

PALM OIL ABSTRACTS

A. GENERAL: OILS and FATS

A00013

RATTRAY, J B M. New fats and oils through biotechnology. In *JAOCs INFORM* 1990 Vol 1(11): 945-951.

Biotechnology is affecting several aspects of the fats, oils and related industries, including the modification of genetic characteristics in oilseed plants. This article describes some of these activities, including development of low-linolenic flaxseed.

A00014

SEN GUPTA, A K. Micellar structures and their implication in the chemistry and technology of fats and other lipids. Plenary Lecture presented at Joint Congress of DGF/ISF, Münster, Germany, September 10 1986. In *Fat Science Technology* 1988 Vol 90(7): 251-256.

Different types of micellar structures and microemulsions are described. Both aqueous and non-aqueous systems are considered and their basic similarities as well as basic differences analysed, emphasis being put on the phenomenon of micellar solubilization. Some examples of micelle formation and their implications for the technology of oils and fats are discussed: decithination of soyabean oil; formation of soap micelles during alkaline neutralization of crude edible oils with particular reference to the neutral oil losses; micelles and microemulsions in margarines and butter; formation of inverted soap micelles in neutralized and dried oils with particular reference to the efficiency of bleaching; formation of inverted phospholipid micelles in hexane extracts; solubilization of life enzymes in hexane by their accomodation in inverted micelles; the Lipofrac-Process.

B. OIL PALM

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

B00033

FRIM Research Pamphlet 0103. Utilization of palm stems and leaves: An annotated bibliography. Kuala Lumpur: Forest Research Institute of Malaysia, 1989. 157p R 016: 634.614 FRIM.

This bibliography covers literature on the coconut palm, followed by the oil palm, sago palm, nipah palm, date palm and others. The entries compiled embrace the subject of utilization of palm stems and leaves. Taxonomic or other articles have only been included where they have some relevance to utilization. The palms cited are arranged in alphabetical order according to their botanical names. Vernacular names, where available, are given. The bibliography comes with a subject and author index.

B00034

PIGGOT, C J. Growing oil palms: An illustrated guide. Kuala Lumpur, The Incorporated Society of Planters, 1990. 152p.

This is a management guide to the cultivation of oil palm in the producer countries world-wide. It covers the various aspects of growing oil palm from land preparation to processing. The book carries photo illustrations of palms in many countries and under varying conditions and agronomic procedures.

B00035

HO, J. New prince of palms. In Malaysian Business 1990 11(1-15):74-75.

The oil palm unseats the coconut as the 'Tree of a Hundred Uses'.

B00036

HENDERSON, J ;OSBORNE, D J. Cell separation and anatomy of abscission in the oil palm *Elaeis guineensis* Jacq. In Journal of Experimental Botany 1990 Vol 41(223):203-210.

Shedding of the fruit of the oil palm takes place in two co-ordinated stages. The first, a cell separation event at a pre-defined positionally differentiated abscission zone at the base of the fruit, is followed by further cell separation in peripheral tissue at the junction with the rudimentary

androecial ring and the tepals. The position of the second separation is determined by the age and ripeness of the fruit and the degree of pressure to which it is subjected; it is also dependent upon completion of the first stage. Implications of this unusual two-stage separation process are discussed.

B00037

ALLOTEY, J ;KUMAR, R. Insect pest spectrum of stored palm kernel and the damage caused by them. In Insect Science Application 1988 Vol 9(5) :617-623. P/R 03782.

Assessment of damage to apparently good quality palm kernels by test insect species under laboratory conditions revealed that all the cultures had other pest species due to hidden infestation. The total damage caused by the insects to palm kernels in the experimental jars ranged from 17.5% to 30.9% at the end of a 1-yr storage period. With the exception of test species *Oryzaephilus mercator* (Fauv.) and *Tribolium castaneum* (Herbst) which were predominant in cultures in which they were formally introduced, the other cultures were found to be dominated by *O. mercator*, *T. castaneum*, *Lasioderma serricornis* (F.) and *Cryptolestes ferrugineus* (Steph.). Thus the damage reported above was principally due to these four species. Symptoms of damage to palm kernels by *O. mercator*, *T. castaneum* and *L. serricornis* have been given for the first time and the pest status of the beetle pests associated with stored palm kernel assessed relative to damage caused.

B00038

HORNUS, P. Chemical weeding in adult oil palm circles: Low volume technique. In Oléagineux 1990 Vol 45(6) :299-301.

