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The official newsletter of the Industrial Technology Development Institute published semi-annually

DOST Food Innovation Centers (FICs) gaining ground in the regions

True to its commitment, the DOST continues to provide local food processors with viable technological innovations through the High Impact Technology Solution (HITS) food processing equipment developed in 2014, in tandem with the Food Innovation Centers (FIC), which started business operations in some regions of the country.

Today, DOST-ITDI pushes for higher efficiency of the Food Innovation Centers (FIC). To achieve this, a training program on the operation and maintenance of the five HITS food processing equipment namely the water retort, vacuum fryer, spray dryer and the latest additions freeze dryer and vacuum packaging machine — was conducted on May 4-15, 2015. Participants were DOST Regions 2, 4A, 4B, 5, 6, 8, 9, 10, 11, and NCR (National Capital Region) FIC managers and operators. They underwent a two-week training that covered familiarization with the equipment parts and accessories, their features and functions, maintenance, and quick fixes to common equipment maintenance-

equipment maintenance-related problems.

Currently operating FICs of Regions 2, 8, and 11 also participated notably to share their experiences on the actual conduct of the business, suitability of the center, and efficiency of the equipment.



Trainers and resource speakers were the DOST-PMEDSO engineers and DOST-ITDI food technologists who worked together in developing and designing the equipment.

Aside from lectures, actual production or 'hands on' using the newly-fabricated vacuum fryer,

NML-ITDI: Inspiring customer trust through DAkkS



Monalisa R. Enot and Jes Andre G. Trillana of the Temperature Standards Section at NML ensure that tested products are reliable with regard to their quality and safety.

Trust through accreditation by DAkkS and reliability of tests and test results are what customers of the National Metrology Laboratory of ITDI-DOST (Industrial Technology Development Institute-DOST) has come to expect.

One such business partner since is Shimadzu Philippines Manufacturing. A subsidiary of Shimadzu Corp., it is a Japanese multinational company globally recognized for its expertise and excellence in design and high-quality manufacture of scientific and medical equipment.

NML currently provides them test services for its Uni Bloc and Non-Uni Bloc models of electronic balances.

Reliability through conformity assessment

"Inspecting the inspectors" is what DAkkS or Deutsche Akkreditierungsstelle GmbH, headquartered in Berlin,

5

From the Executive's Desk...

Taking on the role of Director of ITDI is a new and exciting opportunity for me. Joining at this time when big projects of the Institute and the DOST are in the pipeline is truly challenging and exciting.

ITDI has carved out its niche in R&D and the various sectors it serves especially the industry over the years. Because of that, a great amount of work has to be done continuously to maintain leadership and excellence in the field and be highly competitive.

ITDI strives to be the best, never losing sight of the fact that we have the potential to be the best in our area. And as the core ingredients needed to do this are in place, I believe that this can be achieved.

We must therefore continue delivering good quality and consistency of customer service and upholding the values of respect, understanding, transparency, and accountability within our Institution.

We have the support and guidance of our key stakeholders and most importantly, clients who trust and go back to us time and time again.

We also hope to bring renewed focus and energy to achieve our mission. And with the interests of our clients at the core of all that we do, we hope to deliver sustainable outcomes at all times.

Likewise, recognizing that the driving force behind our results is our people, we hope to enable a conducive working environment to encourage the hardworking men and women on the front line and the many more who work behind the scenes to get actively engaged in the development and implementation towards the success of our initiatives.

Together, we can make this happen.

An Patina V. Gray. Dr. MARIA PATRICIA V. AZANZA

NML-ITDI:... from p. 1

proclaims as its basic role being Germany's national accreditation body that accredits companies, accrediting bodies, customers, and legislators.

As the National Metrology Institute of the Philippines, NML has since 2010 submitted itself to the accreditation requirements of DAkkS and has been twice issued calibration certificates bearing the DAkkS and ILAC-MRA logo.

What these logos signify is the maxim "Tested once, accepted everywhere" or international comparability and recognition of certificates, inspections, tests or calibrations which allows NML customers to reduce their testing costs resulting from multiple assessments.

In addition, they show that products tested by NML and bearing the DAkkS logo is accepted nationally and internationally since DAkkS is a member of international accredition organizations such as the European cooperation for Accreditation (EA), International Accreditation Forum (IAF), and International Laboratory Accreditation Cooperation (ILAC).

