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Summary of Discussion Session H-1 on Future Trends

G. WILLHITE, Recorder, American Oil Chemists' Society, Champaign, IL 61820

Discussion session chaired by A.R. Baldwin and K.F. Gander; the panel consisted of Messrs. Boelhouwer, James, Mounts and Wiedermann.

The major interest during the discussion on long-term trends centered on palm oil and on the potential of biotechnology to affect the fats and oils industries.

Lars Wiedermann was asked for more details on why he did not think palm oil's share of world trade would increase as rapidly during the next few decades as would the market share for soybean, sunflower or rapeseed (see plenary talk). Wiedermann listed several reasons including: (a) the need for more profit-making refinery capacity if refined palm oil is to be sold on world markets, particularly as crude palm does not travel as well as refined palm oil; (b) lack of markets for palm oil byproducts compared to those of competing oilseeds; and (c) the relative narrow portion of prime liquid oil produced by crude palm oil fractionation.

Kurt Berger of the Palm Oil Research Institute of Malaysia said he expected more growth for palm oil than did Wiedermann, in part because palm is a perennial crop whereas soybeans, sunflower and rapeseed are annual crops whose production may fall dramatically in any given year if economics induces growers to plant other crops. Palm oil acreage, once planted, will continue producing for decades despite price fluctuations, Berger said. He added that the tissue culture cloning described by James (see plenary talk) and initial results in using weevils to increase fresh fuit bunch production may increase palm oil supplies at a greater rate than anticipated.

Tony James was asked about the possibility of using biotechnology to modify characteristics of oils from

present crops, progress on developing tissue culture clones of coconut, and viability of the palm oil clones.

James noted that while much biotechnology publicity has focused on implanting characteristics from one organism into another (the "sunbean"–a sunflower with enhanced protein content), plants can better be changed by the deletion or inactivation of a current gene, without adding any new genetic material from exogenous sources. The location of genes in the soybean that control linolenic fatty acid formation are not yet known, James noted, but it might be possible to modify fatty acid composition using the system he described.

Tissue cloning of coconut probably will be accomplished within five to seven years, James said. The oil palm cloning was developed in about 9½ years; the coconut work is not expected to take as long. At present, researchers have succeeded in producing "calluses" of coconut tissue, but have not yet succeeded in growing coconuts from the callus material. A typical coconut tree may yield up to 60 nuts a year at best. Cloning will mean doubling of yield of copra and probably will mean increased acreage when producers become aware of the better income potential, he said.

About 40 palm oil clones have been developed thus far, James said, and plantations will be stocked with different clones to avoid disease problems. Tea and rubber plants are clones now and agronomic practices avoid major disease problems. The fact that existing palms are basically a hybrid development means the clones carry a hybrid's resistance to disease also, James said. Some of the clones produce oil with close to 10% palmitic acid content, James said. Berger noted that vitality of palm oil for the future is being protected by development of a gene pool of West African palm varieties, and more additions for the collection are being sought in South America.

There was a brief discussion of physically refined oils. T.L. Mounts said he knew of only three facilities, all outside the United States, that were physically refining crude soybean oil. Others noted that corn oil in South Africa and sunflower oil in Yugoslavia are physically refined. Some refineries in Europe were reported to be physically refining soybean oil when they could segregate crude oil with low phosphatides. One participant noted that the subject of physically refining commercial oils had been discussed in papers at the 1980 AOCS/ISF meeting in New York City (Physical Refining of African Maize Oil, Forster and Nel; The Impact of the Preparation and Extraction Conditions of Soybeans on the Oil Quality, T.L. Ong). A paper by Ong in Fette Seifen Anstrichmittel was described as having provided comparisons of costs and quality for traditional and physical refining of crude oils.

In response to a question on use of supercritical fluids to extract oils, Mounts said work at the USDA's Northern Regional Research Center had been done at pressures of 1,030 psi and temperatures of 31 C. Processing conditions can be varied to tailor end product characteristics, Mounts said.

There was considerable general discussion regarding the future genetic changes that might be made in oilseed crops. One opinion was offered that the temperate zone crops (soy, rape, sunflower, etc.) would be modified as to their proteins. Another idea was advanced that the tropical plants offered large opportunities for oil composition changes. It was noted that the palm oil germ pool now contains samples that yield oils lower in palmitic or others with iodine values that are approaching olive oil's IV. Other opportunities were also mentioned for other crops.

The general tenor of the discussion was very optimistic regarding technical possibilities in the oilseed and related industries. The socio-political-economic problems of distributing these products among the world's population remains to be solved.

Boelhouwer was asked to estimate the impact of petrochemical-based alcohols and acids on our industry in the 1990s. He indicated that companies such as Shell would produce large volumes of fatty alcohols from petrochemicals, but that the fatty acids so derived had continuing compositional problems of varied isomers and chain-branching.