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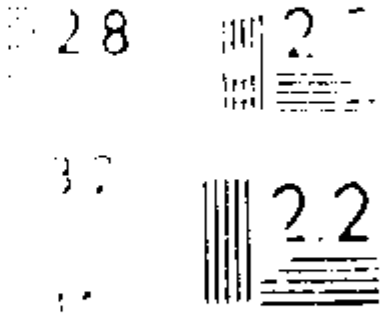
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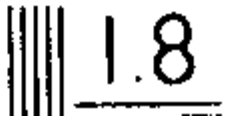
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TECHNOLOGY SERVICES DELIVERY SYSTEM (TSDS) EXPERIENCES IN THE PHILIPPINES, TECHNOLOGY RESOURCE INSTITUTION (TRI) EXPERIENCES - III *

by

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Introduction

I am very much pleased and honored to be with you today to be able to share and discuss with you our experience as a cooperating Technology Research Institute (TRI) in facilitating the delivery of the Bureau on Small and Medium Industries' (BSMI) program for the Food Processing sector.

In assuming this very pleasant privilege, let me first provide you a basis for what will follow by describing to you the National Institute of Science and Technology (NIST) and its Food Technology Research Department (FTRD).

The National Institute Of Science and Technology

The NIST was created on July 1901 and was named the Bureau of Government Laboratories. Five years later (1905), it was renamed Bureau of Science, a name that spread fame and prestige to all the world not only in developing areas but also in more affluent areas. The emphasis of its activities then was on public health, sanitation problems and food research. Through its research efforts, cholera and small pox were stamped out in the Philippines. After World War I, it was the premier scientific research institute in the Philippines and its Scientific Library was credited to be"the best scientific library east of Suez". From the ruins of World War II, leaders of the government took note of its previous accomplishments and renamed it the Institute of Science and Technology and finally under the Science Act of 1958, it became the National Institute of Science and Technology.

The NIST is a multidisciplinary research institute involved in applied research and related basic research. It engages in technology

development and transfer, renders technical assistance and dissemintes scientific information, and in general promotes sicetific advancement. The bulk of scientific research is done at two centers - the Industrial Research Center and the Biological Research Cneter. Through its Test and Standards Laboratories and Scientific Instrumentation Division, it maintains the national physical standards of measurements and offers calibration services, product staddardization and calibration. To encourage scientific awareness, the NIST through its Division of Information produces, prints and broadcast materials for dissemination to the public. The planning and programming activities include linkages with private and government agencies initiated by NIST researchers.

In support of the national development plan, NIST gears its program of activities towards countryside development, industrialization, scientific advancement and organizatioanl adbancement.

The Food Technology Research Department

The FTRD which is one of the research departments of the Industrial Research Center of NIST implements research programs in Food Science and Technology. FTRD has directed its research efforts towards countryside and industry oriented projects. Its major research objectives are to (1) undertake studies that would enhance the availability and marketability of foods and its products (2) conduct basic and applied research that will imrprove the quality and processing effieiency of locally processed food and (3) promotes the application of science and technology in the food industry through surveys, consultation, collaborative efforts and information dissemination.

The Division's research program is based on the results obtained from a nationwide survey on the research needs of the Food Processing Industry in the country.

The food research studies being done include 1) Standardization of canning, dehydration and fermentation procedures for local foods and establishment of their packaging requirements; 2) characterization of the physical and chemical properties of fruits and vegetables important to their

processing; 3) utilization of agro and food industry wastes for animal feeds and foods; and 4) chemical and microbial hazards in foods under their control.

All these activities are aimed at generating specific mission-oriented programs that will assist the small and medium scale food industries and which are relevant to the needs and requirements of the Food Industry.

Significant Research Accomplishments

The division has made significant advances in the processing of local food materials into quality dehydrated foods (dried fruits and fishery products), canned foods (canned coconut milk, sugar cane juice, vegetables, etc.), breakfast and baby foods, fermented foods (soy sauce, binuburan and burong isda), candied fruits etc.

Of significance is the project on the development of thermal processes for canned low-acid foods. The canning industry is presently in urgent need of heat penetration data and thermal death time measurements for various local canned food products. These information are important not only for optimizing product quality but for establishing Fo values which is required in the export market for canned low acid foods. Fo value is the amount of lethal expressed in minutes at 250°F required for the canned product to attain commerical sterility.

