PALM OIL ABSTRACTS

A. GENERAL: OILS AND FATS

A00015

GUNSTONE, F D. Structure determination from M. E. Chevreul (1786–1889) to the present time via T. P. Hilditch (1886–1965). Chevreul Conference, Toulouse, France, 1990. In Rev. Franc. des Corps Gras 1991 Vol 38 (1–2): 3–6.

The author reviews the contributions of Chevreul and Hilditch to the chemistry of oils and fats. Between 1811 and 1823, Chevreul, using the very limited techniques available, drew a number of very important conclusions on the structure of fats and oils which marked the beginning of the understanding of their nature. Hilditch occupied the Chair of Industrial Chemistry in Liverpool from 1926 to 1951. He was awarded the Chevreul Medal in 1964. When he retired, the structure of most fatty acids was known. The author summarizes his own contributions on some other fatty acids such as vernolic acid. Recent progress is then reviewed, including the impact of new techniques for structural studies, especially ^{13}C NMR.

OILS AND FATS-Analysis FATTY ACIDS NUCLEAR MAGNETIC RESONANCE (NMR)

A00016

YUSOF bin Basiron. Palm oil trade and future prospects. Antwerp Oils and Fats Contact Days 10th. Antwerp, 5–7 June 1991. CP 00570

This paper reviews the increasing influence of palm oil as a major participant in the international oils and fats markets. The versatility of palm oil enables it or its components to be used in most applications of fat products, hence increasing market demand, especially in India, Pakistan and China. The nutritional acceptance of palm oil has improved, supported by the positive results from PORIM's nutrition research projects conducted world-wide. In fact, palm oil is nutritionally superior to many other oils – *e.g.* the tocotrienols it contains are 40 times more effective as antioxidants than the

tocopherols in other oils. The paper also emphasizes that there are land savings to be had from growing oil palm by comparison with other oil crops. By importing palm oil in 1991, India, Pakistan and China collectively saved 4.4 million hectares which could be used for much-needed cereal crops. The paper further postulates that imports of palm oil into the EC in 1990 saved subsidies equivalent to 1.56 million tonnes of oil.

PALM OIL INDUSTRY-Malaysia/OLEOCHEMICAL INDUSTRY-Malaysia/ MARKET DEVELOPMENT

A00017

ANI Bin Arope, Tan Sri Dato Dr. Challenges for the palm oil industry towards the 21st century. PORIM International Palm Oil Conference 'Challenges for the Palm Oil Industry Towards the 21st Century', Kuala Lumpur, 9–14 September 1991. Bangi: PORIM, 1991. CP 00582

This Keynote Address outlines eight challenges which the palm oil industry of Malaysia must face in order to achieve and maintain the product's rightful status as the leading edible oil of the world in the 1990s. These are: reducing and possibly eliminating protectionism; improving marketing and market promotion; increasing the efficiency of production and distribution; fostering greater co-operation among producers; countering competition from other vegetable oils; meeting world demand for oils and fats; overcoming the negative image of palm oil; and promoting downstream activities and value-added products.

PALM OIL INDUSTRY-Malaysia/OILS AND FATS/OLEOCHEMICAL INDUSTRY-Malaysia/MARKET DEVELOPMENT

A00018

MIELKE, T. World oils and fats outlook for 91/92. Antwerp Oils and Fats Contact Days 10th, Antwerp, 5–7 June 1991. In Oil World 1991 Vol 34(23): 185–190.

The paper analyses the following developments: the structural changes in the oils and fats markets, *i.e.* more countries with large production at different times of the year and more growth in demand from developing countries sensitive to prices and short of foreign exchange; decline in oilseed production and export supplies in South America and prospective shift of demand to the USA; bumper rapeseed crop in the EC; prospects for world supply of and demand for oils and fats; and the price outlook.

