

PALM OIL ABSTRACTS

A. GENERAL: OILS AND FATS INDUSTRY

A00029

STAAT, F. Vegetable oil methyl esters as a diesel substitute. In *Lipid Technology* 1993 Vol 5(4):88-91.

The idea that the methyl ester of a vegetable oil could be used as fuel for diesel engines in France goes back to 1981 when the Institut Francais du Petrole started its studies sponsored by ADEME (Agence de l'Environnement et de la Maitrise de l'Energie). Today, 35 000 ha of rapeseed are devoted to the production of methyl ester(Diester). Hundreds of city vehicles use a mixture containing 5%-100% of this product.

KEYWORDS: USES AND BY-PRODUCT UTILIZATION; VEGETABLE OILS AS FUELS; RAPESEED OIL; DIESTER; DIESEL FUELS; OILS AND FATS INDUSTRY-France

A00030

1993/94 World oilseed outlook. In *Oil Crops* 1993 Vol 38:6-9.

Global oilseed output in 1993/94 is forecast at a record 228.05 million tonnes. Major increase will be seen in cottonseed, sunflowerseed and to some extent in rapeseed. The world soyabean production will be down, due primarily to a decline in US production. Global oilseed exports are expected to be down 3.5% to 37.48 million tonnes, and protein meal exports to decline to 42.09 million tonnes. World soya bean exports are forecasted to recede by 5% to 31.4 million tonnes, while other vegetable and marine oils output is projected to reach a record 63.6 million tonnes, with exports forecast up to 21.37 million tonnes.

KEYWORDS: ECONOMICS; OILS AND FATS INDUSTRY; OILSEEDS; PRODUCTION FORECASTS; PALM OIL; SOYA BEAN OIL; COTTONSEED OIL; SUNFLOWERSEED OIL; RAPESEED OIL; PROTEIN MEAL.

B. OIL PALM

Cultivation. Crop Management. Plant Protection. Plant Science. Breeding and Genetics. Biotechnology.

B00076

Description of a simplified technique for setting up an oil palm plantation along contour lines. In *Oleagineux* 1992 Vol 47(11):666-670.

Setting up oil palm plantations on moderately to steeply sloping land, with no special land improvements, often leads to mediocre and sometimes catastrophic results. In equatorial and sub-equatorial climate, aggressive rainfall often cause the deterioration of soil fertility through destructuring of the upper layer and sometimes severe erosion. These phenomena are serious when the soils are fragile and fairly shallow. Water losses through runoff can reach 60% of rainfall in some cases lead to the natural water deficit. Thus, in the Dabou savannah (tertiary sands) in the Ivory Coast, Prioux observed a sharp drop in yields at the Cosrou oil palm plantation (1970:12.5tonne/ha-1978:7.5tonne/ha). Kochko *et al.* reported very low production in an old block of oil palms at R.Michaux (1) (4.7tonne/ha on average from 1967 to 1977). In both cases, severe sheet and gully erosion phenomena were seen on slopes, combined with abundant sand accumulation in the *thalwegs*, occasionally reaching several dozen centimetres thick. Setting up an oil palm plantation on slope (gradient 3%-5%) should not be considered unless accompanied by suitable land improvements. This advice note sets out to describe a cheaper, simplified method of planting along contour lines.

KEYWORDS: OIL PALM-Cultivation; LAND CLEARING AND DEVELOPMENT; SOIL EROSION; CONTOUR PLANTING.

B00077

HAFIDZI Mohd Noor. Nature of damage to oil palm by the plantain squirrel. The Planter 1993 Vol 69(806): 207-210.

The nature of damage to oil palm fruitlets by the plantain squirrel, *Callosciurus notatus*, was deduced from analysis of the the gut contents of those squirrel. The results indicated that 24 of the animals, or 80% of those dissected, fed on the mesocarp of ripe oil palm. One was found to have fed on the kernel. Depredated oil palm seeds also indicated a preference for the fleshy mesocarp

with little or no feeding on the kernel. Observations on feeding behaviour showed that *C. notatus* dislodged individual fruitlets from the fruit bunch and fed on them singly. Additional finding suggested that *C. notatus* also fed on the larva of *Tirathaba rufivena*, a pest of oil palm.