"By having our products calibrated at NML instead of in laboratories abroad, we saved Php1.95 million in calibration expenses in 2013 alone," says Jonathan Fortunato, senior manager of Shimadzu Phil.

The savings is no mean amount when one considers that the CEPZA-based company exports 99 percent of its scientific and medical products to Brazil, China, Germany, and Singapore and employs a workforce of 262 workers.

With better acceptance of its products and easier market access, the DAkkS' proof of NML's competence has served Shimadzu Phil. well. Several hundreds of customers which received 1,385 certificates of calibration from NML can also attest to this.

Re-accrediting NML anew

DAkkS' certificates of accreditation are generally valid for five years. Accreditation Certificate ISO/IEC 17025:2005 Registration No. D-K-15035-0L-00 which Dr. Michael Wolf of DAkkS in Braunschweig issued NML has a validity co-vering the period from May 7, 2012 to October 18, 2015.

Michael Jason A. Solis, NML's quality manager and head of the Mass Standards Section, and Big Volume and Flow Standards Section, as well as officer-incharge of the Length Standards Section, reported that NML is currently working to comply with the re-assessment findings of DAkkS before their accreditation cycle ends.

He said that the re-accreditation process is still on-going having started in March which covered conformity assessment of "Quality Management Systems and Calibration of Electronic Non-Automatic Weighing Instruments" as per guidelines

page 2



In Nanotechnology, There's Plenty of Room at the Bottom



"Making the invisible, visible," or "There's Plenty of Room at the Bottom" are just two of the many ways by which people have gone to lengths in order to describe nanoscience and its end product - nanotechnology.

Both colorful idioms of describing this "science of small" refer to the ways researchers manipulate materials in order to come up with a product - the traditional top-down method and the new common of bottom-up approach.

The top-down method produces cutting-edge forms by continuously chipping and removing pieces from a large material. It is similar to creating a sculpture out of a big stone. The method uses much energy, releases toxic chemicals, and generates much wastes.

On the other hand, the bottomup approach is like playing with Lego. Pick and connect desired shapes one by one until one gets the desired form and function. The approach is achieved by molecular assembly techniques.

In 1959, Richard Feynman, an American theoretical physicist, described the process in which scientists of the future would be able to manipulate and control individual atoms of a molecule in a talk called "There's Plenty of Room at the Bottom" referring to the molecular stage where nano research begins.

Size does matter

Nano as a unit of measurement of length is comparable to similar units like meter. But, exactly how small is nano small?

Just divide a meter by one billion — that is one nanometer. If you would like to play on the comic side of it, try converting an inch into nanometer and you will get 25,400,000 nanometers. Still finding it hard to imagine the quintessential size of a nano? A newspaper page is 100,000 nanometers thick.

Indeed, research exploits that focus on playing this field require very sophisticated equipment and tools. One such is STM or Scanning Tunneling Microscope which IBM invented in 1980 and used to observe the structure of a molecule.

The world, however owes to Norio Taniguchi, a professor of Tokyo University of Science, the earliest efforts on nanotechnology. He coined the term in 1974 to describe work on semiconductor processes such as thin film deposition and ion beam milling on the order of a nanometer.

Today, nanotechnology research mainly consists of the process of separation, consolidation, and re-development of materials by one atom or one molecule.

A Pinoy NanoLab for *Juan* techies

"At the Industrial Technology Development Institute (ITDI-DOST), our NanoLab is one of the youngest of units providing technical services to our local industries," Josefina R. Celorico, a supervising science research specialist at the Materials Science Division (MSD) recounted.

"We are pleased to inform you as well that on 1 July 2015, NanoLab will be opened for public viewing. Now our Juan techies can personally appreciate the look and feel of new nano products," she enthused.

Introduced in 2012 by Science Secretary Mario G. Montejo, NanoLab is one of the very



few public nanotechnology research laboratories in the country.

▶ 4



In Nanotechnology... from p. 3

It offers to the public world-class equipment and devices meant to provide nanotechnology-related technical services. By developing materials with structure at the nanoscale, researchers can explore their unique optical, electronic, or mechanical properties.

NanoLab is currently housed at the MSD building where a high resolution field emission transmission electron microscope (FE-TEM) can be found, a first in the Philippines. FE-TEM can magnify materials up to 1.5 million times and is capable of rapid data acquisition.