OILS AND FATS/PRICES/PRODUCTION FORECASTS/WORLD MARKETS

B. OIL PALM

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

B00043

CHEW, L T. Oil palm stems, rubberwood and industrial wood wastes – sources for the manufacture of urea particle-boards. Regional Seminar on Management and Utilization of Agricultural and Industrial Wastes, Universiti Malaya, 21–23 March 1990. Kuala Lumpur: Institute of Advanced Studies, 1990.

Work at the Forest Research Institute of Malaysia (FRIM) has shown that oil palm stems, rubber wood, and industrial wood wastes can be readily utilized for the manufacture of low- and medium-density urea particle-boards. These reconstituted wood products satisfy the British Standards for Type 1 Board for the furniture industry. Single or three-layer urea particle-boards from mixture of these agricultural and industrial wastes could also be manufactured to meet the requirements of Type 1 Board.

OIL PALM STEMS/RUBBER WOOD/PARTICLE-BOARD/PALM WOOD/MALAYSIA/FURNITURE/USES & BY-PRODUCT UTILIZATION

B00044

ABU AZAM Md Yassin; AZMI KAMIS; MOHAMAD Husin. Palm kernel shells as a lost circulating agent for oil-well drilling. Regional Seminar on Management and Utilization of Agricultural and Industrial Wastes, Universiti Malaya, 21–23 March 1990. Kuala Lumpur: Institute for Advanced Studies, 1990.

The feasibility of using palm kernel shells as a lost circulating agent to determine the characteristics required to combat lost circulation was assessed. Tests were also carried out to evaluate the characteristics of the lost circulation materials and the effect of palm kernel shell on the properties of mud. The results showed that palm kernel shells performed better than walnut shells. The effect of palm kernel shells on the properties of the mud was negligible if the pericarp surrounding the shell was properly removed.

OIL PALM NUT SHELLS/PALM KERNELS/ OIL DRILLING/USES & BY-PRODUCT UTILIZATION

B00045

RAO, V; DONOUGH, C R. Preliminary evidence of a genetic cause for the floral abnormalities in some oil palm ramets. Bangi: PORIM 1990. In Elaeis 1990 Vol 2(2): 199–207.

In some ramets of oil palm clones, the normally vestigial gynoecia and androecia of male and female flowers respectively developed abnormally, resulting in floral dysfunction. Such abnormal development has also been observed in the open-pollinated progeny of these ramets. This evidence of, most probably, matroclinal sexual transmission suggested that the abnormalities may have arisen from changes to extra-chromosomal hereditary determinants during tissue culture.

RAMETS/OIL PALM CLONES/*Elaeis guineensis*/TISSUE CULTURE/INFLORESCENCES/BREEDING & GENETICS/ ABNORMALITIES

B00046

SOH, A C. Oil palm breeding: Breeding into the 21st Century. In The Planter 1991 Vol 67(782): 203–215.

Current broad trends and issues regarding the breeding of oil palm (*Elaeis guineensis*) are reviewed in the light of the changing needs of the industry. Aspects covered include: propagation, both from seed and clonal, the latter being considered unsatisfactory due to unfavourable somaclonal variants; breeding objectives, including higher oil yield and quality, short stature, the ideotype and resistance to pests, diseases and abiotic stresses; breeding methodology, notably recurrent selection, and the potential of novel techniques such as marker-assisted selection and genetic transformation; and genetic resources, including *E. oleifera*.

BREEDING & GENETICS/OIL PALM/ *Elaeis guineensis*

C. PALM OIL

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

C00036

CHONG, C N; WANG, C W; HOH, Y M; OOI, C K. 1, 3-Regiospecific lipolytic modification of palm oil fraction. In ASEAN Food Journal 1991 Vol 6(2): 69–75.