KEYWORDS: OIL PALM PESTS; PLANTAIN SQUIRREL, *Callosciurus notatus*.

B00078

YSSELMUIDEN, I L A. Oil palm cultivation in higher rainfall areas of Uganda. The Planter 1993 Vol 69 (806): 191-204.

With existing limited oil palm plantings established during 1960 and 1972 have shown that certain parts of Uganda have good prospects for its cultivation.

Agricultural, environmental, institutional and smallholder problems, especially farmers' acceptance of oil palm cultivation, are discussed and suggestions offered.

KEYWORDS: OIL PALM-Cultivation;PALM OIL AND OIL PALM INDUSTRY-Uganda.

B00079

BAUDOUIN, L. Use of molecular markers for oil palm breeding 1:Protein markers. In *Oleagineux* 1992 Vol 47(12):681-691.

In so far as they provide access to variability not revealed by conventional techniques, molecular markers are a valuable tool for breeders. Their potential applications cover genotype identification, drawing up of crossing and breeding strategies and studies of population diversity in particular. This article illustrates results obtained using protein markers on oil palm. The polymorphism of seven *Elaeis guineensis* populations was studied by enzymatic electrophoresis. Fifteen polymorphic loci totalling 52 alleles were detected. The populations were differentiated according to their degree of polymorphism, linked to their breeding background, and their allele composition, linked to their genetic origin. A positive relationship was found between the performance of hybrids produced using one of these populations and the genetic distance between it and its partner. A

similar study was carried out on 41 wild *Elaeis oleifera* stands surveyed in the Amazon basin. Fourteen polymorphic loci with 31 alleles were studied. Polymorphism distribution made it possible to group these stands in broader groups, linked to their position in the hydrographic network. Total protein electrophoresis was applied to calli cultured *in vitro* revealed a band specific to fast-growing calli. This type of callus is linked to a flowering abnormality seen in certain plants produced by *in vitro* culturing. Besides the above applications, the diversity revealed by enzymatic electrophoresis makes it an effective tool for oil palm genetic identification.

KEYWORDS: OIL PALM; BIOTECHNOLOGY; BREEDING and GENETICS; ENZYMATIC ELECTROPHORESIS; *IN VITRO* CULTURE; *Elaeis guineensis*; GENETIC DIVERSITY; *Elaeis oleifera*.

B00080

TRI HUTOMO; PAMIN, K. Hasil awal uji keturunan kelapa sawit persilangan D x P dan Dy x P di Sumatera Bagian Utara 1: Interaksi genotype dan lingkungan terhadap pertumbuhan vegetatif tanaman. Preliminary results of a progeny trial on D x P and Dy x P oil palm hybrids in Northern Sumatra 1: Genotype-environment interaction on the vegetative growth. In Buletin Perkebunan 1992 Vol 23(1-2):67-78. (In Indonesian.)

Two groups of five year old oil palm hybrids, namely D x P and Dy x P, each comprising twenty-five single crosses were planted on three locations, *viz.* Perlamban, Keraksaan and Sungai Yu in the Northern Sumatra region for evaluating genotype-environment interaction on the vegetative growth in the field. Leaf area, frond length and petiole relative area showed significant genotype-environment interaction in both groups of hybrids, whereas plant height, stem girth and frond production per year were not influenced by location differences. Analysis of stability using leaf area and frond length as vegetative parameters identified one D x P cross and two Dy x P crosses which were considered as stable hybrids and may be planted in large areas.

KEYWORDS: OIL PALM; BREEDING and GENETICS; PROGENY TRIAL-Indonesia; OIL PALM HYBRIDS; GENOTYPE-ENVIRONMENT INTERACTIONS.

C. PALM OIL

Chemistry. Product Development and Quality. End Uses. By-product Utilization.

