oil from Spent Coffee Grounds	January- December 2023	MLMYsulat
Utilization of Okara Byproduct from Taho/Tofu Production through the Development of Stabilizer/Emulsifier for Personal Care Products	January- December 2023	MGYao
Microbial and Chemical Profile of Kombucha Tea made from Different Symbiotic Colonies of Bacteria and Yeasts (SCOBYs) in the Philippines Phase 2. Chemical Profile and Antioxidant Activity of Kombucha (Year 2)	January- December 2023	UGBigol
Carbon Capture using PDMS/PVDF Thin Film Composite Membranes	January 2022- December 2023	ARPremacio
Operation of the DOST Sewage Treatment Plan (STP) and Development of Strategies for Water Reuse	January 2022- December 2023	DCVergara

Project Title	Project Duration	Project Leader
Qualitative and Quantitative Assessment of Microplastics along the Key Sites of Laguna de Bay, Philippines	January 2022-March 2023	ADCChavez
Utilization of Septic Sludge for Biogas and Compost Production using a Portable Biogas Digester	January 2022-March 2023	DLHerrera
Implementation of an Effective Solid Waste Management Program for ITDI: Part 1 - Assessment and Conduct of Waste Analysis and Characterization Study (WACS)	January-September 2023	MCArtuz
Improvement of Exterior Features of Existing Horizontal Water Spray Retort with Timing Control System Upgrade	April 2022-March 2023	RBarcala, Jr.
Ultrasonic Assisted Extraction (UAE) and Microencapsulation of Virgin Coconut Oil (VCO): Study 2: Validation of UAE Process of VCO	April 2022-March 2023	UGDollete
Development of Shelf-Stable <i>Randang</i> Sauce	February 2022-June 2023	MRManalo
Safety and Quality Evaluation and Testing of DOST-ITDI Developed Cacao Roaster Equipment	October 2022-September 2023	CMCMontesa
Development of Shelf-Stable Intermediate Moisture (IM) Chevron Products (Jerky and Chinese-Style Sausage) using Hurdie Technology	January-December 2023	MEEVaristo
Development and Pilot Scale Production of Shelf-Stable Food Products as Ready Food Reserve	January-December 2023	MBMacaraeg
Test Marketing Implementation and Soft Launching of Thermally Processed <i>Randang</i> Sauce	July-December 2023	MRManalo
Application of 3D Printing in Arts and Designs for Creative and Handicraft Industries: 3D Printing Application for Bespoke Designs in Baked Products	January-December 2023	MCOQue
Application of 3D Printing in Arts and Designs for Creative and Handicraft Industries: 3D Printing Application in Designing Products for the Pottery Industry	January-December 2023	AKCollera

Project Title	Project Duration	Project Leader
Laboratory Scale Production of Porous Bi-phasic Calcium Phosphate Bioceramic Orbital Implant (Phase 1)	January-December 2023	JPReyes
Stereolithography-Fabricated All Ceramic Dental Crown using Locally Available Materials (Year 1)	January-December 2023	JPReyes
Recycling of Postconsumer Multilayer Plastics Packaging (PMPP) - Phase 1	January-December 2023	MAPaglicawan
Cellulose Nanocrystals (CNC) derived from <i>Ananas Comosus</i> leaves for Industrial and Medical Applications: Phase 2-Functionalization and Applications Testing	January-December 2023	MAPaglicawan
Design, Optimization and Prototyping through Simulation and 3D Printing with PVDF/PES Membrane Development of a Hollow Fiber Membrane Module for Emergency Water Supply Treatment	May 2022-July 2023	MTMargarito
Development of Three (3) New RTE Disaster Relief Foods for Vulnerable Groups (Elderly and Children)	April 2021-March 2023	GDNoceja
Development of Intelligent Packaging Colorimetric Sensor as Total Volatile Basic Nitrogen (TVBN) Indicator (Phase 2)	February 2022-December 2023	RAGCasas
Development of Random Vibration Test Procedures/Methods using Acquired Shock and Vibration Data in the Last Leg Delivery of Small Products within Metro Manila	August 2021-June 2023	ETNolasco
Preliminary Study on Epoxidized Soybean Oil Migrating from Metal Closure into Bottled Spanish Style Sardines	July 2021-February 2023	HEArmario
Development of Brand Name and Label Design for Unique Philippine Products (Phase 3)	January 2022-June 2023	KJRDizon
A Preliminary Study on the Exposure Assessment of Filipino Consumers to Phthalates Migrated from Plastic-Based Materials used as Packaging for Food and Beverages	February 2022-December 2023	ACAlcantara
Fabrication and Testing of Fiber-Based Cushion Pads and Partition Boards Derived from Pineapple Waste for Transport of Fresh Produce	February 2022-December 2023	MJPaico



Project Title	Project Duration	Project Leader
Utilization of Biochar as Green Active Packaging in Prolonging the Overall Freshness of High-Value Agricultural Produce (Cavendish Banana and Okra)	April 2022-August 2023	DAGBalanon
Validation and Optimization of the Developed Packaging Technology for Pork <i>Lechon</i>	June 2022-December 2023	CMBihis
Development of Real-Time Data Acquisition Program for High Accuracy Machine Indicators using Artificial Neural Network	April 2021-March 2023	ACCGernale
Upgrading High-capacity Manual Mass Comparators through Development of an Automated Rotary Multi-Position Weighing System	February 2022-December 2023	KPSuycano
Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines Project 1: Chemical Metrology for Organic Contaminants in Food and Water	March-December 2023	ACDacuya
Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines Project 2: Chemical Metrology for Inorganic Toxic Elements in Food and Water	March-December 2023	ATJunsay
Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines Project 3: Biological Metrology for Microorganisms in Food	March-December 2023	MSAAguinaldo
Capacity Building for Preservative Efficacy Test (PET) for Cosmetics	January 2022-December 2023	MSAAguinaldo
Development and Validation of Ion Chromatographic Method for the Determination of Water-Soluble Anions in Concrete and Related Materials	January-December 2023	CSDaniel
Program: Enhancement of ITDI-STD Fuel Testing Services Phase 2: Development of Charcoal In-house Quality Control Material for Proximate and Ultimate Analysis in Solid Fuels	January-December 2023	ACBidol

## GIA projects

Project Title	Project Duration	Project Leader
Product Development of Okara: From Soybean Processing By-Product to High Energy Protein Ready-to-Drink Product	September 2022-December 2023	MGYao
Comparative Study Between Standard Methods and Philippine Made PM and CO Measuring Devices-Y1	January 2022-January 2023	DCPangayao
Development of Competency on Establishment and Validation of Adequate Processes for Thermally Processed Food	April 2022-March 2023	MDLVillasenor
Production of Dietary Fiber using Sugarcane Bagasse from Raw Sugar Manufacturing	April 2021-March 2023	RMGomez
Training of Trainers Program (ToT) on Nanotechnology	January 2022-September 2023	MAPaglicawan
Nanotexturing of Stainless Steel 316L by Electrochemical Etching for Biological Implants (CRADLE Project)	January 2022-September 2023	MAPaglicawan
Development and Field Testing of Retort Foods as Food Ration for Men-in-Uniform during Combat Operations and Other High Risk Operations	February 2021-August 2023	FVLoberiano
Pilot Testing of Packaging Technology Developed for Frozen Durian using Locally Produced Packaging Materials	April 2021-September 2023	DAGBalanon
Upgrading of ITDI-Laboratory Animal Facilities in Support for Tuklas Lunas and Other DOST Programs, and Industry Needs	November 2019-May 2023	CNOchona
Establishment of Halal Assurance Management System and Halal-Compliant Standardized Process for Spa Skincare Products for the Halal Tourism Industry	January 2022-October 2023	MRVParcon

# Highlights of the Completed Projects

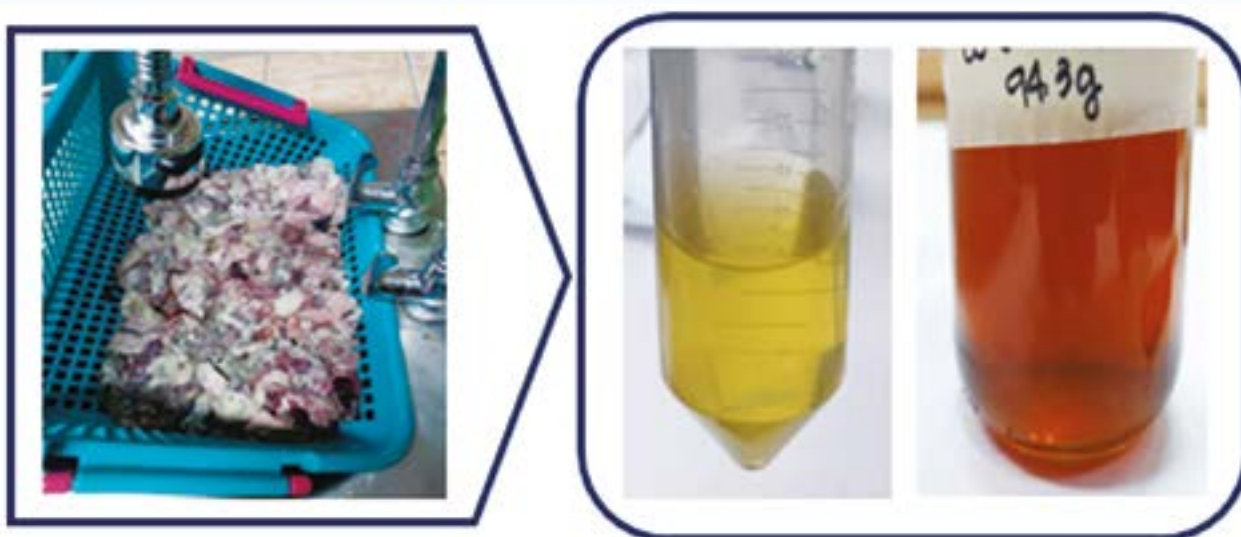
## Screening of Biological Activities and Secondary Metabolites from Two (2) Endemic Species of *Vanoverberghia* (Zingiberaceae) and their Application as a Topical Product

The primary aim of this project is to give light to the phytochemical constituents as the antibacterial activity of two new *Vanoverberghia* species, *Vanoverberghia sepulchrei*, and *Vanoverberghia vanoverberghii*. In this research, it was discovered that these *Vanoverberghia* species contain tannins, saponins, free fatty acids, leucoanthocyanins and  $\gamma$ -benzopyrone nucleus. Moreover, it was also discovered that the extracts from the plant material are potent against *Bacillus subtilis* and *Staphylococcus aureus*. To further realize the potential of the bioactives, the project formulated an antibacterial topical cream.



## Production of Fish Oil from By-Products of Local Fish Processors and its Application in Personal Care

Through this project, refined oil from the processing wastes of local milkfish processors was developed at a laboratory scale. The method used was simple yet adequately effective to treat the crude oil into a finished product with acceptable quality. Currently, the researchers are aiming to further purify and isolate the omega-3 fatty acids of the refined oil to increase its nutritional and market value.



## Optimization Study on the Co-production of Activated Carbon and Bio-oil from Spent Coffee Grounds

Coffee is a staple beverage in the Philippines. Around 90% of Filipino households have coffee stocked in their pantries and 80% of Filipino adults are avid coffee drinkers, consuming an average of 2.5 cups of coffee each day. The high coffee consumption rate makes the coffee industry contributory to a significant volume of solid waste. Typically, 650 kg of spent coffee grounds (SCG), by-products from the coffee brewing process, are generated from one ton of green coffee beans. This project aims to mitigate the environmental impact of this waste by converting it into valuable products like activated carbon and bio-oil.



The study successfully co-produced mesoporous activated carbon and bio-oil from spent coffee grounds using a one-stage process using superheated steam. The resulting activated carbon can be used in many applications, including edible oil refinery and dye removal from wastewater with a 99-100% removal rate. Meanwhile, crude bio-oil produced has a high heating value ranging from 28-30 MJ/kg which can be further refined to be used as biofuel.

## Utilization of Okara By-Product from Taho/Tofu Production through the Development of Stabilizer/Emulsifier for Personal Care Products

The potential of Philippine okara was explored where its use in both food and non-food applications remains largely untapped. Specifically, the composition and functional properties of okara were determined. Moreover, okara was physically and chemically modified and was used as stabilizer/emulsifier for the formulation of personal care products such as lotion and cream. Furthermore, a sensory evaluation participated by 50 respondents was conducted to determine the acceptability of the formulated products. The project seeks to reduce the disposal problem posed by the substantial amount of okara waste by unlocking its value as a valuable resource.



## Product Development of Okara: From Soybean Processing By-Product to High Energy Protein Ready-to-Drink Product

The project details the development of a high-energy protein Ready-to-Drink (RTD) product derived from okara, a by-product of soybean processing. The initiative, led by DOST-NCR and ITDI in collaboration with Queenbee Enterprise, addresses the challenge of effectively utilizing the substantial amount of okara generated during the production of chilled taho and soya milk.

The initiative aims to overcome the challenges associated with okara, creating a sustainable solution that adds value to the soybean processing industry and promotes its use in the food sector.



## Carbon Capture using PDMS/PVDF Thin Film Composite Membranes

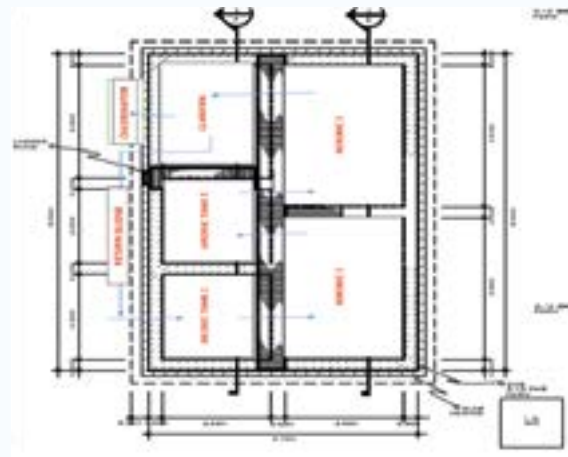
Polydimethylsiloxane (PDMS) pre-polymer solutions with n-hexane and crosslinker were prepared. Nano-clay was dispersed to incorporate the particles and form so-called Mixed Matrix Membranes (MMM). PVDF hollow fibers were coated with the solutions. The resulting composite membranes were tested for percent CO<sub>2</sub> removal from a 5% CO<sub>2</sub> in air mixture which simulates flue gas from a natural gas-fired boiler. The tests were conducted at 25 and 30 psi pressure and flow rates from 78 to 132 mmol / hr. The maximum percent CO<sub>2</sub> recoveries were 31 and 46% at 25 and 30 psi respectively and at 78 mmol/hr flow rate.



## Operation of the DOST Sewage Treatment Plan (STP) and Development of Strategies for Water Reuse

The DOST sewage treatment plant (STP) was converted from a sequencing batch reactor (SBR) system to a modified activated sludge system in anticipation of increased wastewater volume and the need to comply with stringent standards for nutrients in the effluent standards. The new system, as shown below, is an aerobic wastewater treatment system with an anoxic chamber that combines two distinct biological processes to achieve a more complete treatment of contaminants, particularly nitrogen compounds.

An added objective of the project is the reduction of the water consumption of the institute by utilizing the treated water from the STP for garden watering. The project implemented two key strategies to leverage treated wastewater (effluent) for garden watering: dedicated storage and provision for an irrigation delivery system. These strategies promote water conservation by utilizing readily available treated water for garden needs, reducing reliance on freshwater resources.



## Qualitative and Quantitative Assessment of Microplastics along the Key Sites of Laguna de Bay, Philippines

This project aims to determine the occurrence and abundance of microplastics along key sites of Laguna de Bay to provide baseline information on the degree of microplastic pollution in the lake and for the development of potential mitigation programs. The results of the study can also be used in the development of environmental policies and pollution management strategies in terms of microplastic pollution in freshwater bodies such as rivers and lakes.



## Utilization of Septic Sludge for Biogas and Compost Production Using a Portable Biogas Digester

The project aims to convert septic sludge into biogas for energy sources through anaerobic digestion with compost as a by-product. The project utilized the existing portable biogas digester and gasholder. Septic Sludge was collected from a siphoning company. The inoculum used was pig manure, which was collected from a backyard piggery in Muntinlupa City.

The start-up operation of the anaerobic digestion used 50 li of pig manure and 50 li of septic sludge. The biogas produced during the start-up operation totaled 1,321.5 li in 25 days' duration with a daily average of 52.85 li of biogas per day. This project concluded that septic sludge can produce biogas and is recommended for pilot-scale application for siphoning companies.



## Implementation of an Effective Solid Waste Management Program for ITDI: Part I- Assessment and Conduct of Waste Analysis and Characterization Study (WACS)

The assessment highlighted the individual initiatives of personnel regarding waste segregation, recycling, and composting, and the lack of an Institution-wide program for solid waste management which affects its overall compliance with existing waste management policies. Moreover, results from the conduct of WACS determined that DOST-ITDI generates a total of 91.56 kg/day of waste during the dry season and a total of 77.54 kg/day during the wet season. The generated waste is mainly composed of residuals for disposal (35.93% and 37.75%, dry and wet seasons) and biodegradable wastes (27.80% and 21.46%). Per capita generation rates of 0.21 kg/pax/day and 0.18 kg/pax/day during the dry and wet season, respectively, were also recorded. The conduct of WACS and the effects of the initial programs support the need for the creation of Institution-level programs, strategies, policies, and facilities to support future initiatives to be laid out to further improve, promote, and sustain proper solid waste management in DOST-ITDI.



## Comparative Study Between Standard Methods and Philippine-Made PM and CO Measuring Devices-Y1

The general objective of the study is to address air pollution problems by ensuring the results of the developed air monitoring sensors and measuring devices are valid. Specifically, it aims to provide a comparative analysis and report of Philippine-made sensors and measuring devices against the standard methods. This analysis will be used to validate client claims of the accuracy and effectiveness of their products. Moreover, It can validate the existing measuring devices as a preventive maintenance activity.



## Production of Dietary Fiber using Sugarcane Bagasse from Raw Sugar Manufacturing

This study focused on the technical aspects of producing dietary fiber from sugarcane bagasse.

A production process for dietary fiber from sugarcane bagasse was established and the final product was characterized in terms of microbiological, physical, chemical, and functional properties according to food and nutraceutical industry standards. Additionally, applications of SCB Dietary Fiber (SCB-DF) in various food products were explored to identify potential new markets. The technology for SCB-DF production will be adopted by the Raw Sugar Milling Company Inc., which has already secured a contract with a food processing and pharmaceutical company.





## Development of Shelf-stable *Randang* sauce: Thermally Processed Sauce in Bottles and in Pouches, and Pre-mix Powder

*Randang* is a Filipino version of the *Rendang* dish, which is commonly cooked with beef and popular among the Muslim community. Like other viands, it has a short shelf life that limits its broader market distribution. To overcome this challenge, this study aimed to develop a shelf-stable *randang* sauce through dehydration technology and thermal processing.

Premixed *randang* powder only has a shelf-life of two months while the thermally processed *randang* sauce in bottles and pouches is more shelf-stable (at least one year) as evidenced by the results of the commercial sterility test. The resulting shelf-stable *randang* sauce not only meets industry standards but also offers consumers the convenience of a longer storage life without compromising the authentic flavors of the *randang* dish.



## Safety and Quality Evaluation and Testing of DOST-ITDI Developed Cacao Roaster Equipment

The project focused on ensuring the reliability and performance of the cacao roaster equipment developed by ITDI. The study was structured into three main objectives. Firstly, to assess and test the fabricated cacao roaster equipment by an accredited testing laboratory, Agricultural Machinery Testing and Evaluation Center (AMTEC), in accordance with industry certification requirements and guidelines. Secondly, to facilitate the certification process of the fabricated equipment through the accredited agricultural equipment certifying body, the Bureau of Agricultural and Fisheries Engineering (BAFE). Lastly, to validate the equipment and process specifications of the ITDI-developed cacao roaster and translate them into a comprehensive safety and quality manual, aligned with industry standards and guidelines. Through these systematic evaluations and certifications, the project aims to ensure that the cacao roaster equipment meets stringent safety and quality standards, fostering trust and confidence among stakeholders in the cacao industry.



## Development of Shelf-Stable Intermediate Moisture (IM) Chevron Products (Jerky and Chinese-Style Sausage) using Hurdle Technology

With a focus on chevon, the project formulated two distinct intermediate moisture meat products: jerky and Chinese-style sausage. Intermediate moisture meat (IMM) refers to products with moisture levels between fresh and fully dehydrated meats, offering an optimal balance of texture and shelf life.

Comprehensive evaluations ensured that these products met stringent standards of physico-chemical composition, texture, and sensory appeal. By employing advanced packaging techniques and rigorous safety protocols, guaranteed the microbiological safety and extended shelf life of the vacuum-packed chevon products. Continuous monitoring of various parameters throughout storage enabled the product to maintain its quality and anticipate any changes. Moreover, developmental cost and financial analyses provided valuable insights into the commercial viability of these novel meat offerings.



## Development and Pilot Scale Production of Shelf-Stable Food Products as Ready Food Reserve

The food product prototypes developed such as the squash powder for soup preparation and shelf-stable bread can gain positive evaluation from relevant stakeholders upon the conduct of key informant interviews with LGUs/PDRRMO units from Bulacan and Sorsogon. The squash powder through dehydration processing was developed and analyzed through rehydration rate, moisture content, water activity, and color determination, with the conduct of sensory evaluation tests. The shelf-stable bread can employ thermal processing procedures that involve seam evaluation, conduct of heat distribution and heat penetration tests, and microbial testing, to ensure the safety of the developed products. On the other hand, former Ready-to-Eat (RTE) developed products produced through pilot scale production, such as the chicken egg, mungbean coconut, and rice drink products were successfully presented in IETM 2023 – International Ecotourism Travel Mart, Handa Pilipinas 2023 and evaluated by the Disaster Response Management Bureau (DRMB) unit of DSWD.