An assessment of the lipase-catalysed incorporation of stearic acid into three palm oil products, namely palm oil itself, palm stearin and palm olein, by the 1,3-regiospecific Novo lipase Lipozyme IM20 showed that a complex mixture of triglycerides was produced, as adduced by GLC and HPLC analyses. The stearoyl incorporation resulted in the formation of 40%–50% of disaturated-monounsaturated glycerides, namely distearoyl-oleoyl-glycerol (SOS), palmitoyl-oleoyl-stearoyl-glycerol (POS) and dipalmitoyl-oleoyl-glycerol (POP), whose relative compositions were comparable to that of cocoa butter. The

remaining triglycerides in the modified fats were approximately equal proportions of trisaturated (PPP, PPS SPS, SSS) and monosaturated-diunsaturated (POL, POO, SOO). Thus, appropriate fractionation procedures would have to be devised to separate the desired cocoa butter equivalent components from the complex interesterified palm oil fractions.

PALM OIL FRACTIONS/PALM OIL-Analysis/STEARIC ACID/COCOA BUTTER EQUIVALENTS

C00037

BOEY, P L; TEH, G B; TERAO, J. Oxidative stability of Malaysian palm oil and its blends. In Yukagaku 1990 Vol 39(12): 1045–1049.

The oxidative stability of palm oil and that of its blends were studied by the AOM method. Crude palm oil (CPO), refined, bleached and deodorized (RBD) palm oil, and refined palm kernel oil (RPKO) showed increased oxidative stability after being washed with aqueous sodium hydrogen sulfite (5% w/v). Washing with sodium hydrogen sulfite failed to increase this parameter effectively for soya bean oil. However, when soya bean oil was blended with CPO, RBD palm oil or RPKO, increased oxidative stability was noted. A relationship between the degree of unsaturation and oxidative stability was also observed as follows: a higher degree of unsaturation lowered the oxidative stability and washing with hydrogen sulfite was ineffective for increasing it. The effects of tocopherol and carotene on the oxidative stability of palm oil blends were also examined.

PALM OIL-Analysis/PALM OIL BLENDS/ OXIDATIVE DETERIORATION/PALM KERNEL OIL-Analysis/PALM OIL-Quality

C00038

MA Ah Ngan. Latest developments in the management of palm oil industrial wastes in Malaysia. Workshop on Toxic & Hazardous Waste, Kuala Lumpur, 1–2 July 1991.

In recent years the emphasis in management of palm oil industrial wastes has changed from disposal to beneficial utilization. Cost-effective treatment systems for palm oil mill and refinery effluents have been successfully developed. Palm oil mill effluent is being treated by anaerobic digestion followed by an aerobic/facultative process as a polishing step. Most of the treatment plants are able to produce good quality discharge complying with the Department of Environment's standards in terms of biochemical oxygen demand (BOD). Likewise a very compact and efficient process called sequencing batch reactor (SBR) has been developed for the treatment of palm oil physical refinery effluent. POME contains a high level of plant nutrients and is being increasingly used as a fertilizer or soil conditioner in the plantations. Similarly, the empty fruit bunches are being recycled as mulch in estates or used as fuel where extra energy is required. This paper describes the efficacy of these management systems.

PALM OIL MILL EFFLUENT (POME)/ WASTE TREATMENT/BIOGAS/POME-Treatment/ANAEROBIC DIGESTION/ PONDING SYSTEM/PALM OIL REFINERY EFFLUENT (PORE)

C00039

MD YUSOFF Sudin. Performance of Sahiwal-Friesian growing heifers on different levels of dried palm oil sludge in their concentrate ration. In Malaysian Agricultural Journal 1988 Vol 54(3): 165–171.

The performance of growing heifers given different levels of dried palm oil sludge in their concentrate rations was studied. Concentrates (2 kg per animal daily) contained 0%, 15%, 30% or 65% dried palm oil sludge. The rations were isoenergetic and isonitrogenous. Grass was given *ad libitum*. Animals fed rations with 15% dried sludge showed a performance that was similar in average daily gain, feed efficiency (kg TDN/kg gain) and cost of feed (per kg gain), to that of animals fed a ration without sludge. With 15% sludge,

performance was significantly better than with 30% or 65% sludge.

