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Assuring quality, competitive value of agri/fishery products

INSIDE...

R&D NOTES

Improving A/F postproduction towards global competitiveness

It was with a different focus on the technical and social researches that there is a need to look into the various ways of improving the conditions of our agriculture and fishery products both in domestic and global markets.

Confronted with the challenge to further improve the competitiveness of these products, researchers are looking into the means to continuously address and respond to the best quality of goods that would not only satisfy the consumers' needs but also presenting and packaging them to satisfy one's craving.

The 2008 first quarter issue of the **BAR R&D Digest** presents ideas, issues and concerns, and challenges, including roles and responsibilities of institutions involved in agriculture and fishery postproduction. The researchers and development practitioners are working conscientiously to highlight our comparative advantage and be globally-competitive. As such, several researches were conducted to show that Philippine products will consider both national and international standards from production and processing to marketing.

Our emphasis is for the agriculture and fisheries sector to look into effective strategies to make worthy enterprises and agribusiness right at the start of producing these goods for consumers. We believe that through appropriate information, these things will be incorporated as individuals do their everyday tasks. These tasks which we listed vary in terms of who handle or operate within the postproduction activities.

There are basically four items identified in agriculture and fisheries post production activities. These are *postharvest handling, storage and transport, processing and packaging*, and *marketing*. All of these will be tackled separately. However, in this issue the focus will be on products' competitive advantage in production, processing, and packaging.

Furthermore, information supportive of all these topics will be complemented by featuring a research institution working on postharvest research and training activities, a renowned postharvest horticulturist, and providing an industry scenario as the basis to improve and address the challenges in the field of postharvest handling. Likewise, we are also featuring two success stories on garlic and banana processing.

Our assurance to people is to continuously come up with up-to-date and innovative information that will be used by key players and stakeholders who are motivated and willingly support our cause in research and development.

Our guiding principle for all our efforts in the Department of Agriculture, specifically our Bureau, is "*To* **attract – satisfy – manage – retain** *customers in order that they will appreciate and proudly promote Philippine products not only in agriculture and fisheries but also all other products that support the ingenuity, creativity and artfully-skilled Filipino.*"

May this be a reminder that all of us are responsible and accountable to this concern to make our products competitive both domestically and globally.

Marlowe U. Aquino, PhD
Head, MISD

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Postharvest handling
Keeping agricultural commodities at its best

Story by ELLAINE GRACE L. NAGPALA
Photos by RICARDO G. BERNARDO, MARLOWE U. AQUINO and RITA T. DELA CRUZ

When we visit the market to buy our weekly supply of food—fruits, vegetable, fish, or meat—we tend to select the best product that is conceived by our senses. The overall quality of the commodity dictates the consumer whether to buy that certain good or not. Likewise, the overall quality of the commodity dictates the price of that item.

Before it reaches our dining table, our food is taken care of by several handlers as it passes through a distribution chain. These handlers influence the overall quality of the commodity, and can either preserve or deteriorate it.

Postharvest handling specifically involves the movement and the operations that commodities undergo from harvest to the time immediately before meal preparation. Its main concern is to keep commodities in an acceptable state from harvest until it reaches the consumer since most commodities are channeled in their perishable state.

In addition, postharvest handling aims to minimize losses at the least possible cost. The existing postharvest environment requires appropriate technologies to maintain quality of commodities. Poor handling of agricultural commodities can result in quality deterioration and losses.

Facts and figures of postharvest losses

Postharvest losses of commodities represent a very significant loss of 10-50 percent of production output in developing countries. This means that one-tenth to one-half of all the land, inputs, and labor used to produce the commodities goes to waste. When expressed in monetary terms, this could amount to millions of pesos (*Table 1, page 6*).

Losses can be incurred from harvest, all along the handling route, up to the consumer's level. Causes of losses may be due to unsuitable harvesting tools and aids, improper handling, inferior quality of the containers, high temperature during transit, storage and distribution during the day, and lack of facilities, predominance of rough roads, delays in distribution, and inappropriate policies and socioeconomic factors.

In 2005, Philippine fruits and vegetables were worth PhP 101.5 billion (BAS, 2005). An average loss of 35 percent thus amounts to PhP 35.52 billion annually. A loss reduction of 1 percent is equivalent to PhP 355.2 million gain in productivity.

The combined market value of cutflowers such as orchids, gladioli, roses, and chrysanthemums was estimated at PhP 354.6 million in 2005. Given a 50 percent loss, a 1 percent loss reduction means PhP 1.77 million in savings.

Postharvest losses and poverty

Losses from postproduction can be related to occurrence of poverty.

If the quality of the produce becomes inferior, there will be a lower probability of repeat of sales. A trader who loses money because of postharvest losses may have to layoff workers, hence, fewer jobs.

With more losses, there will be less food available for the increasing population, resulting in increased cost per unit of food and further making it difficult for lower income families to obtain the needed amount of food.

Losses result in decreased nutritive value of produce that can lead to lesser capacity of a person to work efficiently, which will result in a lesser pay.

The monetary value of the lost produce is usually passed on to the consumer who has to pay for a price normally higher than usual.

Impacts of postharvest

All the wastes that result from improper handling could be avoided through proper postharvest techniques. Dr. Ofelia K. Bautista, a postharvest specialist, stated that there is a need to give more attention to the postharvest handling of perishable crops owing to the following reasons:

Huge losses. Reported statistics shows that losses in developing countries are two to three times higher than those of developed countries and the amount is at times staggering (Table 2). Unless the huge postharvest losses are minimized, the gains from production will be offset and the potential income can be fully utilized.

Food security. With the rapid increasing population, the urgency in increasing food supply must be addressed. Increasing productivity, expanding production area, and controlling the growth of population are the usual solutions to this. Proper postharvest handling is an additional or complementary way of solving food needs. At some points, reducing postharvest losses is seen as a better choice in solving food needs rather than increasing food production. Reducing losses is cheaper since simple, inexpensive, and low labor-requiring techniques can result in a reduction in loss.

Increasing urbanization and industrialization. As industrialization takes place, people increasingly move to the cities while the production areas are pushed farther away from population centers. The increasing distance between the production areas and markets makes it more difficult to maintain the freshness of produce, especially that some production areas are often accessible by footpaths or rugged roads.

Huge opportunities and stiff competition in exporting fresh produce. Fruits, vegetables, and other produce that could not be exported before are now being sold abroad when the General Agreement on Tariff and Trade removed tariff barriers and subsidies that previously made it difficult for developing countries to export. However, the competition has increased tremendously that our farmers and traders are also competing with other countries even in our own markets.

Growing attention to quality. Customers have become conscious of the quality of the food that they take in that they are now willing to pay a premium price for good quality produce.

Changing tastes and lifestyle. Fresh cuts of fruits and vegetables, packed meat, poultry and aquaculture products have gained popularity owing to their convenience as compared to intact commodities. However, as a consequence of wounding, fresh cuts deteriorate easily. Hence, additional postharvest processes are needed to retain the products' good quality for a longer period of time.

Demands for fresh flowers, whether as decoration or gifts for different occasions, have also grown. With increased demand for fresh flower goes increased use of florist green. The handling of tropical florist green can be a promising area for research owing to the lack of information on it.

Growing concerns on food safety. Food safety is becoming mandatory in the export market at the same time people are becoming more careful about the food they eat. In developed countries, the establishment of a quality management system, which is an export requirement, is becoming a prerequisite. Utilization of non-chemical ways of eliminating or minimizing pests and diseases and the chemicals that are Generally Regarded as Safe (GRAS) could be exploited.

Heightened health consciousness. People are becoming more and more conscious of the nutritive value and the disease-preventing properties of the food that they take in. Preservation of the nutritive value goes hand in hand with the prevention of quality deterioration.

Fluctuating supply and prices over time. Farmers can take advantage of fluctuating price of commodities in the market. Onion, for instance, is abundant and cheap during harvest months. Hence, part of the harvest is stored while farmers and traders anticipate better prices during the off-season with proper storage of the commodity.

Milestones in postharvest loss reduction

In 1974, the World Food Conference drew international attention to food loss prevention as one opportunity to meet mankind's food requirements. It is concluded that production of food alone does not solve food scarcity. The following year, the UN General Assembly resolved that, as a matter of priority, postharvest food losses could be reduced by 50 percent by 1985, particularly in developing countries. As a result, several national and international donor agencies initiated programs on reducing postharvest losses. The Food and Agriculture Organization's (FAO) food loss prevention program initiated in 1975 was focused mainly on grains. Programs on other crops were later developed.

In the Philippines, in 1977, the Australian government established the Postharvest Horticulture and Training Research Institute (PHTRC) at the University of the Philippines Los Baños (UPLB) as an Association of Southeast Asian Nations (ASEAN) Center. From then on, PHTRC has taken the lead in human and technological resource development in postharvest, specifically horticulture, in support of national programs to increase rural income and profitability in agriculture. As an outcome, PHTRC has achieved several research breakthroughs, including the hot water treatment (HWT), modified vapor heat treatment, and floatation technique for maturity detection which are now utilized by mango exporters. The center has also developed technologies that reduce losses during non-refrigerated transport of produce from Mindanao to Manila such as modified atmosphere packaging, ethylene adsorbent, and improvement of non-refrigerated van design for ships transporting fruits. Fabrication of postharvest equipment for more efficient operations-- such as the hot water tank, sizers, packinghouse line for round fruits, and sorting table for baby corn-- was also developed by PHTRC.

The inclusion of postharvest technology to be a top priority in curriculum development in agricultural degrees at the undergraduate level in Asia was recommended by the Association of Agricultural Colleges of Agriculture (ACAP) in the Philippines in 1981.

The National Postharvest Institute for Research and Extension (NAPHIRE), now the Bureau of Postharvest Research Extension (BPRE), of the Department of Agriculture (DA), which used to work only on the postharvest handling of durable crops was later mandated to cover also perishable crops upon becoming an attached agency of DA in 1986. BPRE is mandated to generate, extend, and commercialize appropriate and problem-oriented postproduction technologies and practices to reduce losses, improve food and feed quality, and maximize the benefits to various stakeholders. It has developed and improved several postharvest technologies and systems, which are now being promoted to various stakeholders:

- ✓ Agricultural tramline
- ✓ Cold chain
- ✓ Grain moisture meter
- ✓ Improved corn sheller
- ✓ Mobile flash dryer
- ✓ Outdoor storage technology
- ✓ Grain admixture
- ✓ Peanut seed storage technology
- ✓ Maize aflatoxin control system
- ✓ Bulk storage system
- ✓ Integrated pest management (IPM) in storage
- ✓ Alternative to highway drying
- ✓ Storage decision support system 1.0
- ✓ Whole cashew kernel sheller and charcoal-fired cabinet oven for cashew roasting

Realizing its role in the modernization of agriculture, the government has exerted more efforts, particularly by including postharvest handling of both durable and perishable crops, as recognized in the Agriculture and Fisheries Modernization Act of 1997.

What we desire

The role of proper postharvest handling in the modernization of agriculture and fisheries sector is indeed crucial that even the incumbent Agriculture Secretary Arthur C. Yap included postharvest and storage in the government's Five Developmental Pillars for Agriculture and Fisheries.

However, to achieve a globally

Table 1. Actual postharvest losses of selected perishable crops in the Philippines[a]

Commodity	Shipping points	Period	Amount lost (PhP)	Shipper/owner
Saba banana	Davao to Korea	1987	32,000	multinational company
Banana, mixed load	Agusan del Norte to Manila	2000	15,600	consignee
Strawberry	Baguio to Hongkong	1994	12,000	cooperative
Papaya	Negros to Manila	January 1994	54,075	agribusiness association
Seed potatoes	USA to Philippines	1993	1,000,000	importer
Onion	(stored)	1989	89,000,000	bank

[a]*Source: Agravante et al. 2003*

Table 2. Reported postharvest losses of perishable crops in ASEAN countries[a]

Country	Produce	Postharvest loss (%)
Vietnam	fruits	25-40
	vegetables	20-30
Malaysia	fruits and vegetables	20
Thailand	fruits	14
	vegetables	17-35
Philippines	fruits	28
	vegetables	42
Indonesia	fruits and vegetables	15-40

[a]*Source: Bautista 2002*

competitive agriculture and fisheries sector characterized by dynamic postharvest technologies could, much remains to be done.

