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NEWSROUND

Waste plastics and asphalt mix developed for road pavement

Using plastic bags to pack and carry different materials including household articles is commonly practiced today. However, this practice continuously generates a large volume of waste plastic bags posing a serious environmental problem. To address this problem, the ITDI has been conducting researches on how to recycle this plastic wastes. Apparently, there is a growing interest to find useful applications for these waste materials. Among the researches now being conducted is on the study on the utilization of waste plastic bags in asphalt mixes for road pavement.

Asphalt mix also known as asphalt concrete is the most common pavement surface being used today. It consists of 90- 95% aggregates and 5-10% asphalt. Asphalt is a dark brown to black cementitious material that binds the aggregates in asphalt mixes.

In the study being conducted by ITDI's Materials Science Division, 5-8% waste plastic bags were added to commercial asphalt (AC 60/70). The asphalt with waste plastic bags mixture was then combined with aggregates to produce an asphalt paving mix suitable for road pavement. The properties of the developed asphalt waste plastics paving mix were determined following the standard test procedures of AASHTO (American Association of Street Highway and Transportation Officials). The tests, Marshall Stability and Durability, were conducted at the Bureau of Research Standards, Department of Public Works and Highways in Quezon City.

In the Marshall Stability test, a minimum of Marshall Stability value (MSV) of 1,800 lbs is required for asphalt paving mixes for heavy traffic. The developed asphalt paving mix had a MSV of 3,800 lbs which is higher than the required value. This result indicates that the developed asphalt mix is a potential or suitable material for road pavement in heavy traffic.

The durability tests, on the other hand, determine the compressive strength of

asphalt mixes before and after immersion in water bath at 50°C for 4 days. The compressive strength of the developed mixes before and after immersion was 2750 KPa and 2000 KPa, respectively. The developed mixes showed 75% retained strength after immersion, which is above the minimum requirement of 70% retained strength.

Based on the results of the study, the potential of using waste plastic bags in asphalt mixes for road pavement has been established. The developed product showed improved properties such as stability, strength, and fatigue resistance compared with conventional asphalt mixes. Performance testing of the developed asphalt mixes will soon be carried out by filling the potholes within the vicinity of ITDI-DOST grounds. (J.R. Celorico)

ITDI intervenes to
sustain growth

of Philippine VCO

The phenomenal rise of the
demand for virgin coconut oil (VCO) in both the local and foreign markets as a "miracle oil" (perceived to have health benefits), has indeed brought in some fresh hope and optimism for the country's coconut industry. While this is a welcome development, it also has brought out several issues and concerns that need to be addressed, to allay fears of repeating the "boom and bust" experience of our nata de coco industry. Hence, in order to sustain the growth of the Philippine VCO, no less than PGMA took the cudgels in creating a task force spearheaded by the DOST to generate scientific data that shall form the bases in safeguarding the product quality, substantiating claimed health benefits, and establishing technical support mechanisms and infrastructures.

In order to contribute in addressing such issues and concerns, the ITDI through its Food Processing Division (FPD), Packaging Research and Development Center (PRDC), and Integrated Program on Cleaner Production Technologies (IPCT) will be conducting a project composed of four (4) studies as follows:

Study 1, "Quality and Shelf-life Testing of Virgin Coconut Oil from Different Commercial Processes"- intends to assess the quality of locally produced VCO from five (5) identified commercial processes, namely: fermentation process with heat, fermentation process without heat, centrifugation, dry process, and enzymatic process.

Study 2, "Effect of
Moisture Content (MC) on the Quality Parameters of Virgin Coconut Oil"- intends to determine the acceptable level of MC for each process and the shelf-life that can be attained for each MC level. Studies 1 and 2 will be undertaken for

two (2) years simultaneously.

Study 3, "Development of
Appropriate Packaging Technology for Virgin Coconut Oil" - intends to develop appropriate packaging technology that includes design on primary packaging, transport containers and cushion/partition for VCO (both for food supplement and for cosmetic/topical use), safety of packaging for VCO, packaging performance; and simulation study to determine effects of storage temperature/conditions and environmental hazards on the stability of VCO during transport and distribution.

Study 4, "Environmental
Management Systems for Small and Medium Scale Virgin Coconut Oil (VCO) Producers" - intends to provide technical support to VCO manufacturers in terms of environmental management systems, cleaner production, best available technologies, best environmental practices, and energy efficiency in addressing their significant environmental impacts.