C00071

AITZETMULLER, K; GRONHEIM, M. Gradient elution HPLC of fats and oils with laser light scattering detection. In Fat Science Technology 1993 Vol 95(5):164-168.

Gradient elution HPLC of oils and fats using reversed-phase HPLC separation systems with laser light-scattering detection is described. Potential advantages and shortcomings are discussed. Flexible solvent grading programming permits an adaption of the system to several types of applications. Using systems of this type the usual solubility problem with long-chain saturated triglycerides can easily be overcome. A useful test mixture consisting of a series of saturated triglycerides two carbon numbers apart can be obtained by interesterification of hydrogenated palm kernel oil and hydrogenated palm oil. HPLC systems of this type will also permit the simultaneous investigation of diglycerides and triglycerides in oils.

KEYWORDS: OILS AND FATS-Analysis; HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC); LASER-LIGHT SCATTERING DETECTION; PALM OIL-Analysis; PALM KERNEL OIL-Analysis.

C00072

D'SOUZA, V; DEMAN, J M; DEMSN, L. Chemical and physical properties of the solid fats in commercial soft margarines. In JAOCS 1992 Vol 69(12):1198-1205.

The fats of ten Canadian soft margarines were crystallized from acetone at 15°C to obtain the high-melting glycerides (HMG). The solid fats in the margarines were extracted with isobutanol at 5°C. X-ray diffraction showed that the canola margarines were in the β crystal form, the soya bean and sunflower-palm-palm kernel margarines in the β' form, while those of canola-palm and another sunflower-palm-palm kernel margarine contained a mixture of β' and β forms. X-ray diffraction of the isolated solids showed additional short spacing compared with those of the original margarines. Differential scanning

calorimetry heating curves of the solids were compared with those of the HMG. The melting temperatures of the HMG were 10°C higher than those of the solids. It is suggested that the polymorphic behaviour of soft margarines is related to the chemical composition of the HMG and their solids. Solids in margarines can also be provided by interesterification of palm oil products.

KEYWORDS: MARGARINE-Analysis; FATTY ACIDS CONTENT; PALM OIL PRODUCTS; POLYMORPHISM; TRIGLYCERIDES.

C00073

SIEW Wai Lin; NORAINI Mohamad. The effect of fruit storage on palm oil bleachability. In *JAACS* 1992 Vol 69 (12):1266-1268.

Storage of oil palm fruits resulted in crude oil that was difficult to bleach, especially that taken from bruised fruits. Fruits stored in the shade were less affected than those exposed to sun and rain. Surprisingly, oil from fruits stored at 5°C was highly hydrolyzed and difficult to bleach.

KEYWORDS: FFB-Analysis; BLEACHABILITY; PALM OIL; OIL PALM FRUITS; STORAGE.

C00074

NORAINI Idris; HANIRAH Hassan; OH Flingoh Chuan Ho; NOR AINI Sudin. Resistance to crystallization of blends of palm olein with soyabean oil stored at various temperatures. In *JAACS* 1992 Vol 69(12) :1206-1209.

The aim of the study was to determine the resistance to crystallization at different temperatures of palm olein (POo) blended with soya bean oil (SBO). POo of iodine value (IV) 65 showed better resistance to crystallization than POo of IV 60 or IV 63. For applications such as salad oil, the use of POo of IV 65 is limited to 30% in a blend with SBO. If POo of either IV 60 or IV 63 is chosen, its proportion in a salad oil blend must be limited to 10 per cent. However, for applications other than salad oil, such as for cooking or frying, 100% POo of any IV can be used. For cold climates, the proportion of POo (IV 60 or 63) recommended to get a clear blended oil

is 10%-30 per cent. Alternatively, up to 40% POo of IV 65 can be blended with SBO. For temperate climates, the proportion of POo (IV 60 or 63) recommended can be up to 60 per cent. With POo of IV 65, the proportion recommended is as high as 80%-90% for application as a cooking or frying oil.

KEYWORDS: PALM OIL BLENDS; PALM OLEIN; SOYABEAN OIL; SALAD OIL; CRYSTALLIZATION.