Some of the finished studies undertaken in the Division which are worth mentioning are: 1) Studies in Food Suplement Formulations of canned baby foods, coconut skim milk beverage and high protein formulations from coconut flour, munggo flour, non-fat dry milk, fish flour and other indigenous raw materials intended for infants and pre-school children as protein supplements. 2) Studies on coconut food products - Efforts have been concentrated in the production of better foods from coconuts to im prove its market potential as well as increase the export value of this crop.

A simple and inexpensive method of controlling infection during sun-drying of coconut kernel was developed by dipping in a chemical solution, followed by drying under the sun. The oil extracted from the treated kernel is of the best edible quality oil with a fatty acid content of about 0.1% to 0.3%. The flour with about 25% protein can be utilized in the preparation of coco noodles and crunchies.

Food products that have been developed from coconut are cocochips (sweetened and salted), coco syrup, vitamin fortified nata de coco, and canned meatless spread from coconut protein isolate.

A process for canned coconut milk has been developed and transfered to Industry. The utilization of the by-products from its manufacture have led to process formulations for low fat coco jam, coco honey and cocowhey syrup. Coconut protein isolate of about 71% protein has also been developed from coco skimmed milk and utilized for enriching cookies and other snack items.

A book entitle Milkfish (Bangus) as food which contains results of studies on the standization of canning procedures for canned bangus (sardine and salmon style), bangus relleno, paksiw na bangus escabeche, smoked bangus in oil and curried bangus has been prepared.

All research results are translated into layman's languange and given out as handouts and "Do It Yourself" pamphlets for interested entrepreneurs. The division also gives consultation and technical services to existing and would be food processors.

Joint Project with BSMI for Small Food Industry Development

In the light of the foregoing, FTRD was selected as one of the Technology Research Institutions (TRI) by the Bureau of Small and Medium Industries (BSMI) of the Ministry of Industry, to help in the implementation of BSMI's Product Research Assistance Project, with the end in view od developing regional food processing industries in the country. The specific objectives of this project were: 1) to implement research assistance projects for existing food processing industries with regard

to the improvement of existing products and processes and the determination of new product opportuntities for this sector 2) to improve the level of tehcnological awareness of the regional food processing SMIs by effectivvely disseminating research results and through related activities, and 3) to initiate the formation of regional industry groups, in order to provide a useful forum for the dissemination of technical information related to quality and productivity enhancement with the possibility that such groups will eventually undertake cooperative efforts leading to the solution of common problems.

I would like to metioned here that the BSMI, through its regional Small Business Advisory Centers (SBAC) identified the Food Processing groups to which assistance on product research should be offered. Information on the characteristics of the targeted industry groups e.g. member groups, average size, present market, existing common problems, nature of the group or industry organization etc. were channeled to FTRD. The targeted area identified as test center for FTRD were the sugar concentrate producers in San Miguel, Bulacan, which is 100 km. from Metro Manila.

San Miguel, Bulacan has established a nationwide reputation for the kitchen-scale processing of carabao's milk into delicately flavored candies known locally as "pastillas de leche" The products are sold only in the locality because its limited shelf-life and volume does not allow large-scale distribution. BSMI chose this group of processors for development assistance.

Mechanics of Reaching Out to the Small Food Processors

The program started with personal interviews and visits with the proprietors of the small and cottage level producers in the area. In carrying out the dialogue, the team tried to determine not only specific and general technical problems, but the types of researches that would be of interest to the industry and its evaluation of the relevance of these researches to their operations. Ways by which FTRD and BSMI could be of help to Industry were also discussed and attempts were made to determine what have prevented the group from seeking assistance from FRTD and BSMI.

The interviews were frank, cordial and sincere. It was not difficult to obtain the information we needed. There was that characteristic Filipino hospitality.

Nature of the Technical Problems and Assistance Delivered

For the purpose of this presentation, I would like to present the problems according to those needs and opportunities for research that are common to the producers in the area.

The cottage producers we visited are engaged in the larger than kitchen scale production of traditional grandmothers recipes. Delicacies indigenous to the area like "pastillas de leche", coconut balls. "espasol" and candied fruits like santol (Sandorium loetjape Linne) are some of its products.

