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Food Scientist Airs Views on Edible Oil and Fat Industry

Dr. Stephen Chang, former president of the American Oil Chemists' Society anl currently professor of chemistry of the Department of Food Science, Rutgers, the state university of New Jersey, has submitted 23 proposals for the developmtnt of vegetable oil and fat industry in Taiwan.

Dr. Chang, who arrived in Taiwan in late March as a short-term consultant to the National Science Council, submitted the proposals at the end of his three-week trip in mid-April after visiting 14 major edible oil refineries and participated in a number of seminars sponsored by the Joint Commission on Rural Reconstruction and NSC on the utilization and manufacturing techniques of edible oils and fats. He also lectured on Aflatoxin in peanut oil, Erucic acid in rapeseed oil and their removal, deep fat frying and the administration of edible oils protection.

Dr. Chang's proposals, grouped under three separate headings, are listed below.

I. Proposals to the Industry

1. To improve analytical facilities and quality control with advanced instrumentation and qualified technical personnel in order to produce oils and fats with acceptable flavor and flavor stability.
2. To build hydrogenation plants in order to produce oils and fats with higher stability such as partially hydrogenated and winterized soybean oil suitable for use as salad oil and slightly hydrogenated lard suitable for deep fat frying.
3. To improve the stability of packaged oils by the use of nitrogen to replace air in the oil and in the headspace.
4. To send two technical staffer each year to my laboratory at Rutgers University in the United States for training for a period of six months, with the hope that this will gradually build up qualified technical personnel in the industry.
5. To utilize the waste of refining to produce valuable by-products, such as tocopherols and sitosterols and to use steam refining to recover free fatty acids.
6. To consider the manufacture of lecithin from wet gum.
7. To increase the production of newer oils, such as castor oil, corn oil anl sunflower seed oil.
8. To improve the techniques of processing. The following are some examples:
   A. Drastically reduce the contamination of oils and fats by metals, particularly iron and copper.
   B. Add metal chelating agent, for example, citric acid, after deodorization.
   C. Eliminate directly heated deodorizers.
   D. Use three stage steam ejector to obtain better vacuum for deodorization.
   E. Avoid the formation of polymers on felter press.
9. To decrease the deterioration of oils and fats during frying, such as in the manufacture of instant noodles, by
   A. Adding methyl silicone, 2 ppm., to the oils and fats.
   B. Improving the efficiency of filtering to remove fine particles by using finer filter and addition of filter aid.
   C. Using partially hydrogenated lard as frying medium.
10. To train and to establish organoleptic evaluation panel in each plant to determine the initial flavor stability of its products.

II. Proposals to the Oils and Fats Association

1. To organize a joint central laboratory for the analysis, quality control and research in the field of the chemistry and technology of edible oils and fats.
2. To organize a joint central library to collect books, journals and materials concerning the chemistry and technology of edible oils and fats.
3. To participate in international meetingings, seminars and short courses in the area of the chemistry and technology of edible oils and fats, such as the annual meetings of the American Oil Chemists' Society and the bi-annual meeting of the International Society of Fat Research.
4. To arrange technical personnel of the industry to receive short term trainings of six months to one year in appropriate laboratories in the United States.
5. To sponsor short courses concerning chemistry and technology of edible oils and fats in Taiwan to educate and train the technical personnel of the industry.

III. Proposals to Government Agencies

1. To establish complete specifications for various edible oils and fats and their products such as shortening and margarine which are commonly manufactured in Taiwan.
2. To establish appropriate regulations to control the conditions of processing of edible oils and fats, for example, the temperature of deordorization.
3. To establish strict regulations to

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Forestration Administration in Taiwan

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3. Taiwan Forestry Bureau has also been trying its best inviting famous forestry breeding genetic professors from foreign countries to Taiwan for seminars. Those who came to Taiwan for this purpose under this project are: Dr. J.W. Wright, forestry genetic professor, Michigan State University of America. Dr. C. W. Wang, forestry breeding professor, University of Idaho of America, and Dr. Sokai, genetic professor, Tokyo University of Japan.

Guiding principles of reforestation

(a) Reforestation in the working circles of national forest has to be expanded, and nurseries be established near the planting area in order to minimize the cost of reforestation.
(b) In 20-year long range reforestation plan of the government, suitable tree species will be planted to meet the needs of forest industry development.
(c) National forest land will be leased to private planters to make full use of labor and capital for reforestation.
(d) An extensive benefit-sharing bamboo planting program has been carried out since 1964 to recover illegally cultivated forest land. This program will be continually enforced hereafter.