Of more than 200 colleges and universities of agriculture in the country, there are less than 10% teaching Postharvest Handling of Perishable Crops as subject. Concurrently, there are a very few institutions doing research work on postharvest. Extensive studies have to be done as a basis for developing appropriate market-oriented technologies to solve postharvest problems. Moreover, a dynamic extension work on postharvest must be carried out. Information materials on postharvest handling should be regularly published since there are very few published materials on it. There is also a need to produce radio broadcasts, television programs, as well as modules on training programs. This emphasizes the need for training people in academic and research institutions.

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Dr. Elda Esguerra:
The dedicated postharvest horticulturist

Story and Photos by CHRISTMAS B. DE GUZMAN

"Dedication, patience and hardwork." These are three words that Dr. Elda Berroya Esguerra stated when asked about her working attitudes.

Born on 27 December 1955, Dr. Esguerra is the eldest child in the family. She values education very much and eventually, has proven to her three sisters and three brothers that she could nurture and look after them when their parents passed away.

Dr. Esguerra is a Research Associate Professor IV and the head of the Postharvest and Seed Sciences Division (PSSD) of the Crop Science Cluster (CSC) of the University of the Philippines Los Baños (UPLB) College of Agriculture (CA).

On becoming a researcher

Though her first love was medicine, she still was able to succeed with her undergraduate degree, agriculture. "Studying to become a doctor would take a lot of money, or is very expensive and my parents then could not afford that," said Dr. Esguerra. "Hence, I decided and took my chance to pursue BS Agriculture. She started her studies at UPLB in 1972 and graduated in 1977. She majored in Horticulture with Postharvest Physiology as her field of specialization. She did not expect that she would be able to embrace horticulture (the science and art of cultivating fruits, vegetables, flowers, or ornamental plants) as her undergraduate degree since she did not have much interest in the subject when she first stepped in college. Her inspiration was her former professor in postharvest technology, Dr. Ofelia K. Bautista, one of the pioneers of the Postharvest Horticulture Training and Research Center (PHTRC) and currently, an Adjunct Professor of the CA-CSC.

The PHTRC was established in 1977 in response to the United Nations (UN) General Assembly resolution to reduce postharvest food losses. The core staff was drawn from a group of postharvest horticulturists who had initiated a modest but significant postharvest research program at UPLB. The Center was built and equipped with funds from the Association of Southeast Asian Nations (ASEAN)-Australian Economic Cooperation Program. That was the time when she joined PHTRC by becoming a research assistant in a project regarding postharvest handling of fruits. Her first supervisors were Dr. Doroteo B. Mendoza, Jr. and Dr. Ernesto B. Pantastico.

On postharvest horticulture

Working as a research assistant in the University through the externally-funded projects gave her the privilege to study further. Again, she took up Horticulture, with major specialization in Postharvest Physiology. She completed her master's degree in 1982.

According to her, horticulture, etymologically, can be broken down into two Latin words – "hortus" which means garden and "cultus" which means tilling. Horticulture involves five areas of study, namely: floriculture (involves production crops), landscape horticulture (involves production and maintenance of landscape plants and implementation of landscape design), olericulture (involves production vegetables), pomology (involves production of fruits), and postharvest physiology (involves maintaining quality and preventing spoilage of horticultural crops).

"When you say postharvest physiology, essentially you are dealing with living tissues and the basic biological processes going on inside the tissues," stressed Dr. Esguerra. "Vegetables and fruits differ on their morphological and anatomical structures and these should be considered in the design or development of postharvest technologies."

Her greatest work experience includes a research collaboration with Japanese scientists through the Japan Society for the Promotion of Science (JSPS), led by Dr. Maria Concepcion Lizada. With that, she was able to get a

study grant (PhD) in Japan, under the Monbusho (Monbukagakusho) Scholarship Program. She finished her doctoral degree at Ehime United Graduate School of Agricultural Sciences in Kagawa University within three years and six months (1989-1993). The commodity she studied was banana. Specifically, it was removal of astringency of 'Señorita' banana. Experiments were done first on the basic physiology of banana followed by applied studies on the ripening methods and techniques to remove astringency.

She considers her involvement in various R&D projects on mango led by Dr. Ma. Concepcion C. Lizada as one of the highlights of her career. Through her pioneering efforts and collaboration with other researchers from PHTRC and other units of UPLB, her significant research findings and postharvest technologies developed have contributed to the competitiveness of the Philippine fruit and vegetable industry and reduced losses both in quantity and quality thereby increasing stakeholders' income. Believing that research results or technologies developed should meet the needs of target users, she implements her research projects in close collaboration with various industry stakeholders (farmers, growers' association, traders, exporters).

Proofs of her unrelentless efforts in pursuing research are the technologies that she has developed in collaboration with other researchers-scientists. The modified vapor heat treatment (VHT) procedure, a quarantine treatment of mangoes for export to Japan for the control of fruit fly, is an example. Just recently, the Chinese quarantine authorities approved the use of extended hot water dip as a quarantine treatment of mangoes exported to China. She is one of the leading researchers in the optimization of the treatment conditions together with Dr. Kevin F. Yaptenco, Ms. Noida B. Flor (both university research associate II at PHTRC), Dr. Hernani G. Golez (center chief of the National Mango R&D Center-Bureau of Plant Industry in Guimaras) and Dr. Glenda O. Bilog (senior science research specialist at the Philippine Nuclear Research Institute of the Department of Science and Technology).

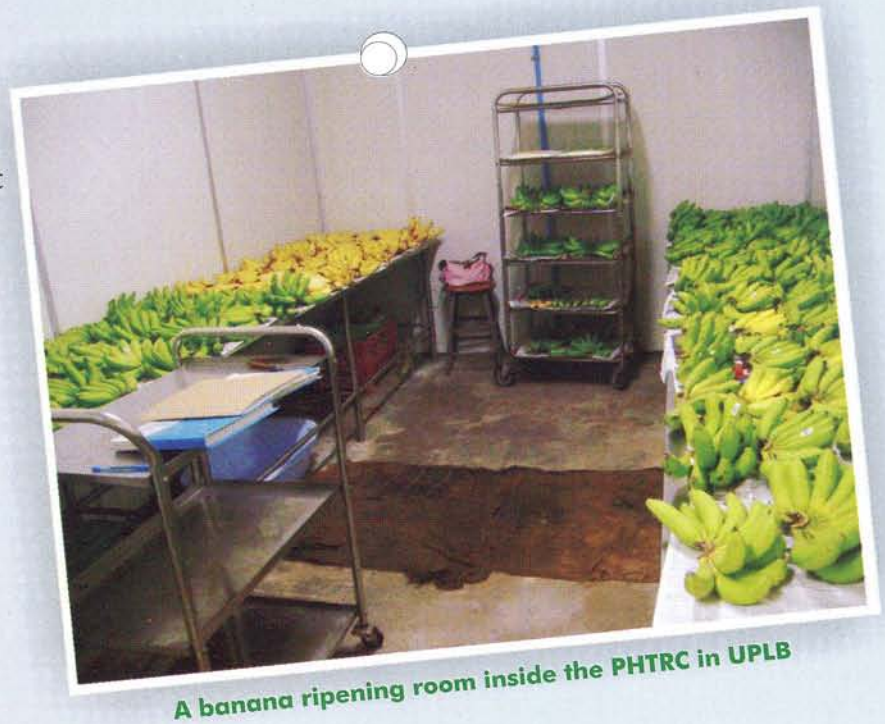
Through the DOST-funded research project on mango, she initiated the development of the LPG-fueled hot water tank for disease control of mangoes

with Dr. Yaptenco. This solved the high amperage requirement of electricity-operated hot water tank.

The rapid hot water treatment of mangoes for disease control which she developed a few years back has been increasingly being adopted by traders and exporters since the technique can treat bigger volume of fruits compared with the conventional hot water treatment.

Through a private-public partnership, Dr. Esguerra in collaboration with Dr. Oscar S. Opina, a Professor at the Crop Protection Cluster of UPLB-CA demonstrated that it is possible to control postharvest diseases of mango during a 28-day stationary commercial controlled atmosphere (CA) trial. The technology involves pre- and postharvest management of the two major postharvest diseases of mango, anthracnose and stem end rot, which limits the potential storage and marketable life of mango fruits. The CA technology for the 'Carabao' mango was developed by Dr. Lizada and served as the basis of the commercial trial. The project

> **"She was also part of the research team that established the irradiation dose as an alternative quarantine treatment for mangoes and the low temperature storage of 'Sinta' papaya."**

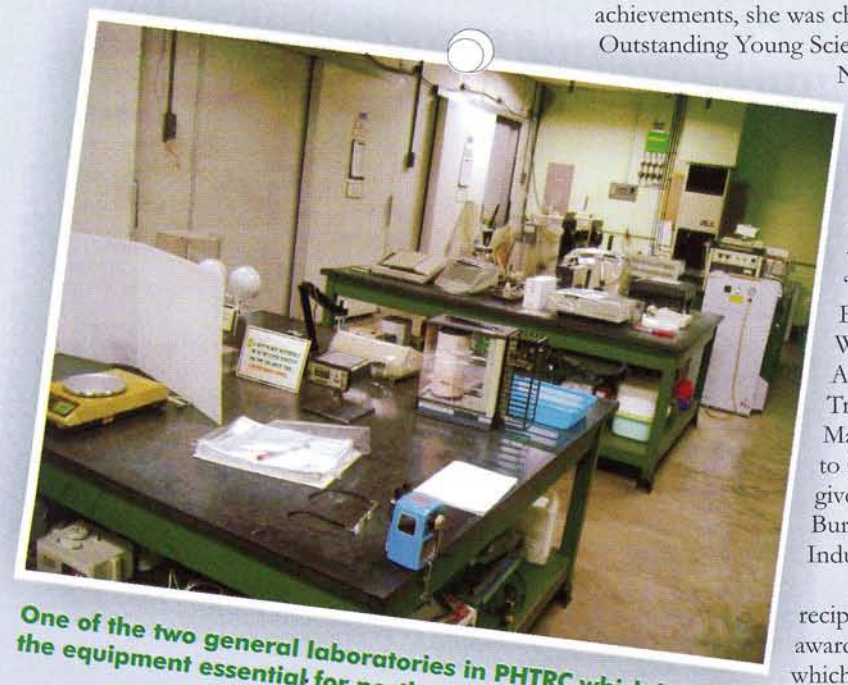


A banana ripening room inside the PHTRC in UPLB

was supported by the Department of Science and Technology (DOST), and the partners from the private sector include the Diamond Star Agro-Products, Inc., a mango exporter and Maerks Line, a private shipping line which allowed the use of its CA van for free during the trials.

She was also part of the research team that established the irradiation dose as an alternative quarantine treatment for mangoes and the low temperature storage of 'Sinta' papaya. Along with Dr. Bautista, she formulated packaging and modified atmosphere storage of tomatoes, and the programming and disposal of onions during cold storage.

The results of her research outputs do not end up only in technical journals but are popularized also in the form of posters, leaflets and circulars for the benefit of end users. Her untiring efforts in disseminating the results of her researchers can be gleaned also from her active participation in various national and international seminars, training programs, workshops and lecture fora.



One of the two general laboratories in PHTRC which houses the equipment essential for postharvest research activities

On being recognized

Cognizant of her scientific achievements, she was chosen as one of the Outstanding Young Scientists by the National Academy of Science and Technology (NAST) in 1994. Her latest recognition award was for her study "Development of Extended Hot Water Dip as an Alternative Treatment of Mangoes for Export to China" which was given by the DA-Bureau of Plant Industry (BPI).