There are 19 other high-level machines and gadgets that MSD researchers use in their constant blending and re-development.

Churning the nano mill

Outside of NanoLab's aseptic walls, the curious may find a variety of sources of nanomaterials, often natural and functional.

Our biological systems boast of these. Foreign researchers may have in fact used any one of these in their studies — wax crystals covering a lotus leaf, or spider and spider-mite silk.

For the really adventurous some may have even used butterfly wing scales, or the horny materials from birds and animals such as skin, claws, beaks, feathers, horns, and hair.

Even our own bones are all natural organic nanomaterials; all of which are uniquely different but difficult to gather to form the critical volume. Explaining the material type chosen by NanoLab, Celorico said, "We decided to rely on what are abundant, unexploited, and natural organic or inorganic nanomaterials."

And so the stakes for the ordinary, dull, and everyday nanomaterials have been raised.

Materials like nanoclay from the Bicol Region, cassava and cornstarch from your local supplier, and zeolite from Pangasinan have taken the nanoresearch spotlight.

Likewise, Camarines Sur supplies silica or quartz. Further along, the list contains other materials such as natural rubber and halloysite from Mindanao. Calcium carbonate, a substance found in rocks, is also included, among others.

New butter from the mill

It took NanoLab researchers quite some time to bring to the selling table new and extraordinary products.

After the required separation, consolidation, and re-development, Celorico lists the following innovations which are certainly nothing but common.

Suitable for use to address waste management and environmental concerns is fiber membrane/ filter to treat heavy metal contaminated water using chitosan. Chitosan is made by treating shells of shrimp and shellfishes.

As well, industries powered by biogas digesters can profit from the use of nanofiber from zeolite to purify methane gas in methane-running pipelines; impure methane gas causes rapid pipe corrosion.

Construction firms working on skyways, on the other hand, may well wonder at the 20% to 60% increase in loading strength of highperformance concrete due to silica additives. Meanwhile, maintenance/ cleaning of glass walls and metals of high-rise buildings can be low-cost and headache-free with the use of nano titanium dioxide.

To get value for money on infrastructure investments, the new metallic zinc nano silica composite coating for steel-based tools, part and components can improve corrosion resistance.

But for Dr. Marissa A. Paglicawan, supervising science research specialist, an environment champion is their team's 100 percent biodegradable food cutlery.

Made from cornstarch (industrially termed as thermoplastic starch) and polylactic acid or PLA, cutleries are rendered degradable.

"Toxin migration tests conducted by the Packaging Technology Division of ITDI were negative," Paglicawan related.

She continued that, in lab tests, cutleries degraded from within three to four months at low colony of bacteria and fungi. Those buried in soil with high colony get degraded within a month.

A survey conducted by TESDA in 2014 counted the food services group in the country as totaling 1,093 establishments. It is not hard to imagine the volume of nonbiodegradable cutleries and other food packaging materials that they use up and throw away.



Salinas Foods Corp. closes DOST-ITDI/GAIN's salt iodization QA/QC Training

On May 7, 2015, ITDI, DOST-I and the Global Alliance for Improved Nutrition (GAIN) awarded a Certificate of Training to Salinas Foods Corporation's Salt Iodization Facility in Bolinao, Pangasinan for completing the In-Factory Training Course on Salt Iodization Quality Assu-rance/Quality Control.

In attendance during the awarding ceremony were ITDI Director Dr. Maria Patricia V. Azanza and Project Leader and CED Chief Dr. Annabelle V. Briones, along with Dr. Armando Q. Ganal, Regional Director of DOST-I, and Felicidad Gan, DOST-PSTD of Pangasinan. The certificate was received by Mr. Gerald Khonghun, the Operations Manager of Salinas Food Corp.

The activity was part of the project of ITDI, DOST and

GAIN entitled, "Capacity Building of Internal Quality Assurance of the Salt Industry in the Philippines", which was funded by GAIN and covered by a Memorandum of Agreement. ITDI con tinued its commitment to the project by building the capability of the Philippine salt industry in internal quality assurance/control of salt iodization.

Salinas Foods Corp., was the first local salt producer awarded with the certificate of said in-factory training course.