FEEDS/PALM OIL SLUDGE (POS)/PALM OIL MILL EFFLUENT (POME)

C00040

SALEH, M I; JAB, M S; ABDUL RAHMAN, I; NORASIAH, S. Aqueous extraction of copper and iron from palm oil by ultrasonic cavitation. In Analyst 1991 Vol 116(7): 743–745.

A method for the extraction of Cu and Fe from palm oil into an aqueous solution using a 20kHz ultrasonic probe is described. The acidic aqueous phase was separated from the organic phase through a filter-paper after agitation. The optimum conditions for the extraction were a power of 200W and an agitation time of 4 min with 1.00 mol dm^{-3} HNO_3. A recovery of approximately 98% of 4ppm Cu and Fe from the spiked samples was achieved with a precision of less than 2% relative standard deviation (RSD). The proposed method was compared with standard dry ashing sample preparation and precisions were attained of not more than 5% and 37% RSD for the proposed and standard methods, respectively. A sample preparation time of less than 10 min is possible, and the prepared sample may be readily aspirated into the atomizer of an atomic absorption spectrometer.

PALM OIL-Quality/TEST METHODS/ TRACE METALS/COPPER CONTENT/ IRON CONTENT/PALM OIL-Analysis

C00041

ABDUL AZIS Ariffin; MOHAMAD Sulong. Utilization of palm oil milling wastes for the production of industrial chemicals. Regional Seminar on Management and Utilization of Agricultural and Industrial Wastes, Universiti Malaya, 21–23 March 1990. Kuala Lumpur: Institute for Advanced Studies, 1990.

Biomass generally consists of cellulose, hemicellulose and lignin. Glucose produced by enzymatic catalysis can be converted to alcohol. There are also viable processes for the fermentation of sugars from hemicellulose hydrolysates, which contain both the 5-carbon (pentose) and 6-carbon (hexose) sugars, but the present fermentation technology only allows conversion of the 6-carbon sugars (including glucose) to alcohols. Pentoses cannot be converted by biological means to alcohols, but they can be chemically converted to perhaps more valuable chemicals such as furfural and its derivatives. The palm oil milling process produces a tremendous quantity of biomass as waste in various forms, the most important being the empty fruit bunches, sterilizer condensates, pressed fibre, liquid sludge and, more recently, decanter solids. There is a great potential for utilizing the wastes for the production of important industrial chemicals.

USES & BY-PRODUCT UTILIZATION/ INDUSTRIAL CHEMICALS/PALM OIL MILL EFFLUENT(POME)/BIOMASS/ LIGNINS

C00042

ABDUL GAPOR Mohd Top. Utilization of palm fatty acid distillate (PFAD). Regional Seminar on Management and Utilization of Agricultural and Industrial Wastes, Universiti Malaya, 21–23 March 1990. Kuala Lumpur: Institute for Advanced Studies, 1990. CP 00565

Malaysia is the world's largest producer of palm oil and more than 90% of the oil is processed locally. Palm fatty acid distillate (PFAD) is a by-product of the physical refining of palm oil and its fractions. The availability of PFAD and the need to develop its effective utilization are discussed in this paper. Analytical results on the major and minor components of PFAD and its use as a feedstock for the oleochemical industry are discussed; the potential of PFAD as a source of vitamin E, sterols and squalene is highlighted.

PALM FATTY ACID DISTILLATE (PFAD)/ USES & BY-PRODUCT UTILIZATION/ PALM OIL/VITAMIN E

C00043

BENJAMIN, M; CHEE, K H. Use of dry palm oil mill effluent cake as a fertilizer in oil palm nursery. In The Planter 1991 Vol 67(779): 57–62.

