Research and Development of Community Economy for Self-Reliance:
Case Study of Value Added Nipa Palm Products in Phra Samut Chedi District,
Samut Prakarn Province

Prasit Pusomma, Pornsiri Kongnuan. Nualrahong Thepwiwatjit and Janwipa Supaking
Dhonburi Rajabhat University

2016

This research program was conducted to 1) develop community economy in Phra Samut Chedi District, Samut Prakarn Province, 2) add value on nipa palm products and 3) to construct a tool for cost reduction study of the nipa palm product. The program was carried out in 3 research projects as follows:

The "Production of Osmotic Dehydrated Nipa Palm" project was to add value on nipa palm products. The study on the appropriate ratio between nipa endosperm and sucrose solution at 1:1 1:2 1:3 and 1:4 revealed that the appropriate ratio was at 1:3. The osmotic nipa palm endosperm dehydrated at 60ºC for 6 hr received the highest overall acceptance scores from 100 panelists via 9-point hedonic scale at like moderately (6.77 ± 1.41). The study on the application of natural colorant in osmo-dried nipa palm endosperm used butterfly pea extract for blue violet color, Sappan wood extract for yellow and reddish orange colors and natural color of nipa palm endosperm yielding 4 colored products. The result showed that all products had moisture and a_w in the range of 17.02–17.11% and 0.71–0.72, respectively. The study of the microbiological qualities of all products showed that total viable count, yeast and mold, *E. coli* and Coliform passed the requirements of Thai Community Product Standard: Dried Fruit (TCPS 136/2550). The quality changes at accelerated condition were studied and calculated the product shelf life. It was found that L* decreased over storage time while moisture content and a_w were rather steady. The predicted shelf lives of the four products (natural color, yellow, reddish orange and blue violet color) were 96 92 113 and 99 days, respectively.

The project on the "Construction and Efficiency Test of Solar Drying Cabinet for Nipa Palm Drying for Community Enterprise" was to construct a tool for reducing production cost of the osmotic dehydrated nipa palm in the 1st project. The developed solar drying cabinet had a width x length x height of 30 cm x 30 cm x 60 cm with 3 stacking trays. The heat pipes conducting the heat from the sun radiation were used as a heat source in the dryer. So it did not rely on any electricity system and could save the electricity power. The results from osmotic nipa palm drying test, setting the drying temperature at 50, 60 and 70ºC for 6 hours, showed that the

average intensity of solar was 750.58 W/m^2, the initial moisture content was 39.65% dry basis and the final moisture content was 17.04% dry basis. Considering the drying efficiency, the quality of the osmotic dehydrated nipa palm product after drying and the specific energy consumption (SEC), all aspects were in good level and the result was evidently when the temperature was set higher than 50°C. Comparing the construction cost of the solar drying cabinet with the cost of a conventional electric dryer (1000W) including the cost of electricity consumption which was 6 KW-hr, the solar drying cabinet would reach the break-even point within 1 year 48 days and could save more money in the long run.

The last project, "Development of Healthy Drink from Nipa Sap Vinegar", also aimed to add value on nipa palm products. The attempt at developing vinegar drink from nipa sap vinegar was successful. The results yielded 4 acceptable vinegar drink products, namely nipa sap formula, butterfly pea formula, roselle-jujube formula and gac fruit formula. The results from 9-point hedonic scale from 100 panelists by purposive sampling indicated that the overall acceptance scores of the nipa sap formula was at like moderately (7.45 ± 0.72) while the others were at like very much (7.71 ± 0.67, 7.82 ± 0.67 and 7.83 ± 0.79, respectively. The optimal nipa sap formula consisted of 7.69% vinegar and 92.31% nipa sap while butterfly pea and gac fruit formula consisted of 7.69% vinegar, 11.54% honey and 80.77% butterfly pea extract or gac fruit juice. The optimal roselle- jujube formula consisted of 7.69% vinegar, 15.38% honey and 76.92% roselle- jujube juice. All products could be kept at room temperature and cold storage (4°C) for 2 months without any change in pH, total soluble solid and acetic content. The microbiological qualities of all products were at safe level.

The results from the research program yielded 2 new food products which were osmotic dehydrated nipa palm and nipa sap vinegar drinks including a new solar drying cabinet. The training of both products to the community enterprise in Laem Fha Pa subdistrict, Phra Samut Chedi district, Samut Prakarn province, achieved a high and the highest satisfaction. From the product feature analysis, label and packaging development, cost analysis, criticisms of product prototype and marketing feasibility studies, it was found that the osmotic dehydrated nipa palm had a chance to be produced for marketing in the future while the nipa sap vinegar drinks had a constraint in difficulty of raw material finding, although the products were interesting.

Keywords: Community economy, value added, nipa palm products,
Phra Samut Chedi district, Samut Prakarn province