She was also a recipient of 12 other awards, eight (8) of which are for her scientific papers either published or presented in conferences. These include the Best Paper Award from the Bureau of Agricultural Research (BAR) during the 12th National Research Symposium, the Los Baños Science Community Foundation, Inc. (LBSCFI) Outstanding R&D (PARRFI R&D Award), the Crop Science Society of the Philippines (CSSP) Best Paper Award and the NAST Outstanding Publication Award.

Scientific societies such as the Philippine Fruit Association (PFA) and the Crop Science Society of the Philippines (CSSP) recognize also her contributions to the advancement of postharvest horticulture in the country by giving her the Achievement Award in Crop Science Research in 2005 and 2007, respectively. In 2003, the research team she led for the Fruit Crops Postharvest Program was recognized Outstanding Research Team during the 94th Foundation Day of UPLB-CA.

With all the numerous awards and recognitions she has received, she stays humble and constantly looks forward to striving better in her career. Her vision is that the Center under the Division she's directing be still the leading institution on postharvest horticulture of tropical commodities not only in the Philippines, but also in Southeast Asia.

A masterpiece called fruit wine

How a Filipino-made wine made it to Tom Cruise's wedding table

Story by MIKO JAZMINE J. MOJICA
Photos by ANTHONY A. CONSTANTINO and MIKO JAZMINE J. MOJICA

Multi-awarded fruit wine exporter, Mr. Elbert Pigtain

If you think you are too geeky to drink wine, then you might be fascinated with the information that the science of wine and winemaking is known as "oenology". Now that should make it easier for you to finish this article and learn from a wine expert.

They say that judging color is the first step in tasting wine. Mr. Elbert Pigtain, a multi-awarded fruit wine exporter, lamented how locally-produced fruit wines in the country don't taste good or have very artificial-looking colors.

"I don't intend to offend, but I tried the local strawberry wine and I think we need a lot of improvement. The color is very artificial. We have to address the lack of standards and proper procedures in producing quality fruit wines," he said in his lecture on the improvement of homemade fruit wine at the 10th Anniversary and Scientific Symposium of the Mycological Society of the Philippines in La, Trinidad, Benguet.

Pigtain started the Tropical Fruit Winery Corp. and Oriental Synergies Export Corporation (OSEC) in 2003 which is into the export of fruit wines such as *bignay* (wild berry), *duhat* (plum), *guyabano* (sour sop), and mango as well as fruit preserves and syrups and other Philippine products. Despite the Philippines not being known as a wine-producing country, Pigtain was able to penetrate the high-end markets in US and Europe. Moreover, his tropical fruit wines found a niche market abroad despite the well-established and more popularly known grape wines. Wine production is currently dominated by European countries France, Italy, and Spain. Understandably, they are also the world's top three exporters.

"Packaging counts a lot in selling wines," Pigtain said. He cited the common practice of local producers when packaging their wine: "You don't need to tie a ribbon on a *sinamay* cloth around the bottle of your wine. It makes for a messy look that doesn't attract customers who are really into wine drinking," he explained.

Perhaps his advice should be taken very seriously by local fruit wine producers in the country as Pigtain appears to be not only a credible source, his products are also recognized in the international market as among the best in the world.

In 2003, his fruit wine brand Mijiah won first place as the Trendiest Product in the International Food Exhibition (IFEX) Philippines. In 2004, Mijiah Duhat Wine (Philippine Plum Wine) joined the 11th Concours Mondial de Bruxelles at Brussels, Belgium and was awarded a 76.7% rating, a good enough rating according to Pigtain. In 2005, when the Department of Trade and Industry (DTI) asked for samples of his wines, he thought they were just going to send them as gifts to foreign dignitaries and investors. It turned out they have sent them as entries to the APEC 2005 Traditional Wine and Liquor Contest Second Senior Officials' Meeting in Jeju, Korea. The Duhat Wine ended up winning 2nd place in the Special Wine Category. In Utrecht, The Netherlands, Mijiah Tropical Fruit Wines

was chosen by the professional juries of the National Food Week (World Foods) as the Philippine's official entry and was chosen as one of the 15 Best Products of the World.

If that is not enough to convince you that this Filipino-made fruit wine is all the toast in the international scene, Mr. Pigtain's fruit wine has been a "hot item" in the fashion world and Hollywood. "Mijiah Mango Wine was served in 2004 at the Gucci fashion show in Florence, Italy. George Clooney gave Mijiah Wines as gift to the wedding of Tom Cruise," Pigtain said.

You can tell that the fruits of his success have been sweet like his wine, indeed. But you can bet that these weren't achieved in a smooth manner like his wine passing one's throat. "I know I was able to open doors for wine producers in the country to penetrate the international market but the path that I took has been difficult," Pigtain recounted.

"Aside from the competition, it's hard to secure a wine producer/exporter license as this is considered a 'sin' product. In the US, I had to spend a big amount for the license that was processed for one year before it was released. These countries have also stiff tariffs because they protect their own [products]," he said.

Another glitch Pigtain encountered was the brittleness of the corks he used to source from the only supplier in the Philippines. "The corks were too brittle and had leaks. Now we do our own corking in the US which is of high quality," Pigtain said.

The winning edge of Pigtain's fruit wines, aside from its quality being competitive to grape wines produced abroad, is his original and innovative packaging. His Mijiah wine bottles are made of stoneware with unique shapes and attractive colors that can be called a piece of art on its own.

Pigtain had found his way to sweet success in making and exporting fruit wines, though these were laborious and tricky (not to mention expensive). "If not for my passion in making wines, I wouldn't probably go through it," Pigtain said. As with everything that we do, Pigtain said that enjoying what you do and working diligently to achieve your goals is always the winning formula to your triumph.

His advice is not only to aspiring wine producers but hopeful exporters: "We need to be innovative. Our edge is our fruits and vegetables but we need to be more imaginative and inventive in processing and packaging them. Thailand is now dominating the oriental shops in Europe though we have almost the same products, if not better. But why can't we do it?" Pigtain said.

"Here in Baguio City, you have your strawberry wines but do you drink them? Why not make strawberry ice cream and sell them in every corner of Baguio? Maybe you could also lace your ice cream with fruit wine. That would be a hit—fruit-based ice cream and wine in Baguio are perfect," Pigtain told his audience during his presentation in Benguet.

According to him, there are now about 10,000 organic shops in Europe and that by 2010, the demand for organic products will swell in the US. During his presentation in Benguet, Pigtain particularly asked the researchers in the academe to maximize their capacity to help the small industries prosper in agribusiness. Likewise, he said his company is offering assistance to small enterprises in packaging their processed fruits. He also welcomes suppliers of fruits for his wines.

Pigtain believes that his wine, despite being considered a 'sin' product, is actually noble. "This is a product produced out of social and environment concerns. It is also a versatile product. Besides enjoying wines as drinks, it could be used for cooking and blending with other healthy drinks such as coffee. It all boils down to the right processing and packaging," he said.

During the open forum of his presentation in Benguet, one lady whose interest in processing fruits for wines had been awakened, told Pigtain about a certain indigenous fruit found in her province in Samar. She said the red wild fruit locally called *"Igot"* is abundant in Samar and she wondered what can be done with these. It turned out that Pigtain had been looking to source the fruit for a long time now. "Maybe you can supply me with it. I need five tons of that fruit," he said.

Talk about a new door opened.

Mr. Pigtain's Mijiah Fruit Wines is exclusively distributed locally at SM Kultura. For more information, you can contact him at (02) 535-8063, email: osec@compass.com.ph, or visit their website at www.mijiah.com.

Aesthetically and nutritionally enhanced tomatoes

Story by ANDREA B. AGILLON, PhD
Photos by JOSE IRA ARCHIMEDES D. BORROMEO and MARLOWE U. AQUINO

Have you ever wondered why the color of ripe tomatoes is sometimes yellow, other times orange, and at other times red? Still there are times when there are even blotchy colors of yellow, orange and red!

These color differences tell of the long story these tomato fruits have been through. Most people think these are varietal differences, but actually they are not. Color development in tomatoes is temperature-controlled. You might notice that during the cold months of December and January, tomatoes in the market are mostly red. On the other hand, summer tomatoes produced in Luzon are mostly yellow or orange. Tomatoes that ripen during colder months are redder. The physiological responses of tomatoes to surrounding temperatures make it so.

Owing to television commercials, it is now common knowledge that red tomatoes are rich in lycopene which are said to be health-giving phytochemicals. Lycopene is even promoted to be good in preventing the occurrence of cancer.

Ripe tomato colors are due to the pigments called carotenoids. These include the *a* and *β* carotene, which are the yellow to orange carotenoids and lycopene, the red carotenoids. The β-carotene, which is responsible for the orange color, is the precursor of vitamin A synthesis in the body. The formation of these pigments depends on the temperatures the fruits are exposed to and the length of exposure time in those temperatures. Exposures of fruits can either be while they are still attached to the vines or after harvest during storage. Whereas ß-carotene synthesis occurs in detached plant organs under almost any condition favorable for vital processes, lycopene formation is characterized by extreme temperature sensitivity (Went et al, 1942) and is said to be inhibited at 32°C. Holding harvested fruits at 21°C resulted in the fastest and most uniform ripening with the least loss from rots and the best ripe quality for any given lot of tomatoes (Truscott and Brubacher, 1963).

There was a time when tomato traders were bringing their green tomatoes to Baguio City or Tagaytay City. When the fruits ripen, they will bring down the fruits back to the Manila and lowland markets. Somehow these businessmen were able to observe that cold temperatures were able to bring out nice red colored tomatoes as they ripen. It is a practical method of ripening tomatoes to full red, although not necessarily inexpensive.

In an experiment conducted to observe the color characteristics of tomatoes subjected to different temperature regimes (Agillon and Lizada, 1984), it was able to show the temperatures and length of storage needed to effect the color changes. The 'Improved Pope' variety of tomato was used for all the trials. These were harvested in Claveria, Misamis Oriental and transported at the mature green stage to the Postharvest Horticulture Training

and Research Center, UP Los Baños, after which the fruits were stored at 15, 20, 25°C, and ambient temperatures. The length of storage before transfer or color of fruits at transfer to ambient temperatures was also studied.

Storage and ripening of these tomatoes at temperatures lower than ambient resulted in a distinct improvement of color quality. High color quality refers to the magnitude of lycopene content or intensity of deep red. A longer period of holding fruits at 15°C or 20°C favors lycopene synthesis over the other carotenoids. This means that generally, the more advanced the color index at withdrawal from cold temperature to ambient temperatures, the better the color quality at the full ripe stage. A combination of lower temperature and the longer holding time resulted in increased lycopene which, in turn, led to higher color quality in the fully ripe fruits. However, extending the holding time until fully ripe did not lead to a significant difference in color quality rating between fruits held at 15°C and those held at 25°C.

Temporarily holding fruits at 15°C before transferring to ambient conditions resulted in a significantly higher level of vitamin C and higher levels of carotenoids other than lycopene, thereby presenting a nutritional advantage over fruits held at 25°C before withdrawal to ambient temperatures.

It was evident that refrigerated temperatures produced ripe tomatoes with markedly enhanced color quality compared to those held continuously at ambient. It is interesting to note that holding fruits at 15°C for either 1 or 2 weeks resulted in inferior color quality compared to holding fruits at 20 or 25°C for the same length of time. That is because there is still green parts of the fruits when held temporarily at 15°C for only 1 or 2 weeks, while fruits stored at the same length of time at 20°C or 25°C already ripened. Color quality, which reflects the lycopene levels formed in the fruit, is the immediate visual manifestation of these responses.

The best temperature regime for 'Improved Pope' variety of tomatoes appears to be two-week storage at 20°C or 25°C. Hence, if storage facilities are nonexistent or very expensive, air conditioned rooms can be used to obtain optimum quality tomato. So instead of incurring high transport costs to Baguio City just to get good color quality, Metro Manila cold storage rooms can be used. Moreover, an added advantage is the extended storage life for using the cold rooms which can also be used to regulate the supply of tomatoes during off-season in Luzon. Furthermore, traders catering to processors will be benefiting from these storage regimes because processors normally prefer deep red tomatoes.