Palm oil mill effluent (POME) cake was evaluated as an inorganic fertilizer substitute in oil palm nurseries. At 4 kg of POME per polybag (*i.e.* 26% of it in the soil mixture), the growth of seedlings was comparable with the standard estate practice using 220g per seedling of compound fertilizer applied over nine months in eleven rounds.

PALM OIL MILL EFFLUENT (POME)/OIL PALM-Cultivation/FERTILIZERS/USES & BY-PRODUCT UTILIZATION

D. ENGINEERING AND TECHNOLOGY

Farm Mechanization. Palm Oil Surveying. Palm Oil Mill Engineering.

D00019

SIDEK, B B. Palm oil extraction by double pressing. In Oléagineux 1990 Vol 45(12): 559–565. In French.

The process consists in pressing the fruits once at low pressure, separating nuts and fibres from the press cake and pressing the fibres alone a second time at high pressure, thus avoiding the risk of breaking the nuts. The process reduced oil losses in fibre, which was reflected in a 2% increase in the oil extraction rate and an increase of around 1% in the kernel extraction rate. In addition, screw and press cage wear was reduced, as was oil contamination by lauric oil. Lastly, with a few adjustments, it was possible to obtain palm oil with a high IV and carotene content for vitamin A extraction.

PALM OIL-Processing & Milling/EXTRACTION/DOUBLE PRESSING/PRESSING

E. NUTRITION

Dietary Fats. Cancer and Carcinogenesis. Coronary Heart Disease.

E00027

MURAKAMI, C; CHIMI, K; KANEMATSU, H; NIIYA, I. Effect of processed oils and fats on cholesterol metabolism; Part 2: Effect of interesterified palm oil. In Yukagaku 1991 Vol 40(2): 114–120.

Five groups of weaning male rats were each fed palm oil, palm olein, their randomly interesterified oils, and soya bean oil as control for 28 days. Comparative studies were made on cholesterol and its metabolites in several tissues and faeces from these groups of rats and on the chemical and physical properties of the palm and interesterified oils.

PALM OIL/FEEDING TRIALS/PALM OLEIN/NUTRITION/CHOLESTEROL METABOLISM

E00028

GURR, M. Nutrition: Oil palm lipids: Edible oils with interesting nutritional attributes. In/Lipid Technology 1991 Vol 3(2): 62–64.

In a sustained campaign against the so-called tropical oils in the USA, palm oil was grouped with the lauric oils (palm kernel and coconut) and categorized as a 'cholesterol-raising saturated fat'. The truth was quite otherwise.

PALM OIL SMEAR CAMPAIGN/NUTRITION/PALM KERNEL OIL/DIETARY FATS/PALM OIL/COCONUT OIL

E00029

WOOD, R; O'BRIEN, B; KUBENA, K; TSENG, S; CROOK, R; MARTIN, G; SHI, J. Effect of palm oil and other dietary fats on serum lipids and lipoproteins: a human study. PORIM International Palm Oil Conference: Progress, Prospects and Challenges Towards the 21st Century, Kuala Lumpur, 9–14 September 1991.

Thirty healthy male university faculty and staff between the ages of 30 and 60 were selected for the study on the basis of family history, blood chemistry results, physical examination, interest in dietary fat and expected travel. The study design