Squash powder for soup application

Canned bread

## Application of 3D Printing in Arts and Designs for Creative and Handicraft Industries: 3D Printing Application for Bespoke Designs in Baked Products

Additive manufacturing revolutionizes different key sectors in the society, even the food industry. For the past couple of years, many 3D printing enthusiasts have looked beyond the traditional methods of producing food. This project involves the application of additive manufacturing in creating molds. Chefs and food enthusiasts can experiment with intricate designs, shapes, and textures, pushing the boundaries of traditional culinary art. The mold will serve as the pattern for thermoforming of polymer materials used as separators of different food materials.



The image on the left shows two different types of 3D printed molds while the image on the right shows the thermoformed polymer separators.

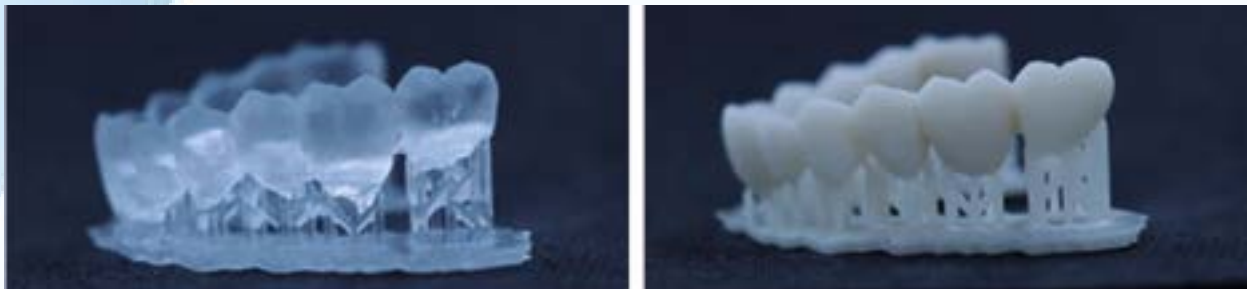
## Laboratory Scale Production of Porous Biphasic Calcium Phosphate Bioceramic Orbital Implant (Phase 1)

A porous biphasic calcium phosphate bioceramic orbital implant with antibacterial properties was successfully developed using calcium phosphate dihydrate and local calcium carbonate. The bioceramic implant demonstrated a mineral composition of 80%  $\beta$ -tricalcium phosphate and 20% hydroxyapatite, with a porous structure exhibiting 70-80% porosity, pore size of 100-500 microns, a bulk density of 0.6 to 1.1 g/cm<sup>3</sup>, compressive strength of 2-3 MPa (porous) and flexural strength (solid) of 45 MPa. Bioactivity tests revealed partial inhibitory activity against *Staphylococcus aureus* and *Escherichia coli*, and cell viability assays showed 222.8% viability, indicating noncytotoxicity. Further biocompatibility studies, including in vivo and in vitro assessments, are recommended to thoroughly evaluate the material, with a particular emphasis on long-term in vivo testing for real-world performance, and continuous monitoring of bioactivity and tissue integration over an extended period for comprehensive insights.



## Stereolithography-Fabricated All-Ceramic Dental Crown using Locally Available Materials

A novel approach to crafting porcelain dental crowns involves stereolithography 3D printing, utilizing a combination of commercial photopolymer resin and locally synthesized porcelain powders. The process includes ball milling the local raw materials (clay, silica, and feldspar), preparing a ceramic slurry with resin, and subjecting the 3D-printed crown to debinding, sintering, and thorough characterization. Additional investigations and formulation adjustments to improve the overall properties of the dental crown are still needed. The intricate production steps aim to achieve optimal particle size, distribution, and resin elimination for an improved final product.



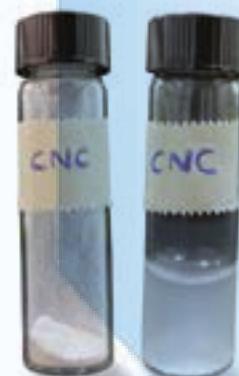
## Recycling of Postconsumer Multilayer Plastics Packaging (PMPP)-Phase 1

The collection of post-consumer multilayer plastic packaging (PMPP) was successfully done through collaboration with the Upper Bicutan Elementary School. This project was able to fabricate a washing machine and drying method for the pre-treatment of post-consumer multilayer plastic packaging necessary for the production of plastic laminate board. The plastic laminate board was produced by the compression molding machine, two-roll mill, and compression molding machine. The mechanical properties, water absorption, burning rate, density, and specific gravity were determined. Processing of plastic boards using a commercial-scale pressing machine by the Rural Industrial Corporation was conducted. Chairs and small tables were fabricated using a plastic laminate board from PMPP, as shown below.



## Cellulose Nanocrystals (CNC) Derived from *Ananas comosus* Leaves for Industrial Application: Phase 2 - Food Packaging Application

The pineapple (*Ananas comosus*) crown leaf fiber from agro-waste was successfully converted to high-value cellulose nanocrystals. Due to the high gas barrier properties of cellulose nanocrystals, materials coated with the usual plastic packaging like polyethylene (PE) or polypropylene (PP) were studied to get rid of multi-layered packing which can make sachets easier to recycle. The project utilizes plasma treatment and electron beam irradiation to improve the wettability of the PE film and it was observed that both methods are capable of improving the wettability of the film.



## Design, Optimization, and Prototyping through Simulation and 3D Printing with PVDF/PES Membrane Development of a Hollow Fiber Membrane Module for Emergency Water Supply

This project involves the development of a hollow fiber membrane with membrane module design, simulation, and fabrication through 3D printing. Through simulation, the flow profile and pressure along the filtration volume can be visualized to see the dead volume and shear forces at the shell side of the membrane. These shear forces can reduce the fouling formation (the formation of biological coatings on a surface) at the membrane's surface extending its life and efficiency. The flow rate can be adjusted by varying the number of hollow fibers in the design. The prototype was used as a filtration module for the existing rainwater harvesting system of ITDI.



## Development of Three New RTE Disaster Relief Foods for Vulnerable Groups

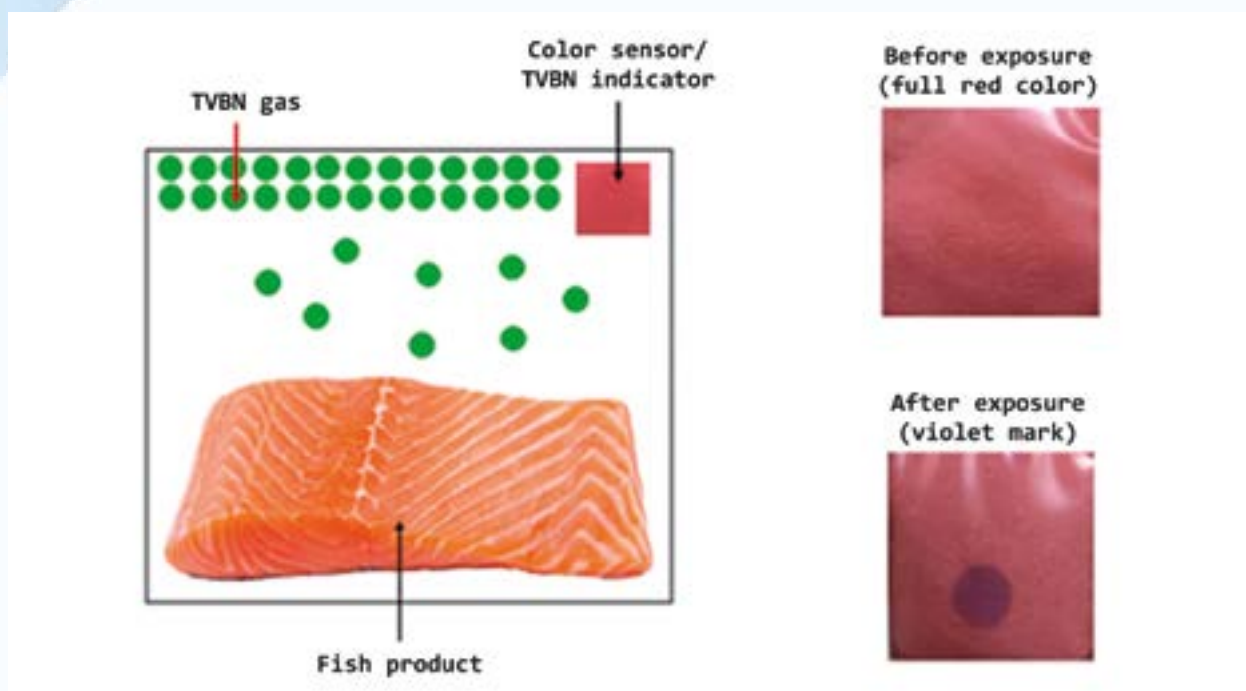
In the development of RTE chicken corn soup, potato carrot soup, and ginisang munggo, the four pillars of food security, namely, availability, access, utilization, and stability were considered to ensure that there will be food available for the needs of vulnerable groups composed of the elderly and children in times of calamities. Using retort pouch packaging technology and transport packaging, developed RTE retort foods can fulfill their purpose as disaster relief foods.



## Development of Intelligent Packaging Colorimetric as Total Volatile Base Nitrogen (TVBN) Indicator Phase 2

The objective of the project was to create a visual sensor. It is an “intelligent packaging” as the color response of the sensor has the potential to inform the quality of fresh-chilled fish and fishery/aquatic products. As the aquatic product spoils, the TVBN content in the flesh increases. TVBN compounds are volatile, which can escape the flesh and then be released to the package headspace. The colorimetric sensor contains a chemical-responsive component which can react with the TVBN compounds. The sensor’s response is the change in color from red to violet.

In Phase 1 of the project, the fabrication of the sensor was established. While in Phase 2, the design of the encasing material was improved to enhance the sensitivity to TVBN gas. The color response of the sensor is correlated to the TVBN content of the fish and fishery/aquatic products during storage.



## Development of Random Vibration Test Procedures/Methods Using Acquired Shock and Vibration Data in the Last Leg Delivery of Small Products within Metro Manila

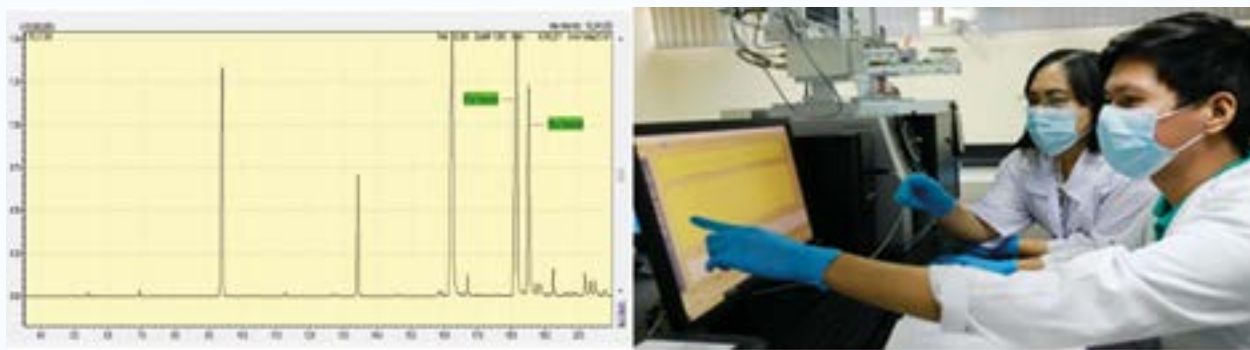
The studied shock and vibration data from the previous study were encoded and programmed in the newly acquired random vibration tester located at the Packaging Technology Division’s Simulation Packaging Testing Laboratory. The programmed test procedure was conducted to sample products via PTD’s random vibration tester and validated by subjecting similar packaged samples to actual shipment using existing modes of e-commerce delivery.

The developed test procedures/methods will be offered as a regular test service of the Packaging Technology Division.



## Preliminary Study on Epoxidized Soybean Oil (ESBO) Migrating from Metal Closures into Bottled Spanish-Style Sardines

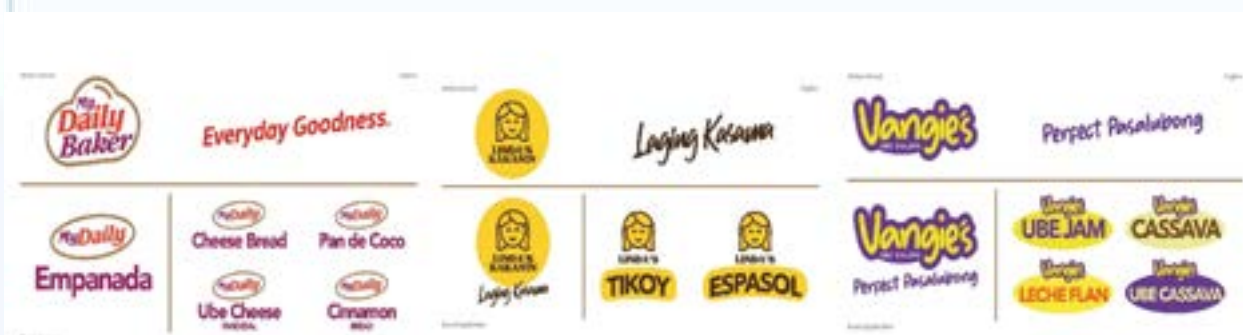
This study focused on Epoxidized Soybean Oil (ESBO), a prevalent epoxy ester used in the production of flexible polyvinyl chloride (PVC), with significant applications as a plasticizer and hydrochloric scavenger. ESBO, listed as an authorized substance for food packaging, is considered a valid alternative to phthalates. The project aimed to develop and validate an analytical method to determine ESBO concentration with the primary objective of assessing its migration from metal closures of glass containers to food. Given the potential risks associated with ESBO migration, the study holds significance in risk management. By focusing on the development of the method for the determination of ESBO, this project will set the stage for future initiatives. Policymakers can use the data from follow-up studies to establish national standards and guidelines for glass jars with metal caps as closures. Consequently, results of the study can help manufacturers, distributors, and sellers improve their local products, penetrate global markets, and protect the safety of the public.



## Development of Brand Name and Label Design for Unique Philippine Food Products (Phase 3)

The study aimed to enhance the competitive identity of four unique Philippine snacks through the development of packaging design and brand name. The four products selected are: (1) *empanada*, (2) *espasol*, (3) *ube*, and (4) *tikoy*. The brand development process started by gathering information about the product and consumer behavior, visiting/ meeting with producers, and researching existing brands in the market.

Based on the information gathered, initial concept designs and brand names were developed and presented to focus groups for discussion, input, and recommendations. After a series of revisions, the brand name and logo mark for each product were finalized.



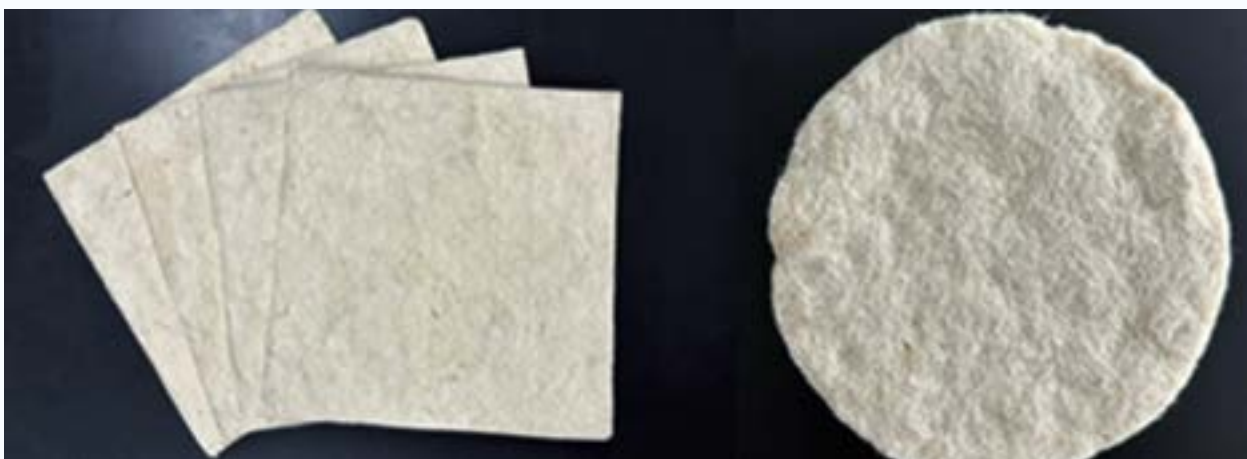
## A Preliminary Study on the Exposure Assessment of Filipino Consumers to Phthalates Migrated from Paper-based and Plastic-based Materials Used as Packaging for Food and Beverages

This research project investigated the extent of phthalate exposure among Filipino consumers through plastic-based food packaging. By focusing on takeout and delivery food products in Taguig City and locally sourced samples, the research sought to contribute to the establishment of a database that evaluated phthalate concentrations in packaged food commonly consumed by Filipino adults. The research observed significant variations in exposure doses between low and high body weight within each container type, emphasizing the impact of both age and container type on DEHP exposure through ingestion.



## Fabrication and Testing of Fiber-Based Cushion Pads and Partition Boards Derived from Pineapple Waste for Transport of Fresh Produce

The project aimed to develop partition boards and cushion pads intended for the transport packaging of fresh produce. The project has successfully proven that agri-waste from pineapple leaves (leaf fiber) can produce new and alternative ancillary packaging materials. The fabricated partition boards can improve the stacking strength of the boxes during storage and transport while the cushion pads reduced the amount of shock absorbed on pineapple fruits by up to 40%.





## Utilization of Biochar as Green Active Packaging in Prolonging the Overall Property Freshness of High-Value Agricultural Produce (Cavendish Banana and Okra)

Carbonized rice hull is normally used as a soil conditioner in agriculture. ITDI has found a way to refurbish a conventional agricultural by-product to a value-adding material. By harnessing the adsorptive capacity of these charred plant materials, it can act as an effective packaging agent to lengthen the storage life of packaged fresh produce. The use of these adsorbers could extend the storage life of packed bananas from 15 to 21 days and okra from 9 to 15 days in refrigerated conditions.



## Validation and Optimization of the Developed Packaging Technology for Pork *Lechon*

The project studied the optimization of the previously developed packaging technology for pork *lechon*. This project was conceptualized to address the maintenance of quality, safety, and crispiness of pork *lechon* that is shipped to far destinations. The study focused on the validation and optimization of the redesigned packaging system for medium-sized pork *lechon* from Cagayan De Oro and Tacloban City.

Pork *lechon* packaging needs to have some sort of ventilation to let moisture out from condensation to preserve the crispy pork skin. The study's findings can be applied to medium-sized *lechon* shipped from their place of origin to their destination or the point of sale. The intended beneficiaries are *lechon* producers and distributors in different provinces of the country.



## Development and Field Testing of Retort Foods as Food Ration for Men-in-Uniform during Combat Operations and other High-Risk Operations

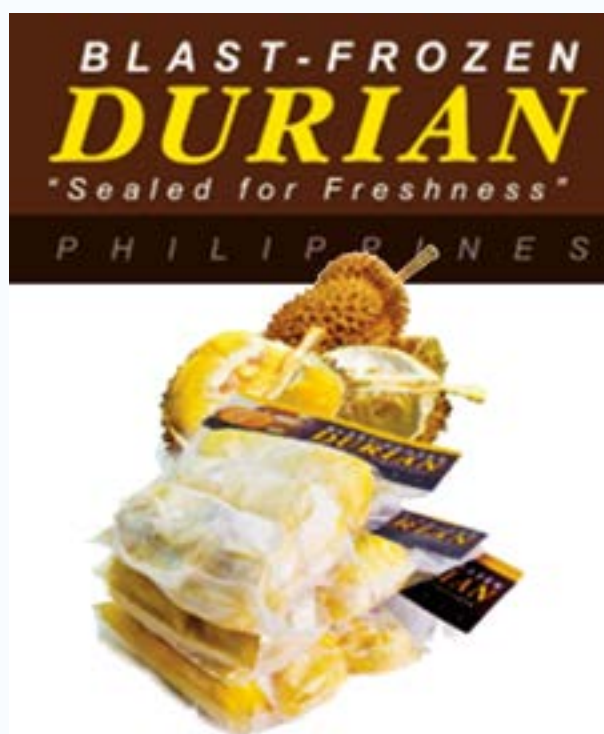
The six RTE foods, which include chicken *adobo*, beef curry, mixed vegetables, white rice, and chicken *afritada*, were developed at the PTD Pilot Plant and commercially produced using a toll-packing facility. The field testing of the RTE foods in identified sites was conducted in collaboration with the Research and Development Center (RDC)-Philippine Army (PA) and Directorate for Research and Development (DRD)-Philippine National Police (PNP).

Results of the field testing conducted in both PA and PNP warehouses show no signs of deterioration for more than 12 months of storage for the RTE foods except for the mixed vegetables which exhibited signs of deterioration at 11 months of storage. The package performance showed that the RTE foods can be distributed by aerial drop at a height of 10 ft and water drop height of 15 ft. It can be transported by land, water, and air without incurring transportation-related damages.



## Pilot Testing of Packaging Technology Developed for Frozen Durian using Locally Produced Packaging Materials

Durian (*Durio zibethinus*) is an exotic tropical fruit grown throughout the Southeast Asian region. It has a yellow-to-cream flesh with a buttery mouthfeel and a distinctly strong aroma. The expansion of the durian industry and advancement in the processing of durian products has significantly expanded due to international trade. However, one major factor that hinders market expansion is still its strong distinct smell. The technology of high barrier packaging from ITDI was able to contain the durian aroma and established a shelf life of one-year frozen durian. This was also featured in international and national food exhibitions and market-tested in various events and online platforms which showed the market potential of the frozen durian in its new, odor-free packaging.



## Development of Real-Time Data Acquisition Program for High Accuracy Machine Indicators using Artificial Neural Network

This project focuses on developing and testing a Data Acquisition Program using Artificial Neural Network (ANN) technology for high-accuracy machine indicators. Field tests assess the program's real-world performance across diverse digit image sets, with user feedback guiding iterative improvements for enhanced accuracy and usability. Documentation and reporting ensure transparency and knowledge sharing throughout the process, fostering robust evaluation and refinement. Field test activities included infrastructure setup, orientation sessions, image preprocessing, model development, testing, and review sessions to address any issues or challenges encountered. Plans are in place to document insights from the field tests for future program enhancements.