Restaurants with food preparations using the aesthetic versatility of tomatoes can use storage temperature regimes to produce their desired tomato color. In the households, we can all take advantage of our lower refrigerator compartments in producing red ripe, more nutritious tomatoes. This is done by putting in the less ripe or predominantly green tomatoes and taking them out when no more green part is visible. Salad tomatoes will be more enticing and visually better when fully red ripe. This way both the visual and the nutritional characteristics are pleasantly enhanced.

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> “Storage and ripening of these tomatoes at temperatures lower than ambient resulted in a distinct improvement of color quality.”

Tomatoes like it spongy and cool

Story by MIKO JAZMINE J. MOJICA
Photos by JOSE IRA ARCHIMEDES D. BORROMEO and RITA T. DELA CRUZ

On the dining table, the common conversation between a vegetable (V) and non-vegetable (NV) eaters, goes this way:
V: *"Paano magkakasustansya ang katawan mo kung puro karne ang kinakain mo? Dapat matuto ka naman kumain ng gulay.* (How can you get all the nutrients your body needs when all you eat is meat? You know you should eat your vegetables.)
NV: *"Kumakain naman ako ng gulay, ah. Mahilig kaya ako sa kamatis!"* (As a matter of fact, I do eat vegetables. I love tomatoes!)

Tomatoes are vegetables, isn't it? Apparently, that's hard to tell. Like the nuisance on the debate whether the chicken came before the egg or vise-versa, the debate on whether tomato is a fruit or vegetable had, at one point, come a close second. Botanists will declare tomato as a fruit because of its seeds while any other common consumers will definitely pass it up as a veggie for the reason that they mostly use it as a cooking ingredient and not serve them fresh together with their bananas and apples.

Wherever side you are in, the essential thing is that as a commodity, tomatoes command a great demand and probably won't go missing in anyone's kitchen. That's where the appropriate postharvest technology comes top priority in order to protect the precious tomatoes with what delicate skin and short shelf life it has.

Latest postharvest study

A recent study funded by the Department of Agriculture's Bureau of Agricultural Research (DA-BAR) was conducted by the Postharvest and Seed Sciences Division (formerly Postharvest Horticulture Training and Research Center), University of the Philippines Los Baños (UPLB), to confirm the feasibility of postharvest technologies used in tomatoes and conduct full-scale tests for its commercialization. These technologies include the storage of tomato in moist coconut coir dust (spongy, peat like residue from the processing of coconut husks) and an evaporative cooling chamber (low-cost alternative to refrigerated air conditioning) for high humidity storage from the DA-BAR-funded study on Postharvest Systems Improvement and Quality Assurance for Tomato in 2000 to 2003, also conducted by the same UPLB center.

> **"Postharvest technology comes top priority in order to protect the precious tomatoes with what delicate skin and short shelf life it has."**

The study, Commercialization of Postharvest Technologies for Off-Season Supply of Tomato, was conducted in two sites: in Liliw, Laguna for the testing of coconut coir dust storage; and in Manaoag, Pangasinan for the storage trials using fabricated evaporative cooling chambers.

Freshly harvested mature green tomatoes packaged in bamboo basket, wooden, and plastic crates were used to test the coconut coir dust storage in Liliw. The researchers used polyethylene bag (PEB) as a modified atmosphere (MA) packaging material and the PHTRC-patented ethylene scrubber (ES) to delay ripening in conjunction with coconut coir dust storage.

On the other hand, since the PHTRC-fabricated evaporative cooling chamber was completed after the tomato harvest season, the researchers decided to use *rambutan* instead for their test trial in Manaoag.

Research results

After one month, data analysis showed higher recovery of good quality, marketable tomatoes using wooden crates with or without PEB as liner for tomatoes held under coir dust storage. According to

the researchers, the advantage of using PEB in conjunction with coir dust storage can be two-fold: 1) delaying ripening and minimizing moisture loss and shriveling as a result of active gas modification inside the bag, and 2) absence of coir dust clinging onto the fruit surface, making the fruits look clean.

Disease development was the main cause of deterioration during storage in coir dust as noted by the researchers. They have likewise identified problems during the storage and marketing trial such as coir particles adhering to the fruit, hence, the need to wash the tomatoes prior to selling.

Meanwhile, the results of tests conducted over a four-day period showed that humidity levels of 94 percent to 99 percent can be maintained inside the evaporative cooling chamber and a drop of 4 to 6 degrees Celsius from ambient temperature can be achieved. These conditions resulted in maintenance of the quality (no shriveling) of tomatoes over two-week storage duration inside the chamber set up in Pangasinan. The researchers also used pallet wraps to delay warming and results showed that faster warming rate was exhibited by samples wrapped under 10-mm PE foam owing to its thickness.

Cost-benefit analysis

From their partial budgeting results, the researchers concluded that high net benefit was attained when tomatoes were packed in PEB first before laying them onto the moistened coir dust. Moreover, they stated that greater net benefit could be realized if the tomatoes are withdrawn on the fourth week of storage.

However, the researchers stated that the net benefit of the technology could be made higher if the chamber is utilized throughout the year as storage and ripening chamber for other crops such as eggplant and leafy vegetables. This is because operating a storage chamber solely for ripening tomatoes would result in a net loss since it is usually done only once or twice a year during a period of glut.

From their analysis, for an initial investment of about P47, 000 for the cooling chamber, the estimated payback period is 2.3 years. Moreover, a partial budget analysis showed that modest savings of P2,220 per year could be realized using the pallet wrap technology rather than refrigerated transport, assuming that the tomatoes required pre-cooling with ice and were transported only once a week.

Potential users

The researchers identified farmers and farmer-cooperatives, traders, wholesalers, and retailers as the potential beneficiaries of the technologies they have tested. Furthermore, they expect the tested storage methods to cater only to local markets. The general aim of the researchers was to commercialize the village-level storage technologies that increase the shelf life of tomatoes over a longer period of time after the peak harvest season and facilitate the transfer of these postharvest technologies through the farmer-scientist tandem approach.

The article was based on the study, Commercialization of Postharvest Technologies for Off-Season Supply of Tomato conducted by Dr. Edralina P. Serrano, Dr. Kevin F. Yaptenco, and Ms. Gloria D. Masilungan. For more information, please contact them at tel.no. (049) 536-2444 or 536-3138.

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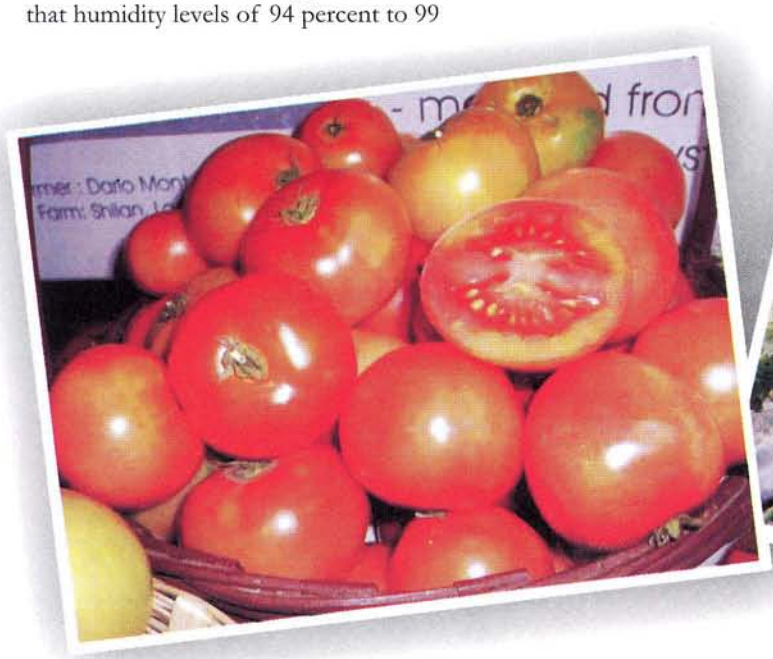

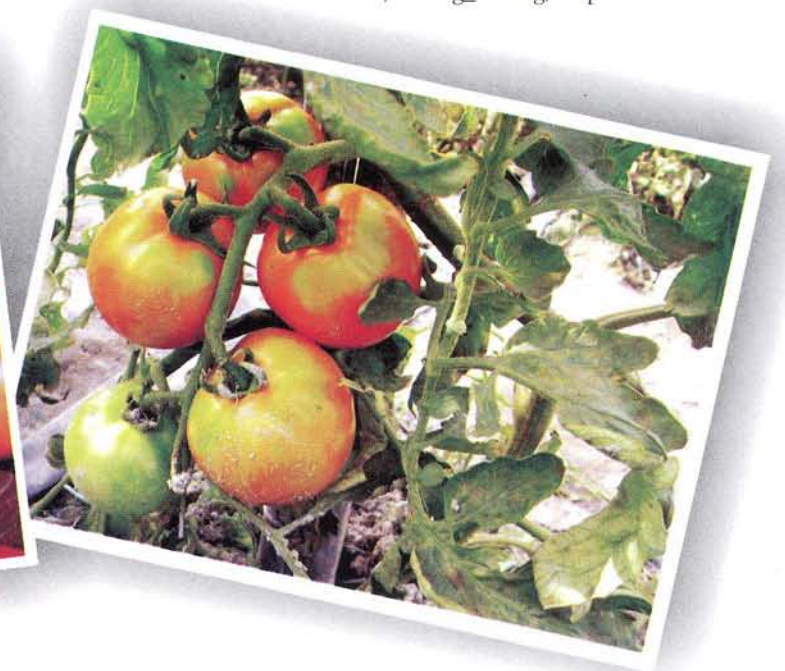

Have you ever wondered why there is always a comparison on our fresh or processed products and those of other countries?

Whether it's fruits, vegetables, meat, poultry, dairy products, fishery products, and even garments, they must all be in the name of "QUALITY."

One could never deny his or her appreciation of marketable goods when these are presented, packed, and piled in stores and supermarkets or in other various forms which captivate consumers' eyes. The observation is common to all sellers, buyers, and the general consumers when they purchase goods that could be kept for a longer period of time. Most often, consumers go after the shelf life, including the product packaging and nutritional value. When these factors are considered prior to product processing and packaging, then surely the goods will have an added value that is competitive both in the domestic and international markets.

Adding value to agriculture and fishery products through food processing and marketing is an innovative way of generating income and creating new jobs. This is one of the objectives set by the Department of Agriculture (DA) to address food security, sustainability, affordability, and availability of agriculture and fishery products. Several DA initiatives were conceptualized and developed into national programs all of which were formulated to address product standards, and competitiveness.

Looking at the details of agriculture and fishery products for competitive markets require certain parameters to be considered by producers, processors, traders, and consumers. These aspects should not start from harvest but should begin at the on-set of production management. Crops, livestock and poultry, and fishery products like any other commodity must have the right face-value to attract consumers. The essence of marketable products is always on the quality it possesses.

It is in this light that we would like to encourage our key players and stakeholders in Philippine agriculture and fisheries to reflect and consider visual and appropriate indicators to make our goods at *par* with the global markets. Not because we only wanted to sell our goods but we should do something about them particularly, improving postharvest handling, storage and transport, packaging and processing, and most of all, providing a boost on their comparative advantage that are uniquely Filipino.

We believe that our products have their own special features that could pass international standards and support the rising appreciation and requirements for quality. Based on these, we have directed our efforts in providing the right information to producers and processors, including consumers of agriculture and fishery products that seek more than satisfaction. Our goal is to inform, attract, satisfy, manage, and retain customers to patronize our products. We share the product packaging aspect of goods that encourage the right mindset and attitude for global competitiveness.

The need for product quality

Competitive value of agriculture and fishery products depends on assured quality and product standards. These could be done during systematic processing and appropriate packaging of goods. Based on researches conducted by experts, quality products are developed because there is a need to survive and grow, especially the introduction of new types, kinds, and models of products. This is complemented by dynamic markets that address the changes being anticipated and expected.

As such, there should be continuous product makeover, especially if these are obsolete or not saleable in the market; product diversification on seasonal products with brand new presentations; and the ever-emerging and fast growth of maturing market that oversee the proliferation of new products that shortens the life cycle of existing products. At hand, these are the factors that customers look deeper into and when new product lines of agriculture and fisheries products are at the market.