With a view to keeping production costs down to a strict minimum, whilst ensuring that circles are kept clean enough, and to compensate for the frequent shortage of personnel on commercial plantations, herbicide treatments are used. This technique has to be combined with manual hoeing each every two years to clear away

plant debris from the foot of each palm, as it would hinder fallen fruit collection if it accumulated. Low-volume circle treatment is being adopted, since it reduces the rates applied from 300 to 30 litres per hectare treated. The procedure described in this Advice Note was developed at the plantations belonging to Société Camerounaise de Palmeraies (SOCAPALM) and has been followed for several years. Over 20000 hectares have been successfully treated in this way.

B00039

MARIAU, D; BIKOI, J D. *Monolepta apicicornis* Thomson (Coleoptera chrysomelidae) oil palm root miner in West Africa. Initial results. In *Oléagineux* 1990 Vol 45(7): 316-317.

The *M. apicicornis* larva destroys tissue located between the endodermis and cortex causing the root to dry out where the attack takes place. Over 50% of the root system can be destroyed, causing significant drops in production. Adult emergence is cyclic and in Cameroon, where the observations were made, maximum populations are seen in April and October. The development cycle lasts six months. Larva control is not feasible, but it is easy to deal with adults as they emerge. On the study site, attacks were very severe in the 1970s and have decreased considerably in the 1980s.

B00040

CORBINEAU, F ;ENGELMANN, F; COME, D. Ethylene production as an indicator of chilling injury in oil palm (*Elaeis guineensis* Jacq) somatic embryos. In *Plant Science* 1990 Vol 71(1):29-34.

Somatic embryos of oil palm (*Elaeis guineensis* Jacq.) are very susceptible to chilling injury. The critical temperature is found to be close to 18°C. The development of injury increases with decreasing temperature and with extended exposure to chilling temperatures. Ethylene production is inhibited at temperatures below 18°C; however it is enhanced after transfer of somatic embryos to a warmer temperature (27°C). This chilling-induced

ethylene production decreases with extending chilling treatment. Results obtained suggest that ethylene release after warming chilled tissues could be a good indicator of the severity of chilling injury. Repairing of damage induced by chilling is associated with an increased activity of the enzymatic system (ethylene forming enzyme) which converts ACC to ethylene.

B00041

NOUY, B; ASMADY; LUBIS, R. Effects of competition in North Sumatra in oil palm genetic trials: Consequences for the evaluation of planting material. In *Oléagineux* 1990 Vol 45(6): 253-255.

Competition between trees has been studied on trials on small (4 x 3) and large (5 x 5) elementary plots. It appears that when problems of competition arise, they are due rather more to differing growth than to differing bulk and that the repercussions are more serious for bunch numbers than for mean bunch weight. In the trials on small elementary plots, production can be seriously affected as little as 5 years after planting. For the cumulated period 6-9 years, evaluations of the trees as a whole and those obtained using only inner trees can differ by more than 10%. In the trials on large elementary plots, competition between trees has little effect on evaluations made before year 10, but long-term monitoring should be conducted using only inner trees. In addition, as regards ortet choice, the fact that the effect of competition is not taken into account means that the most dominant trees in a row are selected in preference to others.

B00042

HALIMAHTON Mansor; SUDO, K; ISHIHARA, M. Preliminary studies on the steam explosion treatment of the oil palm stem. In *Pertanika* 1990 Vol 13(2): 165-170.

Steam explosion was found to be an effective method of improving the enzymatic hydrolysis of cellulose in the oil palm stem. The pretreatment also caused the degradation of hemicelluloses and rendered them water-soluble. By aqueous

extraction of the exploded material, 23-31% hemicelluloses with xylose contents up to 83% after acid hydrolysis could be recovered. This paper also discusses some morphological changes which occurred in the pretreatment.

C. PALM OIL

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

C00032

LOKE Kwong Hung; HAMIRIN Kifli; ABDUL HALIM Hassan, Dato Dr Hj. The chemurgy of palm fruit oils. Symposium Kimia Analisis Kebangsaan ke Empat, UPM Serdang, 4 - 6 September 1990. CP 00547.

An overview of the chemurgy of palm fruit oils is presented, with examples of how the building blocks of the oleochemical industry such as fatty acids, methyl esters, fatty alcohols and fatty amines can be derived from them, and an account of the conversion of these building blocks into downstream products. Mention is made of PORIM's R&D in these areas as well as PORIM's perceptions of how the palm-based oleochemical industry will develop in the future.

C00033

OH, Flingoh C H. Measurement of surface tension of palm oil: Application of physics methodology. National Physics Symposium 1990, 25 August 1990, Kuala Lumpur. CP 00561.