The scope of the training course included: Project Briefing, Good Manufacturing Practices (GMP), Quality Level Check, Iodization, QA/QC Software (SIQM), and Coaching. (*Roualdo P. Parreio, Jr.*)

paqe 4

DOST's Food... from p. 1

Vacuum-fried mixed-veggies, ampalaya, sweet pototo, okra, squash, banana, and taro



water retort, and spray dryer stationed at the food processing pilot plant of ITDI was also experienced by the participants. They processed different food products such as fruits, vegetables, and fishes, and then evaluated the products' acceptability and taste.

After this training, more regional FICs are expected to open soon, ready to assist interested stakeholders.

Since May 2014, FIC Davao in Region 11 has been operating and now serves its clients using the developed water retort, spray dryer, and vacuum fryer.

Two more followed, one in Region 2 at Cagayan State University - Carig Campus in September, and another in Region 8 at Eastern Visayas State University in November.

To date, these FICs had produced a variety of new food products from locally abundant raw materials using the equipment. Among these are:

- *Vacuum-fried* okra, sweet potato, string beans, root crop mix, crispy pinakbet, taro, pineapple, suman moron, and scallops.
- Spray-dried products like tamarind, pomelo, calamansi, kangkong, carrot, tomato, camote, pechay, ampalaya, arroz de cafe, Volteaz 5 (guyabano, malunggay, saluyot, pandan, carrots), Barinday (mussels), juice drinks (dalandan-carrottomato and kalamansi-mangosteen-tomato).
- Thermally-processed products using water retort (in bottle and pouches) - papaitan, kaldereta, adobo, round scad Spanish-style sardines, chicken arroz caldo, longganiza, adobo rice, sisig, picadillo,

In Nanotechnology... from p. 4

These, however, do not just end up in landfills.

At the larger scheme of things, the United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) estimated that land-based sources account for up to 80 percent of the world's marine pollution, 60 to 95 percent of the waste being plastics debris.

According to Claire Le Guern Lytle, a plastic pollution advocate, global plastic consumption worldwide in 2008

Spray dried calamansi, malunggay, tomato and carrot



biko, mutton kaldereta, mutton tausi, nata de coco, danggit gourmet.

 Vacuum-packed products - dried fish and pusit, onion, garlic, peanut, malunggay leaves, smoked fish, pickled santol and ampalaya, seaweed, and choco blocks.

Nelia Elisa C. Florendo, project leader of the DOST-HITS equipment roll-out said, "before the year ends, fabrication of the two remaining equipment, freeze dryer and vacuum packaging machine will be completed and these will also be installed in the FICs."

With that, more trainings will be conducted to further enhance the efficiency of the centers.

"We train people to become efficient 'steeringwheels' of local innovations especially in the regions where the learned and skilled FIC managers and operators can help propel the growth of local food industries and contribute to our national gain which is most timely with the ASEAN integration this 2015," Florendo concluded.

This means, more FICs will be installed to provide accessible food processing facilities and food-related trainings/activities to small and medium scale enterprises, starting-up businesses, and students.

Also, this provides local food processors an alternative so they would not have to depend on imported facilities or equipment which are often expensive. (*Delia D. Gotis*)

was estimated at 260 million tons. Global Industry Analysts reported in 2012 that plastic consumption will reach 297.5 million tons by 2015.

With Paglicawan's research on biodegradable foamed food containers, food packaging films, and cutlery from corn and cassava starch, it is easy to picture a low-plastics use in the food industry - at least in the country.

The global statistics, however, are mind-boggling and suggest deeper concerns that nanoresearch should address. (*Adelia M. Guevarra*)

paqe 5

ADMATEL aims for new heights, unveils new ISO/IEC 17025 marker



Secretary Montejo (4th from left) while receiving the Certificate of Accreditation from Dionisio, OIC of PAB, for the two labs of ADMATEL. With him were ADMATEL Project Leader Dr. Basilia, ITDI Director Dr. Azanza, and ADMATEL General Manager Virgilio Aguinaldo.

Science Secretary Mario G. Montejo unveiled on May 4 the new ISO/IEC 17025:2005 marker of ADMATEL, a Class 100K cleanroom laboratory, at DOST Complex, Bicutan, Taguig City.

Several officials of the science agency, namely, Undersecretary for R&D Dr. Amelia P. Guevara, ITDI Director Dr. Maria Patricia V. Azanza, and SEIPI President Dr. Dan C. Lachica, among others, witnessed the unveiling together with more than 50 guests from other agencies and the industry.