## Upgrading High-Capacity Manual Mass Comparators through the Development of an Automated Rotary Multi-Position Weighing System

The project aimed to enhance the Mass Standard Section (MSS) facilities by upgrading five high-capacity manual comparators to an automated rotary multi-position weighing system improving the calibration accuracy and extending the comparators' lifespan. Collaborating with mechanical engineering students from the Technological University of the Philippines (TUP) - Manila and the ITDI team, the project designed and assembled the machine. The Material Science Division assisted in fabricating necessary accessories. The developed system demonstrates promising calibration results for weights up to 20 kg, surpassing manual methods and meeting manufacturer standards.



## Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines

### Project 1: Chemical Metrology for Organic Contaminants in Food and Water

In this project, significant advancements were achieved in method validation for key target analytes in fish and cucumber. Liquid chromatography-isotope dilution mass spectrometry (LC-IDMS) methods were used for AOX and chloramphenicol analysis in fish, while gas chromatography-tandem mass spectrometry (GC-MS/MS) with matrix-matched calibration was employed for  $\alpha$ -endosulfan analysis in cucumber. These methods demonstrated suitability for assigning reference values to prepared reference materials (RMs). Evaluation of RMs for homogeneity and stability ensured the reliability of analytical results, with acceptable uncertainty ranging over a 12-month validity period. A proficiency testing scheme focusing on salbutamol in meat was conducted, providing insights into laboratory performance. Engagements included participation in training sessions on food safety laboratory quality management and pH measurement. Findings were disseminated through publications and presentations, showcasing advancements in chemical metrology for contaminants in food.



# Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines

## Project 2: Chemical Metrology for Inorganic Toxic Elements

The project aimed to improve ITDI's ability to develop reference materials (RMs) for heavy metals in food and water, following ISO Guide 35:2017 standards. Ten primary measurement methods for toxic elements in food were successfully developed and validated, utilizing various techniques such as HVG-AAS, DMA, GFAAS, and ICedP-OES. Four RMs and two calibration solutions were produced and tested for homogeneity and stability. These RMs will be used for proficiency testing, while calibration solutions will be available for sale. Success in a post-PT scheme on sulfite in desiccated coconut highlighted the commitment to quality assurance. Obtaining the Certificate of Authority to Operate (CATO) from the Professional Regulation Commission affirmed NML's dedication to legal compliance and public safety. Through promotional events and collaboration, the project continues to advance chemical metrology.



## Enhancement of the Competence and Capabilities of the National Metrology Laboratory of the Philippines

### Project 3: Biological Metrology for Microorganisms in Food

This project is a crucial initiative aimed at enhancing the capabilities of microbiology laboratories in the Philippines. It addresses the lack of local proficiency test (PT) providers in food microbiological testing by developing PT materials and conducting schemes across the country's microbiology laboratories. Initial studies involved isolating and identifying microbial isolates from milkfish and octopus, establishing growth curve characteristics, and determining harvest times. Various PT materials were developed, covering parameters like APC, *Salmonella sp.* detection, and Total *Coliform Ct.* Five PT schemes involving 105 participants were conducted, with 88.8% of submitted results deemed satisfactory, showcasing the project's effectiveness in enhancing proficiency in food microbiological testing.



### Development and Validation of Ion Chromatographic Method for the Determination of Water-Soluble Anions in Concrete and Related Materials

The Inorganic Chemistry Section of STD conducted method validation for water-soluble chloride and sulfate in concrete and cement using ion chromatography. The method, based on ASTM standards, addresses the need to ensure compliance with building regulations. High chloride concentrations can lead to steel corrosion in concrete, while high sulfate levels may cause concrete cracking. Method validation assessed various parameters using concrete and cement samples, meeting acceptance criteria. The validated method was successfully applied to analyze ten ordinary Portland cement samples and one concrete sample, demonstrating its suitability for routine testing in chemical laboratories.



## Enhancement of ITDI-STD Fuel Testing Services

### Phase 2: Development of Charcoal In-house Quality Control Material for Proximate and Ultimate Analysis in Solid Fuels

The project aimed to develop a coconut shell-based charcoal Quality Control Material (QCM) for routine proximate and ultimate analysis of solid fuels. Following ISO Guide 80, the preparation and characterization of the QCM ensured its homogeneity and stability. Proximate analysis was conducted gravimetrically, while carbon, hydrogen, oxygen, and sulfur were measured using ASTM methods. The QCM was established to be homogeneous and stable for carbon, hydrogen, and sulfur for ultimate, and ash and volatile matter for proximate test parameters. An interlaboratory comparison was conducted with the DOST-FPRDI and the results obtained were statistically comparable. The developed charcoal QCM has a high potential for application in routine chemical testing and as an alternative quality control measure in the absence of CRMs for proximate and ultimate analyses in solid fuels.



### Establishment of Halal Assurance Management System and Halal-Compliant Standardized Process for Spa Skincare Products for the Halal Tourism Industry

The project aimed to establish a Halal Assurance Management System (HAS) and develop standardized processes for producing, packaging, storing, and delivering Halal spa skincare products, aligning with ASEAN standards. It addressed the need for Muslim-friendly spa services in the growing Halal tourism industry. By using locally sourced essential oils and adhering to Shariah teachings, the project ensured compliance with Halal requirements. This initiative supports national programs on Halal tourism and contributes to the economy while promoting consumer safety and health.



# Products/Processes

ITDI was able to develop 91 products and 38 processes from the GAA projects implemented this year. A few of the products and processes developed are as follows:



**Randang Sauce**



**Okara-based Ready-to-Drink Chocomilk**



**Okara-based pre-mixed formulated drink**

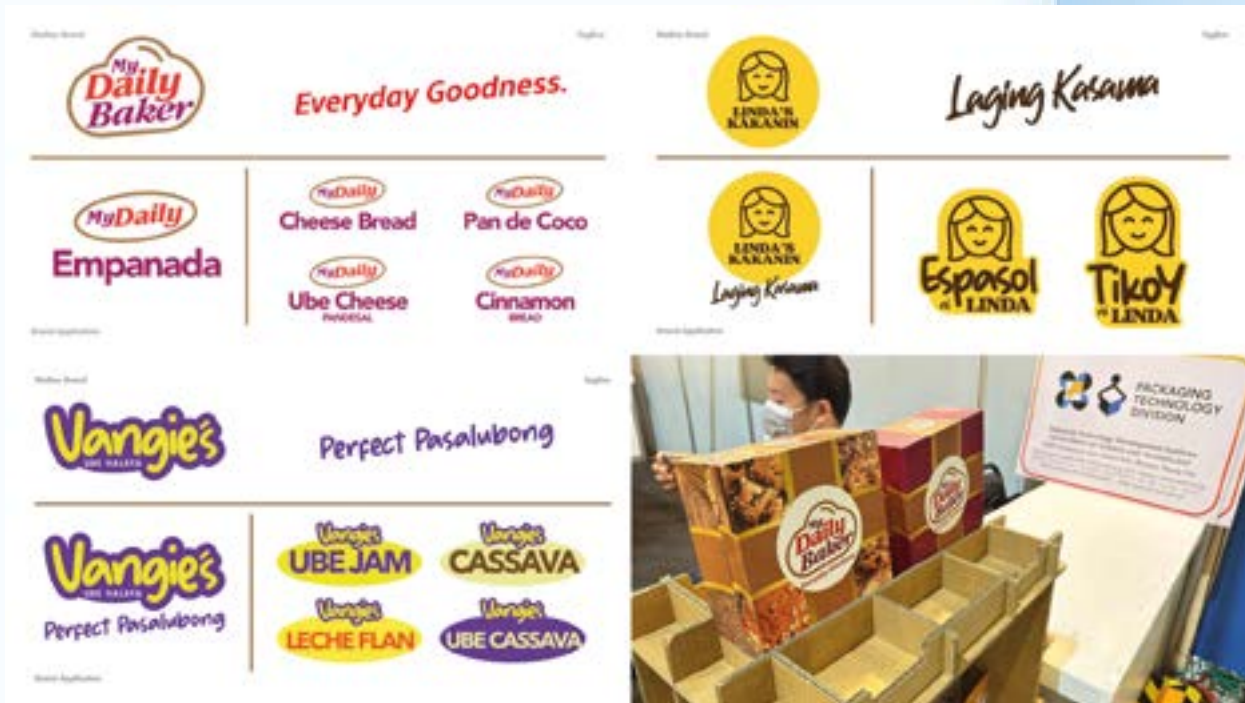


**RTE Pack of Duty (Chicken Adobo, Beef Curry, Mixed Vegetables, Bangus, Sisig, Chicken Afritada and White Rice) for Men-In-Uniform**



**Development and Validation of Ion Chromatographic Method for the Determination of Water-Soluble Anions in Concrete and Related Materials**





**Enhancement of the Competitive Identity of Four Unique Philippine Food Products (Empanada, Espasol, Tikoy, Ube) through the Development of Packaging Design, Brand Name, and Label Design**



**Fish Oil from By-products of Local Fish Processors and Identified its possible applications in food products**



**Developed Process in Producing Activated Carbon and Bio-Oil using Steam Activation**



**Halal-Compliant Spa Skincare Products**



**Utilized the By-Product Generated in Taho/ Tofu Processing through the Development of Potential Stabilizer/ Emulsifier for Personal Care Products**



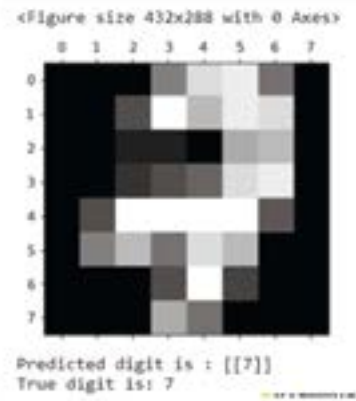
**Improved Bioceramic Orbital Implant with Antibacterial Properties for Orbital Reconstruction**



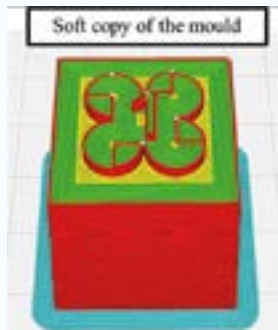
**Tuslob Rapid DNA Extraction Kit for African Swine Fever Virus DNA Extraction**



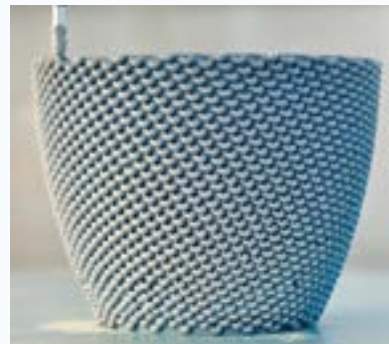
**3D Printed Porcelain Dental Crown**



**AI-Based LED Indicator Calibration using Artificial Neural Networks (ANN)**



**3D Printing Application for Bespoke Designs in Artisanal Food Products**



**3D Printed Ceramic Pottery**



**Recycling of Post-Consumer Multilayer Plastics Packaging and Production of Prototype Plastic Boards via Compression Molding**



**Household-type Emergency Disinfection System (SAFEWATRS)**

# Paper Published

For this year, DOST-ITDI published a total of eighteen **18 technical papers** in various refereed journals.

Title	Authors	Journal
Application of lignin nanoparticles in polybutylene succinate-based antifungal packaging for extending the shelf life of bread	ATBasbasan Jr.	Food Packaging and Shelf life <a href="https://doi.org/10.1016/j.fpsl.2023.101127">https://doi.org/10.1016/j.fpsl.2023.101127</a>
On the direct ink write (DIW) 3D printing of styrene-butadiene rubber (SBR)-based adhesive sealant	AKMCollera	MRS Communications <a href="https://doi.org/10.1557/s43579-023-00436-0">https://doi.org/10.1557/s43579-023-00436-0</a>
<i>Terminalia catappa</i> L. leaf extract interferes with the biofilm formation of <i>Vibrio parahaemolyticus</i> and enhances immune response of <i>Penaeus vannamei</i> against acute hepatopancreatic necrosis disease (AHPND)	SDAMantaring, JKDelosSantos, REstrella, JPGJose, IJLCastro, UGBigol, JPMDGuzman	Aquaculture <a href="https://doi.org/10.1016/j.aquaculture.2023.740266">https://doi.org/10.1016/j.aquaculture.2023.740266</a>
Isolation and genome sequencing of five lytic bacteriophages from hospital wastewater in the Philippines	MALNada, JBAncla, NMRYadao, VPdPaz, JGManalaysay, FLDSamante, UGBigol	American Society for Microbiology's Microbiology Resource Announcements journal <a href="https://doi.org/10.1128/MRA.00311-23">https://doi.org/10.1128/MRA.00311-23</a>
Effect of Dextran and Concentrated Fructose from <i>Weissella cibaria</i> in the Physicochemical and sensory properties of Milk bread ( <i>pan de leche</i> ), gelato and calamansi ( <i>Citrus microcarpa</i> ) juice	IJLCastro, AMBRivera, MKim, UGBigol	Journal of Food Science and Technology of the Institute of Food Science and Technology <a href="https://doi.org/10.1111/ijfs.16757">https://doi.org/10.1111/ijfs.16757</a>
Utilization of Out-of-specification Unripe Cavendish Banana [ <i>Musa acuminata</i> (AAA)] as Banana Powder	MRManalo, MEMFalco, RMGomez, KASdCruz, PMMEstudillo, JMFRamos, BBFlores Jr., CMUCortado	Philippine Journal of Science <a href="https://doi.org/10.56899/152.05.24">https://doi.org/10.56899/152.05.24</a>
Refining the Selection of Historical Period in Analog Ensemble Technique	FEdel Pozo Jr.	Energies <a href="https://doi.org/10.3390/en16227630">https://doi.org/10.3390/en16227630</a>

Title	Authors	Journal
Estimation of Measurement Uncertainty for the Analysis of Arsenic in Water by Hydride Vapor Generation - Atomic Absorption Spectrometry	ARCDablo, NAPKalacas, VRABarintos, IEUbando, RLDamian, JACValdueza	Philippine Journal of Science <a href="https://doi.org/10.56899/152.03.16">https://doi.org/10.56899/152.03.16</a>
Optimization of Spray Drying Conditions for the Development of Fermented Shrimp Powder using RSM	ARCDablo, NAPKalacas, VRABarintos, IEUbando, RLDamian, JACValdueza	Philippine Journal of Science <a href="https://doi.org/10.56899/152.01.26">https://doi.org/10.56899/152.01.26</a>
Emerging challenges on viability and commercialization of lignin in biobased polymers for food packaging: A review	ATBasbasanJr.	Food Packaging and Shelf Life <a href="https://doi.org/10.1016/j.fpsl.2022.100969">https://doi.org/10.1016/j.fpsl.2022.100969</a>
Developments of interlaboratory comparisons on pressure measurements in the Philippines	MNISalazar	Acta Imeko <a href="https://doi.org/10.21014/actaimeko.v12i2.1448">https://doi.org/10.21014/actaimeko.v12i2.1448</a>
A new controllable capillary-type standard leak for vacuum applications	MNISalazar	Acta Imeko <a href="https://doi.org/10.21014/actaimeko.v12i2.1448">https://doi.org/10.21014/actaimeko.v12i2.1448</a>
Effects of Wood Flour Reinforcement on the Warpage and Compressive Strength of 3D Printed HDPE	MARAgbayani, MAPaglicawan, MTMargarito, BABasilia	Materials Science Forum <a href="https://doi.org/10.4028/p-4f7avg">https://doi.org/10.4028/p-4f7avg</a>
Influence of Philippine Halloysite on Thermal and Mechanical Performance of Poly(Lactic Acid) Filament for FDM Printing Applications	SCayabyab, SGelilang, NVillanueva, JLLaga, LMilo, MAPaglicawan, JRCelorico, BABasilia	Materials Science Forum <a href="https://doi.org/10.4028/p-4f7avg">https://doi.org/10.4028/p-4f7avg</a>
Performance, applications, and sustainability of 3D-printed cement and other geomaterials	GCruz, JRCDizon, NFarzadnia	MRS Communications <a href="https://doi.org/10.1557/s43579-023-00358-x">https://doi.org/10.1557/s43579-023-00358-x</a>
On the direct ink write (DIW) 3D printing of styrene-butadiene rubber (SBR)-based adhesive sealant	VJGarcia, GMFazley Elahee, AKCollera	MRS Communications <a href="https://doi.org/10.1557/s43579-023-00436-0">https://doi.org/10.1557/s43579-023-00436-0</a>
PLA/MWCNT Nanocomposite: Improved Electrical, Thermal and Antibacterial Properties for Fused Deposition Modelling Additive Manufacturing Applications	PANdeYro, KCocho, JBRueda, GQuiachon, MEbarvia, BABasilia	Materials Science Forum <a href="https://doi.org/10.4028/p-04wj70">https://doi.org/10.4028/p-04wj70</a>

# List of Paper/ Poster Presented

This year, a total of 38 papers and 28 posters have been presented in various local and international forums, symposiums, and conferences.

## LOCAL

### PAPER

Date Presented	Title	Event	Author/s
March 30	Natural Colorants: The Future of Cosmetics	Philippine Alliance of Laboratory Equipment Users (PALEU): "What is the Lab of the Future?", St. Paul University, Quezon City	MRVParcon
May 17-18	DOST Support to MSMEs: Cosmetic Product Formulation Principles & Practices	COSMETICON: Cosmetic Conference, Crowne Plaza Hotel, Ortigas Center	MRVParcon
May 23-25	Philippine Capacity Building for the Development of Proficiency Testing (PT) Materials in Food Microbiological Measurements	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	MSAAguinaldo
May 23-25	Positioning and Maintaining ISO/IEC 17025:2017 Accreditation	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	ARCDablio
May 23-25	Method Verification of AOAC 990.28 for Food Safety Application in Philippine Dried Fruit Products	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	CCRamil

Date Presented	Title	Event	Author/s
June 22	Review of Strategies in the Computation and Evaluation of Uncertainty of Analytical Measurements	World Accreditation Day	ARCDablio
July 26-28	Evaluation of Measurement Uncertainty of Internal Quality Material for Cadmium and Lead in Soil	37th Philippine Chemistry Congress, SMX Convention Center, Bacolod City	MSLagmay
July 26-28	Determination of Nitrite Concentration of Locally-Produced Branded Processed Meat using a Verified AOAC 973.31 Method	37th Philippine Chemistry Congress, SMX Convention Center, Bacolod City	CBBembenuto
July 26-28	Effect of Extraction Conditions to the Antioxidant Activity and Aromatic Profile of Philippine <i>Cymbopogon citratus</i> (Lemongrass) Essential Oil Through Solvent Free Microwave Extraction	37th Philippine Chemistry Congress, SMX Convention Center, Bacolod City	CKFJose
July 26-28	Proficiency testing evaluation of Philippine testing laboratories for the determination of histamine in fish	37th Philippine Chemistry Congress, SMX Convention Center, Bacolod City	PAMQuiton
July 26-28	Method Validation of Mercury in Cane Sugar using Gravimetric External Calibration via Direct Mercury Analyzer for the Assessment of Candidate Reference Material	37th Philippine Chemistry Congress, SMX Convention Center, Bacolod City	CDLaurio
September 4-9	Electrowinning System for the Removal of Copper in Wastewater	20th APCChE and 84th PIChE National Convention, SMX Convention Center, Pasay City	BJGutierrez
September 4-9	Immobilization of Dredged Material from Tullahan-Tinajeros River System as Partial Substitute for the Production of Concrete	20th APCChE and 84th PIChE National Convention, SMX Convention Center, Pasay City	DCPangayao

Date Presented	Title	Event	Author/s
September 4-9	Nanostructured Herbal Extract of Ampalaya, Garlic, and Turmeric as Antidiabetic Agents	20th APCCChE and 84th PICChE National Convention, SMX Convention Center, Pasay City	EAOngo
September 4-9	ULIMS: The Unified Laboratory Information Management System of DOST Philippines for One-stop Laboratory Services	20th APCCChE and 84th PICChE National Convention, SMX Convention Center, Pasay City	ETDaranciang
September 4-9	Valorization and Investigation of Volcanic Ash as an Aggregate Building Brick Component	20th APCCChE and 84th PICChE National Convention, SMX Convention Center, Pasay City	NCRodriguez, EOSantos
September 5-7	Nitrite in Processed Meat - Halal Thayyib: Securing Quality through Food Safety	Bangsamoro Science Technology Week (BSTW) celebration of the Ministry of Science and Technology (MOST) of the Bangsamoro Autonomous Region of Muslim Mindanao (BARMM)	MRVParcon
November 12	Stage-Gate Process for Developing a Shelf-Stable Randang Sauce	International Research, Education, and Innovation Summit (IREIS) 2023, Winford Hotel, Sta. Cruz, Manila	MRManalo
November 12	Evaluation of Maltodextrin Application on Quality Attributes of Vacuum Fried Okra Slices Emerging Technologies for Food Preservation and Safety	International Research, Education, and Innovation Summit (IREIS) 2023, Winford Hotel, Sta. Cruz, Manila	MBMacaraeg
November 13	Consumer acceptability of Dietary-Enriched Food Products	International Research, Education, and Innovation Summit (IREIS) 2023, Winford Hotel, Sta. Cruz, Manila	JMFRamos



Date Presented	Title	Event	Author/s
November 21-22	Emerging Technologies for Food Preservation and Safety	62nd PAFT Annual Convention, Novotel Manila, Araneta Center, QC	DJSLusanta (S&T Fellow)
November 21-22	AOAC Southeast Asia (SEA) Section Initiatives on Harmonization of Methods for Emerging Concerns	62nd PAFT Annual Convention, Novotel Manila, Araneta Center, QC	ARCDablio
November 24	Using Talisay ( <i>Terminalia catappa</i> L.) as a feed supplement for <i>Penaeus vannamei</i> shrimp postlarvae	NSTW2023: "TechnoForum on Blue Technologies", Iloilo Convention Center	SDAMantaring
November 24	Validation of Method for the Determination of Arsenic in Fish	NSTW2023: "TechnoForum on Blue Technologies", Iloilo Convention Center	CCRamil
November 24	Effect of Extraction Conditions to the Antioxidant Activity and Aromatic Profile of Philippine <i>Cymbopogon citratus</i> (Lemongrass) Essential Oil Through Solvent Free Microwave Extraction	3-Minute Pitch (3MP) to Policy Makers Competition, Park Inn by Radisson, North EDSA, Quezon City	MLYow

