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**Science, Technology, Research and Innovation for Development
(STRIDE)**



**Product Development of Mango-Derived Nutraceuticals
By Spray Drying Technology**

GRANTEE: University of San Carlos (USC)

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INDUSTRY PARTNER: Green Enviro Management Systems, Inc. (GEMS)

COLLABORATING PARTNER: Case Western Reserve University (CWRU)

GRANT PERIOD: November 1, 2015 to March 31, 2017

GRANT AMOUNT: Php 6,256,232 (approximately USD133,100)

Turning mango wastes into useful products

Mango peels and seeds, which are commonly regarded as waste by-products in fruit processing, are becoming a potential hazard to public health and the environment, if not immediately handled and treated appropriately. At present, especially in many Asian countries like the Philippines, where mangoes are abundantly processed, the collected mango waste peels and seeds are simply dumped in landfills and open dumpsites. Many organisms feed on this waste, and many of them are pathogenic. This causes immediate rotting and degradation and results in the release of foul odors and the generation of potentially hazardous leachates. Thus, there is an urgent need to establish the immediate disposal and proper treatment of mango waste. Studies have revealed that mango peels and seeds are good sources of many commercially viable products such as



Researchers at USC develop new recipes using mango flour

pectin from peels and flour and kernel oil from seeds, among others.

The USC in Cebu, with support from USAID STRIDE, developed a process technology that relates to simple and integrated processes for the treatment of mango waste from fruit processing and the subsequent recovery and preparation of high-value

products. The methods allow for an efficient and instantaneous processing of the mango waste, which is imperative to avoid hazardous degradation. The transfer of this university-developed technology to industry means industry can implement the process on a commercial scale.

Milestones

In this project, the products resulting from the integrated process developed are interestingly varied. The mango peel powder and mango kernel powder have shelf lives of at least 6 months and can readily be used, for example, as ingredients in food and functional food preparations, in nutraceuticals, and as animal feeds or fodder. Further treatment of these compositions allows for the preparation of a variety of



Members of the research team demonstrate the use of spray dryer

semi-refined products with high nutritional and commercial value. The integrated process also results in the most efficient use of process equipment involved such as the dryer and mill, leading to more attractive and economical process routes for products, most of which can readily be used as ingredients in food, feed, and functional food preparations; in nutraceuticals, as antioxidants; and as anti-diabetic and antimicrobial agents.

Furthermore, the integrated processes developed in this work resulted in the most efficient treatment and utilization of mango waste, adding good value to seemingly worthless fruit by-products and eliminating their potential hazard to public health and the environment.