Studies 1
to 3, which will be undertaken under the project entitled, "Quality Assessment and Packaging System Development for Philippine VCO" had been granted funding support of PhP13.70M for year 1 and PhP1.97M for year 2 by the DOST. Meanwhile; the Virgin Coconut Oil Philippines (VCOP) in a gesture of support to this project has provided counterpart funding of PhP1.09M. Study 4 had been granted funding support of PhP1.50M by the DOST and PhP0.269M by VCOP.

Scientific data that may
be generated by the project will be used as bases in assessing the quality of various VCO products that are commercially processed in the country, and in providing recommendations for process and package improvement and, more importantly, aid in the formulation of a more acceptable and workable product quality standards. (Z.V. Ang)

ITDI interventions pave way for ‘lambanog' PNS

The Philippine National Standard or PNS for the production of lambanog is now being drafted in an effort to boost the product's potential in the international market.

This move is an offshoot of earlier interventions done by the lambanog task force initiated by the brand development program of the Center for International Trade Expositions and Missions (CITEM), of the Department of Trade and Industry (DTI).

As a member of the lambanog task force, the ITDI made notable contributions in the form of a guide manual for lambanog processing which is now being used as one of the bases in drawing up the draft national standards or PNS. The PNS is presently undergoing public review.

The proposed PNS would give lambanog the technical name "distilled fermented coconut sap." It aims to "provide for a common language on the clarification, general requirements, essential composition and quality factors, packaging, hygiene and labeling system" for lambanog.

The draft standards would also help in addressing reports that some unscrupulous sellers label their products lambanog even if these fall short of the standards set by the legitimate producers.

Lambanog is a local alcoholic drink made from coconut sap that goes through a process of natural fermentation and distillation. It is the country's version of vodka.

It has been identified by CITEM as one of the country's potential export products under its brand development program, based on comments from foreigners who had tasted its unique quality in various expositions abroad. However, there are certain factors that hinder its global acceptance.

One example was in March 1999 when 'killer' lambanog hugged the national headlines. There is a lack of scientific basis on the safety of the product, as well as product standard. Production process significantly varies among the distillers and quality is not maintained. It has no identity and comes in outdated packaging.

To address such concerns, CITEM came to fore and initiated the formation of the lambanog task force. Aside from ITDI, other members of the task force include the local government of Tayabas in Quezon province, DTI IV in Southern Tagalog where lambanog is produced, DTI-Quezon, DOST-PSTC-Quezon, National Food Authority (NFA) - Food Development Center (FDC); and the Mallari, Buncayo, and Capistrano distilleries in Tayabas, Quezon.

The interventions done by the Institute were a result of a study on the quality improvement of lambanog that was conducted by ITDI's food researchers led by Engr. Norberto Ambagan. Based on the results, a guide manual on lambanog processing was prepared that will help in standardizing the product and process of the distilllers in Tayabas, Quezon. The standardized process is necessary to produce quality lambanog, and to address reports of deaths being attributed to drinking low quality lambanog.

To come up with the guide manual, several activities were done by the ITDI researchers. Lambanog distilleries in Quezon were visited/inspected, and production processes were observed and monitored. Based on their observations, recommendations to standardize the process were made.

For example, in collecting the raw material or coconut sap, cleanliness should be maintained. It was emphasized to the distillers that the presence of vermins or worms and other contaminants in the raw material greatly affects the quality of the product. Alcoholic fermentation should be from 2 to 3 days only to avoid the formation of unwanted acidity.

As to the amount of head or bating (which contains the toxic alcohol methanol) to be collected, this can be based on the temperature of the liquor during distillation. The collection of the heads is stopped only when the temperature of the liquor has started to rise steeply, indicating that the amount of boiling components (like methanol) is already low. It is recommended to collect 600 mL bating/500L batch, with the last collection done at a temperature of 93°C-94°C. This can be done by installing a temperature-indicating instrument (like a thermometer) in the still or distillation vat.

With this instrument, over boiling during distillation can also be avoided. This is important since liquor that is distilled longer at lower temperature produces the finest distilled spirit. Lambanog at 80-proof is ideal.

Moreover, ITDI discourages the distillers' common practice of adding the tails or parasan to the still for the next batch of distillation. Though this can increase the product yield, it may result to lower or inferior product quality. The tails are higher boiling components of the liquor containing higher amounts of fusel oils and acetic acid.

The ITDI was also responsible for the official definition of lambanog. Samples of lambanog underwent chemical tests and analysis at the Institute, and a set of guidelines as to what may qualify as lambanog was developed together with the

Bureau of Food and Drug (BFAD).