## POSTER

Date Presented	Title	Event	Author/s
February 15-17	Method Validation of Automated Photometric Titration Method for the Determination of Total Hardness in a Candidate Reference Material for Water	International Conference on Chemistry (IC2) hosted by the Kapisanang Kimikang Pilipinas, University of Santo Tomas, Manila	ATJunsay, CJGatchalian, TFAviles, JECGuerrero, CDLaurio
February 15-17	Proficiency Testing Scheme on Mercury in Drinking Water for Philippine Testing Laboratories	International Conference on Chemistry (IC2) hosted by the Kapisanang Kimikang Pilipinas, University of Santo Tomas, Manila	CJGatchalian, TFAviles, JDManiego, EKPEncarnacion, CDLaurio, CSDaniel, ACDacuya, ATJunsay, BSEbarvia

Date Presented	Title	Event	Author/s
March 10	Locally-isolated protease-producing <i>Bacillus</i> spp. from soil inhibits biofilm formation of <i>Staphylococcus aureus</i>	90th NRCP General Membership Assembly, PICC, Pasay City	SDAMantaring, DJNAlmazan, SKCArcan, NLNoval, AHPalanca, JPGJose, REDCutab, JPMDGuzman
March 10	Virus detection using shotgun metagenomic sequencing of aviaian oropharyngeal swabs	90th NRCP General Membership Assembly, PICC, Pasay City	KDNeri, ACAbad, MLEbarvia, BJMGutierrez, MBCarandang, AVBriones
May 23-25	Capability Assessment of Philippine Testing Laboratories on Arsenic in Drinking Water using Proficiency Testing Scheme	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	TFAviles, EKPEncarnacion, CSDaniel, ACDacuya, ATJunsay, BSEbarvia
May 23-25	Determination of Sulfite in Commercial Dried Fruit Products in the Philippines	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	ACBidol
May 23-25	Method Validation of Hydride Vapor Generation - Atomic Absorption Spectrophotometry for the Determination of Total Arsenic in Fish	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	CSDaniel
May 23-25	Development and Validation of High-Performance Liquid Chromatographic Method for Vitamin A in Infant Formula	Asia-Pacific Food Analysis Network (APFAN): International Workshop on Laboratory Quality Standards towards Global Competitiveness, Acacia Hotel, Alabang, Muntinlupa City	MRVParcon

Date Presented	Title	Event	Author/s
July 12-13	Preparation, Homogeneity and Stability Assessment of a Reference Material for Accurate Determination of Cypermethrin Residue in Mango	National Academy of Science and Technology (NAST) Philippines 45th Annual Scientific Meeting, Manila Hotel, Philippines	AGHBion, JACValdueza, JCStaAna, ACDacuya, ATJunsay, BSEbarvia
July 12-13	Assessment of Homogeneity and Stability of Candidate Reference Material for Total Hardness in Water using Validated Automated Photometric Titration Method	National Academy of Science and Technology (NAST) Philippines 45th Annual Scientific Meeting, Manila Hotel, Philippines	CJGatchalian, TFAviles, JECGuerrero, CDLaurio, ATJunsay
July 12-13	Method Validation of Liquid Chromatography – Isotope Dilution Mass Spectroscopy and Optimized Monier Williams Distillation for the Characterization of Sulfite in Desiccated Coconut Proficiency Test Material	National Academy of Science and Technology (NAST) Philippines 45th Annual Scientific Meeting, Manila Hotel, Philippines	JDManiego, EKPEncarnacion
September 4-9	Valorization and Investigation of Volcanic Ash as an Aggregate Building Brick Component	20th Asia Pacific Confederation of Chemical Engineers (APCCChE) Congress, SMX Convention Center, Manila, Philippines	EOSantos
September 22	Physicochemical characterization of used palm olein & coconut oil from vacuum frying new Kuroda variety of carrots as affected by frying cycle	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	MBAMacaraeg
September 22	Potential Application of Bromelain from Philippine Pineapple Peels as a Mild Enzyme Exfoliant for Emerging Skin Care Strategies	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	MRVParcon
September 22	Microencapsulation of Naturally-produced Colorants using Spray-drying technology for Cosmetics Applications	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	MRVParcon

<b>Date Presented</b>	<b>Title</b>	<b>Event</b>	<b>Author/s</b>
September 22	Development of an In-house Quality Control Material for the Analysis of pH of Water	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	LMMontero
September 22	Development of Coconut Shell-based Charcoal In-house Quality Control Material (IQCM) for Proximate Analysis in Solid Fuels	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	ASJMedel
September 22	Use of Internal Quality Control Material (IQCM) for Anions Solution from Laboratory Chemical Waste for Routine Analysis QC Charting	Philippine Association for the Advancement of Science and Technology (PhilAAST) 72nd Annual Convention, The Manila Hotel, City of Manila	JACValdueva
November 12-13	Validation of a Method for the Extraction and Quantification of Water-soluble Chloride in Concrete by Ion Chromatography	52nd Annual Convention and 3rd International Conference Kapisanang Kimika ng Pilipinas - Southern Tagalog, Inc., UP Los Baños, Laguna	JECGuerrero
November 21-22	Emerging Technologies for Food Preservation and Safety	62nd PAFT Annual Convention, Novotel Manila, Araneta Center, QC	DJSLusanta (S&T Fellow)
November 23-24	A Simple Efficient Extraction Method for Vitamin A Analysis in Food: A Green Chemistry Approach	7th International Symposium and 14th Annual Scientific Conference Metro Manila Health Research & Development Consortium (MMHRDC), Park Inn by Radisson, North EDSA, Quezon City	ABCruz

## INTERNATIONAL

### PAPER

Date Presented	Title	Event	Author/s
February 21	Evaluating the preparedness of a developing economy in the implementation of digital calibration certificates	CPS Metrology Society of Australasia (MSA) Conference 2023, Wellington, Zealand	CDLaurio
May 23-26	Characterization of Taal Volcanic Ash as Potential Raw Material for the Construction Industry	First European Green Conference (EGC), Vodic, Croatia	MSLagmay
May 24	Shelf-life Extension of Fresh-cut Pineapple by Sodium Alginate-based Active Edible Coating with Lemongrass Essential Oil	31st IAPRI Members Conference, Hotel Four Points by Sheraton, Navi, Mumbai, India	DJOrtiz
May 26-28	Performance Investigation of Airmask: A novel personalized ventilation device using CFD simulation against virus-laden aerosolst	14th International Conference on Mechanical and Intelligent Manufacturing Technologies (ICMIT 2023), Cape Town, South Africa	KYAlmeria
July 3-6	Classification and Prediction of Overloaded Trucks Passing the Southbound Lane of North-Luzon Expressway using Artificial Neural Network	9th International Conference on Controls, Decisions, and Information Technologies, Rome, Italy	ACCGernale
July 26-28	Isolation, Characterization, and Potential Applications of Cellulose Nanocrystal from Pineapple Crown Leaf Fiber Agro-waste	ANM 2023, University of Aveiro, Aveiro, Portugal	MAPaglicawan
October 11-13	Validation of a Method for the Extraction and Quantification of Water-soluble Chloride in Concrete by Ion Chromatography	IMEKOTC 8, TC 11, and TC 24 Joint Conference, Funchal, Madeira, Portugal	CSDaniel

Date Presented	Title	Event	Author/s
October 17	Beneficiation and Functionalization of Iron Oxide Nanoparticles from Philippine Black Sand for Antibacterial Applications	2023 5th International Conference on Nanomaterials, Materials and Manufacturing Engineering (ICNMM 2023), Tokyo, Japan	PANdeYro
October 17	Effect of Nano-Alumina (Al <sub>2</sub> O <sub>3</sub> ) Loading on the Thermo-Mechanical Properties of Poly (Lactic Acid) for Fused Deposition Modeling 3D Printing Applications	2023 5th International Conference on Nanomaterials, Materials and Manufacturing Engineering (ICNMM 2023), Tokyo, Japan	PANdeYro
October 17	Comparative Examination of Cellulose Nanosphere from Corn Husk and Rice Straw	2023 5th International Conference on Nanomaterials, Materials and Manufacturing Engineering (ICNMM 2023), Tokyo, Japan	PANdeYro
October 24-27	Bridging & Halal: Creating Communication Plan & materials for DOST-ITDI's Halal Compliant Food Products	17th ASEAN Food Conference, Borneo Convention Centre, Kuching, Sarawak, Malaysia	MRManalo, PMaverick, NEstudillo, MEMFalco
October 25-27	Validation of Analytical Methods for Arsenic and Mercury Determination in Aquacultured Milkfish	7th International IME-KOFOODS Conference-Worldwide Food Trade and Consumption: Quality and Risk Assessment, Maisons-Alfort, France	ATJunsay
October 28	Isolation of Cellulose Nanosphere from Corn Husk as a Filler for UV-cured PEGDMA Nanocomposite Hydrogels	TKP Conference City Hakata, Fukuoka, Japan	PANdeYro

## POSTER

Date Presented	Title	Event	Author/s
April 14-16	Performance Evaluation of Water Flow Calibration Rig for CMC Claims	7th International Conference on Measurement Instrumentation and Electronics (ICMIE) 2023, Hangzhou, China	JMDLatosa
August 1-2	A Networking Success: The Role of the Philippines' DOST OneLab network in Ensuring Food Safety for both National and International Markets	AOAC SEA Section 2nd Annual Conference, Sheraton Hotel, Ho Chi Minh City, Vietnam	ARCDablio
August 1-2	A Novel Development of Chicken Meat-Based Reference Material for Reliable Determination of Ethoxyquin Residues	AOAC SEA Section 2nd Annual Conference, Sheraton Hotel, Ho Chi Minh City, Vietnam	AGHBion
September 20	Differential expression of immune-related genes and increased resistance of <i>Penaeus vannamei</i> against pathogens upon dietary supplementation with <i>Lactiplantibacillus plantarum</i>	Japanese Society for Fisheries Science Conference, Japan	JPMDGuzman
November 20-22	Energy Materials from Cellulose Whiskers as Filler for Hybrid Composite	9th ASEAN Collaborative Symposium on Energy Materials; Bandung, Indonesia	RPParreno Jr
November 22-24	Effects of dietary supplementation with freeze-dried <i>Lactiplantibacillus plantarum</i> on the immune gene expression and resistance of Whiteleg shrimp ( <i>Penaeus vannamei</i> ) against diseases	11th International Fisheries Symposium, Novotel Future Park Rangsit, Bangkok,	JPMDGuzman
November 2-December 1	Evaluation of AFM and TEM Dimensional Measurement Uncertainty of Nanoparticles Intercomparison Samples	NanoThailand 2023: The 8th Thailand International Nanotechnology Conference: Nanotechnology for Sustainable World, Dusit Thani Pattaya Hotel, Chon Buti, Thailand	MSLagmay

# List of Internal Policies Developed

- Updated Policy on the Grant of Hazard Pay to Project-Based and/or Contract of Services (COS) Registered Chemists and Registered Chemical Technicians Working in Chemical Testing Laboratories (DOST Administrative Order No. 006 Series of 2023)
- Updating of the DOST AO on Guidelines on the Computation and Increase of Fees and Charges of Technical Services (Memorandum: April 11, 2023)

## List of Published Standards

DOST-ITDI personnel, serving as technical experts, have developed and published a total of 39 standards on various products.

- PNS/BAFS 338: 2022: Establishment of Traceability System for Cultured Finfishes and Crustaceans – Guidelines
- PNS ISO 19749:2022: Nanotechnologies - Measurements of particle size and shape distributions by scanning electron microscopy
- PNS ISO/TS 22292:2022: Nanotechnologies - 3D image reconstruction of rod-supported nano-objects using transmission electron microscopy
- PNS IEC/TR 63258:2022: Nanotechnologies - A guideline for ellipsometry application to evaluate the thickness of nanoscale films
- PNS ISO/TS 21357:2022: Nanotechnologies - Evaluation of the mean size of nano-objects in liquid dispersion by static multiple light scattering (SMLS)
- PNS ISO/TS 23151:202: Nanotechnologies - Particle size distribution for cellulose nanocrystals
- PNS ISO/TS 23302:2022: Nanotechnologies - Requirements and recommendations for identification of measurands that characterize nano-objects and materials that contain them
- PNS IEC/TS 62607-2-4:2022: Nanomanufacturing - Key control characteristics - Part 2-4: Carbon nanotube materials - Test methods for determination of resistance of individual carbon nanotubes
- PNS ISO 13322-1:2022: Particle size analysis - image analysis methods - Part 1: Static image analysis methods
- PNS 2181:2022 - Halal lipstick – Specification
- PNS 2172:2022 – Halal Toilet Soaps
- PNS 2182:2023 - Nutribun – Specification
- PNS/BAFS 136:2023: Fresh Chilled and Fresh Frozen Cephalopods - Product Standard
- PNS/BAFS 177:2023: Live, Fresh Chilled and Fresh Frozen Crabs - Product Standard
- PNS/BAFS 70:2023: Fresh Chilled and Fresh Frozen Shrimps and Prawns - Product Standard
- PNS/BAFS 373:2023: Sensory Evaluation of Fish and Shellfish in Laboratories – Guidelines



- PNS 07:2022 – Portland Cement – Specification
- PNS ASTM C51:2022 – Standard Terminology Relating to Lime and Limestone (as Used by the Industry)
- PNS ASTM C109/C109M:2022 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- PNS ASTM C185:2022 – Standard Test Method for Air Content of Hydraulic Cement Mortar
- PNS ASTM C191:2022 – Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle
- PNS ASTM C204:2022 – Standard Test Methods for Fineness of Hydraulic Cement by Air-Permeability Apparatus
- PNS ASTM C219:2022 – Standard Terminology Relating to Hydraulic and Other Inorganic Cements
- PNS ASTM C226:2022 – Standard Specification for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Hydraulic Cement
- PNS ASTM C266:2022 – Standard Test Method for Time of Setting of Hydraulic Cement Paste by Gillmore Needles
- PNS ASTM C451:2022 – Standard Test Method for Early Stiffening of Hydraulic Cement (Paste Method)
- PNS ASTM C452:2022 – Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate (ASTM published 2021)
- PNS ASTM C465:2022 – Standard Specification for Processing Additions for Use in the Manufacture of Hydraulic Cements
- PNS ASTM C563:2022 – Standard Guide for Approximation of Optimum SO<sub>3</sub> in Hydraulic Cement
- PNS ASTM C1038/C1038M:2022 – Standard Test Method for Expansion of Hydraulic Cement Mortar Bars Stored in Water
- PNS ISO 17088:2023- Plastics – Organic recycling – Specifications for compostable plastics
- PNS ISO 16929:2023- Plastics – Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test
- PNS 2158:2023 (ISO/TR 23891:2020) - Plastics — Recycling and recovery — Necessity of standards
- PNS 2167:2023 (ISO 15270:2008)- Plastics — Guidelines for the recovery and recycling of plastics waste
- PNS 2038:2023- Plastics identification code and relevant markings
- PNS ISO 16620- 2:2023- Plastics — Biobased content — Part 2: Determination of biobased carbon content
- PNS ISO 16620- 5:2023- Plastics — Biobased content — Part 5: Declaration of biobased carbon content, biobased synthetic polymer content and biobased mass content
- PNS 1104:2023- Plastic Materials for food contact use – Colorants – Specification
- PNS ISO 14782:2023- Plastics – Determination of haze for transparent material

# Places Reached

DOST-ITDI was able to reach a total of 82 places (local and international) through consultancy, training, technology transfer, and product launches, among others.



International Food Exhibition (IFEX 2023), World Trade Center, Pasay City, Philippines



COEX Food Week 2023, Seoul, South Korea



2023 Seoul International Invention Fair, South Korea



*Thank you!*  
**Health Sciences Authority  
(HSA) Singapore**  
DOST-ITDI STD Food Safety Project  
Team **BENCHMARKING** on Food  
Safety Programs and Initiatives

Benchmarking on Food Safety and Testing Capability, Health Sciences Authority (HSA), Singapore




National Institute of Metrology (Thailand) (NIMT) Ministry of Higher Education, Science, Research and Innovation, Thailand



Eurofins Food Testing (Thailand) Co., Ltd. Kasetsart University, Thailand



**Topic:** Green and Sustainable Materials for Food Packaging Application with emphasis in Postharvest packaging

 **LIVE** **RADYO CLSU LIVE**  
October 19, 2023 | Thursday 4:00-5:00 PM

**Central Luzon State University, Nueva Ecija, Philippines**



**Benguet Cold Chain (BCC) Project, La Trinidad, Benguet, Philippines**



**DOST GAD Focal Point Assembly 2023, Cauayan City, Isabela, Philippines**



**National Youth Science, Technology, and Innovation Festival, PICC Forum Tent, Pasay City, Philippines**



**20th Asian Pacific Confederation of Chemical Engineers (APCChE), SMX Mall of Asia Convention Center, Pasay City, Philippines**



**Women Strong Network Hybrid Trade Fair, SM Megamall, Mandaluyong City, Philippines**



**NSTW 2023: "TechnoForum on Blue Technologies," Iloilo Convention Center, Iloilo City, Philippines**

# DOST-ITDI in Regional Science, Technology, and Innovation Week (RSTW)



**Cordillera Administrative Region (CAR), Bangued, Abra Province**



**Region I, Laoag City, Ilocos Norte**



**Region II, Tuguegarao City, Cagayan Province**





**Region IV-A, Los Baños, Laguna Province**



**Region IV-B, Boac City, Marinduque Province**



**National Capital Region, Bonifacio Global City, Taguig City, Metro Manila**



**REGION VII, Dumaguete City, Negros Oriental Province**



**Region IX, Dipolog City, Zamboanga del Norte Province**



**Region X, Iligan City, Lanao del Norte Province**



**Region XI, Tagum City, Davao del Norte Province**

# DOST-ITDI in Handa Pilipinas



Handa Pilipinas Luzon Leg, World Trade Center, Pasay City



Handa Pilipinas Visayas Leg, Summit Hotel, Tacloban City



Handa Pilipinas Expo, Limketkai Mall Atrium, Cagayan de Oro City

# Local and International Events Hosted

## Nanovation Forum on Nanotechnology and 3D Printing



Students from various high schools and state universities received a crash course on the basics of nanotechnology and 3D-printing during the Nanovation: Innovation Forum on Nanotech and 3D Printing held during the 2023 National Youth Science, Innovation, and Technology Festival (NYSTIF) on October 27, 2023. With more than 200 participants, the Innovation Forum highlights the nanotech innovations of the Nanotechnology Laboratory (NanoLab) and the Materials Development Laboratory of the Advanced Manufacturing Center (AMCen) of DOST-ITDI.

## International Conference on Cashew Green Oils



DOST-ITDI organized the international conference, themed “Advancing Cashew Industry through Green Technology” on November 3, 2023 at the Dusit Thani Manila. A series of scientific lectures followed, exploring the industrial applications of cashew and its derivatives for food and biomedical products, cosmetics and personal care, biofuels and polymers. These were delivered by experts from DOST-ITDI’s Chemicals and Energy Division and SAAS, as well as the cashew production industries, pharmaceuticals, and academic research.

## 2023 World Metrology Day



DOST-ITDI, through its National Metrology Laboratory (NML), joined the world in celebrating World Metrology Day on May 30, 2023. Held at the Simulation Packaging Testing Laboratory, the highlight of the event was the hybrid webinar themed, “Measurements Supporting the Global Food System,” with Sen. Loren Legarda as keynote speaker with Sen. Cynthia Villar.

The webinar, which was live streamed via Zoom and Facebook Live, focused on the relevance of metrology in our daily lives and its significance to food safety and packaging safety, as discussed by forum speakers Mr. Kiveen Suycano, Mr. Admer Rey Dablio, Mr. Christian Niamey Curtado, Mr. Aaron Dacuya, and Mr. Elyson Encarnacion.

## 2023 DOST OneLab *Kapihan*

**DOST OneLab *Kapihan***  
11 August 2023  
Titanium Auditorium,  
DOST-MIRDC, Bicutan,  
Taguig City

web.onelab.ph | itdl.onelab@gmail.com | itdl.onelab

**OneLab**  
Our Laboratory, Worldwide

In an effort to increase public access to testing and calibration services, the Department of Science and Technology (DOST) hosted a DOST OneLab *Kapihan*, a meet and greet with DOST officials for all the DOST laboratories and non-DOST laboratory representatives on August 11, 2023 at the Titanium Auditorium of the DOST Metals Industry Research and Development Center (MIRDC) in Bicutan, Taguig City.

The DOST OneLab is a Network of laboratories anchored on an IT Platform to provide a referral system for testing and calibration services at a single touch point. It aims to provide customers with convenient and easy access to laboratory testing and calibration services.

The DOST OneLab *Kapihan* was attended by representatives from member laboratories of the network, coming from DOST Regional Standards and Testing Laboratories (RSTLs) DOST Research and Development Institutes (RDIs), other government agencies, and private testing and calibration commercial laboratories. The *Kapihan* was made as an opportunity for the member laboratories to express their gratitude in the success of the referral system of the network and the other benefits enjoyed, as well as raise issues and concerns which the DOST OneLab Project Team can help as ways forward.

## Metrology Bill Workshop

DOST-ITDI organized the National Metrology Institute Bill (NMIS) Workshop, which took place at Splendido Hotel in Tagaytay City from January 24-25, 2023. The primary objective of this workshop was to underscore the significance of metrology across various scientific domains. Participants included representatives from LGUs, calibration laboratories, congressional secretaries, and other relevant stakeholders.