"Pastillas de leche" is made principally of fresh carabao's milk and sugar. This popular fudge-like candy lasts for about 1-2 weeks when packed in retail packaging materials and stored at ambient conditions. Mold growth on the surface of rolled "pastillas" is usually observe on longer storage. Hardening of the surface is also a prevailing problem.

Aside from the retail packaging of "pastillas", the processors also practive bulk storage in pails of the cooked "pastillas". This is then recooked and mixed with fresh milk needed. However, "pastilllas" stored in pails last only about 3-4 weeks due to mold concentration and souring particularly on the surface. The short storage period therefore does not enable producers to meet consumers' demand when there is a lean supply of milk. Carabao's milk is usually scanty at times when the carabaos (water buffalo) are used by farmers in the preparation of land plantation. Its peak season is during calving time.

The need for lengthening the self life of "pastillas de leche" both for retail packaging and bulk storage is of utmost importance for "pastillas processors". Packaging material plays a significant role in preventing hardening if it offers good moisture barrier protection to the product.

To solve these problems studies on the packaging of "pastillas de leche" for retail sale, processing for bulk storage and sorption isotherms were conducted. "Pastillas de leche" for study was processed in one selected "pastillas de leche" producer.

Upgrading of the storage life of product for export might involve stadardization of milk and sugar contens, establishment of the time and temperature requirements, packaging research and the setting of Microbiological standardards that would meet the requirements of the export market.

At the end of the study, a sminar workshop was organized by BSMI with the help of the SBACs. The results of the study was presented to the industry group.

Other topics included in the seminar, which was also in the dialect were improving sanitary practices and adoptation of quality control measures in both the raw materials and finished products.

Evaluation of the Project: The Requirements for Technology Transfer

Most of the cottage producers have not had the benefits of a technical education. As mentioned earlier, the process that they followed are grandmother's recipes handed down from generation to generation. What improvements they would make on the process are based on observation. They will not usually understand simple concentration units of 0.5 or .01 In our case the anti mold had to be converted into its corresponding equivalent in teaspoons per gallon of cooked "pastillas de leche".

To help the small&medium processor, therefore, the constrains and limitations involved in the application of modern technology to his processing operation have to be carefully evaluated. The technical information had to be translated into a form that would be usable to him and solutions to his problems had to be easily adaptable to his processing operation. There were producers who were hesitant to use our findings but were later convinced when we brought samples of food product

popularly eaten in the locality containing humectants and antimold agents like sorbitol and sobic acid respectively. Our findings were translated into local dialect.

Many small and medium scale industries could be helped by technical research even if they themselves are not aware of it. The problem is to acquaint them with what research can do to help and to find out what difficulties they are experiencing. This can only be done by personal discussion which should be carefully planned.

Very often, the first matters on which industry requires help are relatively simple and the scientist can deal with them quickly efficiently. Rapid and sound answers to such problems bring lasting credit to the scientific institution. Only when confidence in the research institute is achieved will problems requiring research. It should be made clear to our entrepreneurs that any information it imparts about its problems, processes, products or plans will be treated confidentially.

In planning to assist the small and medium scale food processor access to advisory service, credit, nonformal education, training for entrepreneurship development and better management should be provided for. Research and development institutions should focus more of their attention on technological improvements particularly appropriate to the region that is capital-stretching, labor intensive, small scale and simple.

The industrialization of promising food products that have an export potential would be a major research effort that desserves attention. Improving sanitary practices and adoptation of quality control measures and standardization of both the raw materials and finished products could help some problems. Any technical information has to be translated to be easily understood and solutions to problems must be those that could be readily applicable to his processing operation.

Conclu ion

Since agriculture is the backbone of the Philippine economy in the past, present and foreseeable future and industrialization in the course of time, development in the food processing industry is one the most logical approaches for the country. Both traditional and modern food processing sectors have ample rooms for expansion. With working housewives holding jobs and family cooks getting scarcer and more expensive to pay, more and more families resort to the convenience of processed foods. The trends are conducive to the development of food processing in the Philippines. Food processing, whether small, medium, traditional or modern, when properly developed, hopefully will survive and contribute to the promotion of food availability, nutrition and economic growth.