Many tree species are suitable for reforestation because of the extreme altitude differences and climatice variations.

Forest conversion project

Tree volume per hectare:

The understocked forest with an average tree volume under 50M³ per hectare occupies some 51% of the total area, and that over 50M³ but under 100M³, 19%. In other words, in 70% of the total forest land, the tree volume is under 100M³ per hectare. The average tree volume per hectare of the whole forest land is 115M³ for conifers and 87M³ for hardwoods. It is evident that as a whole, the timber resource is rather poor and needs to be developed for fullest utilization of the forest land.

Purposes of forest conversion:

The purposes of forest conversion are:

(a) to convert those poorly stocked natural forest into high value plantations.
(b) to enhance the utilization and profitability of forest land and to achieve sound forest management practices.
(c) to fulfill the needs of the fast-growing forest industry development.

Forest area and volume covered under this project:

Under this forest conversion project, a total forest area of 84,119 ha. with a total tree volume of 4,757,070-M³. will be covered. These areas are scattered in 35 forest working units. The average growing stock per hectare is less than 60M³. Annual cutting and planting area will amount to 4,206 ha. and volume, 237,851M³, under a 20-year liquidation period. Various kinds of foreign aid and loan are to be sought for this long term investment venture.

First period—The first period of forest conversion project, starting from January 1, 1965 through June 30, 1966, for nearly one and half-year, was aided by WFP support with food, at three working circles in Pa-sien-Shan, Chutung and Chiaochow, with a total area of 2,000 hectares accomplished in conversion work of reforestation, logging, forest road and nursery construction. By investigation, the average increment percentag is up to 90%. The planted trees there all grow very well and are greatly admired by the visitors from every circle of the whole world. They are all growing so well that some of them are entering the stage of thinning.

Second period- The second period of forest conversion project, starting from July 1, 1966 through June 30, 1968, was also aided by WFP support with food, at five working circles at Cho-sui-shi, Lao-nun-shi, Chiaochow, Tawu and Hengchung, with a total area of 3,000 hectares accomplished in logging forest-road and nursery construction as well as reforestation works. All work has been accomplished in late June as scheduled 1968. By investigation, the average increment percentage is up to 91.04%. The income of logging during this period, after having paid for the government counterpart fund for this project, was 20,000,000 (NT$) more than expected. With this fund, and by order of the Ministry of Economic Affairs, Taiwan Provincial Government as well as by the recommendation of T.P.A., another project of grassland reforestation (altogether 2,000 ha.) was put into force at Nannung and Ta-Chia.

This conversion work has been tensely accomplished more than expected by the end of 1968. By investigation, the average increment percentage is up to 96.69%.

Because this kind of forest conversion project in the first and second periods was carried out smoothly and with great achievements, TFB has decided to continue this important work and therefore a third period of forest conversition project was proposed.

Starting from January of 1968 through June 1970, the Taiwan Forestry Bureau provided on its own the budget itself, and selected six working circles at Chutung. Twi-Kao-yu, Yu-ching, Chiao-Chow, Henchung and Tawu for carrying out this project with a total area of 5,000 ha. This conversion work was accomplished at the end of June, 1970.

According to the policy of the central government, The Taiwan Forestry Bureau enlarged the forest conversion project, converted 5,000 hectares annually and proposed a 5-year forest conversion project (that is the third period of this kind) has approved by WFP (approved No. 586). The period for enforcement is five years, starting from June of 1970 through the end of 1974. The conversion area for reforestation is 25,-000 hectares. This five-year project, with WFP food aid, is valued at US$ 6,481,300 (equivalent to NT$259,-252,000).

Forest research

The Taiwan Forest Research Institute, under the Provincial Department of Agriculture and Forestry, is an official agency responsible for forest research work in Taiwan. Research of lesser scope is carried out by National Taiwan University, Taiwan Forestry Bureau, and the Provincial Chung Hsing University.

