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Undye-ing *Ube*

One of the over 600 varieties of yam is the purple species called *ube*. It is in fact among the yam's major cultivars in humid tropics. Cultures claim a range of uses for the yam – from culinary to medicinal to even ornamental. In the Philippines, *ube* is used in a variety of desserts: as a flavor for biscuits, ice cream, milk, tarts, cookies, cakes, and other pastries. It is what Filipinos make and eat as *ube halaya*, a common ingredient of the local *halo-halo*.

But technology has been unkind to the *ube* or what agriculture authorities specifically call *Dioscorea alata.* The bright lavender tuber is disrobed of its distinctive color once technology of processing takes its toll, compelling the use of color additives to offset color loss and make the food visually appealing. Such has been the fate of *ube* under the roof of processing industries.

Until one former university professor in La Union engineered a technology in food processing which stabilized and retained that color which *ube* is named after.

'Not Ordinary'

He is Ernesto M. De Padua, an agricultural engineer who taught in one of the country's premiere agricultural universities, the Don Mariano Marcos Memorial State University (DMMMSU) North La Union Campus from 1976 to 1988.

His graduate studies at the University of the Philippines (UP) Los Baños focused on food processing. And this area cultivated his way through *ube* powder production.

Ube powder is used as a main ingredient in *ube*-flavored ice creams, pastries, and other desserts. Upon retirement, he and his family embarked on a business that mostly interested him – processing. *Ube* especially appealed to him because of the 'mystery' of discoloration when processed. They named it ***CHEMFREE Foods*** after an advocacy against chemicals in foods. There started the discovery of color retention technology.

Color retention in fruits and vegetables commonly used as flavors in desserts, pastries, and other

delicacies is a key concern for processing plants. Most powdered products which have been subjected to high temperature in the process of drying and pulverization lose their natural color, requiring producers to resort to food coloring for added market value.

"My product is not ordinary," it was of course an understatement, with a technology so rare if not exclusive, the sixtyish-old prodigy could have declared better. The three reasons for the claim have to do with *ube*'s color after processing: retained, enhanced, and stabilized. One highlight of Mang Ernesto's technology on top of the three is its capability to store and preserve the powder's natural color for up to two years exceeding the normal one year counterparts would typically last.

'Big' Clients

Mang Ernesto disclosed a current client who recently added *ube as* flavor to his existing biscuits menu. The manufacturer ordered from one of the country's biggest supplier of *ube* powder but was disappointed when the product supplied to him turned brown when cooked and mixed. The client is Croley Foods, and it produces four of the most in-demand biscuit hallmarks in the market today: the 21-flavored *Sunflower Crackers, Butter Cream Crackers* with its four variants, the *Lobo Cookies,* and the *Assorted Biscuits.*

Mang Ernesto had his four-man family initially work on the first years of CHEMFREE. There, at a rented house in Casiaman, Bacnotan, La Union, the pioneering chemical-free *ube* powder was processed. Their first clients were mainly walk-ins who made home-made ice creams, baked breads, and other pastries. They also received orders. Since the plant started running in 2001, they never had big-time clients. CHEMFREE's official registration in 2004 unbolted exhilarating opportunities for profit and the introduction of chemical-free *ube* powder in the bigger market.

Big shots in the food industry started to rap on CHEMFREE's doors as Mang Ernesto's *ube* powder processing technology developed. The business' market extended across regions. *Amira's Tarthouse* of Tagaytay City, *Farmtech* of Silang Cavite, and *Sunlight Foods Corporation* of Marikina City are now faithful markets of CHEMFREE Foods. These market dragons are constant in their increasing *ube* powder demand.

The initial three regular workers hired had increased into 10 to sustain the flourishing enterprise. As CHEMFREE Foods grew and its market expanded, so did the problem of the supply of *ube* tubers as raw materials. Mang Ernesto then developed three hectares of upland farm for *ube* cultivation. He also has a regular supplier of the purple tuber from Sugpon, Ilocos Sur which delivers truckloads of *ube* as per order. At the same time, he explored producing powder of other agricultural products like *malunggay*, lemon grass, squash, ginger mushroom, and even carrots.

With the rate CHEMFREE was producing and selling, it was no surprise that it hit a P1.44 million net worth as of December 2009 with zero liability.