The surface tensions of palm oil, palm olein and palm stearin were measured using a Krauss Digital-Tensiometer. The measurements themselves were straightforward. However, some thought and some precautions were required in the setting-up of the instrument and in establishing the procedure. The paper discusses the following topics: temperature calibration; cleanliness of the measuring ring and the glass container; tempering block; comparison with published data; reproducibility and repeatability of

measurement; extending the upper temperature limit; and establishing the lower temperature limit. The measurement of surface tension is one of many examples of the application of physics methodology in the palm oil industry.

C00034

SILROY, S; BHATTACHARYYA, D K. Cooling curve characteristics of some interesterified fats, hydrogenated fats and their blends. In JOTAI 1989 Vol 21(2): 31-33.

It was possible to use cooling curves to identify transesterified and hydrogenated fats and their blends used in vanaspati manufacture. Hydrogenated fats had a distinct supercooling point and solidification point and a characteristic rise in temperature. The transesterified (interesterified) palm and rice bran oil mixture had no supercooling or solidification point, but did have an insignificant rise in temperature, possibly related to the typical glyceride profile of palm oil. There was no rise in temperature in the transesterified fat at a bath temperature of 0°C - 5°C.

C00035

KLAGGE, P; GUPTA, A K S. Quality aspects of palm oil. In Fat Science Technology 1990 Vol 92(8): 315-319. In German.

The quality of crude palm oil of different origins is surveyed. The influence of transport and storage conditions on hydrolytic and oxidative deterioration is discussed. The effect of the crude oil quality on the quality parameters of the refined oil is demonstrated on the basis of colour, stability towards oxidation, and keepability in general. Some of these correlations are shown graphically.

D. ENGINEERING AND TECHNOLOGY

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

D00018

HO, C C; TAN, Y K. Comparison of chemical flocculation and dissolved air flotation of anaerobically treated palm oil mill effluent. In *Water Research* 1989 Vol 23(4): 395-400.

The chemical flocculation and the dissolved air flotation processes for the secondary treatment of the anaerobically digested liquor of palm oil mill effluent (POME) were investigated and compared. The dissolved air flotation method was more efficient than chemical flocculation in an all-round removal of pollutants from the digested liquor. Even though both methods were able to achieve a 97% removal of the suspended solids of the digested liquor, the removal of soluble matter of inorganic and organic origins was far from satisfactory. This is in general agreement with the recognized view of the superior efficiency of biological methods over physico-chemical methods in treating soluble substances. An explanation of the observed behaviour of the digested liquor in the presence of aluminium salt and polymeric flocculant in terms of the solution chemistry of polyelectrolyte and hydrolysable metallic cations was attempted.

E. NUTRITION

Etiary Fats. Cancer and Carcinogenesis. Coronary Heart Diseases.

E00026

NG, T K W; ISHAK, R; ABDUL GAPOR Mohd Top; LOH, C K. Effects of tocotrienol-rich and tocopherol-rich fractions from palm oil on serum lipids and platelet aggregation in the rat. In *ASEAN Food Journal* 1990 Vol 5(4): 165-169.

The addition of either a tocotrienol-rich or a tocopherol-rich fraction to vitamin E-stripped RBD palm oil at levels of 2 000 ppm or 20 000 ppm, before incorporation

into a hypercholesterolaemic diet (at 40 energy %) led to marginal (7-9%) reductions in serum total cholesterol in male Sprague-Dawley rats after 10 weeks of feeding. However, serum LDL-cholesterol, HDL-cholesterol and triglyceride concentrations were unaffected by these vitamin E components. Some anti-thrombotic effect, as indicated by a reduced platelet ATP release reaction, was obtained with the tocotrienol-rich fraction but this was only apparent at the higher dietary level of the test material used, *viz.* about 38 mg per rat per day. The results indicated that this beneficial effect was primarily attributable to the tocotrienol component in palm oil.

F. ECONOMICS

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

F00024

BASTIN, G. Indonesia's dilemma. In *Oils and Fats International* 1990 5: 21 - 23.

Indonesia has been exporting crude palm oil and palm kernel oil in increasing quantities in the recent past. Exports of CPO and PKO in 1989 totalled 921 291 tonnes, valued at US\$495 386 000 - up by 8% in volume, though down by 11.7% in value. In the next few years, the country will maintain its export potential. It is projected that palm oil exports will rise to 806 000 tonnes in 1995. This projection is based on the assumption that production will grow at a faster rate than consumption. Production should rise by 14.1% in 1990 and 1991, but could slow thereafter as the bulk of the acreage reaches maturity. Domestic consumption is projected to rise only by 5% annually in the next six years. With low cost production and the potential of excess supply, the country is poised to move into downstream processing.