## 2023 Asia Pacific Legal Metrology Forum Meeting and Working Group Meetings

The 30th APLM Forum and Working Group Meetings took place on November 7-10, 2023 in Bohol Province, Philippines. The event was graciously hosted by the Industrial Technology Development Institute (ITDI), with invaluable assistance and support from DOSTPh - International Cooperation, Department of Science and Technology VII, and DOST Bohol PSTO. The venue for the meetings was held in Henann Resort Alona Beach.

Throughout the meetings, various significant topics were deliberated upon, including the presentation of annual reports from the APLMF Working Groups, updates from the APLMF President and Secretariat, strategic planning for future APLMF activities, and discussions on enhancing cooperation among APLMF, international, and regional metrology organizations.



# People Services

## WASTE ANALYSIS AND CHARACTERIZATION STUDY (WACS) TRAINING WORKSHOP

DOST-ITDI conducted a WACS training workshop on the various Local Government Units (LGUs) and organizations:



Zamboanga Peninsula, Region IX, Pagadian City



Agoo, La Union Province





**Tabuk, Kalinga Province**



**Baras, Rizal Province**



**Laguna Province**



**Teresa, Rizal Province**



**DOST-ITDI, Taguig City, Metro Manila**

## TOURS OF ITDI FACILITIES

This year, numerous colleges, universities, and institutions visited the laboratories and facilities housed within DOST-ITDI, seeking insights and collaborations in diverse fields.



**La Consolacion College-Tanauan Campus, Tanauan City, Batangas Province**



**San Pablo Colleges, San Pablo City, Laguna Province**



**Department of Biological Sciences, University of Santo Tomas, Manila City, Metro Manila**



**Renaissance Youth Network, Parañaque City, Metro Manila**



**Biological Engineering, Mapua University, Manila City, Metro Manila**



**Philippine Science High School CALABARZON Region Campus, Batangas City, Batangas Province**



**Bataan Heroes College, Balanga, Bataan Province**



**BS Food Technology Program, Laguna State Polytechnic University- Siniloan Campus  
Laguna Province**



**Colegio de Muntinlupa, Sucat, Muntinlupa City, Metro Manila**



**Agricultural and Biosystems Engineering (ABE), Mindanao State University – General Santos City Campus, South Cotabato Province**



**Bureau of Fire Protection - Fire Laboratory Service (BFP-FLS)**



**Prof. Fortunato T. Dela Peña, Ms. Rose Zamora and Ms. Minerva Tanseco**



**DOST Region X, Cagayan De Oro City, Misamis Oriental Province**



**Agricultural Center Region X**



**College of Engineering, Camarines Norte State College, Daet, Camarines Norte Province**



**Shandong Academy of Agricultural Sciences, Jinan, Shandong, China**



**Office of the National Higher Education, Science, Research and Innovation Policy Council, Bangkok, Thailand**



**International Participants from Asia Pacific Food Analysis Network (APFAN)**





**DOST CAR and CALABARZON**



**DOST Region I**



**Participants of the Asian Conference on Chemical Sensors (ACCS)**



Philippine Space Agency (PhilSA), Bagumbayan, Quezon City, Metro Manila

**Thank you for the visit,**  
**Bureau of Fire Protection (BFP)**  
**Fire Science and Technology Research Division!**

**Consultative Meeting on the  
Standardization, Certification and  
Testing of Fire Protection Equipment**  
**03 April 2023, STD-ITDI**

  [std@itdi.dost.gov.ph](mailto:std@itdi.dost.gov.ph)  [std.itdi.dost](https://www.facebook.com/std.itdi.dost)  [itdi.dost.gov.ph](https://www.itdi.dost.gov.ph)

Fire Science and Technology Research Division, Bureau of Fire Protection (BFP)

**Ecosystems Research and Development Bureau (ERDB)  
Department of Environment and Natural Resources (DENR)**

*Thank you for your visit!*

**16 October 2023**

**Benchmarking on STD's Laboratory Quality Management System (LQMS) based on PNS ISO/IEC 17025:2017**

[std@itdi.dost.gov.ph](mailto:std@itdi.dost.gov.ph)
[std.itdi.dost](https://www.facebook.com/std.itdi.dost)
[itdi.dost.gov.ph](http://itdi.dost.gov.ph)

**Ecosystems Research and Development Bureau (ERDB-DENR), Los Baños, Laguna Province**



**Congressional Committee on Science and Technology, led by committee chair and Aklan 1st District Rep. Carlito S. Marquez**

# PARTNERSHIPS

As the Institute is committed to achieving our vision to be the country's leading industry partner in Science, Technology, and Innovation, DOST-ITDI forged 42 new local and international partnerships through a Memorandum of Agreement (MOA) or Memorandum of Understanding (MOU) on R&D studies, technical assistance, and trainings, among others.



MOA with DepEd TAPAT-Division of Taguig City and Pateros for the GAA-funded project titled "Recycling of Postconsumer Multilayer Plastic Packaging" to spread awareness among the younger generation on the negative impacts of plastic waste and possible ways to help mitigate this through proper waste segregation and recycling of post-consumer plastic packaging.



MOU with Arthologic, Inc. to develop innovative materials for manufacturing and product advancement, and facilitate rapid development and testing of materials intended for use in medical devices.



MOA with the Nanotechnology Training and Educational Group (NTEG) of Tehran, Iran to inaugurate the “Training of Trainers on Nanotechnology” project which aims to augment the scientific expertise and knowledge of a handpicked group of Filipino researchers and scientists in the field of nanotechnology and its applications.



MOA with the Department of Foreign Affairs – Technical Cooperation Council of the Philippines (DFA-TCCP) to provide locals of Timor Leste livelihood training on fruits and vegetables processing, root crops processing, emergency food reserve, coconut processing and other DOST-ITDI technologies such as the Orvicidal-Larvicidal (OL) trap system, ceramic water filter, collapsible toilet bowl for emergency/disaster operations, and the dual drum composter.



MOA with the Forest Products Research and Development Institute (DOST-FPRDI), Iba Botanicals Inc. (IBBA), D&L Polymer and Colours Inc. (DLPC), and Manly Plastics Inc. (MPI) to collaborate on development of bio-composites and thermoplastics from waste root parts of vetiver grass (*Chrysopogon zizanioides*).



MOU with Line Seiki Philippines, Inc. on the joint-project of generating novel materials for use in mechanical and electrical devices utilizing additive manufacturing technology.



MOU with Vision College of Jeonju, Jeonju, South Korea on academic and educational exchange on electrical control systems and other control systems engineering solutions, and conduct of development projects that will help improve the electrification status in the Philippines.



MOA with the International Center for Environmental Technology Transfer (ICETT) in Yokkaichi, Japan on the Awareness-raising Seminar on Waste to Energy in the Philippines (ASWEP).



Following its MOA signing on February 6, 2023, a Power Back-up System (PBS) unit was turned over to Dr. Gracia Fe B. Yu, President and Co-founder of NATPRIL Corporation at its facility in Morong, Bataan on July 16, 2023. The PBS serves as a reliable alternative energy source during power outages, crucial in ensuring continuous operation particularly of NATPRIL's freeze dryer, among other equipment used in the company's processing of organic topical creams, liniments, and other pharmaceuticals.

## Other Partnerships:

Requesting Party	Activity Title
Healing Basket Food Store	[FPD] Development of Rice Alternative from Hearts of Coconut Palm (3 months)
DOST-NCR and Baivi Group of Companies	[EBD] Upscaling of the DOST-ITDI Developed Electric Plastic Densifier
Universal Robina Corporation	[CED/EBD] Improvement/Development of a Plastic Laminate Wastes Pyrolysis Facility at the URC and/or its Selected Partners
DOST Regional Office VI and The Arborvitae Farm	[FPD] Emergency Food Reserve: Sagip Nutriflour
Viandrei Nicole Joson Cuevas & Dr. Julius Caesar V. Sicat (DOST Region III)	[FPD] Setup of a Ready-to-Drink Calamansi Juice Processing Facility
Gregorio J. Rodis (Bataan Peninsula State University) & Dr. Julius Caesar V. Sicat (DOST Region III)	[FPD] Training and Consultancy Services on Basic Vacuum Frying Processing of DOST-ITDI to PSTC-Bataan (ITDI Ref. No. MOA-FPD-2303-001)
De La Salle University (DLSU) and Mapua University	[MSD] Method Optimization of Digestion and Extraction of Microplastics in Milkfish ( <i>Chanos chanos</i> )
BSP (Balik Scientist), Arch. Mitsy Canto-Jacobs	[EBD] High Containment (BSL 3 & 4) Workshop and Architectural Design of the VIP Facility in Clark
DOST-ITDI and National Defense Medical Center	[EBD] 2023 Training on Basic BSL-3 User and Core Facility of the Lab-to-Lab Training Program under the MECO-TECO HAT Initiative



Requesting Party	Activity Title
PNRI	[MSD] Collaborative project on PREx Plastic (Post-radiation Reactive Extrusion of Plastic Waste)
Zamcor Detergents	[CED] Development of Pet Shampoo and Pet Deodorizer
Shimadzu Asia-Pacific Ltd. and Shimadzu Philippines Corporation	[PTD] Method Validation and Determination of Per/Polyfluoroalkyl Substances in Locally-Available Paper-Based Food Packaging using LCMSMS
Anthrologic Inc.	[MSD] Development and Testing of Materials for Medical Devices
Packaging Institute of the Philippines	[PTD] Packaging Education (use of facilities, resource persons/speakers)
RLGV Fruit Wine Industry	[FPD] Training and Consultancy Services on Wine Processing using the ITDI Wine Kit
Anandaraj Venkidusamy	[FPD] Dried Fruits Processing
Cebu Doctor's University Hospital and University of San Carlos	[MSD] 3D-ABi: Development and Performance Evaluation of Biocompatible Materials and Pore Design Structure for 3D Printed Artificial Bone Implants
Alpha DDSI	[MSD] Research Collaboration in the Utilization of Agricultural and Industrial Waste for the Thermoplastic Composites and 3D Printing of Prototype Products

Requesting Party	Activity Title
BF Industries	[CED] Optimization Study on the Co-Production of Activated Carbon and Bio-oil from Spent Coffee Grounds
Coycoy's Lechon	[PTD] Pilot Testing of the Developed Packaging Technology for Pork Lechon
Daily Baker	[PTD] Development of Brand Name and Label Design for Unique Philippine Products (Phase 3)
BAIVI Corp. & DOST-NCR	[CED] Field Testing of the Plastic Waste Pyrolyzer and Trial Production of Pyrolytic Oil Using Catalyst
University of Tsukuba	[CED] Cooperation on the Development and Testing of Energy Materials and Fuel Cell Components
Dr. Quail Farm	[FPD] Scale-up Production and Technology Validation of DOST-ITDI's RTE Boiled Quail Eggs (as a project partner)
Taha Foundation Ph	[FPD] Test Marketing Implementation and Soft Launching of Thermally Processed Randang Sauce
Mimi's Cacao	[FPD] Market Testing of Tablea Beverages
PAMANA Peanut Butter Manufacturing, Bulacan	[CED] Valorization of Post-Processing By-Products Generated from Industrial Scale Production of Peanut Butter

# TECHNICAL SERVICES

ITDI offers a wide range of technical services to clients from various sectors that contribute to enhancing their productivity and maintaining the quality of their products/services. For 2023, ITDI has rendered a total of 68,127 technical services involving testing and analyses, calibration, materials testing, and R&D services to 7,115 customers nationwide which generated a total revenue of PHP 45.63 million.

## TECHNICAL SERVICE ACCOMPLISHMENTS (JANUARY - DECEMBER 2023)

	Clients Served	Technical Services Rendered	Revenue Generated
Testing and Analyses	1,550	56,986	7,132,911.00
Calibration	2,045	9,959	13,918,964.34
Material Testing	162	456	16,215,639.00
Other Technical Services	3,358	726	8,357,871.98
<b>TOTAL</b>	<b>7,115</b>	<b>68,127</b>	<b>Php 45,625,386.32</b>

The Packaging Technology Division's Simulation Packaging Testing Laboratory offered new testing services for Packaging Systems this year. These services are posted in the Philippine Gazette and issued under the DOST Administrative Order No. 010 S. 2023, the services are as follows:

No.	Testing Service	Test Method	Fees and Charges, PhP	Discounted Fees and Charges, PhP
1	Random Vibration Testing (1 hour)	ASTM D4728-17 Standard Test Method for Random Vibration Testing of Shipping Containers	10,180.00	8,144.00
2	Compression testing for Palletized Load	ASTM D642-20 Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads	3,660.00	2,928.00
3	Leak Testing	ASTM D3078-02 Standards Test Method for Determination of Leaks in Flexible Packaging	975.00	780.00

# Technology Transfer, Training, and Promotion

**Technology Transfer.** The DOST-ITDI through the Technological Services Division (TSD) promoted 165 of its technologies, products, and services in 2023 through various modes of engagement. These efforts were able to generate 29 agreements with 25 individuals, private companies, the academe, and local government units.

The institute facilitated eight trainings from the agreements complemented by technical assistance, and nine new and renewed licenses for local customers including an agro product enterprise in Tamilnadu, India. These activities generated Php2.73 Million in revenues.

Support services to the regions, academe, and other National Government Agencies (NGAs) included consultative meetings, technology pitchings, and IP training, among others.

Further, the Institute secured protection for 23 intellectual properties through the Intellectual Property Office. Of these, 12 products and services were submitted for patent/utility model protection, 9 for trademark, and 2 for copyright protection.

## 2023 Agreements Forged

	Title of TLA/MOA	Company	Type of Agreement
1	Swisspharma Research Laboratories, Inc.	Isotonic Drink, Mungbean Coconut Milk Beverage, Ready-to-eat Beef-filled Suman, Ready-to-drink Rice Milk, High Dietary Fiber from Calamansi Wastes, Ready-to-drink Tablea, Ready-to-eat Sweet Potato, Ready-to-eat Cassava in Syrup, Ready-to-eat Chicken Egg, Ready-to-eat Smoked Fish Meal, Ready-to-eat Chicken Arroz Caldo	TLA
2	Swisspharma Research Laboratories, Inc.	RTD Calamansi Juice, Mango Products (Puree and Dried) and Sagip Nutriflour	MOA
3	LLQC Food Industries Inc.	Basic Thermal Processing	MOA
4	Agricola Di Organico	Basic Thermal Processing	MOA
5	Universal Robina Corp.	Pyrolysis	MOA
6	Gracia Fe Yu	Power Back-up System	MOA

	<b>Title of TLA/MOA</b>	<b>Company</b>	
7	Baivi Group, Inc.	RTD Calamansi and Mango Processing	MOA
8	Aicee Catering Food Services	Sagip Nutriflour	MOA
9	CAMPFARMS	Ready-to-drink Calamansi Juice	MOA
10	Arborvitae Farm	Sagip Nutriflour	MOA
11	Tanay LGU	UpEDs/SAFEWATRS	MOA
12	Mr. Anandaraj Venkidusamy (Indian Client)	Dried Mango, Dried Pineapple and Banana Chips	MOA
13	Veterinary Corp.	OL Trap	TLA
14	Bataan Peninsula State University	Basic Vaccum Frying Processing	MOA
15	RLGV Fruits	Vinegar processing	MOA
16	Baivi Group Inc.	Pyrolysis	MOA
17	Rockwell Ent.	UpEDs/SAFEWATRS	TLA
18	Western Mindanao State University	UpEDs/SAFEWATRS	MOA
19	NSB Engineering Design and Fabrication	Salt Evaporating Setup	TLA
20	NSB Engineering Design and Fabrication	ITDI Salt Washer	TLA
21	Bestmark Agro-Industrial Corp.	ITDI Bioreactor	TLA
22	Bestmark Agro-Industrial Corp.	ITDI Dual Drum Composter	TLA
23	Bestmark Agro-Industrial Corp.	ITDI Salt Iodization Machine	TLA
24	L. Angeles Macinerics Corporation (LAMACO)	Household Tumbling Composter and Portable Biogas Digester	TLA

	<b>Title of TLA/MOA</b>	<b>Company</b>	<b>Type of Agreement</b>
25	Bestmark Agro-Industrial Corp.	UpEDs/SAFEWATRS and Salt Evap Setup	TLA
26	Sentinel Upcycle Manufacturing	ITDI Biogas Digester	MOA
27	LGU Batuan and LGU Ezperanza, Masbate	UpEDs/SAFEWATRS	MOA
28	LGU Lubao, Pampanga	UpEDs/SAFEWATRS	MOA
29	LGU Sto. Domingo, Ilocos Sur	UpEDs/SAFEWATRS	MOA

**Training.** Meanwhile, continual skills upgrading and knowledge enhancement through conduct of more than 130 regular and specialized training were provided to nearly 3,200 participants from MSMEs, LGUs, cooperatives, associations, the academe, NGAs, and the private sector.

Trainings were complemented with provision of consultancy, inspection, and assessment services on select food products, improvements, and processes, as well as Waste Analysis and Characterization Study. (Please supplement with table).

Of particular note is a specialized training program on food processing designed by the Institute for the Democratic Republic of Timor-Leste in coordination with the Department of Foreign Affairs-Technical Cooperation Council of the Philippines (DFA-TCCP). The training, held on September 27 to 30, 2023, was attended by 16 local mothers and the Filipino community. It was held at the Escola Dominicana in Hera, Timor-Leste.

In addition, ITDI and DFA-TCCP conducted a Technology/Training Needs Assessment (TNA) to identify interventions to address malnutrition and provide a livelihood training program to maximize the use of available resources in Timor Leste.

## 2023 Training Conducted

<b>#</b>	<b>2023 Customized Training</b>	<b>Frequency</b>
1	Mango Processing	7
2	Passion Fruit Processing (Juice and Jam)	1
3	Waste Analysis and Characterization Study (WACS)	1
4	Calamansi Processing	3
5	EFR Production	1
6	Nata de Coco/Starter Production	3
7	Fruit Juice Processing (Calamansi, Dalandan, Passion fruit)	1
8	Calibration of Household Water Meter by Gravimetric & Volumetric Methods	1

#	2023 Customized Training	Frequency
9	Household Care Products	1
10	Internal Quality Audit	1
11	Dried Fruit Processing	1
12	Training Program on Food Processing for Timor Leste	1
13	Training Program on Volume Metrology cum Work Immersion	1
14	Training Program on Mass Metrology cum Work Immersion	1
15	Charcoal Briquetting	1
16	Virgin Coconut Oil Production	1
	<b>TOTAL</b>	<b>26</b>

#	2023 Regional Training	Frequency
1	Waste Analysis and Characterization Study (WACS)	21
2	Operation and Maintenance of Dual Drum Composter	6
3	Operation and Maintenance of Bioreactor	4
4	Operation and Maintenance of Styroplastic Densifier	3
5	Dishwashing Liquid Production	2
6	Operation and Maintenance of the Salt Iodizing Machine	6
7	Vinegar Production using ITDI Acetator Kit	4
8	Webinar on Green Packaging for Sustainable Future	1
9	Liquid Hand Soap and Hand Sanitizer	2
10	Food Packaging	1
11	Operation and Maintenance of Salt Washer	1
12	Calamansi Processing	1
13	Seminar-Forum on Salt Processing Technology	1
14	Product Development and Formulation	1

#	2023 Regional Training	Frequency
15	Production of Liquid Hand Soap	1
16	Cleaner Production	1
17	Household Care Products	1
18	Citronella Essential Oil Extraction	1
19	Wine Making	1
20	Training Workshop on Waste Diversion Rate Determination and Enhancing Waste Diversion Strategies	1
21	Operation and Maintenance of ITDI-Designed Emergency Disinfection System	1
22	Product-Package Development and Compatibility	1
23	Webinar on Salt Iodine Fortification	1
24	Seminar on Cacao Production	1
25	Introduction to Measurement Uncertainty	1
26	Seminar on Solid Waste Management Technologies	1
	<b>TOTAL</b>	<b>66</b>

#	2023 Regular Training	Frequency
1	Calibration of Liquid-in-Glass and Digital Thermometers	2
2	Calibration of Volumetric Instruments Piston-Operated Pipettes based on ISO 8655	1
3	Humidity Measurement	2
4	Pressure Metrology and Calibration of Pressure Gauges	2
5	Calibration of Non-Automatic Weighing Instruments (NAWI): Laboratory Scales	3
6	Awareness Seminar on Food Packaging, Labeling and Branding	1
7	Formulation of Personal Care Products (Hand sanitizer and hand soap)	1
8	Essential Oil Extraction	1
9	Calibration of pH Meters	1



#	2023 Regular Training	Frequency
10	Internal Quality Audit for PNS ISO/IEC 17025:2017	1
11	Food Product Development and Safe Use of Food Additives	2
12	Calibration of Volumetric Wares based on ISO 4787:2021	1
13	Introduction to Measurement Uncertainty	2
14	Introduction to Sensory Evaluation	2
15	Torque Measurement and Calibration	1
16	Household Care Products	2
17	Calibration of Digital Multimeters	2
18	Calibration of Weights based on OIML R 111-1	2
19	Calibration of Piston-Operated Volumetric Apparatus	1
20	Calibration of Force Testing Machine	1
21	Emulsified Chicken Meat Products Processing	1
22	Calibration of Force-Proving Instruments	1
23	Overview of Shelf Life Testing	1
24	Introductory Course on Validation of Chemical Methods of Analysis	1
25	Calamansi Processing	1
	<b>TOTAL</b>	<b>36</b>

#	2023 WEBINAR	Frequency
1	Ceramic Production	2
2	Overview of Quality Management for Personal Care Products	2
3	Salt Iodine Fortification	1
	<b>TOTAL</b>	<b>5</b>

Total # of participants **3250**  
Total # of trainings **132**

**Promotion.** For 2023, ITDI focused on five modes of promotional projects/ advocacy. While it did not leave out use of traditional media as its first mode, it organized conduct of the Knowledge Exchange for Economic Partnerships (KEEP) international study tour and conference project as a second modality. It also re-branded its science tours and visits package and called it Technology Carousel.

In its fourth mode, it worked to institutionalize its online business talk show ITDI's TekNegoShow. Lastly, it constructed the DOST-ITDI Knowledge Management Platform for Science, Technology, Innovation, Culture, and the Arts (KM-STICA) Facilities Center.