D. ENGINEERING AND TECHNOLOGY

D00025

DUPJOHANN, J. A new process for the recovery of palm oil. In *Fat Science Technology* 1992 Vol 94(11):433-435. (In German.)

The process described illustrates the continuous processing of the undiluted press liquor in the extraction of palm oil. Oil, water and solids are separated very fast by means of centrifugal separation and clarification technology. Long dwell times in large intermediate tanks are avoided, thereby improving the yield and quality of valuable constituents. The big advantage of savings in water is accompanied by the important reduction of the effluent load.

KEYWORDS: PALM OIL-Processing and Milling; EXTRACTION.

D00026

CHIA C S; SHAWALUDDIN Tahiruddin; POON Y C; TEOH C H. Implementation of the ISO 9002 system in palm oil mills in Golden Hope Plantations Berhad. Paper presented at the PORIM Palm Oil Quality Conference, Genting Highlands, 11-13 January 1993.

Golden Hope has a reputation for producing quality palm oil products. This is made possible by an established Quality Control System which includes rigorous monitoring of FFB input, in-process and final product quality, in-production QC team quality improvement and internal performance audit on process and quality status of the mills. Following the introduction of the ISO 9000 Quality Assurance systems in Malaysia, Golden Hope decided to transform its traditional

quality control system to conform with the stringent requirements of the ISO 9002 quality assurance system. This paper describes Golden Hope's experience in the implementation of the ISO 9002 in its palm oil mills. It gives the strategy and methodology adopted and discusses the following aspects of obtaining ISO 9002 certification from SIRIM. i) Organization of QA functions. ii) Compilation of quality manuals. iii) Training of QA personnel. iv) Physical preparation for SIRIM's audit. v) Experience with SIRIM's audit procedures. To date, three of the 11 oil mills in Golden Hope Plantations Berhad have received ISO 9002 certification while others are in various stages of certification. With the adoption of the ISO 9002 quality assurance system, Golden Hope will further enhance its status as a producer of quality palm oil products.

KEYWORDS: PALM OIL MILLS; GOLDEN HOPE PLANTATIONS BERHAD; ISO 9000; MANAGEMENT; DOCUMENTATION; QUALITY ASSURANCE; AUDIT; PALM OIL-Quality; PALM OIL-Processing and Milling.

D00027

MOHD ZOHADIE Bardaie. Agricultural engineering challenges: Implications for Malaysia. In *The Planter* 1993 Vol 69(803):73-77.

The National Agricultural Policy aims to maximize farm income through efficient utilization of resources and to revitalize the agricultural sector so that it can play a significant role in the economic development of the country. Towards this end, greater commercialization of agricultural production becomes vital and the development and adoption of modern technologies become inevitable as the sector strives to become more competitive and productive. This article highlights some of the technological developments which Malaysia should be aware of and needs to consider in its perspective planning.

KEYWORDS: AGRICULTURAL ENGINEERING; FARM MECHANIZATION; PLANTATION TECHNOLOGY; ENGINEERING AND TECHNOLOGY.

E. NUTRITION

E00036

KALANITHI Nesaretnam; ROBERTSON, N;

YUSOF Bin Basiron; MACPHIE, C.S. Application of hydrogenated palm kernel oil and palm stearin in whipping cream. In *Journal Sci Food and Agriculture* 1993. Vol 61(4):401-407.

Non-dairy creams made from hydrogenated palm kernel oil (HPKO) are generally more stable than dairy creams. However, in summer the emulsion tends to separate. This paper outlines some steps that were taken to modify the HPKO with the intention of increasing the stability without affecting whipping performance. This was achieved by blending HPKO with palm stearin (POs). Interesterification was employed to eliminate the increase in solid fat content at 37°C and 40°C. The results of the experiment showed that an interesterified HPKO:POs 66:34 blend proved to have satisfactory whipping performance when compared with creams made with HPKO alone.