was a modified Latin square, consisting of six diet periods and five groups of subjects. All participants rotated through all six diet periods of six weeks in duration separated by six weeks or more of habitual diet. The six test fats were: RBD palm oil (RPO); crude palm oil (CPO); 80% RBD palm oil and 20% RBD sunflower oil (SPO); RBD sunflower oil; butter; and a hard stick margarine. Test fat diets were designed to contain 40% fat of which 60% was the test fat. This resulted in approximately one fourth of a participant's energy being derived from a single fat source. The test fats were used to prepare food products including ice cream, milk, cookies and muffins where the natural endogenous fat had been removed. The test fats to be used as spreads along with the food products were distributed to the participants and incorporated into their diet according to individualized meal plans. Blood was collected weekly. This included two habitual or baseline samples prior to the start of each diet period. Serum was prepared and analysed on the day of collection for more than 15 components. These determinations included metabolic enzymes, nutrients, minerals, and blood constituents, and were done to assure the health of the participants. Lipid analyses on the serum included total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, and apolipoproteins A_1, B and E. Plasma was also prepared and analysed for thromboxane A_2 and prostacyclin. Serum fatty acid profiles were determined for pooled fifth and sixth week samples for each diet from each participant. Analysis of the diet records indicated that the test fat diets contained 36% to 38% energy as fat, which was not significantly different from the habitual diet level. Only minor differences were observed for carbohydrates and protein content between test fat diets. These results along with good compliance data indicated a very successful incorporation of the test fats into the diets of free-living participants. The quantities of some fatty acids consumed daily did not reflect the percentage distribution of the fatty acids in the serum, whereas the quantity of other fatty acids did show some relation with the serum levels. The consumption of palmitate on the sunflower oil diet was the lowest of any diet, yet serum palmitate was not significantly different from baseline levels. The highly unsaturated sunflower oil showed the greatest reduction in total serum cholesterol and LDL-cholesterol, but unfortunately HDL-cholesterol and apolipoprotein A_1 were also reduced significantly. Butter caused a small, but significant elevation in total serum cholesterol and LDL-cholesterol, while HDL-cholesterol remained unchanged. The hard stick margarine diet lowered total serum cholesterol significantly, but LDL-cholesterol was not decreased significantly while HDL-cholesterol was lowered relative to baseline values. Blended palm oil and sunflower oil did not produce any change in serum lipids or lipoproteins. Neither refined palm oil nor crude palm oil elevated serum cholesterol relative to baseline values. Refined palm oil increased HDL-cholesterol and decreased apolipoprotein B significantly. Crude palm oil also decreased apolipoprotein B and LDL-cholesterol significantly.

PALM OIL/DIETARY FATS/SERUM LIPOPROTEINS/PALM OIL, RBD/PALM OIL, CRUDE/SUNFLOWER SEED OIL/ SERUM CHOLESTEROL/NUTRITION.

E00030

HAYES, K C; KHOSIA, P. Palm oil fatty acids (palmitate, oleate) have a neutral effect on plasma cholesterol in normocholesterolemic monkeys. PORIM International Palm Oil Conference: Progress, Prospects and Challenges Towards the 21st Century, Kuala Lumpur, 9–14 September 1991.

Two species of monkeys (10 per species) were fed three cholesterol-free purified diets providing 40% of total energy as fat for 6-week periods. The fats were rich in polyunsaturated (18:2), monounsaturated (18:1) or saturated (16:0) fatty acids, and were fed to each monkey in a random sequence. In cebus monkeys, plasma cholesterol concentrations during 18:2-rich diet

intake (118 ± 16 mg/dL) were 17%–19% lower ($p<0.002$) than the concentrations observed during 18:1 (142 ± 19 mg/dL) or 16:0 (145 ± 18 mg/dL) intake. Plasma triglyceride, VLDL cholesterol, and LDL cholesterol concentrations were comparable for all three diets. The subnormal decrease in plasma cholesterol during 18:2 intake was attributable to decreased HDL. Kinetic studies with ^{131}I-labelled native LDL and ^{125}I-labelled methylated LDL revealed 68% receptor-mediated LDL catabolism for all three diet fats. Furthermore, no differences were noted in LDL apolipoproteins (apo) B pool size or LDL fractional catabolic rates (total, receptor-dependent and receptor-independent). By contrast, rhesus monkeys revealed similar plasma, LDL, and HDL cholesterol concentrations for all three diets. Thus, by contrast with the case of hypercholesterolemic humans, in which both the 18:2 and 18:1 diets decreased total and LDL cholesterol levels compared to 16:0, all three diets produced identical effects on total and LDL cholesterol concentrations and metabolism in these normocholesterolemic monkeys. Thus, dietary 16:0 and 18:1 appear to be neutral in these monkeys, an impact more in concert with data from normocholesterolemic humans.