The first mode, traditional media, allowed ITDI to engage in communication/promotion activities about 165 of its technologies through production of 574 issues/titles of 5 types of IEC materials (press release, radio-TV spot/interview, news bulletin, social media posting, and video) and disseminated 14,188 copies of these.

For 2023, ITDI conducted KEEP with Innovate UK EDGE (KEEP UK-ITDI) together with 10 British companies. It initiated also an agreement with SIRIM Berhad, a Standard, Metrology, Assessment, Research, and Testing (SMART) solution provider based in Selangor, Malaysia.

Under the third mode, ITDI reprised a technology carousel, which means the idealized concept of the never ending cycle (because a circle has no sides) of technology development. ITDI conducted 54 science tours and visits of local and international groups, a 125% increase from 2022.

With the establishment of the online business talk show, TekNegoShow, as part of ITDI's official promotional tool industry stakeholders can expect on a regular basis the broadcast of narratives and insights of technology generators, business people, and the consuming public on how they perceive a featured technology. ITDI produced Season 4 for the year.

With the last mode, DOST-ITDI KM-STICA Platform aims to bring all fragmented pieces of research/ related information, and science and cultural artifacts together in a single platform which DOST-ITDI officers, staff, and customers can access conveniently.



# GOVERNANCE

## DOST- ITDI Pre-planning Workshop

As the DOST cascaded the initial draft of the DOST Strategic Plan 2023-2028 encompassing DOST Pillars and Strategies, the DOST-ITDI, through its Planning and Management Information Systems Division (PMISD) initiated a review of Pre-Planning Workshops for the Support, Technical Services, and Research & Development (R&D) groups held on October 9, 10 and 12, 2023, respectively. Spearheaded by the OIC of PMISD and Deputy Director for ATS, Dr. Zorayda V. Ang, the Institute's operations plan and budget (OPB) targets and accomplishments, including its programs and projects, were reviewed and anchored to the four (4) DOST Pillars namely: Human Well-being promoted; Wealth Creation fostered; Wealth Protection enforced, and Sustainability institutionalized and Foundation pillar: DOST system governance strengthened and harmonized.

The dynamics of this transformative workshop extended across all divisions, where everyone updated their respective program roadmaps aligning these with the thrusts of the current administration.



Representatives from ADM, FMD, and PMISD during the Pre-planning Workshop of the Support Group held on October 9, 2023.



Representatives from NMD, STD and TSD during the Pre-planning Workshop of the Technical Services Group held at ADMATEL Library, ADMATEL Building on October 10, 2023.



Representatives from CED, EBD, FPD, MSD, and PTD during the Pre-planning Workshop of the R&D Group held on October 12, 2023.

## Institute-wide Strategic Planning Workshop

To define the Institute's direction for 2024-2028, a strategic planning workshop was conducted on December 6-7, 2023 at the Development Academy of the Philippines (DAP), Tagaytay City. The workshop underscored the importance of convergence and programming of the projects and activities of the Institute for the upcoming years.

Dr. Annabelle V. Briones set the stage with her welcome remarks. Dr. Zorayda V. Ang, Deputy Director for ATS, presented ITDI's performance and current situation, providing actual data and accomplishments from the Operations Plan and Budget (OPB) starting in 2021. Subsequently, outputs including roadmaps and OPB targets from the ATS group pre-planning workswide held on October 9-10, 2023 were presented by Dr. Ang while that of the R&D group held on October 12 was presented by Dr. Christine Marie C. Montesa, Deputy Director for R&D. Dr. Briones shared her insights and suggestions to finalize the roadmap of each group. The 2023 Financial Performance and 2024 Budget were provided during the discussion led by the Chief of the Finance and Management Division (FMD), Dr. Janet F. Quizon. Other matters such as the hiring of casual employees were also addressed during the 1st day of the strategic planning.

The 2<sup>nd</sup> day commenced with the Deputy Directors presenting group-specific concerns and addressing issues throughout the workshop. Further, the day featured breakout sessions for the ATS and R&D groups. During the workshop proper, discussions were centered on refining the roadmaps and integrating valuable feedback from Day 1 for a more targeted and impactful strategic plan. Each division actively contributed to the identification of Programs, Projects, and Activities (PPAs) as well as the preparation of their divisional succession plans. Final outputs were presented, by the Deputy Directors. PMISD OIC, Engr. Roland Andrew T. Cruz concluded the workshop, highlighting the efforts of the groups present during the activity to draw the roadmap that will guide DOST-ITDI toward achieving its goals.



ITDI Executive Committee Members and Key personnel from each divisions and secretariat during the 2023 ITDI Strategic Planning Workshop last December 6-7, 2023 at DAP, Tagaytay.



ATS group during the breakout session



R&D group during the breakout session



# Corporate Social Responsibility (CSR) Activity

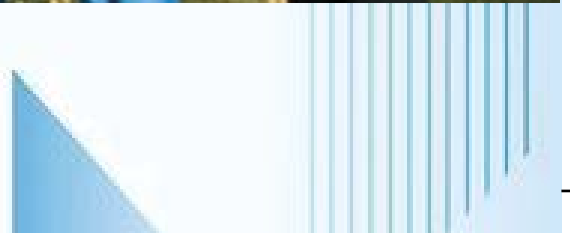
As our resounding commitment to environmental stewardship, ITDI embarked on a meaningful Corporate Social Responsibility (CSR) initiative, a bamboo tree planting activity at SVD Laudato Si' Farm, Tagaytay City on December 8, 2023, right after the 2-day ITDI Strategic Planning Workshop.

The Executive Director of SVD Farm and Rector of the SVD Tagaytay Community, Rev. Fr. Samuel Naceno-Agcaracar welcomed the ITDI team and shared their mission to strengthen the spiritual welfare of guests and employees through its solemn ambiance and liturgical services. It is also their goal to help uplift the economic condition of surrounding communities through livelihood and training programs and to promote organic farming through optimal and sustainable use of technology, resources, and capability building.

During activity, five groups from ITDI successfully planted bamboo trees in five different planting sites. This was followed by a Holy Mass at the SVD Farm Chapel of the Virgin of the Poor.

The success of this CSR initiative was evident in the smiles on the faces of our ITDI team and the recipient farmers. This tree-planting activity signifies the role each of us play in building a greener future and creating significant positive impacts for tomorrow.







# Quality Management System

## Training on ISO 9001:2015 Quality Management System (QMS)

The ISO 9001:2015 training held on May 10-11, 2023 at the ADMATEL Library with resource speakers coming from the Metals Industry Research and Development Center (MIRDC), aimed to enhance participants' understanding of the ISO 9001:2015 Quality Management System (QMS) and its practical implementation.

Resource speakers from MIRDC discussed the standards set under ISO 9001:2015, its historical context, benefits, and Quality Management Principles. Clauses 4-10 of the 9001:2015 QMS were thoroughly discussed, focusing on commonly queried clauses during audits and associated documented evidence.

For Day 1, there were 23 participants from various divisions under ITDI's QMS, including Document Custodians (DC), Internal Quality Auditors (IQA), and also from the Standards and Testing Division (STD) and the National Metrology Division (NMD) while 27 participants attended the second day.

The training effectively equipped participants with a deeper understanding of ISO 9001:2015, enhancing their competency in implementing and auditing QMS processes in the Institute.



## Seminar-Workshop on Internal Quality Audit (IQA)

The three-day Seminar-Workshop on Internal Quality Audit (IQA) held on July 11-13, 2023 at the Metrology Conference Room addressed the critical need for comprehensive training among both old and new auditors within the Institute. Twenty-four active Internal Quality Auditors, Auditors-in-Training (AITs), Co-Auditors, and Team Leaders composed the attendees of this seminar-workshop coordinated by Engr. Joseph L. Herrera, Head of the Internal Audit Group, and facilitated by Dr. Zorayda V. Ang, Quality Management Representative, the seminar featured Ms. Linda G. Rivera from the Metals Industry Research and Development Center (MIRDC) as the resource speaker.

The seminar focused on key objectives, including interpreting ISO 9001:2015 requirements within the context of internal audits, delineating roles and responsibilities within the audit team, planning and executing internal audits in compliance with ISO 19011:2018 guidelines, and recognizing the value of internal audits in enhancing the Quality Management System. Overall, the seminar-workshop equipped ITDI auditors with essential skills and knowledge vital for effective internal audits, reinforcing the organization's commitment to continuous improvement and adherence to ISO standards.



# DOST-ITDI ISO 9001:2015 Recertification

This year, a Recertification Audit for ISO 9001:2015 of DOST-ITDI was held on August 17-18, 2023, covering the provisions of its Research and Development services, Technical Training services specifically in the areas of chemicals, energy, environment, biotechnology, food processing, materials science, and packaging technology. DOST-ITDI received its Recertification valid from October 29, 2023 until October 28, 2026.

# Certificate

Standard **ISO 9001:2015**  
Certificate Registr. No. **01 100 1634770**

Certificate Holder:  **Industrial Technology Development Institute (DOST)**  
DOST Compound, Gen. Santos Ave., Bicutan, Taguig City, Philippines

Scope: Provision of Research and Development services, Technical and Training services in the areas of chemicals, energy, environment, biotechnology, food processing, material science and packaging technology

Validity: Proof has been furnished by means of an audit that the requirements of ISO 9001:2015 are met.  
The certificate is valid from 2023-10-29 until 2026-10-28.  
First certification 2020

2023-11-15

  
TÜV Rheinland Cert GmbH  
Am Grauen Stein · 51105 Köln

www.tuv.com



## ISO 50001:2018 Certification

The Advanced Device and Materials Testing Laboratory (ADMATEL) was granted a certification for ISO 50001:2018 Standard for Energy Management Systems following the completion of the audit for Stages 1 and 2 conducted by TÜV Rheinland in November 2022 and March 2023, respectively.

Findings during the Stage 2 audit, particularly regarding energy management practices noted initiatives, such as the installation of the Smart EMS monitoring system for Significant Energy Users (SEUs) which enables remote access via the internet thus aligning ADMATEL with industry best practices. Additionally, management's decision to implement compressed and reduced working hours in response to current circumstances resulted in a 13% reduction in energy consumption which is anticipated to reach 29.23% by yearend.

The certification is valid until July 2026; surveillance audits will be scheduled with the next audit planned before March 2024.



# ACCREDITATIONS

STD-ITDI completed a three-day external assessment by DTI-PAB, ensuring compliance with industry standards. The Microbiology Section's accreditation was renewed, while existing accreditations of other laboratories were sustained. Twelve new approved signatories were recommended, enhancing the division's capabilities. Additionally, the division received two positive observations for its best practices.

## CONGRATULATIONS, Standards and Testing Division, DOST-ITDI!



### SUCCESSFUL EXTERNAL ASSESSMENT

Department of Trade and Industry (DTI)  
Philippine Accreditation Bureau (PAB)  
**LABORATORY ACCREDITATION**  
**PNS ISO/IEC 17025:2017**  
15-17 November 2023

- RECOMMENDED!**
- ✓ MAINTAINED scopes of laboratory accreditations and approved signatories;
  - ✓ 12 NEW approved signatories



✉ [std@itdi.dost.gov.ph](mailto:std@itdi.dost.gov.ph)

📘 [std.itdi.dost](https://www.facebook.com/std.itdi.dost)

🌐 [itdi.dost.gov.ph](https://www.itdi.dost.gov.ph)

STD-ITDI's Chemistry Laboratory and Microbiology Section, Biological Laboratory renewed its Laboratory Accreditation under FDA for chemical and microbiological testing of food, beverage, and bottled water products. The accreditation, granted until February 2026, highlights the division's efforts to uphold high standards and contributing to food safety enforcement.



ITDI Halal R&D Facility received a Certificate of Excellence in Halal and Hygiene Compliance for 2022-2023 by The Malaysia Halal Consultation and Training Agency, International Halal Integrity Alliance Ltd. (MHCT/IHIA) on January 23, 2023.



The Packaging Testing Laboratory passed the assessment and secured Certificate of Authority to Operate (CATO) from PRC. CATO is a major requirement for all chemical laboratories in the Philippines and is proof that the facility abides by the Implementing Rules and Regulation (IRR) of RA 10657 (Chemistry Profession Act).



The National Metrology Laboratory (NML) underwent a surveillance audit on February 13-21, 2023 to check if it is adhering to the standards set under ISO 17025:2017 as required by DAkkS, a German accreditation body. It checked its scope of compliance in calibrating for mass, temperature, pressure, and small volume. Technical competence was assessed by METAS, the Swiss national metrology institute, while DAkkS audited the Quality Management System (QMS).



The Metrology in Chemistry Section (MiC) of the National Metrology Division has been granted CATO by the Professional Regulation Commission (PRC). This achievement follows the fulfillment of all requirements outlined in Republic Act 10657, the Chemistry Profession Act. By obtaining this certification, MiC demonstrates its commitment to operate following legal standards, ensuring public safety, and contributing to the nation's welfare.





# Gender and Development (GAD) Activities

The Gender and Development Focal Point System (GFPS) Technical Working Group (TWG) organized several GAD activities, such as the Institute's celebration of National Women's Month and capability building on gender equity and empowerment.



**Training Workshop on Gender-Fair Language and Graphics for Social Media Postings**



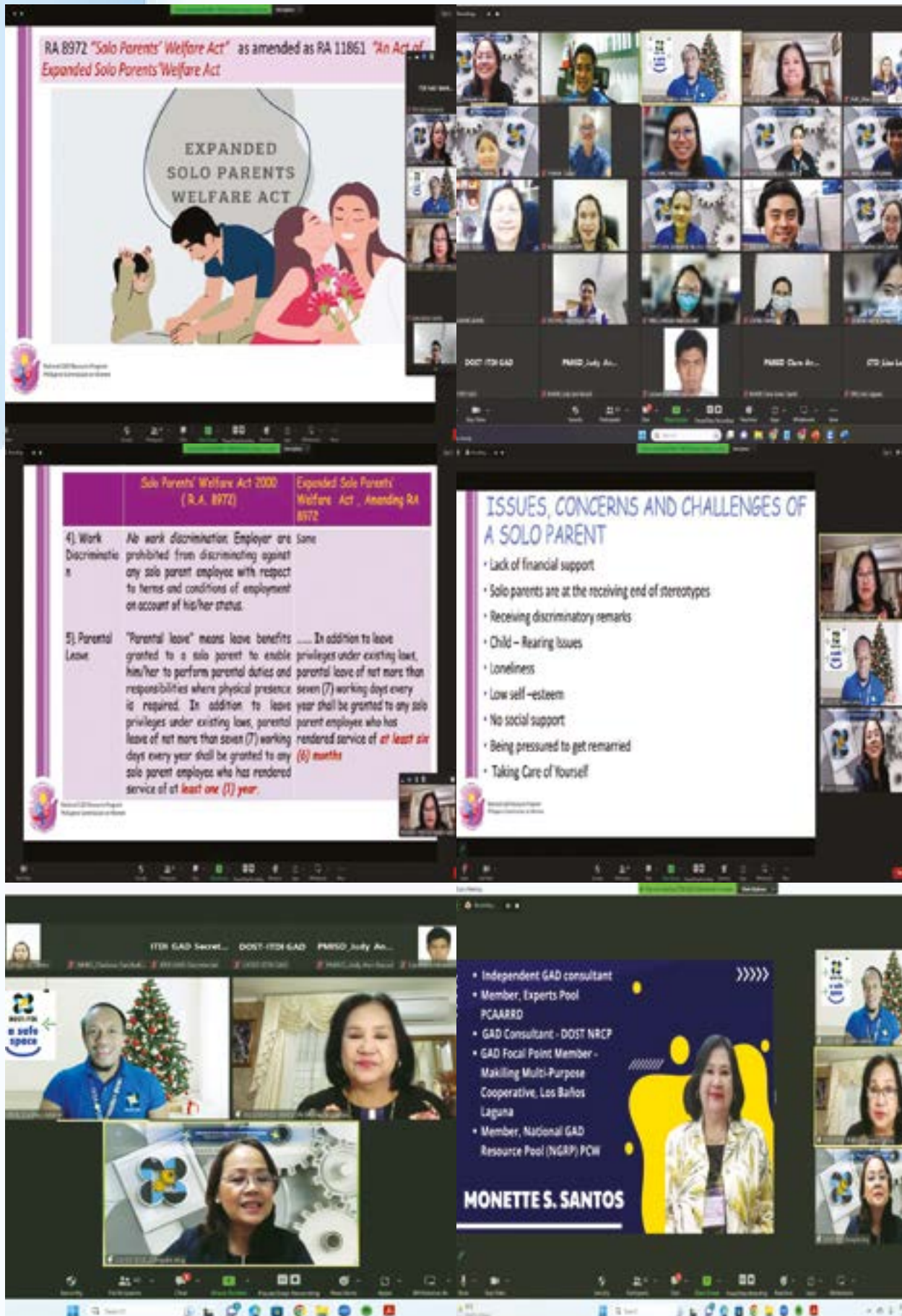
Training Workshop on Gender Analysis and Tools



Webinar on Sexual Orientation, Gender Identity and Expression, and Sex Characteristics (SOGIESC)



**Divisional Seminar on Safe Spaces Act and its Implementing Rules and Regulations (IRR)**



Webinar on RA 11861 or the Expanded Solo Parents Welfare Act



**GFPS Functionality Assessment Tool (GFAsT) Training Workshop**



**GFPS Assessment of the Institute's Gender Mainstreaming Accomplishments for 2022**

## National Women's Month 2023



**Kick-off Celebration**



**Karaoke Open Mic Concert**





**#EMBRACEQUITY for International Women's Day**

## 18-Day Campaign to End Violence Against Women (VAW) 2023



Kick off Celebration



Open Mic Concert 2.0

## DOST-ITDI GAD Logo



### DOST GAD ITDI

REGISTERED TRADEMARK - IPOPHIL (Philippines)

250 Serial number 4082229785	220 Application date November 26, 2022	340 Representation of the mark 
111 Registration number 529781	101 Registration date September 2, 2023	341 Representation of the mark when the mark is represented in standard characters DOST GAD ITDI
001 Kind of mark Individual	102 Filing date September 2, 2023	
030 Type of mark Combined		
011 Nice classification - NCL 26, 40		

The DOST-ITDI GAD Logo has been officially registered with the Intellectual Property Office of the Philippines (IPOPHIL). ITDI is the first line agency to register a GAD logo among the Research and Development Institutes (RDIs) of DOST.

## GAD Issued Policies

- Policy on the incorporation of Gender and Development (GAD) functions in the Individual Performance Commitment and Review (IPCR) targets or key result areas of all GAD Technical Working Group members (ITDI Administrative Order No. 001 Series of 2023)
- Policy on the evaluation of gender mainstreaming of ITDI GAA projects: Proposal, quarterly monitoring and completion (ITDI Administrative Order No. 002 Series of 2023)

# Committee on Anti-Red Tape (CART)

The name of the Anti-red Tape Unit (ARTU) has been replaced in 2023 and is now known as the Committee on Anti-Red Tape or CART. As part of the reengineering efforts of the Institute, the CART revised the ITDI Citizen's Charter (CC) Handbook, including the addition of its new services. Relative to the implementation of the CC, divisional representatives revised Information Bulletins based on the updated ITDI 2022 CC. This year, the CART revised the existing Customer Satisfaction Survey Form (CSSF) based on the ARTA's Memorandum Circular No. 2022-05 Series of 2022 dated September 20, 2022 on the guidelines on the implementation of the Harmonized Client Satisfaction Measurement (HCSM). The new form, as shown below, is called the Harmonized Customer Satisfaction Form (HSCF) and was implemented effective April 3, 2023. In December, the committee submitted to ARTA the ITDI Reengineering Report for 2024.

TSR/Control No. \_\_\_\_\_

Republic of the Philippines  
Department of Science and Technology  
**INDUSTRIAL TECHNOLOGY DEVELOPMENT INSTITUTE**  
DOIT, C-5, General Santos Ave., Alabang, Taguig City  
Tel. Nos. 8400-2071 to 82 (DOIT Functions)  
Toll-free No. 8400-2147  
<http://www.itdi.gov.ph>

Form: **QMS-F3**  
Issued: April 2023

**HELP US SERVE YOU BETTER!**

This Client Satisfaction Measurement (CSM) tracks the customer experience of government offices. Your feedback on your recently concluded transaction will help this office provide a better service. Information provided is protected as per Data Privacy Act (RA10173) and its IRR.

Client type:  Citizen  Business  Government (Employee or another agency)

Date: \_\_\_\_\_ Sex:  Male  Female Age: \_\_\_\_\_

Region of residence: \_\_\_\_\_ Service Availed: \_\_\_\_\_

**INSTRUCTIONS:** Put a check mark (✓) on your answer to the questions corresponding to the Citizen's Charter (CC). The Citizen's Charter is an official document that reflects the services of a government agency/office including its requirements, fees, and processing times among others.

CC1 Which of the following best describes your awareness of the CC?

1. I know what a CC is and I saw this office's CC.  
 2. I know what a CC is but I did NOT see this office's CC.  
 3. I learned of the CC only when I saw this office's CC.  
 4. I do not know what a CC is and I did not see one in this office. (Answer 'NA' on CC2 and CC3)

CC2 If aware of the CC (answered 1-3 in CC1), would you say that the CC of this office was ...?

1. Easy to see  4. Not visible at all  
 2. Somewhat easy to see  5. N/A  
 3. Difficult to see

CC3 If aware of the CC (answered codes 1-3 in CC1), how much did the CC help you in your transaction?