KEYWORDS: PALM KERNEL OIL; HYDROGENATION; PALM STEARIN; FOOD SCIENCE; SOLID FAT CONTENT; WHIPPING CREAM.

E00037

ZANARIAH Jarien; WAN ZURINAH Wan Ngah; ASMAH Rahmat; ABDUL GAPOR Mohd Top; KHALID Abdul Kadir. Effect of different doses of tocotrienol on glutathione peroxidase in the kidney and stomach of rats with induced hepatocarcinogenesis. In *Malaysian Journal of Med Lab/ Sci* 1992 Vol 9 (1):80-83.

Vitamin E in the form of tocotrienols can be obtained in large amounts from palm oil. Tocotrienols have also been reported to have a protective ability against carcinogenesis. In this study, the effects of different doses of tocotrienol on glutathione peroxidase (GSH-Px) were studied. Two types of GSH-Px were investigated using two substrates, *viz.* cumene hydroperoxide (CH) and H₂O₂, corresponding to selenium-independent and selenium-dependent GSH-Px. The organs used were the kidney and stomach. Hepatocarcinogenesis was by means of diethylnitrosamine (DEN) and acetylaminofluorene (AAF). Seventy-two male *Rattus norvegicus* rats (135-150 g) were divided into six groups each of 12 rats: control, tocotrienol, DEN/AAF and a mixture of DEN/AAF and tocotrienol designated AE, A2E and A5E where E=4.66mg/rat/week. The rats were killed after 4 and 8

weeks. Tocotrienols did not have any effect on GSH-Px cumene hydroperoxide or GSH-Px hydrogen peroxide in either organ. In the stomach, DEN/AAF had no effect on either type of GSH-Px. However, feeding the mixture caused the GSH-Px activities (CH and H₂O₂) to increase ($p < 0.05$) for the AE dose after 4 weeks and for the A4E dose after 8 weeks. In the kidney, treatment with DEN/AAF and the mixture of DEN/AAF and tocotrienols resulted in increases in GSH-Px (CH) activity ($p < 0.05$). In conclusion it is suggested that the different forms of GSH-Px activities in the kidneys and stomach were affected differently when exposed to chemical carcinogens and tocotrienols.

KEYWORDS: TOCOPHEROLS and TOCOTRIENOLS; GLUTATHIONE PEROXIDASE; RATS; HEPATOCARCINOGENESIS.

F. ECONOMICS

F00033

OKORIE, A; UGWU, D S. Costs and returns of oil palm projects in Nigeria: A case study of Alloma Oil Palm Project Benue State, Nigeria. In *Journal of Plantation Crops* 1992 Vol 20(1): 32-41.

The study examined the cost and returns of the oil palm project in Benue State, Nigeria from 1974 to 1985. The data used in the analysis were from both primary and secondary sources. A benefit-cost ratio (BC) analytical technique was employed to determine the profitability of the

project. Costs were divided into capital and operating costs. Capital costs amounted to 2.051 million, while the operating cost were 0.284 million. Based on the twelve years of the project's operation, the aggregated stream of costs and benefits gave a BC ratio of 0.915 using a 10% discount rate at prevailing market prices. But using the subsidized prices at which the project's palm oil products were sold and the same discount rate, a BC ratio of 0.012 was obtained. With the incorporation of an inflationary factor into the discount rate, much lower BC ratios were obtained. The low BC ratios could be attributed to low yield, inadequate technology and poor management practices in the project. However, with projection of costs and returns to the year 2000, the BC ratio improved to 0.81, which is still below unity. Thus, to increase the BC to an acceptable level (of more than unity) project costs need to be reduced and returns increased. This would involve the improvement of the estate management practices, and the introduction of appropriate modern technologies into the production and processing of palm oil in the project. There would also be a need for the integration of the horizontal components of palm oil processing as well as efficient utilization of palm oil by-products. Finally, there would be a need to improve the labour and financial management of the project.

KEYWORDS: PALM OIL and OIL PALM INDUSTRY-Nigeria; PRODUCTION COSTS; ECONOMICS; OIL PALM-Cultivation.