PALM OIL/PLASMA CHOLESTEROL/MONKEYS/TRIGLYCERIDES/NUTRITION/DIETARY FATS

E00031

SUNDRAM, K; ABDUL HALIM Hassan, Dato' Dr Hj; OTHMAN Hj Siru; HAYES, K C. Palmitic acid is neutral relative to lauric and myristic acids in its effects on serum cholesterol in man. PORIM International Palm Oil Conference: Progress, Prospects and Challenges Towards the 21st Century, Kuala Lumpur, 9–14 September 1991.

Recent evidence in animal models has suggested a non-raising effect of palmitic acid on serum cholesterol. This observation was evaluated in a human study using diets enriched in either palmitic acid (PA) or lauric + myristic acids (LMA). Eighteen male volunteers enrolled in a double-blind cross-over study consisting of two periods of four weeks each. Rotating menus were used to cook all volunteer meals using fat blends containing 50% of the fatty acids as saturates and contributed largely by either PA or LMA. The monos and polys were held constant. Diets provided 30 energy per cent as fat calories. Volunteers consuming the PA diet had significantly lower serum total cholesterol (3.96 ± 0.45mmol/L) than those consuming the LMA diet (4.40 ± 0.62 mmol/L). This decrease of 10% in serum total cholesterol between diets was significant. Similarly, the PA diet caused a significant 12.5% lowering of LDL-cholesterol (2.39 ± 0.46 mmol/L) compared with the LMA diet (2.73 ± 0.47 mmol/L) HDL-C was increased 7.5% on the LMA diet. This increase was apparent in the HDL_3 but not in the HDL_2 cholesterol sub-fraction. Cholesterol in other lipoprotein fractions, VLDL and IDL, was not diet-influenced. The PA diet caused an 8.3% increase in serum TG (PA = 1.08 ± 0.37 mmol/L; LMA = 0.99 ± 0.41 mmol/L) and this increase was similarly reflected in VLDL-TG (PA = 0.71 ± 0.31 mmol/L; LMA = 0.65 ± 0.34 mmol/L); TG in other lipoprotein fractions were not diet-influenced. The ratio of LDL-C/HDL-C was lowered 5.2% by the PA diet. These results suggest that compared with both lauric and myristic acids, palmitic acid is neutral in its cholesterolemic effects in man.

NUTRITION/PALMITIC ACID/LAURIC ACID/MYRISTIC ACID/SERUM CHOLESTEROL

E00032

ABEYWARDENA, M Y; MCLENNAN, P L; CHARNOCK, J S. Dietary modification of cardiac eicosanoids. PORIM International Palm Oil Conference: Progress, Prospects and Challenges Towards the 21st Century, Kuala Lumpur, 9–14 September 1991.

The relationship between dietary fats, lipoproteins and atherogenesis has been recognized for several decades. In contrast, direct experimental evidence for a link between the 'type' of fat in the diet, cardiac

arrhythmia and sudden death emerged only recently. The precise biochemical mechanism for this link was unclear, but changes in the myocardial eicosanoid profile offered a potential explanation. These oxygenated metabolites of C>20 fatty acids were shown to be closely involved in thrombosis, vessel spasm, ischaemic injury, arrhythmogenesis and sudden death. Both cyclooxygenase (CO; PGI_2, TXA_2) and lipoxygenase (LO; LTB_4, LTC_4, LTD_4) metabolites were implicated as key mediators in these conditions. Recent evidence also indicated potent inotropic and vasoactive actions for LTC_4 and LTD_4 through the activation of myocardial calcium channels. To date, no data were available on the effects of dietary palm oil on the production of these compounds. Thus, NBD and RBD palm oils were compared with partially hydrogenated soya bean oil for effects on myocardial CO and LO metabolites in the rat. In an earlier study it was observed that there was selective inhibition of myocardial production of pro-arrhythmic thromboxane A_2 following supplementation of the diet with NBD palm oil. The extent of inhibition (40%) was similar to that seen after feeding fish oil, which had previously been shown to offer great protection against arrhythmogenesis and ventricular fibrillation. These findings suggest that dietary palm oil may also be potentially anti-arrhythmic but further studies will be required to clarify this.