Product loyalty can be attributed to products that attract, and satisfy customers. In another angle, producers of these goods must properly maintain and retain customers and ensure the required quality.

Strategies to ensure product quality

Basically, there are a lot of strategies that ensure product quality in agriculture and fisheries. These could be done through proper product processing, packaging, and marketing. However, emphasis is drawn on product packaging because this is very visible when we talk about sustainability and competitiveness.

Product packaging is the art, science, and technology of bringing goods from manufacture to the place of consumption at the minimum cost possible. From this, several questions are asked leading to marketable quality goods.

Let us ask ourselves – Do we believe that packaging is – more than just a container; the product's salesman; an investment rather than a cost; a tool to reduce product cost; and a means to a profitable business. If all of these suggest a "yes" response we have to rethink and reconsider our purpose in ensuring product packaging strategies.

At one point, experts will normally ask six basic questions regarding product packaging. These are: What is your product?; Who is your market?; Where is your market?; When are you selling?; Why are you selling?; and How will you market your product? Based on this premise, these are the very reason - questions that make quality product for global product positioning and competitiveness.

Assuring quality, competitive value of agri/fishery products

Story by MARLOWE U. AQUINO, PhD
Photos by MARLOWE U. AQUINO and ANTHONY A. CONSTANTINO

Let us go into the detail of these questions:

What is your product? Products are the result of intensive research and development activities. In order that these are accepted, products must be in their original state, must have their natural appeal, and must establish a wide range of value adding potential when subjected to product development, particularly processing and packaging.

Who is your market? Among the functions of product packaging, its marketing impact has become the hottest growth area. People are the main consideration. As such, there must be a study on the end-user of products, connect product packaging with consumer preferences and lifestyle, and always come up with something new. Another consideration in marketing products is to develop packaging with a heart. This should include the photographs, language usage, type fonts of characters, color combinations, and product structure that convince and attract the general consumers.

Where is your market? Marketing is the best way to sell your products to consumers. However, locating them must be identified and sourced out in order that there will be an appropriate venue for product supply, distribution, and display. In so doing, all product developers must ensure products to reach consumers at its "most delightful" condition, focus on markets that have the most need and want for the product; and use packaging to promote one's products.

When are you selling? Timeliness and appropriateness are the key factors in selling products. Within these factors all products must draw their maximum potential, consumers must keep in mind that the cheapest price is not the only factor for purchase decision, and thirst not your product supply.

Why are you selling? The reasons for product packaging entail a lot of consideration on the part of the processors and packers. It is always a must that these individuals do something good for the consumers, make every consumer feel safe and proud of their purchases, and sell products because processors and packers have something good to offer to consumers.

How will you market your product? The process of packaging and selling your products requires basic items for a given activity. In order to attract, sell, retain and manage product clientele, we must develop brands that are recognizable and memorable, focus on core markets, decide on standards from production, processing and packaging of the goods be it fresh or processed, implement "value" strategy with objectives of "to surprise and delight" consumers, increase market consumption, create multipliers – joining food fairs and export mission by making product or company visible, consider new packaging technologies as part of company's long-term marketing plans, and finally package products to express respect to consumers.

The basic requirements for product development are sensitivity, accountability, and responsibility. If these are considered, surely our agriculture and fishery products will reach desired consumers' acceptability at reasonable prices and making our products globally competitive.

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A profitable venture from *Oregano*

Story by MA. ELOISA E. HERNANDEZ
Photos by MA. ELOISA E. HERNANDEZ, RITA T. DELA CRUZ, and DA-QAES

Dr. Estela C. Taño of the Quezon Agricultural Experiment Station is the lead researcher for the project on Philippine Oregano *(Coleus aromaticus Benth).*

To many Filipinos, oregano is well-known as a medicinal herb or even as a condiment to their food. Oregano, plant rich in Vitamin A and C, contains strong antioxidant properties and possesses antibacterial, anti-inflammatory, antifungal and antiviral properties. Popularly, oregano is believed to relieve coughs.

But more than these therapeutic uses, oregano is now being popularized and commercialized into wine, juice for human, juice for poultry, tea, and vinegar. These were packaged through the project titled "Development of Special Product Lines from Philippine Oregano *Coleus aromaticus Benth*". by Dr. Estela C. Taño, Ms. Rhodora M. Huelva, Ms. Annabel P. Masongsong, and Mr. Emilio M. Mejia, Jr. of the Quezon Agricultural Experiment Station, Lagalag, Tiaong, Quezon.

The Bureau of Agricultural Research (BAR) under the leadership of Director Nicomedes P. Eleazar provided the financial support to the project through BAR's National Technology Commercialization Program (NTCP). NTCP serves as one of the bureau's flagship programs in lieu of Secretary Arthur C Yap's drive on "making business from agriculture." It aims to create job opportunities and income growth through yield-improving technologies generated from research and development (R&D).

The potential products from Philippine oregano are the results of an indigenous technology documentation research effort. This aims to develop innovative products from indigenous plants, increase awareness and promotions, and create market, likewise generating income and sustainable community-based livelihood. The group is now seeing the potential of producing *nata de oregano* (a microbial cellulose) and oregano herbal soap.

In producing the products, Dr. Taño assured everyone that the postharvest processing and procedure entail raw material washing. "We make sure that there are no foreign elements present assuring its freshness prior to processing," Dr. Taño added.

Postharvest and processing procedures are standardized to achieve optimum product yield and quality. Product samples are then sent to an independent government-recognized laboratory for analyses as required by the Bureau of Food and Drugs (BFAD).

Promotional strategies

The various product lines from oregano are already showcased in the BAR Agri Trade Fair and at the 2007 Agrilink sponsored by the Department of Agriculture (DA). Secretary Arthur C. Yap commended the product as one viable industry in the Philippines. As per the Secretary's suggestion, the group has improved its labeling to open its products to local and foreign markets.

Dr. Taño acknowledged BAR, independent laboratories, Department of Trade and Industry (DTI), local government units (LGUs), and the Department of Agrarian Reform (DAR) for the support while developing the products.

Agriculture is business; *Oregano* is business

Dr. Taño sees the great potential of making oregano products as a new agricultural business in the country. From personal testimonies she got from their clients, they are confident that the success

of the oregano industry is not hard to achieve in their hands. The group is now documenting the reported beneficial effects of oregano products on consumers.

"In the near future, the farmer groups whom the researchers trained on the merits of growing oregano organically will benefit because we will buy the raw material," Dr. Taño said. On the other hand, those who do not have jobs or have little income can earn additional income on a commission basis. These people will be tapped to market the different products.

R&D on postharvest and processing technologies

Worldwide interest in oregano is increasing just as it is becoming popular in Southeast Asia, as reported from a thesis work of an agricultural engineering student who worked with the group in developing oregano tea. The demand, however, is not great enough to warrant large-scale commercial production. More research must investigate the possibility of cultivating and creating a market for oregano in other countries in Southeast Asia.

In the Philippines, oregano is largely cultivated for the fresh herb market. Annual consumption of about 1.6 tons was recorded based on purchases of several food service establishments in Metro Manila.

"This fact makes it more exciting on developing an oregano industry in the country because this is where R&D in relation to postharvest and processing technologies will be most significant," Dr. Taño proudly mused.

She added: "If one wants to increase the demand for raw materials, then there should be processing industries. What the industries need are new technologies generated through R&D which they can use to turn the raw materials into consumer products."

Expressing her gratitude to BAR, she said: "I am very pleased that BAR gave us the chance to develop the technologies on processing some products from the ordinary oregano plant."

Economic and social reward

According to Dr. Taño, postharvest and processing technologies pursued through the BAR's NTCP prevent wastage of raw materials, serve as value-adding, and optimize their utilization.

"We are able to create new agribusiness enterprises, helping farmers to have more options on what to do produce at a given time," she attested. Product processors would be able to avail themselves of developed technologies and generate jobs in the processing and marketing force while providing a wide variety of finished products for the consumers to choose from.

On social reward, Dr. Taño asserted that the production of various products from oregano would enable the country to move away from colonial exploitation.

"Through NTCP, we can use our natural resource, feed our own industries, and feed our own people with our own products," she concluded.

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"What the industries need are new technologies generated through R&D which they can use to turn the raw materials into consumer products."

Extended Hot Water Dip:

Effective disinfestation treatment for the control of mango fruit flies

Story by ANDREA B. AGILLON, PhD
Photos courtesy of PHTRC-UPLB

Before the eHWD

After the eHWD

Mango, specifically the Carabao variety, is undoubtedly one of the most important fruits in the Philippines. It enjoys being in the top five fruits being exported in terms of volume and value, third to banana and pineapple. One of the biggest potential markets for Philippine mangoes is China, where it maintains a long experience of exporting mangoes through Hongkong.

In previous years, these mangoes were not required to undergo disinfestation treatments. However, in 2002 mangoes exported to China were intercepted because of fruit fly larvae. This is an insect pest of quarantine significance, meaning a country does not want introduction of this pest in any form. Again in 2006 another mango export interception of the same cause was experienced, prompting China to impose vapor heat treatment (VHT) as a quarantine measure for all mangoes coming from the Philippines.

VHT is the approved quarantine treatment for mangoes exported to Japan, Korea, USA and Australia and has long been used for these countries. However, it is a very expensive treatment which Philippine exporters to China are not willing to utilize because of its cost.

Assessment and collaborations

These incidents posed a major setback in the mango industry. The problem prompted a Philippine delegation, headed by Dr. Hernani Golez, to investigate the matter and propose some possible solutions, one of which is the extended hot water dip (EHWD). They based their advice on early studies of Lizada and Brena (1996) at the Postharvest Horticulture Training and Research Center (PHTRC), UP Los Baños. Their studies showed that EHWD was effective in disinfesting mangoes of fruit fly larvae. With their expertise and familiarity in the different peculiarities and physiology of 'Carabao' mango, PHTRC was commissioned to conduct further verification trials of the treatment. Dr. Elda B. Esguerra led the experiments on fruit quality response conducted from October to December 2006. Conduct of the experiments was urgent because China required that all mangoes it imported as of January 2007 must already be subjected to EHWD. The treatment consists of dipping mango fruits in heated water until the pulp temperature of 46°C is reached, held at this temperature for 15 minutes followed by 30 min cooling in tap water. Other collaborators were Dr. Hernani Golez from the Bureau of Plant Industry and Ms. Glenda B. Obra of the Philippine Nuclear Research Institute (PNRI), who were responsible for conducting and developing the protocol for fruit fly mortality tests. Other researchers from PHTRC were Dr. Kevin F. Yaptenco and Ms. Noida B. Flor, who established the disinfestation temperatures based on the fruit responses in terms of quality, ripening behavior, and sensory attributes. Exporters to Hongkong/China provided the funds and the export quality mango fruits used in the trials which came from Mindanao.

Laboratory and pilot trials

Several trials were conducted on the effect of different temperatures on fruit quality and on insect mortality. Laboratory scale trials used the temperature controlled water bath while the pilot trials used the eight-crate hot water tank at the PHTRC. These hot water tanks are provided with sensors to properly monitor both the water and fruit pulp temperatures. Different variables such as different temperature levels, fruit sizes following the Philippine

National Standard for mango, differences in maturity using flotation in 1% salt solution, delays in EHWD treatment after harvest, and the cooling methods using either cold water or ordinary tap water, were also evaluated.

Result highlights and protocol for export

Expectedly, the time required for fruit pulps to reach the desired 46°C varied with temperature and fruit size. Bigger fruits required longer time to reach the disinfestation pulp temperature. Regardless of initial water temperature at the time of dipping, EHWD did not affect the subsequent ripening behavior, quality, and sensory attributes of the ripe fruits. However, immature fruits or those that floated at 1% salt solution were susceptible to internal breakdown (IB). This is a condition which is not obvious outside but only happens after the fruits are opened. Applying EHWD 48 hours after harvest reduced the incidence of IB if fruits are mature. Hydrocooling with cold water did not give consistent results with regard to IB reduction, hence cooling in tap water is recommended.

