

Status of Biochemical Research in the Philippines

Evelyn Mae T. Mendoza

Filipino pioneers. Biochemistry in the Philippines can be said to have begun at the University of the Philippines, at the Diliman, Los Baños, and Manila campuses. Initial researches were on the nutritional quality of foods, nutritional status of the Filipinos relative to their diets, and chemical and biochemical studies of natural products.

Filipino pioneers of biochemistry include Drs. Adelaida Bendaña-Brown, Solita F. Camara-Besa, Francisco O. Santos, Isabelo Concepcion, and Juan Salcedo, Jr. Dr. Brown, who was based at UP Diliman, worked on the iron content of Philippine foods, Vitamin B, unsweetened condensed milk, amino acids of local foods, coconut oil, "aligue," patis, pectin from santol, guyabano seeds, and several seaweeds. At the College of Agriculture, UP at Los Baños, Dr. Santos worked on food materials such as balut, tikitiki, copra meal and cane sugar.

Drs. Concepcion and Salcedo, both of the College of Medicine, UP Manila (UPCM), co-authored several papers on nutrition-related topics. Dr. Salcedo worked on Vitamin A and B deficiency in selected sectors and on the effect of choline deficiency. Dr. Besa, also of UPCM, contributed significantly to our knowledge of sodium and potassium contents of Philippine foods and dietaries, and the relationship of cholesterol level to the diet of the Filipino.

Institutional research. Biochemical research is done mostly in the universities, which now include the University of Santo Tomas and the Visayas State College of Agriculture. Other institutions involved in biochemical research are those under the Department of Science and Technology, the Southeast Asian Fisheries and Development Center (SEAFDEC) in Iloilo, and the International Rice Research Institute (IRRI) in Los Baños.

Research thrusts. A review of the topics of research reveals a concentration in

the agricultural sciences which has gotten a major share of research funds, followed by the medical sciences. Incidentally, some of the research done in one sector can have applications in the other sector.

Much of these research activities can be described as mission-oriented; even the most basic of them have some foreseen application. Most, if not all, are within the priority areas for research by the different research councils (PCHRD, PCARRD), possibly for better monitoring and more efficient utilization of resources.

In agriculture, work is done on biochemical/chemical mechanisms of plant resistance to pests and diseases, postharvest biochemistry of fruits and vegetables, monoclonal and polyclonal antibodies for diagnosis of crop diseases, genetic polymorphism, hybridity and genetic variability - all towards increased food production and productivity. Bioresources and waste product utilization have included work on alcohol production from saccharine and starchy materials, genetic improvement of cellulose degradation by the cellulomonas sp., and production of biochemicals and enzymes.

Human nutrition is still of interest in medical research. There also are ongoing studies on inborn errors of metabolism, diagnostic tests using biochemical tools, potential mutagenic agents and anti-mutagenic effects of indigenous plant materials.

Work on marine products include toxins from *Conus* venoms, genetic and nutritional studies of food fishes and finfishes, respectively. Biochemical research in industry has been limited to the pharmaceutical sector, with their work on drug bioavailability

The author is Deputy Director of the Institute of Plant Breeding at UP Los Baños. The above article is a part of the status report which she delivered to the members of the Philippine Biochemical Society at their 13th Annual Convention, on October 24, 1987, at the UP College of Medicine.

and drug potential of indigenous materials.

Funding. In general, funding for research and development (R&D) in the Philippines is insufficient (0.2% of GNP) and lower than those of its ASEAN neighbors. Indonesia had 0.5% of its GNP for 1983 earmarked for R&D; Malaysia, 0.64% of GNP for 1982; Singapore, 0.31% of GNP for 1981-1982; and Thailand, 0.25% of GNP for 1982. Sources of funds include government institutions and agencies (DOST, PCHRD, PCARRD, PhilCoA, NRCP, PCRDF) and foreign agencies (USAID, IFS, IAEA, JSPS, JICA).

Publications. Filipino biochemists publish their articles in local journals, most of which are distributed worldwide, and in foreign journals. In the past 15 years, the number of publications per year has fluctuated, with an increasing trend, within a range of 1 to 29. Publications have doubled in the past five years.

Facilities. In Metro Manila, the Department of Biochemistry and Molecular Biology of UPCM, the Chemistry Research Division of the Philippine Nuclear Research Institute and the UP Natural Sciences Research Institute have the equipment for basic research. Facilities have also improved at the BIOTECH, the Institute of Plant Breeding, the Institute of Chemistry and Institute of Food Science and Technology at UPLB. Certainly these laboratories can still stand a lot of improvement.

Relevance of biotechnology. This brings us to the question of relevance of biotechnology to our developing country. Biotechnology is defined as "the application of scientific engineering principles to the processing of materials by biological agents to provide goods and services." R&D activities in biotechnology have centered on fermentation technology, enzyme technology, immobilized bioprocesses, and plant and animal culture techniques. Applications include crop varietal improvement, animal breeding and health, production of economically important and useful substances with plant cells and tissues. Some of these projects have already been started at BIOTECH and NSRI. At IPB we are using some tissue culture techniques and are developing strategies to make use of biotechnology for crop improvement.

It has been mentioned that the rate of adoption of a technology is determined largely by strong economic justification as well as its sociological values. A strong partnership between governmental research organizations and the private sector enhances the development of research.

Government support. The government should be more supportive of science and technology, in general, through the improvement of facilities, increased research funding, availability of foreign exchange for the purchase of equipment and chemicals, less bureaucracy to facilitate these purchases, and the upgrading of salaries and privileges of researchers. Science and technology, if directed properly, could play a crucial role in revitalizing our country's socio-economic condition.

We biochemists have a lot of interesting projects to work on in the Philippines. We have the potential to contribute to the country's economic recovery and to science. Let us all join hands in participating actively in charting directions and strategies for an excellent biochemical research program for the country and in its implementation. ✽

REFERENCES

1. Lantican RM. Imperatives of science and technology for economic recovery. Round Table Discussion on Science and Technology and Societal Transformation. Department of Science and Technology, Manila, 30 September 1987.
2. Mendoza EMT. Focus on biochemical research in the Philippines. Part I. PBS Newsletter, May 1983.
3. Mendoza EMT. Focus on biochemical research in the Philippines. Part II. PBS Newsletter, January 1984.
4. Philippine Men of Science. National Institute of Science and Technology: Manila, 1964.
5. Padolina WG. Chemistry: status, directions, and strategies. 4th Annual Convention of the Kilusan ng mga Siyentipikong Pilipino. UP Diliman, Quezon City, 10 July 1985.
6. Padolina WG. Crucial technologies in the future for third world countries. Regional Workshop on Invention Development and Innovation. Philippine Invention and Development Institute, Manila, 4 December 1985.