Forestry research work of Taiwan has a history of 60 years. Its emphasies are laid on silviculture, introduction of exotic species, forest management and forest products utilization. The Institute has six departments (Forest Biology; Silviculture;

Forest Management; Forest Utilization; Forest Chemistry and Wood Pulping), one, extension office, and five branch stations (Liukwei, Chungpu, Henhchun, Lien Hwa Chi and Tamali) in addition to a resin experiment station at Pahsienshan, as well as a windbreak experiment station at Peikang. Total forest area owned by the Institute for experimental purposes at its branch stations is 16,969 hectares. About 1,000 endemic and exotic species are growing in Taipei Botanical Garden and some 400 species in Hengchun Tropical Arboretum. About 36,000 plant specimens, including 6,000 species and 1,317 type specimens are stored in the herbarium.

Research projects of the forestry departments of National Taiwan University and National Chung Hsing University are concerned chiefly with problems of nursery propagation and planting of forest trees, growth and yield studies in planted stand, forest soils, and forest ecology and forest management, wood seasoning and properties of wood. Substantial results have been produced in all of these fields.

Two kinds of forestry education are offered in Taiwan, namely: college education and vocational education. Three colleges offer forestry courses: the College of Agriculture, National Taiwan University at Taipei; the Provincial Chung Hsing University at Taichung, and the Provincial Junior Agriculture College at Pintung. The first two offer four-year courses in forest which lead to the degree of Bachelor of Science, and the last one offers only a three year-course in forestry. There are about 80-120 students graduated from these three colleges every year and altogether some 3,000 students have graduated from the above mentioned schools. Most of them have been employed by the different forestry agencies, and some are doing private forestry work themselves. Most of them have proved very successful.

Trends on the development of Taiwan forestry

Management of the protection forest

In order to serve its purpose the protection forests should be maintained in the most vigorous growth condition. Through intensive management practices, including proper thinnings of young stands and careful selective cutting old stands could be maintained a proper combination of both overstory and understory. In addition, the idle protect forest land should be given high priority in the reforestation program.

Forest road construction

In order to meet the timber production goals and minimize production cost, good logging truck road will be constructed at a rate of 80 km. a year to serve remote forest areas. The existing forest road system totaling 1,134 km. of truck road and 66 km. of forest railway, 17 5km. of cart passage and 129 km. of cable way has to be maintained and improved. Proper care must be taken for side slopes stabilization and selection of right of ways to avoid excessive soil erosion.

U. S. Science Mission on Fact-finding Tour Here

Dr Edward David, Jr,. science advisor to President Richard Nixon, and a party of seven top-ranking scientists and science administrators of the United States arrived in Taipei April 30 for a short visit. It is the second American group of its kind to visit the Republic of China in five years. In September 1967, a similar mission headed by Dr. Donald Hornig, science advisor to the then President Lyndon B. Johnson paid a week-long visit to this country.

Other members of the David mission include Mr. Herman Pollack, director of the State Department's Bureau of International Scientific and Technological Affairs; Dr. Frederick Seitz, president of Rockefeller University and former president of the U.S. National Academy of Sciences; Dr. Ivan Bennett, vice president of New York University in charge of the NYU Medical Center and former deputy director of the Office of Science and Technology of the White House; Dr. John Pierce of Bell Telephone Laboratories; Dr. David Beckler, assistant director of the Office of Science and Technology (OST) of the White House; Dr. Norman Neureiter, technical assistant for international affairs of the OST; and Mr. John H. Lannan, special assistant to the director of the OST.

Upon arrival in Taipei, Dr. David made the following statement to the press:

"I am greatly pleased to have this opportunity to visit the Republic of China on Taiwan, and to see for the first time with my own eyes the remarkable scientific and technical progress as well as the economic achievements that have won you esteem around the world. I have been looking forward to this visit for some time. I am glad now to be here with you to learn first about your accomplishments in my own fields, but in addition to try to gain some appreciation for your country's age-old cultural and artistic traditions.

"The last visit to Taiwan by a Presidential Science Adviser was that by Dr. Donald Hornig in the fall of 1967. He related to me afterward his many pleasant memories of his stay with you. Since then, we have watched with great interest your implementation of the Republic of China's master plan for science and technology.

"During my present visit, I hope to be able to discuss with the leaders of your Government the policies of my Government in the field of science and technology. I will of course also want to review with the officials of your Government the on-going agreements and programs between our two countries.

"I will look forward to seeing again some of my old friends, such as Dr. Wu Ta-you, the distinguished Chairman of your National Science Council. I will of course look toward to the advise of Dr. Bruce Billings, Special Assistant to Ambassador McConaughy for Science and Technology, whose nearly four years service here on Taiwan has made him unique within the United States Government in his understanding of your goals and progress in this field.