To observe the actual treatment and assessment procedures, the Chinese quarantine authorities were present during one of the pilot trials on larval mortality. Fruit fly larvae mortality tests showed 100% death and 0% pupal recovery from the impregnated fruits. Based on these results, together with fruit quality evaluations, the EHWD treatment procedure recommended consisted of the following: dipping mature fruits in water heated to 47-48°C until pulp temperature of 46°C is attained. This pulp temperature must be maintained for 15 min, followed by 10 min air cooling then 30 min hydrocooling in tap water. Fruits are then air dried prior to packing in 12 kg capacity cartons.

Starting in 2007, exporters to China have adopted EHWD as a quarantine treatment of mangoes.

Important Requirements for EHWD

To have assurance for the effectivity of the EHWD, several requirements must be available or provided, such as:

- Mature mangoes should be used.
- Treatment facility should be registered and insect-proof.
- Sensors must be properly calibrated for water and pulp temperature monitoring.
- Vent holes of cartons should be covered with nets to prevent reinfestation.
- BPI plant quarantine officers should supervise the treatments.
- Fruits should be randomly inspected by BPI quarantine officers after EHWD.

Required follow-up studies

For more comprehensive information on mango disinfestations and treatment cost reduction, a few important follow-up studies still need to be done, such as:

- effect on larval mortality of reducing the required disinfestation temperatures from 15 to 10 min and eliminating the 10 min air cooling prior to cooling in tap water, a reduction of 15 min in the total treatment time means a lot to the exporters considering the volume of mangoes that need to be treated;
- response of mangoes harvested during the early season in Luzon, establishing the appropriate conditioning treatments and its duration as a method of controlling incidence of internal breakdown;
- determining the compatibility of EHWD with other postharvest treatments such as low temperature storage.

Information supplied by Dr. Elda B. Esguerra, PHTRC, UPLB

Smoky no more with the spice-cured tinapa

Story by MA. ELOISA E. HERNANDEZ
Photos by RITA T. DELA CRUZ and NICANOR B. DEL ROSARIO III

A typical Filipino breakfast usually has fish in it. From the traditional way of simply frying, boiling, or blanching fish, Filipinos have learned other ways of making a more delightful means of preparing and preserving fish.

Fish and marine products are now prepared and processed by either smoking, drying, salting, or canning.

In the Philippines, smoked fish locally known as *tinapa* is very popular and has become part of the Filipino meal, especially during breakfast.

However, *tinapa* relatively possesses a characteristic of being smoky and with a short shelf life. In this context, a study on smoked fish was conceptualized and spice-curing technology was developed by the Southern Luzon State University (SLSU) in Lucban, Quezon headed by Prof. Delia Babilonia.

This research aimed at increasing the shelf life of *tinapa* and at the same time improving the earnings of the adopters/processors by providing consumers better smoked fish product that ensures sustainability of market preference of the consumers.

Spice-curing technology for smoked fish

Medium-size Indian sardines or "Tamban" with intact scales and belly are washed with clean water and drained. Spice-curing solution is prepared by dissolving 250 grams of table salt and 100 g of powdered spices (onion, garlic, chili, and black pepper) in 1 gallon of water. This is divided into two equivalent portions, for soaking and cooking of fish.

Fish are then soaked in the solution for 5 hours with occasional agitation. Cured fish are removed from the solution and arranged in bamboo trays and allowed to drain for 30 minutes. The fish are then cooked in boiling solution by dipping the tray for 10-15 minutes under low fire. The cooked fish are maintained in the tray and air-dried for 1-2 hours.

"This is necessary for pellicle formation, which is essential for better color development," Babilonia explained. After air-drying, fish are arranged in the smoking trays and loaded in the pre-heated smokehouse and smoked for 2 hours or when the fish turn golden brown.

To make the product more attractive to consumers, a new packaging style is more hygienic than newspaper or magazine was introduced.

Marketing approach

Product displays and exhibition within and outside the SLSU helped the group promote and market their product. SLSU also developed *Teknokomiks* distributed to Municipal Agricultural Officers (MAOs) of the towns of Quezon to enhance awareness towards the developed technology on spiced-cured smoke fish.

Lecture-demonstrations were held to familiarize fish processors with the process. Marketing of the product at present is exclusive

and selective. Delivery of the product is based on the orders of the prospective buyers.

The SLSU is also providing the technology to individual and association of fish processors and other rural organizations for livelihood purposes as part of its extension program.

Personal note

Prof. Babilonia fully acknowledges Director Nicomedes Eleazar of DA-BAR through the National Technology Commercialization Program (NTCP) and Dr. Cecilia N. Gascon, president of SLSU for their support to the project. "Through granting of the needed financial assistance, the dissemination of the technology to the end-users became possible," she added.

She considers the NTCP as one important component in postharvest/processing technologies. "Technologies are developed to address problems. Most often, people who produce and market their commodities are the ones facing problems in terms of proper postharvest handling. Processing technology is important to fill in the gaps and make the process more scientific," Prof. Babilonia stressed.

According to her, technologies generated must be socialized so that people will benefit from it. "DA-BAR NTCP facilitates commercialization of technologies and made these available to the end-users who are the farmers and fisherfolk. The agency ensures that activities are operationalized through financial and technical assistance. This realizes the objective of BAR to bring mature technology to local level and to modernize activities in agriculture and fisheries," she added.

In the coming years, Babilonia envisions that local fish processors even in the remotest areas can produce smoked and dried fish products in competitive and export quality. "With the continuous R&D in fish smoking and drying, *tuyo* and *tinapa* will not only be a good viand for the low income members of the community but also part of the diet of people at all levels of our society," she averred.

The industry on locally-produced fish products is not hard to achieve. Sooner than we think, these will be penetrating both the local and international markets. This is the reason why individuals are going into developing studies on fish processing for creating business and income-generating livelihood.

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BAR, The Royal Netherlands Embassy support publication on sea urchin

The Department of Agriculture's Bureau of Agricultural Research (DA-BAR) and The Royal Netherlands Embassy supported the publication of "Sea Urchin Grow-Out Culture: Coastal Resources Management Tools." The manual is based on a study on sea urchin conducted by the University of the Philippines-Marine Science Institute (UP-MSI). It highlights the success of grow-out culture technology with variability on the growth and survivorship rates of chosen sites.

Sea urchins (*Tripneustes gratilla*) are common in oceans all over the world. Locally known as "maritangtang," it is the most commercially exploited sea urchin species in the Philippines.

Large population of T. gratilla was once observed in the coastal municipality of Bolinao, Pangasinan, until the local people realized the lucrative export market for it, particularly its gonads or roe which is rich in glycogen, carotenoids, alanine, valine, glycine, methionine, glutamic acid, inosinic acid, and gluanylic acid.

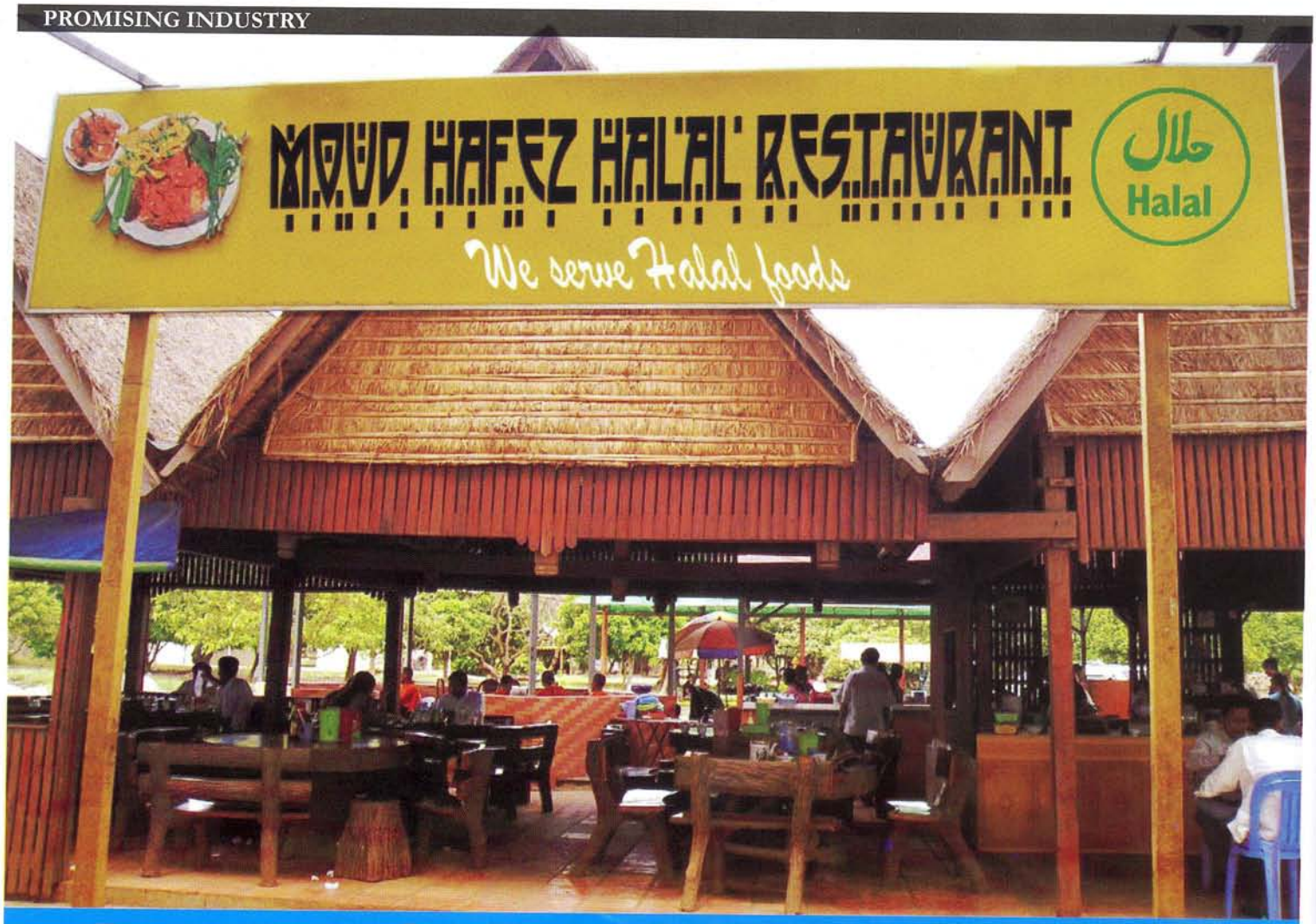
The grow-out culture for sea urchins can contribute largely to coastal resource enhancement. As it is, the technology of sea urchin in cages/pens functions as mini-reproductive reserves and a supplemental source of livelihood for fisherfolk.

Grow-out culture effectively protects juveniles from natural predators, increasing survivorship to reproductive maturity and enhancing recovery of depleted natural population. As examined, the increase of sea urchin in the area has remarkably resulted in the growth of sea cucumber and other species not found in the area prior to the introduction of sea urchins.

Sea urchin grow-out culture, being a resource management tool and a good source of livelihood at the same time, is relatively new. Coastal communities in Pangasinan are more accustomed to open access fishery practices. Consequently, the need for information on practices that can harmonize both economic and ecological needs towards sustainable utilization of the fishery resources is important.

The studies conducted by the UP-MSI have shown that the success of sea urchin grow-out culture is largely dependent on the particularities of a chosen site – different growth and survivorship rates could be expected from different places. It is recommended that prospective fisher-growers may need to subject the grow-out process to initial testing.

The publication was created to function as coastal resources management tool and as an intervention strategy to disseminate data on the general considerations, grow-out procedure, management, and culture. *(Christmas B. de Guzman)*



A great demand for *Halal* foods

Story by CHRISTMAS B. DE GUZMAN
Photos by RITA T. DELA CRUZ and ANTHONY A. CONSTANTINO

Food is everyone's favorite subject and we generally all love to eat meat. However, for Muslims, one thing should be considered.