A service laboratory of the Industrial Technology Development Institute of DOST (ITDI-DOST), the Advanced Device and Materials Testing Laboratory or ADMATEL is equipped with advanced analytical equipment for failure analysis and materials characterization as well as, for process and product development needs of the semiconductor, electronics, and other allied industries.

Dr. Blessie A. Basilia, chief of the Materials Science Division of ITDI and project leader of ADMATEL, announced during the unveiling that two unit laboratories have been assessed and found to be conforming to the requirements for competence in testing and calibration.

Its Thermal Analysis Laboratory, and Chemical and Metallurgical Laboratory have been found to demonstrate their technical competence for the specified scope as shown in Appendix No. ATEL-1-0215-271A and Appendix No. ATEL-1-0215-272A, respectively.

In most major countries, ISO/ IEC 17025 is the standard for which most laboratories must hold accreditation in order to be deemed technically competent.

An accreditation implies, unlike most ISO standards for management systems, that a third party auditing of the laboratory is carried out by the national organization responsible for it.

In the Philippines this is done by the Philippine Accreditation Bureau (PAB), a line agency of the Department of Trade and Industry.

Laboratories are therefore accredited under ISO/IEC 17025, rather than certified or registered.

Following the two main sections in ISO/IEC 17025 which are Management Requirements and Technical Requirements, Ernani M. Dionisio, officer-in-charge of PAB, while awarding the certificates pronounced both laboratories of ADMATEL as manifesting the three marks expected of it, specifically:

- 1. An intact and well maintained technical infrastructure;
- 2. Proof of staff competence, experience, and capability; and
- An effective quality management system.

Dionisio added that its Thermal Analysis Laboratory is accredited to provide test services for miscellaneous materials and products such as clays, ceramic and related materials, plastics, and rubber. It is competent to conduct chemical tests on these products to measure weight loss, temperature range, glass transition, and endothermic/ exothermic peak temperature, among others.

For products such as paints and related surface coatings; resins; inks, dyes and pigments; plastics; and adhesive sealants, it is competent to conduct chemical fingerprinting identification by Fourier Transition Infrared Spectroscopy (FTIR) and chemical fingerprinting identification of microscopic contaminants by FTIR microscopy.

PAB listed Dr. Marissa A. Paglicawan and Carlo S. Emolaga as approved signatories for the Thermal Analysis Laboratory.

For the Chemical and Metallurgical Laboratory, Dionisio approved the scope of accreditation to cover conduct of nondestructive tests by visual inspection of metals and non-metals.

It is approved to conduct visual inspection using optical microscopy and dimensional measurement. Its approved signatories include Dr. Basilia, Dr. Araceli Monsada, and Josefina R. Celorico.

PAB awarded ADMATEL its certificates of accreditation on 9 February 2015 which will remain valid until 08 February 2020. (Adelia M. Guevarra)

page 6

NML-ITDI:... from p. 2

stipulated in the EURAMET (European Association of National Metrology Institutes) Calibration Guidelines cg18 Version 3.

Last April covered "Electrical and Thermodynamic Quantities" while assessment for May covered "Mass and Pressure Quantities."

Solis added that NML has submitted for re-accreditation the following additional scopes:

- 1. Calibration of OIML Class E2 weights;
- 2. Calibration of Electronic Non-Automatic Weighing Instruments
- according to EURAMET cg18; and 3. Frequency (counters/generators).

If found to be competent in these scopes, NML will be bringing the total number of its test competency to six scopes. Its current competency covers performance of calibration tests on:

- Electrical quantities (6 ½ digital multimeters, dc reference voltage standards, standard resistors);
- Mechanical quantities (mass standards, test gauges, pressure calibrators, transducers); and

Profile... from p. 8

- HIMADZU Urraround time: two months
- 3. Thermodynamic quantities (industrial platinum platinum resistance thermometers, liquidin-glass thermometers, and digital thermometers).

Besides reduced tests costs, calibration services provided by NML have also reduced Shimadzu Phil.'s turnaround time. With DAkkS, it can also assure its customers of fewer production errors or recalls.

"We used to send our products for calibration to a lab in Japan. This took us from one to two months turn-around time," says Fortunato.