1. Helped very much  3. Did not help  
 2. Somewhat helped  4. N/A

**INSTRUCTION:** Please encircle the number in the column that best corresponds to your answer. (8 being the highest)

Dimension	Description	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Not Applicable
Responsiveness	The staff responded to the customer's request immediately.	5	4	3	2	1	0
Reliability (Quality)	The service provided is accurate, timely and of high standard.	5	4	3	2	1	0
Access & Facilities	The facilities are accessible and well-maintained, and the billing process and payment method are convenient.	5	4	3	2	1	0
Communication	The relevant information on the services was clearly provided by the staff.	5	4	3	2	1	0
Costs	The potential fees and charges of the services are transparent.	5	4	3	2	1	0
Integrity	The transactions and protection of confidential information are clear and transparent.	5	4	3	2	1	0
Attitude	Staff is knowledgeable, competent, and understanding of customer's needs.	5	4	3	2	1	0
Outcome	The service provided and/or technical help/assistance are sufficient.	5	4	3	2	1	0
OVERALL	I am satisfied with the service that I availed.	5	4	3	2	1	0

**RECOMMENDATION TO OTHER CUSTOMERS (See Promoter Score):**

10	9	8	7	6	5	4	3	2	1
Will Surely Recommend to Others									Will Not Recommend (Please specify why Not Recommend)

Suggestions on how we can further improve our services: \_\_\_\_\_

Email address (optional): \_\_\_\_\_

**THANK YOU!**  
*Inspired by Technology, Driven by Innovation.*

Membership:  
 ASBANK Consultative Committee for Standards & Quality - Rubber-Based Product Working Group | ASBANK Rubber Testing Laboratory Committee |  
 Asia News Forum (ANF) | Asia-Pacific Food Analysis Network (APFAN) | Asia Packaging Network (APN) | Asia Pacific Legal Metrology Forum (APLMF) | Asia-Pacific Metrology Programme (APMP) | General Conference on Weights and Measures (CGPM) | IBSA Global and Asia-Pacific |  
 International Association of Packaging Research Institute (IAPRI)

Harmonized Customer Satisfaction Form (HSCF)

# Association of Employees in Scientific Endeavor (AESE)

A commitment to the principles of inclusion, efficiency, and reliability, AESE remained as a strong symbol of unity and cooperation. The organization, propelled by the collective stand of its members, remains resolute in its mission to forge strong bonds and collaborative endeavors.

Looking ahead, AESE is poised to embark on a continuous journey of progress, unwaveringly marching forward with a vision to institutionalize an array of innovative programs aimed at enhancing employee welfare. These forthcoming initiatives are designed not only to fortify the well-being of each member but also to cultivate a dynamic and progressive relationship between the workforce and management, fostering an environment where mutual understanding and shared objectives flourish. Below are the AESE Board's accomplishments this year:

## Health and Wellness

- Provided medical and bereavement benefits to affected AESE members.
- Granted reimbursement of individual hospitalization and annual medical-physical examination-related expenses incurred for the year 2023 in pursuant to DOST Administrative Order No. 019, Series of 2016, amounting to a total of Php 3,477, 349.71.
- Negotiated with health insurance providers and organized in-house annual physical examination for 521 ITDI employees and their dependents at the Food Processing Division/ Material Science Division building.



## Employee Representation

- Facilitated grant of the Collective Negotiations Agreement (CNA) incentives as the joint effort of the ITDI Management, AESE and its members to implement effective cost-cutting measures and systems improvement this year pursuant to the Department of Budget and Management (DBM) Budget Circular No. 2023-1 dated November 10, 2023.
- Provided monetary contribution to both the 2023 ITDI Anniversary and Year-End Party.
- Provided monetary contribution to the Lifeguard Gabriel Security Agency Corp. for actively safeguarding our community, and ensuring a secure environment for our employees.
- Distributed Christmas grocery packages to all members as well as to utility staff in time for the holiday celebration.



## Sports Festival

As an organization dedicated to promoting a healthy lifestyle and community engagement, AESE facilitated the participation of ITDI employees in the DOST-Wide Sports Festival held between April 22-June 2, 2023, at the Binangonan Recreation and Cultural Complex (BRCC), Rizal Province with the full support of the management. ITDI was able to garner several trophies from several sports activities, such as Men's and Women's Basketball, Table Tennis, Bowling, and Chess.



# Industry Advisory Committee (IAC)

DOST-ITDI's Industry Advisory Committee (IAC) is a group of industry experts and business leaders from both private and public sectors. In 2023, IAC expanded by adding more members from different associations, demonstrating a commitment to enhance collaboration and a comprehensive approach to industry challenges. IAC members are expected to contribute by providing advice on research and development (R&D), business development, and technology transfer.

DOST-ITDI facilitated four (4) IAC meetings this year with its partner industry experts to find solutions to cope with the requirements of Extended Producer Responsibility (EPR) Law, from industry practices and DOST-ITDI developed technologies by organizing a TechClinic event in 2024 to further address these solutions.



# Awards and Recognition

## Mr. Albert M. Pallaya 2023 Outstanding FOI Receiving Officer



In a well-deserved acknowledgement of his dedication to transparency and accountability, Mr. Albert M. Pallaya, serving as a Science Research Specialist II at the Technological Services Division of DOST-ITDI, has been honored as one of the Best Freedom of Information (FOI) Receiving Officers at the 2023 FOI Awards ceremony held on November 21.

As an FOI officer, Mr. Pallaya has been instrumental in facilitating access to government information and promoting transparency across all levels of governance. His diligence and dedication have not only enhanced the efficiency of the FOI Program but have also strengthened the public's trust in government institutions.

## 2023 Energy Efficiency Excellence Awards



DOST-ITDI is among the winners of the 2023 Energy Efficiency Excellence Awards (EEE) under the National Government Agency Category.

The unwavering commitment of DOST-ITDI, particularly its Chemicals and Energy Division, to implement outstanding Energy Efficiency and Conservation initiatives within its facility has truly set it apart. Out of an impressive 360 applicants, DOST-ITDI emerged as one of the 27 awardees, showcasing the organization's dedication to innovation and sustainability.

DOST-ITDI also stands out as one of the two awardees in the National Government Agencies Category, further highlighting its exceptional contributions in the field.



## 2023 DOST Intellectual Property Awards

DOST-ITDI was cited by the National Academy of Science and Technology (DOST-NAST) as the Sole Agency with Granted Patent Registration.



### Granted Patent Award (GP)

1. **A Continuous Screw-Type Salt Washer**, 1-2019-000386, Annabelle V. Briones; Carlos J. De Vera; Oliver C. Evangelista; Jayson B. Nuval; Melquiades B. Canceran; and Alexander G. Cruz

### Utility Model Registration Award (UM)

1. **High-maltose Sugar Syrup from Rice (*Oryza sativa* L.) Bran**, 2-2021-051107, Garry A. Diopol  
**Process for Producing High-maltose Sugar Syrup from Rice (*Oryza sativa* L.) Bran**, UM 2-2021-051125, Garry A. Diopol
2. **Household Tumbling Composter**, 2-2020-050118, Myra L. Tansengco; David L. Herrera; Mario Josefino V. Capule; Maria Theresa C. Artuz; and Joven R. Barcelo

3. **Composting Apparatus**, 2-2017-050232, David L. Herrera; Myra L. Tansengco; Judith C. Tejano; and Efren Q. De Chavez
4. **A Thermoset Composite Panel Made of Natural Fiber Layers and Synthetic Fiber Layers**, 2-2021-050746, Marissa A. Paglicawan; Blessie A. Basilia; Carlo S. Emolaga; Johanna Marie B. Sudayon; and Julius Caesar V. Sicat  
**Preparation of a Thermoset Composite Panel Made of Natural Fiber Layers and Synthetic Fiber Layers**, 2-2021-050747, Marissa A. Paglicawan; Blessie A. Basilia; Carlo S. Emolaga; Johanna Marie B. Sudayon; and Julius Caesar V. Sicat
5. **Natural Fiber Reinforced Composite Structures**, 2-2021-050303, Marissa A. Paglicawan; Carlo S. Emolaga; and Blessie A. Basilia
6. **Method of Manufacturing Composite Material Comprising Pulverized Abaca Fibers**, 2-2021-050309, Marissa A. Paglicawan; Blessie A. Basilia; Carlo S. Emolaga; and Mark Anthony R. Agbayani
7. **Packaging System to Extend the Freshness and Shelf Life of Pork *Lechon***, 2-2018-000266, Cynthia M. Bihis; Daisy E. Tañafra; Fernan S. Victoria; Ermin S. Orendain; and Allan B. Quirante
8. **Mold for Fabrication of A 3D Printed Mold for Production of Bioscaffolds**, 2-2021-051098, Sharyjel R. Cayabyab; Josefina R. Celorico; and Salvador T. Gelilang
9. **A Process for Fabrication of a 3D Printed Mold for Production of Bioscaffolds**, 2-2021-051099, Sharyjel R. Cayabyab; Josefina R. Celorico; and Salvador T. Gelilang
10. **Oxidized Starch Nanocrystals**, 2-2022-050071, Carlo S. Emolaga, Marissa A. Paglicawan; Araceli M. Monsada; Delmar Marasigan; and Nolan Villanueva
11. **Process for Producing Oxidized Starch Nanocrystals**, 2-2022-050072, Carlo S. Emolaga; Marissa A. Paglicawan; Araceli M. Monsada; Delmar Marasigan; and Nolan Villanueva
12. **Thermoplastic Composite Material Comprising Wood by-products**, 2-2022-050073, Marissa A. Paglicawan; Carlo S. Emolaga, Juanito Jimenez; Araceli M. Monsada; Delmar Marasigan; Nolan Villanueva; and Jonathan Co
13. **Composite Filament for 3D Printing**, 2-2022-051051, Marissa A. Paglicawan; Carlo S. Emolaga; Juanito Jimenez; Mark Anthony Agbayani; and Nolan Villanueva
14. **Process for Producing Composite Filament for 3D Printing**, 2-2022- 051052, Marissa A. Paglicawan; Carlo S. Emolaga; Juanito Jimenez; Mark Anthony Agbayani; and Nolan Villanueva
15. **Process for Producing HDPE-wood Composite Filament for 3D Printing**, 2-2022-051045, Mark Anthony Agbayani; Blessie A. Basilia; Marissa A. Paglicawan; and Marianito Margarito
16. **Process of Producing Polypropylene Filament for 3D Printing reinforced with Glass Fibers**, 2-2022-051055, Johanna Marie Sudayon; Marissa A. Paglicawan; Carlo S. Emolaga; Alvin Kim Collera; Nolan Villanueva; Josefina R. Celorico; and Blessie A. Basilia
17. **Polylactic Acid Filament for 3D Printing Reinforced with Microcrystalline Cellulose Fiber**, 2-2022-051055, Johanna Marie Sudayon; Marissa A. Paglicawan; Carlo S. Emolaga; Alvin Kim Collera; Nolan Villanueva; Josefina R. Celorico; and Blessie A. Basilia

## International Publication Award

1. Optimization of Cassava Starch, Glycerol, and Lactic Acid Concentrations as Active Edible Coating for Pork Meat
2. Printability and Warpage Evaluation of Polypropylene/Nano Precipitated Calcium Carbonate Composite Prepared by Extrusion-Based 3D Printing
3. Mechanical Behavior of Functionally Graded ABS Gyroif Lattice Structures Using Fused Deposition Modeling
4. Targeting Quorum Sensing and Biofilm Formation in the Control of *Vibrio Harveyi* Infections in *Penaeus vannamei*
5. What Happened Over the Last 10 Years (2012 to 2021): A Bibliometric Analysis of Acute Hepatopancreatic Necrosis Disease (AHPND) Research in Southeast Asia
6. Acute Toxicity and 28-day Repeated Dose Studies of Multi-Walled Carbon Nanotubes
7. Aquatic Toxicity Studies of Titanium Dioxide and Silver Nanoparticles Using *Artemia franciscana Nauplii* and *Daphnia magna*
8. Influence of Abaca Fiber on the Performance of Abaca-Glass Fiber Reinforced Polymer Composites
9. Preparation of Starch Nanocrystals with Antimicrobial Property
10. Assessment of Microstructural and Mechanical Properties of 420 Stainless Steel Fabricated by Laser Powder Bed Fusion
11. Mechanical Properties and Morphological Analysis of High-Density Polyethylene/Poly (Ethylene Glycol) Methacrylate/Rice Husk Composite
12. Characterization and Antibacterial Potential of Melt Compounded Acrylonitrile Butadiene Styrene/Copper Nanoparticle Composites
13. Coding-Complete Genome Sequence of an African Swine Fever Virus from an Outbreak in 2021 among Domestic Pigs in Pangasinan, Philippines
14. Locally-isolated Protease-producing *Bacillus* spp. from Soil Inhibits Biofilm Formation of *Staphylococcus aureus*
15. ABS/AgZrP Nanocomposite Additive Manufacturing Filament for Antibacterial Applications
16. PLA/MWCNT Nanocomposite: Improved Electrical, Thermal and Antibacterial Properties for Fused Deposition Modelling Additive Manufacturing Applications
17. Optimization of Spray-drying Conditions for the Development of Fermented Shrimp Powder Using Response Surface Methodology
18. The Correlation of Sulfonation Reaction Kinetics with the Degree of Sulfonation (DS) and its Effects on Microstructure and Morphology of Electrospun Fibers for Membrane of Fuel Cells
19. Developments of Interlaboratory Comparisons on Pressure Measurements in the Philippines
20. Performance, Applications, and Sustainability of 3D-printed Cement and other Geomaterials



DOST-ITDI was recognized as **'Project Partner and Collaborator'** by DOST CALABARZON on November 17, 2023.

## Gold Award for Excellence in Invention Creation



Flavored salts developed by DOST-ITDI Director Annabelle V. Briones, together with Maricar B. Carandang and Nadine Kristel A. Garcia of the Chemicals and Energy Division (CED-ITDI), and former ITDI Director Dr. Maria Patricia V. Azanza and staff Ara Antonette Alfuen won the Gold Award for Excellence in Invention Creation during the Seoul International Invention Fair 2023 (SIIF 2023) held on November 3 during the Awarding Ceremony at the Exhibition Place, Convention and Exhibition Center (CoEx), Seoul, South Korea.

The team of Dr. Briones received the award from the Korea Invention Promotion Association, which also awarded the Bronze to the salt washer machine. The machine, designed by the CED Team, was also led by Dr. Briones together with Engr. Carlos J. De Vera, Oliver C. Evangelista, Engr. Jayson B. Nuval, Melquiades B. Canceran, and Alexander G. Cruz.



**ENGR. FEDERICO E. DEL POZO, JR.**  
**Excellent Paper Award**

**Refining the Selection of Historical Period in Analog Ensemble Technique by FE Del Pozo Jr.**  
 12th Asia-Pacific Forum on Renewable Energy (AFORE 2023) Jeju, Republic of Korea  
 November 10, 2023



**ENGR. REYNALDO L. ESGUERRA**

**STI Partner Award for assisting Region 1 in the conduct of RECP, WACS, SAFEWATRS, Dual Drum Composter, given by DOST I during 2023 RSTW, October 18, 2023**



**MR. JOHN PAULO JOSE**

Certified Biosafety Professional given on October 6, 2023



**DOST-ITDI  
Gawad TekInnovation Award**

As a testament to its commitment to accelerating the advancement of the Local Government Unit of Lubao, Pampanga, DOST-ITDI was conferred with the Gawad TekInnovation Award by the Technological Hive of Regional Innovation for a Vibrant Ecosystem (THRIVE) Central Luzon Lead Convenors for its Upgraded Emergency Disinfection System (SAFEWATRS).

The award was received by Mr. Engel Ryan Ibarra of the Environment and Biotechnology Division on October 19, 2023, during the THRIVE Central Luzon Innovation Summit in Botolan, Zambales.



**Continuous Screw-Type Salt Washer  
2023 Regional TUKLAS Award (Best Invention)**

**Salt Harvester  
2023 Regional LIKHA Award (Outstanding Creative Research)**

2023 Regional Invention Contest & Exhibits (RICE), October 20, 2023



**DOST Halal S&T Program  
Lingkod Bayan Award**

**MS. MA. RACHEL V. PARCON**

Chief of the Standards and Testing Division and Project Lead, DOST-ITDI Halal Cosmetics R&D Team

Recognizing its excellence and contributions to the Halal industry, the Civil Service Commission bestowed the DOST Halal S&T Program with the prestigious Presidential Lingkod Bayan Award (Regional Level, Group Category). The award was received by STD Chief, Ma. Rachel V. Parcon.

# CONGRATULATIONS, ITDI-STD's Research and Development Team!



## 3<sup>rd</sup> Place, Best Poster

**"Potential Application of Bromelain from  
Philippine Pineapple Peels as a Mild Enzyme  
Exfoliant for Emerging Skin Care Strategies"**  
Ms. Ma. Rachel V. Parcon, RCh, MSc *et al.*

72<sup>nd</sup> Annual Convention  
Philippine Association for the  
Advancement of Science and  
Technology (PHILAAST)  
22 September 2023



Awarded on 22 September 2023,  
The Manila Hotel, City of Manila, Philippines

✉ [std@itdi.dost.gov.ph](mailto:std@itdi.dost.gov.ph)

📘 [std.itdi.dost](https://std.itdi.dost)

🌐 [itdi.dost.gov.ph](https://itdi.dost.gov.ph)



## DR. EMELDA ONGO and MR. ERISH DARANCIANG

Best Oral Presenters  
20th APCCChE Congress  
SMX Convention Center, Pasay City  
September 4-9, 2023





**MS. ABIGAIL H. BION, RCh, MSc**  
 Best Student Poster Award  
 2nd Annual Conference of the AOAC  
 Southeast Asia (SEA) Section  
 Ho Chi Minh City, Vietnam  
 August 1-2, 2023



**MR. JOHN PAUL MATTHEW GUZMAN**  
 2023 Young Scientist, Annual Scientific  
 Meeting of NAST PHL, July 13, 2023





**ENGR. OLIVER C. EVANGELISTA**  
 Kabalikatan Seasoned Researcher Award  
 PCIEERD 13th Anniversary and  
 Philippine Innovation Expo I  
 July 4, 2023



**ENGR. FEDERICO E. DEL POZO, JR.**  
 Best Paper Presentation Award  
 Korea Society of New and Renewable Energy Conference 2023  
 Busan, South Korea  
 June 2, 2023

# CONGRATULATIONS, ITDI-STD's Chemistry Laboratory!




**PEOPLE'S CHOICE AWARD  
POSTER PRESENTATION**

**"Determination of Sulfite in Commercial  
Dried Fruit Products in the Philippines"**  
Ms. Aileen C. Bidol, RCh, et al.

**APFAN** 

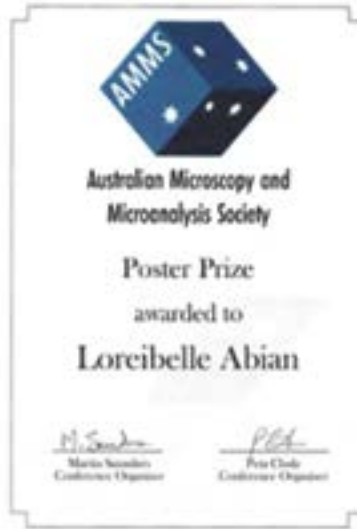
Asia-Pacific Food Analysis  
Network (APFAN)  
International Workshop on  
Laboratory Quality Standards  
towards Global Competitiveness  
23-25 May 2023

Awarded on 25 May 2023, Acacia Hotel,  
Alabang, Muntinlupa City, Philippines

 [std@itdi.dost.gov.ph](mailto:std@itdi.dost.gov.ph)     [std.itdi.dost](https://www.facebook.com/std.itdi.dost)     [itdi.dost.gov.ph](http://itdi.dost.gov.ph)

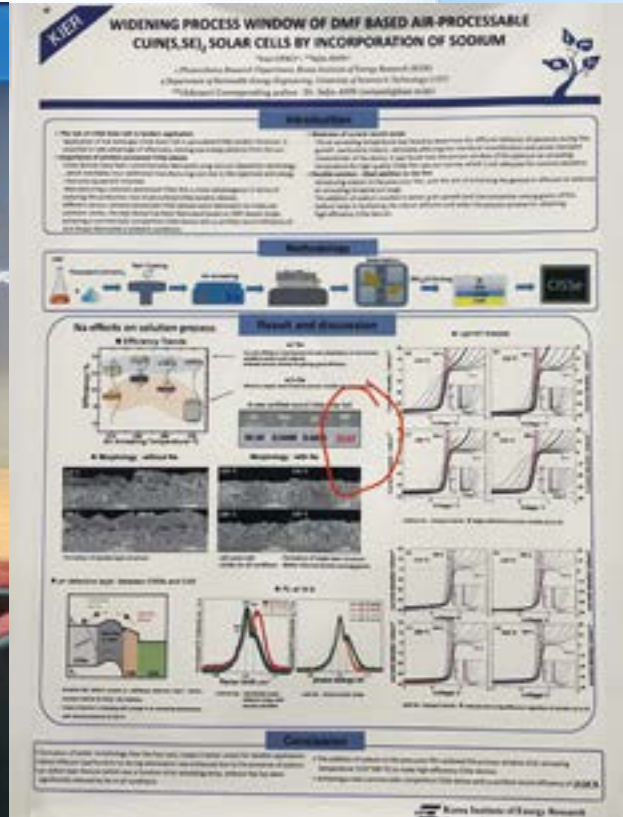


**DR. DONAMEL SAIYARI**  
Best Paper Presentation Award  
2023 International Conference on Environmental Quality Concern, Control, and Conservation (EQC3)  
Taipei, Taiwan  
May 4-6, 2023



**MS. LOREIBELLE ABIAN**  
 Best Poster Presentation Award  
 Young and Early Career Scientist Award  
 Australian Microscopy and Microanalysis Society

**MR. JOSE MARCO D. LATOSA**  
 Excellent Presenter  
 2023 7th International Conference on Measurement Instrumentation  
 and Electronics (ICMIE 2023)  
 April 14-16, 2023



**MR. IVAN OPAO**  
 Excellence Award (Silver) Poster Presentation  
 Korea Institute of Energy Research (KIER) 2023 e-Festa  
 April 14-16, 2023



**DR. NYZAR MABETH ODCHIMAR**  
 7th International Livestock Biotechnology Symposium  
 60th PSAS Scientific Seminar and Annual Convention  
 October 19, 2023



**DR. NYZAR MABETH ODCHIMAR**  
 Best Research Poster (Professional Category)  
 7th International Symposium and 14th Annual Scientific Conference of MMHRDC  
 November 23-24, 2023



**MR. MARK NICHOLAS YOW**  
 1st Place 3-minute Pitch to Policymakers Competition  
 MMHRDC 7th International Symposium



**MS. JUDY ANN G. BACUD**  
 Outstanding Research Award  
 15th Annual Conference of Center of Excellence on Environmental Health and Toxicology,  
 Bangkok, Thailand  
 November 25, 2023



**MR. MICHAEL S. LAGMAY**  
 Best Poster Presentation Award  
 Nano Thailand 2023

# Financial Management Report

This year, DOST-ITDI received a total budget allotment of approximately PHP 1.58 billion with 71% of the resources coming from the DOST Grants-In-Aid (DOST-GIA) and 27% from the General Appropriations Act (GAA) fund. An additional 2% of the total funding was generated from the Department of Energy (DOE)-funded project on the Establishment of Fuel Cell R&D and Testing Center implemented by the Institute.