Halal means lawful and permitted in Islam, according to Islamic law. It can, and is applied to any subject matter. In terms of food, there are certain products that Islamic law does not allow Muslims to consume. These forbidden foods or ingredients are known as *Haram*, which means unlawful or prohibited.

In relation to food and drink, the main items that are *Haram* under Islamic law are alcohol beverages, any part of a pig, carrion (meat of dead animals), carnivorous animals, and blood. Islamic Law also stipulates that all meat consumed must be from animals that have been slaughtered in accordance with the Islamic law, thus making it *Halal* or acceptable for consumption. To satisfy Islamic law, slaughter is done by cutting the animal's jugular vein as this includes rapid and complete bleeding (as blood is thought to be the main carrier of diseases which could be passed to humans).

"O Messengers, eat from the pure foods and work righteousness." From the Holy Qur'an (sacred scripture of Islam) 23:51, this is one of the statements that serve as a proof that *Haram* foods, contrary to *Halal*, are embodied with forbidden ingredients not conforming with Allah.

Similarly, Muslims are taught through the Qur'an that all animals should be treated with respect and well cared for. The goal is to slaughter the animal, limiting the amount of pain it will endure.

Preparation, production and marketing

Contrary to popular belief, the manner employed in the production and preparation of *Halal* meat is one of the most humane and hygienic. Fundamental to this method is the treatment of the animals with the highest respect and the slaughtering with the least amount of pain. The actual slaughtering method used means the animal is totally relaxed and there is very little increase in adrenaline, resulting in more tender meat. The draining of the blood and the removal of the spinal cord mean that all bacteria and toxins are removed from the meat, resulting in a longer shelf life.

Halal food certification

Halal food certification refers to the examination of food processes in its preparation, slaughtering, cleaning, processing, handling, disinfecting, storing, and transporting. It also has to undergo assurance and auditing of the technical matters involved. It thus involves management practices as a

whole. The ways associated to being *Halal* should apply to all stages of processing or should be applied "from farm to table."

Certification of *Halal* foods has the following benefits: 1) consumer confidence, that allows the consumers to make informed choice of their purchase; 2) competitive advantage, which manufacturers can use as a marketing tool to secure bigger market share seeing that *Halal* food is suitable for both Muslims and non-Muslims; 3) quality, which indicates that the food product not only fulfills *Halal* requirements, but also strict hygiene practices; and 4) auditing and monitoring mechanism for the authority.

Meanwhile, *Halal* certification is different from merely determining whether a food product can be taken by a Muslim or not. It actually involves trust and responsibility on the part of the certifying body.

Trust, or *Amanah* in Arabic, is a religious obligation of the certifying body, and those involved in the issuance of certification are accountable to the consumers and to the "Almighty God" who is the all-knowing and the final judge.

Filipino *Halal* industry

In relation to *Halal* food certification, the Islamic Da'wah Council of the Philippine (IDCP), which is a member of the World *Halal* Council (WHC) and the Regional Islamic Da'wah Council of Southeast Asia and the Pacific (RISEAP), accepts the obligation to fulfill the trust imposed by the religion in connection with the verification, analysis, and other necessary acts and safeguards to genuineness and purity without contamination of the product before it issues certification.

The Filipinos, being influenced by neighboring countries, are close to Islamic culture. The Philippines has a Muslim population of about 10 million, most of them living in Mindanao and Metro Manila.

For this reason, the Philippine government itself saw the potential of the market for *Halal* products. As a matter of fact, it's in the process of launching the first official guideline book in making *Halal* foods, which will provide food processors, traders, exporters, and marketing logistic operators with the necessary information in preparing, packing, labeling, and handling *Halal* foods.

Is *Halal* food uniting or dividing us?

The rapid expansion of *Halal* products and establishments has brought numerous benefits to the Muslim community, not to mention the advantage it gives in the form of employment and business opportunities.

Needless to say, *Halal* foods can also be enjoyed by non-Muslims. It sustains its role as a base that will allow people of different religions to sit together over a meal where they previously could not.

However, not all agrees to that. Some perceive this concept as a subtle colonization of Muslims who impose their lifestyle on people of other races and religions. When an eating outlet is certified *Halal*, food prohibited by Islam is not allowed to be consumed in the same premises. These include alcoholic beverages and meat of animals that were not slaughtered according to the Islamic law.

Hence, this prohibition has raised resentment to consumers who, say for an example, can no longer enjoy a cold mug of beer with their favorite dish at their usual eating outlets.

Furthermore, *Halal* foods can cost three times as much as the regular food due to its particular method of preparation. This can be interpreted and taken either positively or negatively, though.

Today, there is a huge international market for *Halal* food and many countries, especially those in Southeast Asia and the Middle East, have been promoting their *Halal* food production for both resident and foreign consumers.

Since it can or cannot be deemed a common denominator, consuming *Halal* appears to be in a case-to-case basis and the question "*Why Halal?*" so remains.

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"*Halal* food certification refers to the examination of food processes in its preparation, slaughtering, cleaning, processing, handling, disinfecting, storing, and transporting."

Siwawer housewives look beyond the flavoring use of garlic

Story and Photos by RITA T. DELA CRUZ

Pungent when raw, sweet, aromatic and mellow when roasted; no food is good in the mouth without that familiar garlicky flavor. To many people garlic is just garlic, a flavoring that gives the right spicy taste to food. To the women of Vintar, Ilocos Norte, garlic is their way of life.

Somewhere between the vast valleys and tall mountains and the silent banks of the Bacarra River sits the small town of Vintar. In this town, lies the Siwawer Garlic Products Association (Rural Improvement Club), a 35-member group of women, engaged in processing various products from garlic. Most of its members are housewives.

Garlic as the binding factor

Garlic or *bawang* is the "White Gold of Ilocos Norte" and an indispensable ingredient in every Filipino dish. A versatile commodity, garlic is considered as the most profitable dry season crop in Region I, making it the major producer accounting for the 65-69 percent of the national output annually. Nutrition-wise, this scented bulb is a good source of calcium, phosphorus, and potassium. Garlic is also known to have therapeutic and healing properties along with its various medicinal uses.

Like in most areas in the North, Vintar is predominantly an agricultural town where Ilocos garlic variety thrives profitably. According to Wilhelmina P. Castañeda of the Department of Agriculture-Regional Field Unit I (DA-RFU I), among the garlics produced in the world, "Ilocos garlic has the best aroma and pungency. Although smaller in terms of size, the bulb compared to the Taiwan garlic, is fuller in flavor and more pungent."

The size problem in Ilocos garlic was resolved when the group of Castañeda introduced the application of gibberellic acid (GA3) in its production. GA3 is a hormone that promotes plant growth and development in garlic. It was found that with the application of GA3, garlic yield has increased by at least 56% resulting to a

66% rise in net income per hectare. With this kind of technology at hand, the housewives of the Siwawer Garlic Products Association were more than happy to know that they could also benefit from this research result.

Tale of the hawk

For the Vintar housewives, everything started with a curiosity and the spur to make use of their idle time while earning additional income for the family. Luckily for them, curiosity has to be supplied with sufficient training and skills.

The Bureau of Agricultural Research (BAR) is supporting the commercialization of garlic technology in Region I, specifically to accelerate the adoption of modern production and processing technologies and help expand and develop markets for garlic and garlic products. Part of this commercialization activity is the provision of trainings to at least 150 garlic farmers on improved garlic production technology and on garlic processing. This has led to increased yield and income to 20-40 percent.

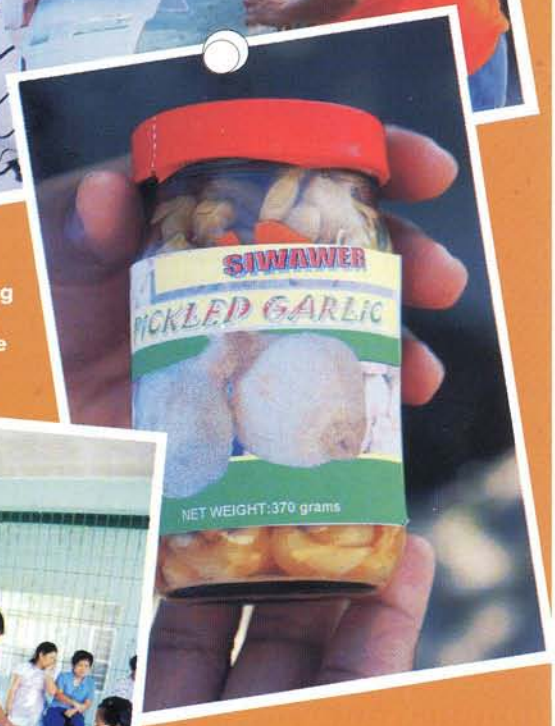
Specific trainings conducted were 1) "Garlic Production Technology and Leadership Training" attended by garlic farmers of Pasuquin and Vintar, Ilocos Norte and was jointly conducted with the Chemical Companies, CropKing and SAGREX Chemicals; 2) "Garlic Processing and Value-adding"; and 3) "Garlic Products Packaging and Labeling" both attended by Rural Improvement Club and 4-H Club members and conducted in joint undertaking with the Mariano Marcos State University (MMSU) and the Department of Science and Technology (DOST).

Established in 2007, the Association is now developing various food products from garlic such as pickled garlic, garlic peanut adobo, and garlic powder to increase their market share and further increase their income

"Establishing this kind of Association was never a walk in the park," quipped Luzviminda H. Tunac, 56, president of the Siwawer Garlic Products Association. "What we have achieved right now are products of perseverance and hardwork," she added.

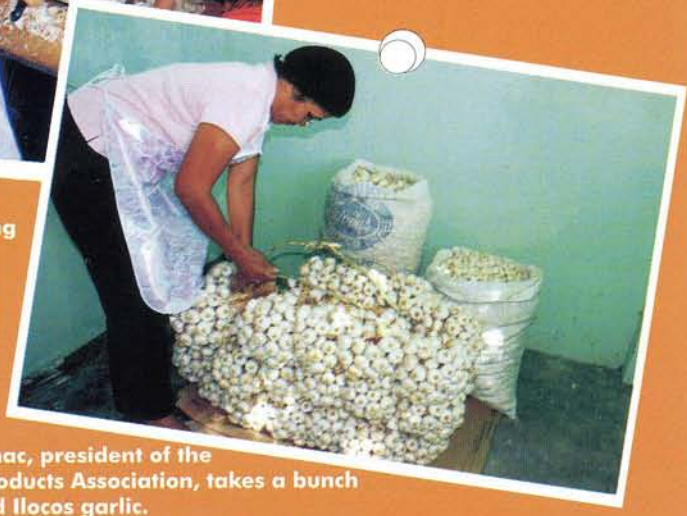
Even the name of the Association has to bear what their town stands for: *siwawer*. According to Ms. Tunac, the people of Vintar identify themselves closely with the siwawer hawks that fly from the mountains of the Cordillera to the east, and thus, the name of their Association, which incidentally, is also Vintar's other name.

Wilhelmina P. Castañeda (right) shows the new packaging design of pickled garlic to BAR staff during their project on-site visit in Vintar, Ilocos Norte.



Properly labeled Siwawer pickled garlic which is now being sold by the Association for 50 pesos a bottle.

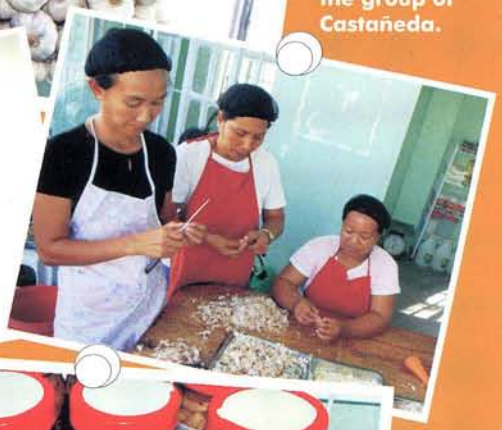
Housewives busy themselves peeling garlic and processing them into pickles and other garlic-based products.