"With NML, this was reduced to two weeks. Having ample lead time means more yields and meeting customer demand, which eventually lead to customer satisfaction."

NML currently has eight approved signatories, namely, Aurora V. Kimura, NML chief, including Kiveen Suycano, Manuel M. Ruiz, Maryness Salazar, Monalisa Ragay-Enot, Michael Jason Solis, Radley Manalo, and Sabino Paulo Leones, Jr.

When re-accredited signatories will total nine to include Jes Andre G. Trillana. (Adelia M. Guevarra)

6. Briones, A.V., T. Sato, Ursela G. Bigol. Antibacterial activity of polyethylenimine/carrageenan multi-layer against pathogenic bacteria

Advances in Chemical Engineering and Science, 2014, 4 No. 2, 233-241

(ISSN Print: 2160-0392; ISSN Online: 2160-0406) Published Online April 2014 in SciRes. http://www. scirp.org/journal/aces; http://dx.doi.org/10.4236/ aces.2014.42026

7. Briones, A.V., et. al. 2014. Detoxified Jatropha Pressed Cake for Use as Animal/Poultry Feeds Production. 36th NAST Annual Scientific Meeting, July 9-10, 2014, PICC, Pasay City

Together with her research team, patents were also filed and granted for invention and utility models, enlisted as follows:

- Invention: Manufacturing Process for Hard Carrageenan, Patent No. 1-1999-000168, issued on October 19, 2007 Researchers: Annabelle V. Briones; Wilhelmina O. Ambal; Merle A. Villanueva; Romulo R. Estrella; Emil J. Ricaforte; Melchor C. Valdecanas, Raymund L. Pacis.
- Utility Model: Process for Preparing Jatropha Methyl Ester from Extracted Oil of Jatropha Curcas (Tuba-Tuba), Pa-tent No. 2-2006-000230, issued, September 22, 2008 Researchers: Cleotilde A. Bulan; Bella R. Redublo, Wilhelmina O. Ambal, Annabelle V. Briones, Carmelita H. Viernes, Joselyn C. Umali and Merle A. Villanueva.
- 3. Utility Model: Production of High Dietary Fiber from Calamansi Wastes, Registration No. 2-2011-000066, issued, July 4, 2011.

Researchers: Annabelle V. Briones; Wilhelmina O. Ambal; Bella R. Redublo; Cesar C. Cortez; Norvina S. Deocampo.

 Utility Model: Composition of Ovicide/Larvicide for Aedes Mosquito and Process of Production Thereof, Registration No. 22011000140, issued, July 11, 2011. Researchers: Annabelle V. Briones; Alice Garbo; Edmar P. Casa; Hermilina S. Bion; Dr. Nuna E. Almanzor; Dr. Severino T. Bernardo.

The above listings indeed manifest a very zealous S&T career woman. Nonetheless, these numerous accomplishments haven't changed her as a person and leader. Her passion and love for technological innovation still burns and even produces more flame, as she drives her team to work with new projects for 2015 and onwards. Her desire to elevate the stature of S&T in the country is boundless, and hopes to achieve this along with her determined research team, CED.

At present, her team persistently works with zeal to produce more R&D outcomes that are relevant and competitive to face the demands of the ASEAN integration that is now unfolding in our midst.

And despite the rigor she has to face day in and day out, this woman manages to stay afloat vibrantly. So that when you happen to see a pretty and slim lady in dignified 'get-up', with sleek long-hair and a ready smile walking her way to DOST offices, you are 99% sure, that's Dr. Briones. (Detia D. Gotia)





Annabelle V. Briones

Doctor of Philosophy in Engineering



Our featured personality is a portrait of a successful career woman, a great boss, and a good friend. She is loved by her colleagues and subordinates for her wit and good leadership. Her works are valuable contribution to ITDI's research and development goals. Aside from professional status, she is one of the timeless reigning beauties of the Institute.

Dr. Annabelle V. Briones is the chief of the Chemicals and Energy (CED) - a fusion of two divisions

Division (CED) - a fusion of two divisions resulting from ITDI's rationalization, namely Chemicals and Minerals division (CMD) and Fuels and Energy Division (FED). At CED's helm since 2010, this able leader led her division in developing technologies that are relevant to the pharmaceutical and energy industry sectors.