CORONARY HEART DISEASES/EICOSANOIDS/ATHEROSCLEROSIS/THROMBOSIS/DIETARY FATS/NUTRITION

ECONOMICS

Production Costs. Socio-economics. Market Development. Futures Trading.

F00025

KHALID Abdul Rahim. Welfare effects of environmental regulation in an open economy: Malaysian palm oil. P/R 03836.

The impact of environmental regulations on the welfare of Malaysian oil palm growers, crude palm oil processors, and refiners was evaluated in a resource-trade linkage model. The estimated incremental effects of effluent standards and changes have been rather small, except in the case of the growers, but the cumulative effects have been considerable. The impact has been most severe for growers followed by refiners and less for the CPO producers, who were directly regulated.

PALM OIL MILL EFFLUENT (POME)/ ENVIRONMENTAL POLLUTION/AGRICULTURAL TRADE MODELS/OIL PALM-Cultivation/PALM OIL – Processing & Milling

F00026

ABDUL AZIZ Abdul Rahman. Challenges facing our commodities. In The Planter 1991 Vol 67(780): 130–136.

For Malaysia to maintain its competitive edge, it needs to reduce the cost of production, continue to invest in R & D, alleviate the constraints in the smallholder sector, improve marketing strategies and gradually restructure the plantation industry.

AGRICULTURAL COMMODITIES-Malaysia/ECONOMICS/RUBBER/PALM OIL/COCOA/AGRICULTURE AND STATE-Malaysia

F00027

MOHD NASIR Bin Haji Amiruddin. Utilization and techno-economic advantages of Malaysian palm oil. Palm Oil Familiarization Seminar, PORIM Bangi, 17 July 1991. Bangi: 1991. CP 00573

Palm oil is one of the 14 major oils and fats produced and traded in the world. The paper deals with the techno-economic competitiveness of palm oil through its reliability in supply, its price against that of other oils and fats, its versatility in many applications, and the savings in cost when palm oil is used.

OILS AND FATS/PRICES/HYDROGENATION/PALM OIL INDUSTRY-Malaysia/ COST BENEFITS/ PRODUCTION COSTS

F00028

KHEIRI, M S A; MAT RASHID Mat Jaais. A PORIM Country study on Libyan Arab Great Jamahiriya. Bangi: PORIM, 1991. PORIM R TAS 961 00028 LBY 01 91

A TAS visit to Libya was made from 5 to 10 May 1991. Libya is basically a liquid oil market, (oil accounting for 92% of the total market). Palm olein, single or double fractionated, for use in blends with other vegetable oils is the only palm product having some potential for securing a share of this market. About 2000 tonnes of HCNO are imported annually for use in bakery and confectionary products, mainly through European suppliers. About 3000 tonnes of tallow and CNO are imported for making toilet and laundry soaps. The National Company for Soaps & Cleaning Materials has agreed to import 35 tonnes of RBD palm stearin, 60 tonnes of PFAD and 18 tonnes of PKO to conduct plant trials. There is a potential for 3000 tonnes of RBD palm stearin and PFAD and palm kernel oil/olein per annum. There is also a potential for exporting Malaysian toilet soap and soap chips to Libya.

LIBYA/PALM OLEIN/PALM OIL PRODUCTS/MARKET DEVELOPMENT/OILS AND FATS INDUSTRY-Libya/OILSEEDS/OIL MEAL