"I deeply hope that my coming consultations with you in this vital field will add further to the historic ties of friendship that bind our two countries together."

During the rest of their stay in Taiwan, the visitors will talk with Chinese government leaders and receive briefings on the various aspects of the Republic of China's scientific as well as economic programs. They will also make entensive tours to research facilities in Taiwan.

Views and Recommendations on Taiwan Industrial Development

(excerpts)

by Kam L. Wong

Abstract

In August, 1971, at the invitation of the National Science Council, ROC, the author visited over twenty-six industrial firms and other activities in Taiwan for the purpose of developing concrete proposals for industrial development in Taiwan. The author concentrated his efforts in exploring the electronic industry because: (1) a tremendous market still exists for Taiwan electronics export, (2) electronic manufacturing can be mechanized easily without requiring backing of huge basic industries, (3) the light weights and small sizes of electronic products make them ideal for export shipping, and (4) maximum return for the effort can be realized as the author's specialization is in electronics . . . .

Conclusion

Because of the promise presented by the electronic industry and the special training and experience of the author the study effort has been concentrated in the field of electronics. Based on the observations and discussions presented in the preceding sections the following conclusions pertaining to Taiwan electronic industry development can be made.

1. A vast world electronics market is waiting for a much deeper penetration by Taiwan products.
2. Electronic production in Taiwan can be increased without waiting for development of other industries.
3. Domestic electronic component markets is both attractive and important as it will lower assembled product cost.
4. The government should assist the industry in marketing components domestically and electronic products to the world.
5. Taiwan has about ten years lead time for electronic technology development with respect to labor rate increase.
6. Based on present electronic production 8 to 15 million dollars from annual profits should be reinvested in R&D.
7. Electronic production and sales should be increased to increase profit which will in turn be used for R&D.
8. The government should find ways to stimulate research and development particularly in supplying capital.
9. The government should find ways to assure that the exported electronic products are up to the desired quality level.
10. Manpower development has been receiving government attention. Inputs from industry should be solicited for development of industry oriented educational and training programs.
11. Pay rates for engineers and scientists are low with respect to the U.S. Supply and demand will establish the pay level in the industry. In governmental organizations a way will have to be found to assure adequate compensation.

Recommendations

1. Additional effort for the development of Taiwan electronic industry should be pursued to increase domestic compents supply and further penetration into the world market.
2. An organization should be set up by the government to plan, coordinate and administer a program for the development of the electronic industry.
3. A Task Group consisting of people in Taiwan and people in the U.S. should be established to do the following:
   - (a) Develop an organizational structure for the organization recommended in "2" and define the function of each element.
   - (b) Identify key tasks, assign priorities and set up schedule for these tasks.
   - (c) Acquire personnel to carry out high priority tasks.
   - (d) Recommend best qualified persons to head up key posts in the organization.
4. As a minimum the high priority tasks under "3" should include:
   - (a) Eastablish a quality inspection system for inspecting components to be used domestically and products to be exported.
   - (b) Establish a division in the U.S. for utilization of manpower in the U.S. and provision of marketing assistance to private companies.
   - (c) Establish a market research organization to serve as a central clearing house for domestic component suppliers and users, and develop export product requirements.
   - (d) Establish an Ad Hoc committee for developing R&D funding policies and methods for fund accumulation and disbursement.

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ensure that edible oils and fats manufactured in Taipan are free from components which are harmful to human health. For example:

A. Aflatoxin in peanut oil
B. Erucic acid in rapeseed oil
C. Mercury in sodium hydroxide used for refining.

4. To clarify the regulations of using anti-oxidants in foods, particularly BHT, which has been prohibited for use in certain foods in some countries.
5. To organize a joint central laboratory, probably in co-operation with the edible oils and fats associations, for the analysis, quality control and research in the field of the chemistry and technology of edible oils and fats.
6. To co-ordinate the marketing requirements and the building of new oil refineries to avoid possible overproduction of edible oils and fats in Taiwan.
7. To cultivate specialists in the chemistry and technology of edible oils and fats by allocating specific quota for sending professors and researchers in this field to the United States for further education.
8. To support the formation of departments of food science and technology in universities to meet the needs of the growing food industry in Taiwan.

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