Dr. Briones is a graduate of Bachelor of Science in Chemistry from Xavier University in Cagayan de Oro in 1981. She then obtained her Master of Science in Chemistry from the University of Sto. Tomas, Manila, 1993. In September 3, 2014, she earned her degree in Doctor of Philosophy in Engineering from Keio University, Japan.

Since her employment in ITDI in 1984, Dr. Briones had produced notable R&D projects and research papers that had earned prestigious awards from reputable bodies within and outside the Department. Worth mentioning are some of those awards/recognitions:

- LIKHA Awards
 - 1st Prize, Most Outstanding Creative Research, National Inventors' Week, *Carrageenan Capsules a Substitute for Gelatin Capsules*, July 15, 1998
 - 1st Prize, Most Outstanding Creative Research, National Investors' Week, Pasay City, *Packaging Film from Carrageenan*, Nov. 2002
 - 2nd Prize, Most Outstanding Creative Research, 1st Luzon Regional Invention Contest, *Absorbable Sutures from Carrageenan*, Sept. 12, 2001
 - 2nd Prize, Most Outstanding Creative Research, National Investors' Week, Pasay City, *Carrageenan-Cocoa Butter-Based Suppositories for Fever*, Nov. 2004
 - 2nd Prize, Most Outstanding Creative Research, *Calamansi dietary fiber powder*, Nov. 2008
 - 2nd Prize, Most Outstanding Creative Research, National Inventors Week, Microemulsified Hybrid Fuel from Jatropha and Coconut Oils, Nov. 2010

Our Business Is Industry



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- 2012 Best Scientific Poster, Biological Sciences Division, NAST - Evaluation of polyethylenimine/carrageenan multilayer for antibacterial activity of pathogenic bacteria, July 13-14, 2012, Manila Hotel
- 2006 Best Scientific Poster, Health Sciences, NAST Carrageenan-Cocoa Butter Based Suppositories for Fever, July 2006
- 2013 DOST International Publication Award
 - Ability of Chitosan/Carrageenan Complex to Encapsulate Bovine Serum (BSA) for Potential Use in Protein Delivery -December 12, 2013, Traders Hotel Manila
 - Effects of Aqueous and Pelletized Admixture of *Piper nigrum L.* on the Oviposition Behavior of *Aedes aegypti* Mosquitoes and Its Larvicidal-Ovicidal Activity -December 27, 2013, Traders Hotel, Manila
- Semi-finalist Civil Service Commission Pagasa Award (Group Category) - ITDI-DOST R & D Team for the Project on DOST Mosquito OL-Trap System, June 6, 2014, Diliman, Quezon City
- Civil Service Commission Pagasa Award (Group Category) -ITDI-DOST R&D for the project on DOST Mosquito OL-Trap System, December 15, 2014, Malacañang Palace

Dr. Briones also has authored and co-authored a laudable number of publications from 1987 to 2014. Among the most recent are as follows:

- Briones, A. V., et. al. Field Testing of Ovicidal-Larvicidal Trap System with Pelletized Extracts of *Piper nigrum L*. for Aedes Mosquito in Quezon City and Marikina City, Acta Medica Philippina, Volume 47, No. 2, Apr-Jun 2013.
- Briones, A. V., Sato, Toshinori, "Evaluation of polyethylenimine/carrageenan multi-layer for antibacterial activity of pathogenic bacteria"- Book of Abstracts- 34th NAST Annual Scientific Meeting, 2012.
- Briones, A.V., et. al. 2013. Production of Plant Oils and Methyl Ester using SCFE (Supercritical Fluid Extraction Method) 35th NAST Annual Scientific Meeting, Manila Hotel.
- Briones, A. V., Sato, Toshinori, "Ability of chitosan/ carrageenan complex to encapsulate bovine serum albumin (BSA) for potential use in protein delivery", Asian Journal of Biological and Life Sciences, Vol. 2, 2013 pp.163-169.
- Briones, A.V. and T. Sato. Structural Studies on Carrageenan Derived Oligosaccharides and Its Application. <u>Advances in</u> <u>Chemical Engineering and Science</u>, 2014, 4, 17-22 (ISSN Print: 2160-0392; ISSN Online: 2160-04) Published Online January 2014 (http://www.scirp.org/ journal/aces)

http://dx.doi.org/10.4236/aces.2014.41003

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page 8