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

PHASE I AND PHASE II



Field Quality Test Kits and Mobile App for the Medicinal Plant Industry: Water Activity and Plant Extract Profile

GRANTEE: Ateneo de Manila University (ADMU)

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INDUSTRY PARTNER: Pascual Pharma Corporation

GRANT PERIOD: Phase I: October 1, 2015 to September 30, 2016
Phase II: December 1, 2016 to November 30, 2017

GRANT AMOUNT: Php 8,453,873.32 (approximately USD179,900)

Affordable tool to test quality of medicinal plants

Philippine manufacturing industries are exerting efforts to control food quality and safety through the use of water activity measurements in the production lines. This is to minimize the risk of the growth of microorganisms and unwanted chemical reactions, which are both directly associated with the quality of the product. The measurement of water activity, or A_w , is even more important in the medicinal plant industry. However, commercial water activity meters are quite expensive (e.g., approximately Php 250,000 for a portable version), and their use requires relatively high technical skills. Thus, measurement of this parameter in the field has not been routinely done, even though it would be advantageous from a supply chain perspective because of reduced risk at the raw material stage. The lack of an A_w tool at the farm for quality assurance purposes limits



Farmers harvest sambong leaves to be used for testing of water activity

the sources of medicinal plant raw materials that can meet the stringent requirements of the local pharmaceutical industry, which looks to package these raw materials into commercial products. The same scenario applies to another quality parameter, the plant extract profile, which is measured using lab-based thin-layer chromatography (TLC).

Colorimetric sensors are an alternative tool to determine the Aw of sample food products or plant extract profile, and they can be fabricated at low cost. Phase I of the project aimed to develop two field-ready test kits to test parameters for first-level screening of the quality of medicinal plant products coming from the field: a) Aw—which is associated with problems of spoilage or degradation, and b) plant extract quick TLC profile—which should evaluate problems associated with thermal or moisture degradation, contamination, and adulteration. The test kits will be easy-to-use; applicable for field use; and rapid, using a mobile camera for image data collection, interpretation, and transmission to a cloud-linked database and will have performance reliability

Milestones

The first prototype was designed in testing of *sambong* (*Blumea balsamifera*) leaves, a recognized medicinal plant used to treat kidney stones and related health problems. These tool kits, coupled with a smartphone mobile app, allow quantitative evaluation as well as rapid data dissemination and archiving.

The successful implementation of the initial project led to the continuing assistance from USAID STRIDE.

Moving forward

In Phase II, the plant extract profile will be expanded to include another major medicinal plant, namely, *Lagundi* (*Vitex negundo* sp.). Realizing the importance of stability of agricultural products against microbial spoilage, the project aims to develop a separate mobile app just for Aw, targeted for dried plant produce (e.g., herbs, vegetables, and fruits).



Dr. Gonzalo Serafica, Technical Consultant, STRIDE (center) and Dr. Isagani Padolina (right most) inspects the finished product from the 3D printer. Said printer will be used to fabricate Field-Ready Quality Assurance Test kits

The project is therefore moving towards a larger target end-user (market) for this technology. It includes a market survey and market-validation research for the “minimum viable product” version of the test kits. Additionally, an accompanying web interface will be developed to allow for data analytics on the test parameters. Finally, a business model will be formulated for the commercialization strategy of the technology.