

Finding Gems from Mango Wastes

Green Enviro Management Systems Inc. (GEMS)

A private firm was born from a partnership between two government entities, which were driven by the need to convert wastes into useful products. Surprisingly, the outputs of this new waste conversion technology are edible food products for health-conscious consumers all over the world.



DIAMOND IN THE DIRT
Carolyn L. Go, CEO of GEMS, poses with the company's innovative products made of processed mango wastes, using a patented technology developed at the University of San Carlos.

The mango peel, seeds, and kernel that always end up as trash are now being exported as edible gluten-free flour for pastries and other food preparations for health-conscious consumers.

A collaboration between the Department of Science and Technology and Cebu's University of San Carlos (USC) has given birth to Green Enviro Management Systems Inc. (GEMS), the company that produces and exports flour, tea, and feed mix from mango wastes, including other flours from cassava and coconut in combination with mango.

GEMS is the first company in the Philippines to industrialize this proprietary green biotechnology developed by the BioProcess Engineering and Research Center of the USC's Department of Chemical Engineering. The technology is patented by the Department of Trade and Industry's (DTI) Intellectual Property Office of the Philippines, as well as the World Intellectual Property Office.

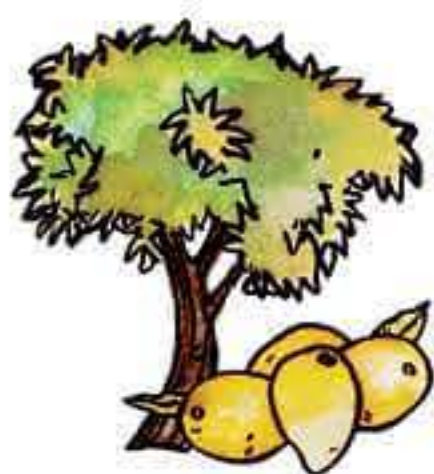
The patents paved the way for the construction of GEMS' bio-refinery plant from the capital outlay of its local investors. The plant is now generating jobs while raising export incomes from a new industry.

DTI'S HELP

GEMS' products are being promoted locally as well as globally through participation in the International Food Exhibition (IFE) in Manila organized by DTI's Center for International Trade Expositions and Missions (CITEM).

A BREAKTHROUGH
Mango peel, seeds, and kernels are thoroughly cleaned before going through a process technology developed to convert waste from the fruit-processing industry into high-value products.





DID YOU KNOW?

Champagne mango or what Filipinos call *Manggang Kalabaw* is the sweetest mango in the world.

Now, GEMS is able to join exhibits and food shows to gain market visibility and establish its brand presence locally and globally.

"We have mango flour, mango pectin [used in jams], mango polyphenols [food supplement] converted or produced from mango seeds and peels," says Dr. Evelyn Taboada, GEMS Chief Operating Officer and Dean of the USC's School of Engineering.

Mango flour is exported abroad and is used for the production of healthy food bars and pastries including bread and muffins for the health-conscious consumers.

"We will go next week to the Winter Fancy Food Show in San Francisco, California," Dr. Taboada says, citing a previous trip to Europe and inquiries from South Africa.

ACADEME AS PARTNER

Dr. Taboada headed the USC research team that developed the technology. While remaining owned by the USC, the technology is licensed to GEMS.

She remembered having visited a dump site and was surprised to see a lot of mango seeds and peels. "We decided to research on it [mango wastes, and] how we could make the wastes useful and not harmful to the environment and to the people."

Dr. Taboada also recalled the many years it took her team to develop the technology to a patent-level stage. Once they had the process figured out, they proceeded to set up the business with the private sector until GEMS was born.

A DIFFERENT GAME

Nonetheless, the business needed to get the market educated on the product. Getting the word around takes time, money, and effort. But to Dr. Taboada, the business is already a success, especially with the assistance from DTI. "We're able to take [the products of] this technology to the mainstream [market]," she says.

At this early stage, GEMS is already saving the wastes from all other fruit processing industries to create new export products.

GEMS is also accredited by the DTI's Regional Interactive Platform for Philippine Exporters Plus (RIPPLES Plus) program, that aims to expand export capacity and competitiveness of Philippine companies through training, product development, marketing support and promotions.

Thus, GEMS has all the help it needs and explores every potential to shine all the way to the future.



A BUSINESS WITH AN ADVOCACY
Aside from promoting green technology, the company also provides opportunities for people who are "the least, the last, and the lost," making it the company's priority to hire people who need help the most. GEMS manufactures mango flour, mango tea, mango coconut flour, feed mix, and more.

HOW DTI HELPED

Through DTI's Regional Interactive Platform for Philippine Exporters (RIPPLES) Plus program, GEMS was able to widen their distribution scope and export their products to the global market.

How mango flour is made

- 1 Mango peels and seeds are brought to GEMS facility.
- 2 The seeds and peels are dried using greenhouse-type solar dryers for energy efficiency.
- 3 The seeds are dehusked and cracked open for the kernel. Whitish kernels are sorted from brownish ones.
- 4 Whitish kernels are grounded and further dried to make mango flour. Brownish kernels are recycled into feeds.