DOST interventions

CHEMFREE got financial backing in 2005 from the Ilocos Consortium for Industry and Energy Research and Development (**ICIERD**) program of the DOST, an 11 year-old group of state and private agencies which supports research and development activities for local industries. The assistance was through a soft loan worth P116,000 for the construction of the multi-purpose dryer and commercialization of food processing technology of *ube*. The self-developed laboratory dryer Mang Ernesto used during DMMMSU days had already evolved into a prototype dryer (which took him years to develop) - the ICIERD -funded multi-purpose dryer. After three years, the fund assistance was paid in full.

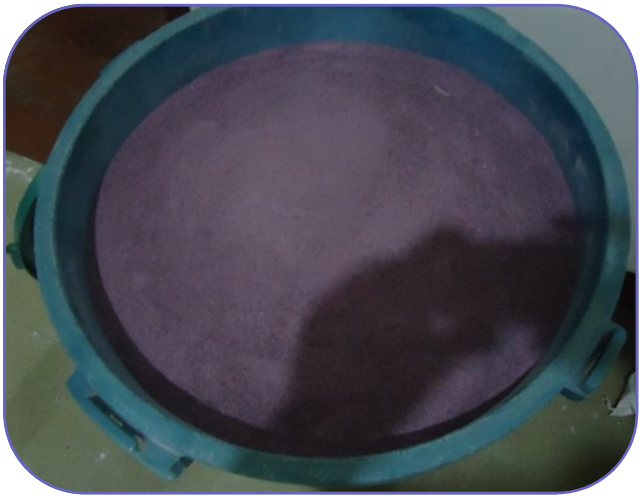
Even with stockholders and relatives infusing additional capital for machineries, CHEMFREE is still strapped in terms of equipment upgrade and modernization. It meant Mang-Ernesto's enterprise still fell short of an efficient and standardized operation.

Then came **SETUP**. It was DOST's term for Small Enterprises Technology Upgrading Program. It is the agency's response to the needs of small and medium enterprises for sustained growth, productivity, and competitiveness. SETUP offers SMEs innovative technologies to improve their operations; manpower training, technical assistance and consultancy services; package and label designs; assistance in the establishment of product standards including testing; database management system; and limited funds for technology acquisition.

Aside from the constant trainings, consultancy services, and technical assistance DOST made available for CHEMFREE through SETUP, the program also became the perfect resort for Mang Ernesto who needed a dehydrator for his plant. And it was going to be this dryer which would hold CHEMFREE's secret of producing natural color-preserved products, a fact which no counterpart in *ube* (or other fruit or vegetable) powder processing is knowledgeable about.

Innovations

CHEMFREE prizes an out-and-out edge over its equals. Though it may share the same supplier with other powder processing plants, its dryer isn't just any other dryer. "I have my own technology inside the machine," explained Mang Ernesto with a smile.



And what about his technology? "It is what enhances and stabilizes *ube's* color when processed," he said. It was the engineer talking now. However he did it, he was able to infuse his knowledge in processing in the machine and program it to produce intended results.

Color retention in *ube* or in any other food starts as early as possible after heat is applied, according to the brain behind CHEMFREE. And since the entire process involves more or less five stages, extra care is required. "You can make or unmake the color of *ube* at the first stage," Mang Ernesto shared. The first stage is steaming (after washing) and the cooked tuber should not be kept long before feeding it to the dryer. "Color is unstable during this time because of the water," he said. After cooking, the purple yam needs to be peeled then shredded before it reaches the dryer. If unable to dry it within the required time which is within four to

eight hours, the *ube* will turn into brown.

The main concern is not in the temperature *ube* is to be subjected, the engineer said. "It is on how fast you can remove the moisture on a given product."

A remarkable innovation Mang Ernesto developed was the "solar heat collector" installed in the drying area of the plant. The machine pools heat and converts it into energy which is consumed by the factory. The technology considerably reduces energy consumption. In fact, Mang Ernesto recalled a usual P18,000 electric current bill dropping into the present monthly P10,000.

"All the things and principles I taught in the academe I am now applying so that even in my retirement, I am able to help my family and the people," declared Mang Ernesto.

Mang Ernesto's fearless innovations in *ube* powder processing remain CHEMFREE Foods' upper hand over other processing industries not only because of a technology inimical to chemical use in processing and of the best practices the enterprise promotes within its walls but also because of the improved productivity it causes its string of buyer industries, the superior quality of its products, the better life conditions of households of workers it welcomed for employment, and the improved socioeconomic conditions of barangay Casiaman (and even the municipality of Bacnotan) CHEMFREE made possible upon its establishment.

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