Luzviminda H. Tunac, president of the Siwawer Garlic Products Association, takes a bunch from the improved Ilocos garlic.

President Tunac shows how the Ilocos garlic variety was improved in terms of size with the application of gibberellic acid developed by the group of Castañeda.

Owing to the lack of machines, members of the Association have to do everything manually including the slicing of garlic into equal sizes.



Aside from pickled garlic, the Association also produces garlic adobo peanut.

Housewives of Siwawer with BAR Asst. Dir. Teodoro S. Solsoloy (4th from left), MISD Asst. Head Julia A. Lapitan (1st from left, back row), Wilhelmina P. Castañeda of DA-RFU I (2nd from left), and NBN s *Mag-Ari Tayo* Exec. Producer Patrick B. Daffon (3rd from left).

Life changing

The Siwawer housewives claim that being members of the Association has changed their lives. When asked how the processing of garlic as a livelihood changed their lives, Ms. Tunac happily related that, "*Nabago po nang malaki ang mga buhay nila dito kase sa halip na mag-tsismisan ang mga kababaihan dahil naiiwan lang sa bahay at walang ginagawa, ngayon ay may pinagkaka-abalahan at pinagkakakitaan na sila.*" (Their lives changed a lot because instead of making gossips, because they have nothing to do, the women are now making the most of their time while earning money.)

Among the garlic-based products that the Association is producing, Ms. Tunac revealed that "pickled garlic is the most profitable business." With the help of Castañeda, they have almost perfected the technology in making pickled garlic. Castañeda reported that, "right now we are focusing on packaging the product for better appeal."

A bottle of pickled garlic is being sold at 50 pesos each. During peak months, the Association can produce and package 50 bottles of pickled garlic in a week. Depending on the numbers of orders that they get, they are able to produce beyond their quota. During these months, the housewives have to work eight hours a day, if not, five hours a day at the most.

Since the Association is still young, problems often occur. Ms. Tunac said that, funding is a crucial aspect and they cannot go fully operational unless they have the necessary machines and equipment to standardize their products. "Production is not a problem since we have enough and able members to do the job. But at the moment, everything has to be done manually," she added.

As for her vision for the Association, Ms. Tunac said that they need to come up with promotional strategies to promote their products more vigorously. It is part of the Association's future plans to include bringing their products to the supermarkets for wider scale of consumers.

Success reaps from growing banana

The stories of Nong Rudy and Ma'am Beck

Story by RITA T. DELA CRUZ
Photos by RICARDO G. BERNARDO and DA-CEMIARC

Like everything in life, success never comes easy to anyone. The right ingredients for success are always there; but one has to work hard for them to achieve it.

For the locals of Poblacion, Bagumbayan in Sultan Kudarat, collecting the right ingredients for success came in full swing after the Community-based Participatory Action Research (CPAR) project on banana was introduced to them. CPAR, which is coordinated by the Bureau of Agricultural Research (BAR), is a platform for technology assessment that involves the participation of the community together with the experts and researchers in identifying the most appropriate technologies that meet the their overall priority needs.

Real bounty needs real hardwork

While some people dream of success, others wake up and work really hard for it. This saying holds true for Rodolfo Sarmiento, 53, one of the 30 farmer-cooperators of the CPAR project on banana at Purok Osmeña 1, Poblacion, Bagumbayan, Sultan Kudarat.

Nong Rudy, as he is fondly called by friends, has always been a farmer all his life and with the two-hectare of land that he inherited from his parents, there is no reason why he should astray from this line of work. But unlike most farmers, Nong Rudy does not look at farming on a subsistence level only. For him, farming is also a business.

Nong Rudy admitted that his one main dream in life is to live in bounty, but due to lack of sufficient knowledge and linkage in crop production, his farming life did not offer that much potential for growth.

In 2005, the Department of Agriculture-Central Mindanao Integrated Agricultural Research Center (DA-CEMIARC), together with local government unit (LGU) of Bagumbayan, organized a consultation meeting among the banana growers in the area to introduce the CPAR project on banana specifically, *Cardava*.

Nong Rudy got interested in the prospect of the project and what it can do to him and his family so he signed up as one of the farmer-cooperators. To hone his skills, he attended seminars and hands-on trainings on banana production and processing.

It was from the 30 CPAR farmer-cooperators that the Bagumbayan Banana Growers Association was established wherein, Nong Rudy was assigned as the business manager. Through the project, the Association was given meri-plants to raise and nurture in the nursery until such time that it will be ready for distribution to the farmer-cooperators to be planted in the field.

As farmer-cooperator of the project, Nong Rudy was given 180 *Cardava* plantlets, 20 *lakatan* plantlets to start his plantation. To enhance his income in banana, he intercropped corn, vegetables (squash, okra, stringbeans), coconut, rambutan, and coffee. Engaging into

diversified farming is new to Nong Rudy as he is previously been adopting the mono-cropping system ever since.

From his banana plantation alone, Nong Rudy harvests 2-3 times in a month providing his family an earning of P5,000 a month. Aside from this, he gets income from selling banana blossoms (*puso ng saging*) which he uses for the gasoline of his motorcycle.

Even though success did not come to him easy, Nong Rudy shares his blessings to his fellow farmers by encouraging them to engage into banana. He also distributed to them 500 suckers for them to start. He is also helping his town generate employment since he hires one helper to maintain his banana plantation and pays him 1,200/month.

From his income, he was able to send his children to school, acquire a motorcycle that he can use everyday, and he even got an additional farm area to expand his plantation. Slowly, his plantation is growing and the bountiful life he once dreamed of is coming into reality.

Rodolfo Sarmiento or *Nong Rudy*, farmer-cooperator of the CPAR project on banana in Sultan Kudarat, poses with his motorbike which he bought out of his income from banana production.

Rebecca Lantog or *Ma'am Beck* is proving to the community of Bagumbayan that there is life after teaching. Ma'am Beck is doing well with her *crunchy banana* with all the orders pouring in.

Life after teaching

Another CPAR farmer-cooperator who now reaps the success from growing banana in Purok Osmeña 2, Poblacion, Bagumbayan in Sultan Kudarat is Rebecca Lantog, a retired teacher.

For her, life did not stop after teaching as she is now a full time farmer with a handful of time in her hand being a farmer scientist of Bagumbayan Farmers Infromation and Technology Services Center, president of the Women's Municipal Federation, and treasurer of the Rural Improvement Club (RIC) of Barangay Poblacion.

It was an opportune time that CEMIARC and the LGU have conducted various seminars and trainings on banana production, which she availed of. Ma'am Beck, as she is fondly called, owns 24-ha of land, which she now profited from by being one of the beneficiaries of CPAR Banana Production Project.

As a farmer-cooperator, her land area served as nursery for tissue-cultured meri-plants which she used to start her plantation and the other farmer-cooperators. She also engaged into diversified farming to boost their income planting other crops such as oil palm, fruits (mango, jackfruit, rambutan), coconut, vegetables and integrate them with livestock, poultry and fishery.

Eventually, with the sufficient production, Ma'am Beck ventured into banana processing given the problem in marketing and the unstable price of banana fruits. The first phase of her business venture was successful so she encouraged women in Poblacion to help in the business. Aside from profiting from this business, she is also providing livelihood and extra income for her fellow women-members.

At the moment, Ma'am Beck is doing well with her *crunchy banana* with all the orders pouring in. She sells them locally and nearby towns and provinces and eventually plans to expand their market.

Yap on efficiency of rice production: Some critical observations

(first of the second part)

by MANUEL F. BONIFACIO, PhD*

In a television interview granted by Secretary Arthur C. Yap recently on what DA will do to solve the present rice crisis, he said, among others, that rice production must be efficient. In more ways than one, this statement *really brought home the real issue facing our agriculture and not only rice production but production in general* -- how to make production more efficient. Although the term efficiency has its own reference point, a dictionary meaning will suffice to meet the intentions of this paper. It is taken from Dictionary.com, efficiency is defined as: 1) *the ratio of the effective or useful output to the total input in any system; and 2) skillfulness in avoiding wasted time and effort.* In other words, efficiency is viewed in term of performance effectiveness.

It seems that even though the term efficiency has not been *deliberately* attached to the process of technology transfer; the presumption is when it is transferred to meet production requirements, output will increase. It is taken for granted that technology can work wonders to increase the output of agriculture.

This is the main reason why AFMA although it wrongly treated technology, advocated that the modernization of agriculture must technology-driven rather than resource-driven. Despite the many negative lessons learned from the failures of technology transfer, there appears to be an unwavering drive to advocate the adoption of technologies to make agriculture efficient. In fact, it has been said that agriculture must be infused with more science. There is no need to belabor the fact that, indeed, technology is critical to production efficiency and putting more science into it, is an imperative.

If we are not mistaken, the same focal orientation will be the basis in solving our present rice crisis. More science and technology must be put in place to turn around our present rice crisis. It must be recognized, however, that the concept efficiency is broader than technology transfer. There is a need to deconstruct the statement of Secretary Yap. What does it mean to make rice production more efficient and what will it take to make it more efficient? It may not be a gross mistake to label agriculture, in general, as inefficient.

It is paradoxical that while the Philippines is the training ground for the best agricultural scientist in the region and yet, it seems that our scientists have not made full impact on meeting the requirements of our *own* agricultural development. It may be the most opportune time to take a look at the concept efficiency and what are its main requirements. Perhaps some of the inherent difficulties in situating the concept efficiency are linked to the failure to put it in its most appropriate context.

In the case of agriculture, efficiency is best situated in the concept farm management. To understand the concept efficiency it is best to examine it from the point of view of the overall management of the farm. This is the most appropriate context and the concept is rendered meaningful from the point of view of management.

When taken in this manner, the issue of efficiency is no longer difficult to define, put in context and therefore, rendered meaningful. In general, there is a ready agreement that efficient management of production includes what is known in management as PPBME, i.e. planning, programming, budgeting, monitoring and evaluation. This is obviously known to most people. However, what is omitted, at times, is the fact that these factors are complementary and interconnected.

The synergistic effect of their complementation is the best indicator of efficiency. Thus, when activity coordination is high then complementation is effective. This creates the right synergy to reduce redundancies and therefore, the activity is cost-effective. This is well-known in agricultural planning and yet it is fair to ask the question as to whether this is strictly followed in agricultural planning.

Perhaps the answers to this question are the three remarks recently made by Secretary Yap that 1) we have to make agriculture business; 2) adoption of an efficient business plan; and, 3) raise the performance efficiency of production. In view of this, the planning of agriculture cannot be other than holistic and systems-oriented.

It is, therefore, rather easy to understand the failure of technology transfer. It failed to utilize the holistic and systems approach in the design and transfer process. In fact, this is the inherent overall weakness of agriculture planning process. It has been and is presently commodity-focused activity. This is reflected in the case of technology transfer and the idea of technology-driven agriculture. The understanding and use of the concept efficiency cannot be viewed in isolation; to do so, will only lead to systems inefficiency.

What then is the *hallmark of efficiency* in agriculture production? This question must be placed in its more appropriate context, i.e., a framework. How does one visualize agricultural production system from a holistic perspective? In other words, what would constitute the overall landscape of agriculture development? In general, it has five major components and these are: social, technical, economic, environmental and political (S T E E P). It must be duly recognized that these components are interactive and complementary. When taken is this manner, one can readily detect the inherent weakness of agricultural planning and this is, its failure to fully take into consideration political issues most especially at the local level. The political classification of municipalities has major implications to agricultural planning. Recent interest in conservation activities in agriculture appears to be mainly focused on land management issues. Take note however, that matters related to land are highly politically charged concerns. The impression one gets from these interventions and similar others is that they are fragmented and do not operate on the basis of a framework. In this approach, one cannot see the overall landscape of production in its holistic and system-oriented design.

(to be continued...)

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Improving the way people live through R&D

CATCHING THEM FRESH FOR FISH PROCESSING. Fishers from Bangar, La Union work together to remove the fresh fish catch from the net which they deliver to a women's group for fish processing. This activity started a long time ago when locals had abundant fish to catch which they processed to augment their income and avoid surplus spoilage.

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