Noteworthy is the nearly 4% increase in funding compared to the previous year's total GAA budget allotment. The budget we received from the Department of Budget and Management (DBM) rose from PHP414.37 million to PHP430.92 million for this year.

## 2023 Total Funding Source

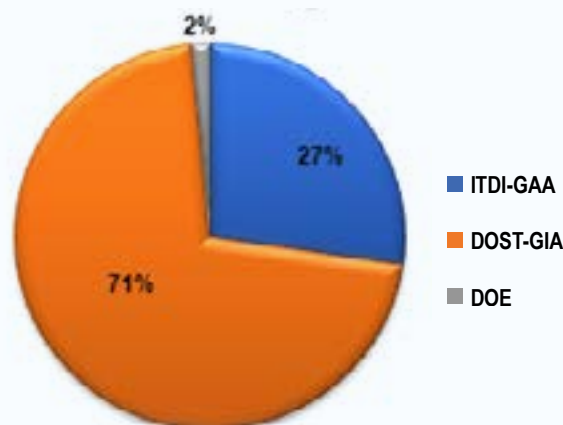


Figure 1. DOST-ITDI Total Funding Source for 2023

ITDI's allotment for Programs, Projects and Activities is comprised of the General Administration and Support (GAS), Industrial Technology Research and Development, Industrial Technology Transfer, Industrial Technology Technical Services Program. For 2023, the Industrial Technology Research and Development Program still incurred the largest fund with PHP 142.61 million (37%) as shown in Figure 2. However, there is a decrease in allotment of approximately 19.8% in the agency's R&D program as compared to last year's PHP 182.61 million. GAS comes second in the highest budget with PHP114.38 million, followed by the Technical Services Program with PHP101.997 million and the Technology Transfer Program with PHP31.93 million.

## 2023 Allotments by PPA

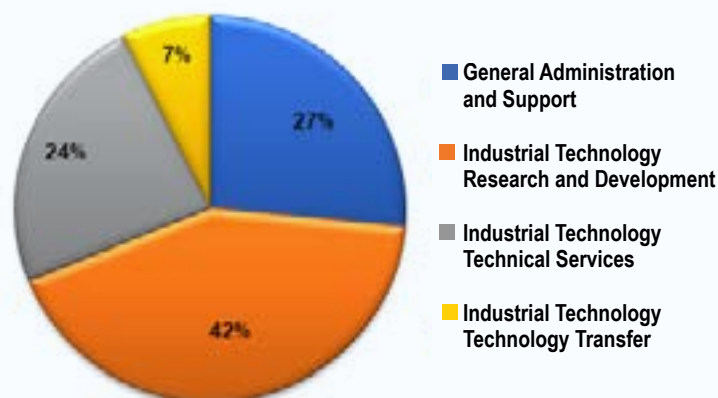


Figure 2. DOST-ITDI Specific Budget by Program for 2023



The Institute's budget allotment was subdivided by class such as Personnel Services (PS), Maintenance and Other Operating Expenses (MOOE) and Capital Outlay (CO). Consistently for the past few years, PS has the highest budget allocation in GAA funds by class. It can be seen in Figure 3 below that 31% has been allotted for MOOE while 9% is for CO.

### 2023 Budget Allotment by Class (%)

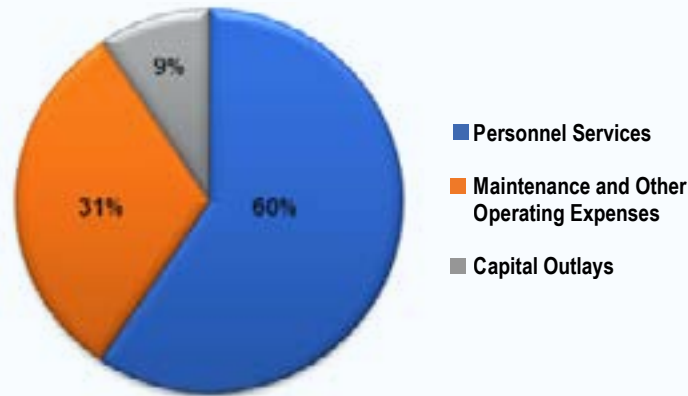


Figure 3. 2023 DOST-ITDI Budget Allotment by Class

Through these budget allotments we received this year, ITDI has operated seamlessly and continuously offers its various services to the public. With this, the Institute generated a total of PHP39.03 million for this year through testing and analysis, calibration, trainings and R&D technical services. Among these, the calibration services of NMD have generated the highest revenue, followed by the testing and analysis from ADMATEL and STD. Combined technical services provided by CED, EBD, FPD, MSD, and PTD contributed significantly, accounting for 11.66% of the total revenue in 2023. In addition, training initiatives led by TSD made a notable impact, representing 4.70% of the total revenue for the year.

### Revenue Generation 2023 (PHP)

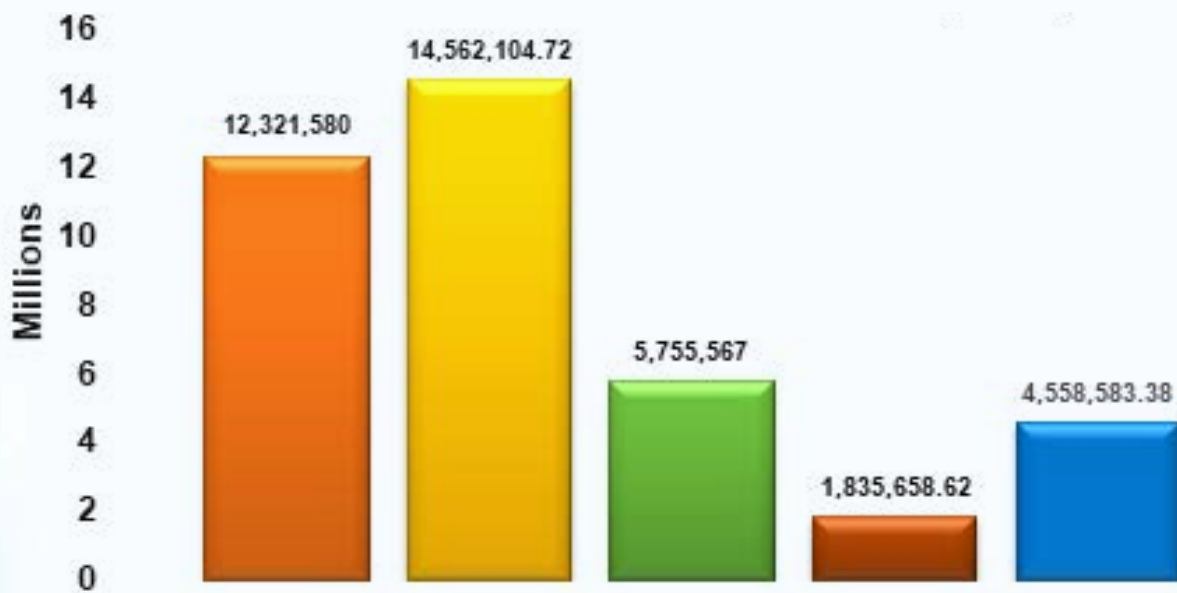


Figure 4. Total Revenue Generated by ITDI for 2023

# Human Resource Report

For this year, a total of 378 authorized positions were reported as of December 2023, where **301** are filled and **77** are unfilled. Out of the total number of employees, percentage by sex shows an equal percentage of **50%** for both male and female employees, as shown in *Figure 2* below. As of those with contract of service (COS), there are **212** contractual workers for this year.

Among all the divisions, STD has the highest number of filled positions, followed by TSD and NMD, as seen in *Figure 3* below.

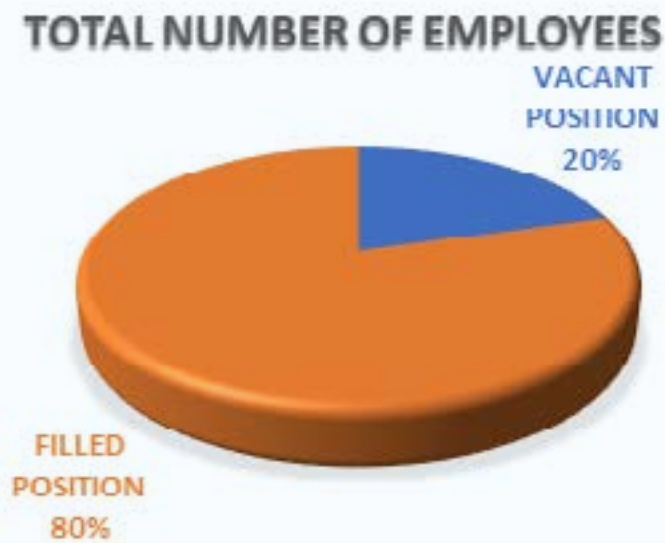


Figure 1. Total Number of Employees

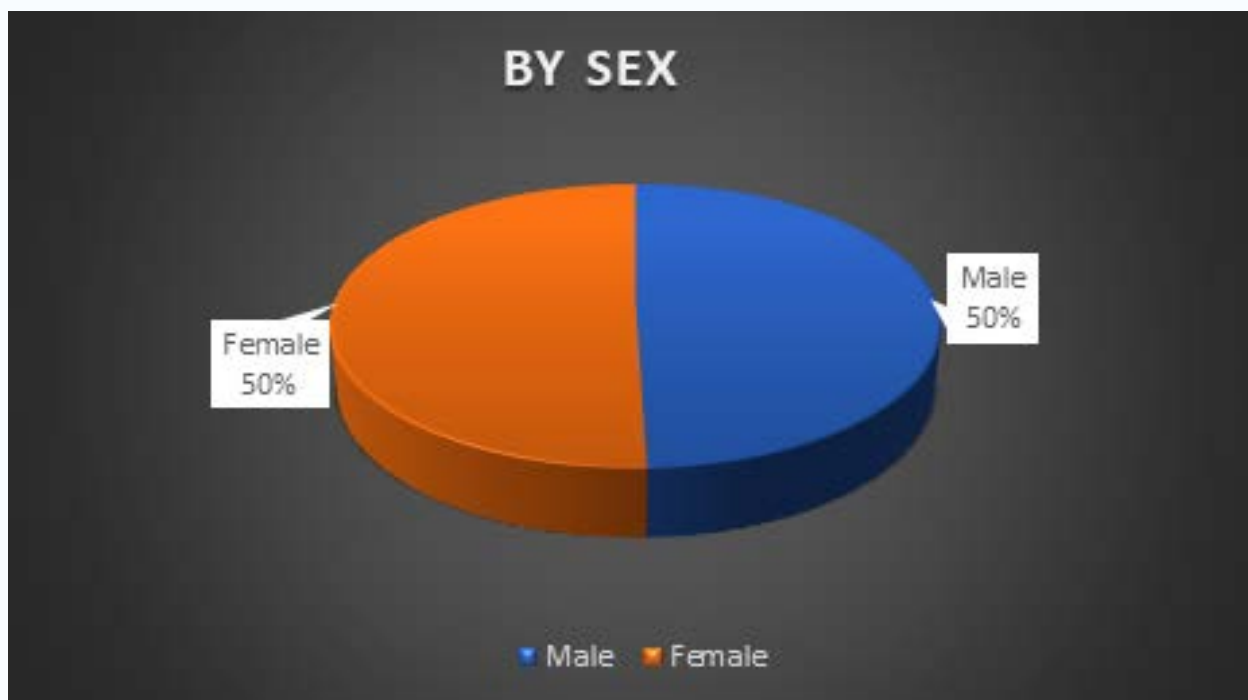


Figure 2. Percentage of Employees by Sex



Figure 3. Distribution of Authorized Positions per Division

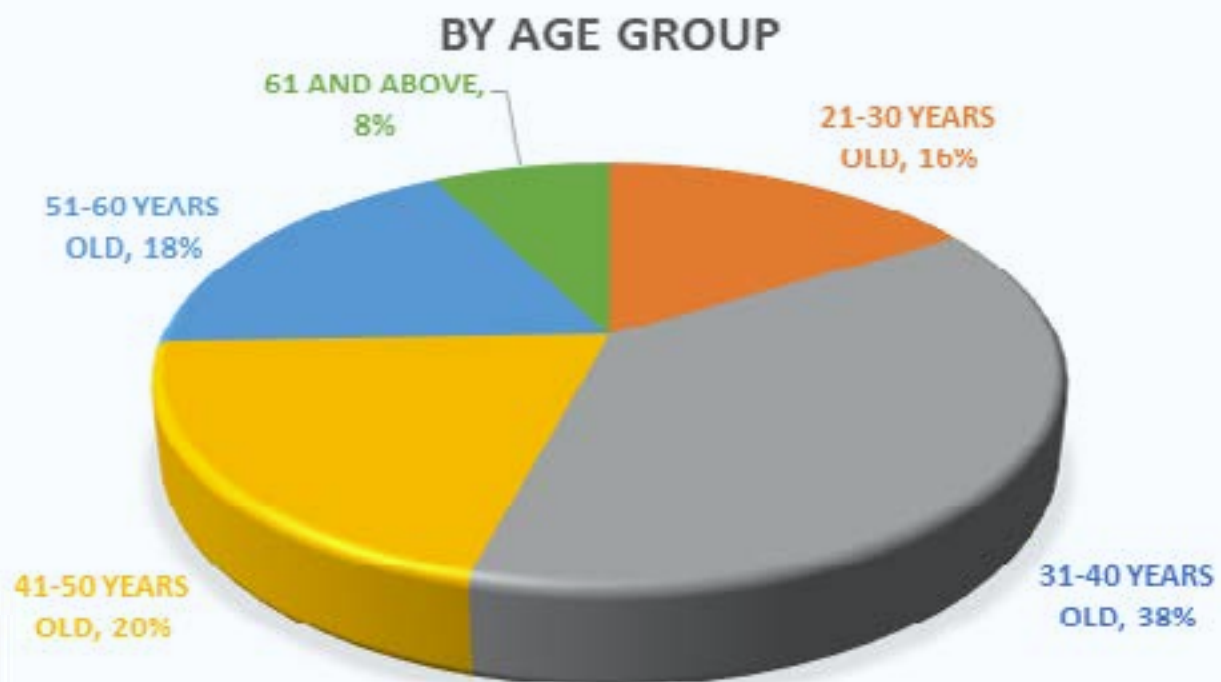


Figure 4. Manpower Profile by Age

Majority of the employees of ITDI are in the 31-40-year-old range with 38% (114 employees), followed by 61 employees within the 41-50-year-old range as seen in *Figure 4*. A total of 13 retirees completed their service to the institution including the Chiefs of TSD and MSD, Ms. Nelia Elisa C. Florendo and Ms. Josefina R. Celorico, respectively. Below is the complete list of the retirees as of this year:

**Table 1. List of 2023 Retirees**

<b>NAME OF EMPLOYEE</b>	<b>DIVISION</b>
Mauro G. Daan	MSD
Brigida A. Visaya	MSD
Maria Elsa M. Falco	FPD
Cynthia M. Nalo-Ochona	STD
Marcelino M. Prudencio, Jr.	EBD
Nelia Elisa C. Florendo	TSD
Adora T. Ortiz	PMISD
Luisa C. David	CED
Josefina R. Celorico	MSD
Violeta F. Mabuti	EBD
Reymundo K. Adan	EBD
Rosemarie B. Antinopo	MSD

To help DOST-ITDI attain its vision to become the country’s leading industry partner in Science, Technology, and Innovation, its human resource continuously strives to proceed to higher degrees and arm the Institute with deeper understanding and a wide range of skills that will increase the institute’s efficiency in achieving excellency of their mandates. This 2023, a total of eight (8) ITDI people accomplished their Master’s and Doctorate degrees, namely:

<b>Master’s Degree</b>	<b>Field of Specialization</b>
Christian M. Baylon	Master in Business Administration
Raisa A. Tongson	Master in Public Administration
Judy Ann G. Bacud	Master of Science (MSc) in Applied Biological Sciences
Jose Marco D. Latosa	Master of Science (MSc) in Mechanical Engineering
Abigail Grace H. Bion	Master of Science (MSc) in Chemistry
Mertella Lenie M. Ysulat	Master of Science (MSc) in Chemical Engineering
Dane Archibald G. Balanon	Master of Science (MSc) in Packaging Technology

<b>Doctorate Degree</b>	<b>Field of Specialization</b>
Angel T. Basbasan, Jr.	PhD in Packaging Technology

# ITDI Organizational Chart





Front row (L-R): Ms. F.V. Loberiano, Ms. M.R.V. Parcon, Dr. C.M.C. Montesa, Dr. A.V. Briones, Dr. Z.V. Ang, Ms. M.M. Regonda, Dr. J.F. Quizon  
 Back row: Engr. M.M. Ruiz, Engr. R.L. Esguerra, Ms. M.D.L. Villaseñor, Dr. V.B. Conoza, Dr. M.T. Margarito, Engr. A.V.O. Bawagan

## 2023 DOST-ITDI Executive Committee

**DR. ANNABELLE V. BRIONES**  
 Director

**DR. CHRISTINE MARIE C. MONTESA**  
 Deputy Director for Research & Development

**ENGR. APOLLO VICTOR O. BAWAGAN**  
 OIC, Chemicals & Energy Division

**ENGR. REYNALDO L. ESGUERRA**  
 Chief, Environment & Biotechnology Division

**MS. MA. DOLOR L. VILLASEÑOR**  
 Chief, Food Processing Division

**DR. MARIANITO T. MARGARITO**  
 OIC, Materials Science Division

**MS. FLORIDEL V. LOBERIANO**  
 OIC, Packaging Technology Division

**DR. ZORAYDA V. ANG**  
 Deputy Director for Administrative & Technical  
 Services & OIC, Planning & Monitoring  
 Information Systems Division

**MS. MERLITA M. REGONDA**  
 OIC, Administrative Division

**DR. JANET F. QUIZON**  
 Chief, Finance & Management Division

**ENGR. MANUEL M. RUIZ**  
 Chief, National Metrology Division

**MS. MA. RACHEL V. PARCON**  
 Chief, Standards & Testing Division

**DR. VIOLETA B. CONOZA**  
 OIC, Technological Services Division

# ITDI HISTORY

- 1901 1st of July - **The Bureau of Government Laboratories (BGL)** came into existence through the Philippine Commission Act. No. 156. It was composed of the biological and chemical laboratories, a science library, and the Serum Laboratory of the Board of Health.
- 1905 By virtue of the Philippine Commission Act. No. 1407, the BGL was reorganized into the **Bureau of Science (BS)** and expanded its functions to include the Bureau of Mines and the Ethnological Survey Division of Education.
- 1934 The headship of the BS was passed on for the first time to a Filipino chemist. Dr. Angel S. Arguelles. The present-day Bureau of Soils, Bureau of Mines, Bureau of Fisheries and National Survey Division of Education Museum developed initially as part of the Bureau of Science during the pre-war years.
- 1947 The BS was transformed into the **Institute of Science (IS)** by virtue of Executive Order No. 94.
- 1951 The IS was renamed **Institute of Science and Technology (IST)** by virtue of Executive Order No. 392 and for the first time primarily concerned itself to industry-oriented research.
- 1956 Congress approved RA Number 1606 authorizing the establishment of the National Science Board (NSB). IST was changed to the **National Scientific and Industrial Research Institute (NSIRI)**, and was placed under supervision of NSB.
- 1958 Under the so-called "Magna Carta of Philippine Science" RA 1067, NSB was reconstituted as the National Science Development Board (NSDB) which was designed to coordinate and supervise all scientific activities in the country. NSIRI became the **National Institute of Science and Technology (NIST)** under the supervision of NSDB.
- 1973 As part of the overall reorganization of the Executive branch of the government, the NIST was reorganized, but retained the same name. With the merger of the Agriculture Research Center, Biological Research Center and Medical Center, only two (2) technical R&D centers remained, namely Biological Research Center and Industrial Research Center. In addition, these were the Tests and Standards Laboratory and the Scientific Instrumentation Division to provide standardization and technical services.
- 1982 By virtue of Executive Order Number 784 dated 17 March 1982, the NSDB was reorganized into the National Science and Technology Authority (NSTA). Under the reorganization NIST remained as one of the R&D Institutes under the NSTA. As reorganized, research on agriculture was transferred to UPLB while the ceramics center emerged into an independent institute (MSRI). The Biological and Industrial research center were also abolished and in their place, three (3) centers were created namely: the National Research and Development (NRDC), Chemical Research and Development Center (CRDC), and the National Standards and Testing Center (NSTC). Under the NRDC and CRDC are seven(7) programs to undertake R&D activities, while the NSTC provides standardization and technical services.
- 1987 The NSTA was reorganized into the Department of Science and Technology (DOST) by virtue of Executive Order Number 128 dated 30 January 1987.
- 1987 Under this reorganization, NIST was renamed **Industrial Technology Development Institute (ITDI)** and remained one of the R&D institutes under the DOST. All centers were abolished and ITDI now has ten (10) technical divisions with (MSRI) now absorbed by ITDI. Seven (7) divisions to undertake R&D activities, three (3) to render technical services and two (2) support divisions were created.
- 2009 to present 26th of August, the ITDI Rationalization Plan was approved and immediately implemented. The new structure consisted of the merger of some divisions / sections while the other divisions remained as separate divisions with minor internal restructuring.

*“Inspired by Technology,  
Driven by Innovation”*

**Contact us:**

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Director, DOST-ITDI

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DOST ITDI Updates



ITDI DOST