In addition, the principles of good manufacturing practices (GMP), and packaging and labeling were introduced through seminars to encourage the distillers to adopt them. GMP allows for the adoption of accepted standards or sanitary procedures to prevent contamination and maintain good product quality. These are measures that can help the distillers produce globally competitive goods.

Consistent with these initial interventions, the distillers that were inspected by the ITDI did their best efforts to comply and be able to produce lambanog of excellent quality. According to Mallari, they focused on research on how to further improve the already superb taste of their product "to suit the picky taste of wine connoisseurs abroad."

Meanwhile, as the ITDI efforts paved the way for the draft PNS, Mallari Distillery's adoption earned for them a partnership with VuQo Incorporated whose head was a former vice president of a California-based liquor company. Together, they shall produce VuQo Premium
Coconut Vodka, the first of its kind in the global spirits market. Most vodkas are distilled from grain and potatoes. The partners' mission is to invade the international market and create a niche for the Philippines' vodka.

Aside from having assured its quality, the partners also dressed up their product and VuQo is now packaged in an elegant, silk-screened, and frosted 750 mL bottle to elevate the product to premium status. Most quality wines are contained in frosted bottles.

The partners wanted to create a product that is internationally appealing both in taste and look yet, different and distinctly Filipino. Its brand, VuQo is a spin-off from the word "buko" the Tagalog name for young coconut. The fully spread coconut leaf on the classy wine bottle makes it distinct from the rest. VuQo vodka is 80-proof, covered with a screw cap and sealed to maintain its ethnic flavor and freshness.

With all these innovations and the PNS, lambanog labeled as a luxury product of high quality is in the offing, and could become the country's first internationally recognized product of its kind. Vuqo's invasion of the European and US markets may yet come sooner than expected.

The draft PNS is being worked on by an inter-agency technical working group composed of the ITDI-DOST, Bureau of Agriculture and Fisheries Product Standards, Bureau of Food and Drugs, Bureau of Products Standard, DTI-Quezon, the Tayabas local government, and representatives from Quezon's lambanog processors.

ITDI reactor makes cheaper and

quality activated carbon

An innovation introduced by the Fuels and Energy Division of the Institute in the production of activated carbon (AC) from dried coconut shell has resulted into a more efficient process at a lower cost. The activated produced carbon is cheaper and of high quality.

The innovation follows a
continuous process in producing activated carbon from dried coconut shells where carbonization & activation are done in a single reactor. In the process, energy is produced in the form of low calorie gas. Since it is a continuous process, energy is saved compared to the conventional method where carbonization and activation are done separately consuming more energy. Thus, the process that takes place in the reactor is self-sustaining since the gas produced is also used as fuel for the boiler which generates steam that is needed for the activation phase.

Using the ITDI-developed reactor reduces the cost and time required to produce activated carbon that is commonly used in purifying air and water. In eight hours, activated carbon can be produced with the new reactor instead of one day with the old model. The reactor has a capacity of 12 to 15 kilos per hour.

Activated carbon or AC is the most widely used adsorbent for industrial applications and environmental clean-up operations such as in wastewater treatment, air purification and treatment of drinking water. It is ideal for applications where purification at trace concentration is required such as for indoor air quality, gas respirators, and pollution control (gas phase). It is also used to recover trace elements of gold, and can adsorb unwanted metals in water. This property is attributed to its extensive micro porosity resulting to exceptionally high surface area where impurities can adhere and/or be trapped.

Today, worldwide demand for activated carbon has been observed to be relatively increasing. This is attributed to the increasing industrial activities coupled

with stricter environmental regulations that aim to protect the eco-system.

Relative to these developments, the application of the activated carbon technology could spell several benefits for the country. Since AC is made from coconut shell, it could boost the income of the coconut farmers. Those engaged in the charcoal business would also benefit since a kilo of AC is eight times the price of a kilo of charcoal. And since it is cheaper, the product has a competitive edge in both the local and foreign markets. An increased foreign exchange earnings for the country is also foreseen from exporting the product to other countries.

On the whole, since the Philippines
is a leading producer of coconut worldwide, the country has a comparative advantage in the production of AC from coconut shell. Other materials that can be used to make AC are wood, coal, and agricultural materials.

On the other hand, the surplus energy that is generated from the entire process can be used for coconut processing as in drying coconut meat and other agro-industrial operations. This can also be converted to electricity applying conventional technologies. As a result, activated carbon plants can be integrated with rural electrification projects particularly in coconut-producing areas such as those in small islands.

Meanwhile, three personalities from the private sector had signified their interest to adopt the technology.

The AC project is being implemented through a DOST-TECHNICOM grant amounting to PhP 3.5 M. (C. G. Magpantay)

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