

Recovery and Purification of Carotenes, Tocopherols and Tocotrienols without Changing the Glyceridestructure of the Oil

P Møller, Poul Møller Engineering Consultancy, Aarhus, Denmark
S Peter, University of Erlangen, Erlangen, Germany
E Weidner, University of Bochum, Bochum, Germany
B Holm-Jensen, Daka amba. Løsning, Denmark

Carotenes and tocotrienols from Palm Oil are biologically superior to synthetic carotene and tocopherols respectively, and they therefore carry significantly higher prices, at present 190\$/kg 30% carotenes and 1.700\$/kg 90% trienol. They are recovered via the methylester route by molecular distillation at high temperatures. Thus their small amount has to carry the production cost plus the devaluation of the oil.

Palm oil contains 500-700 ppm carotenes and 600-1000 ppm tocos, about 70% of the latter are trienols. Species containing a multiple of carotenes are in progressing.

Predegummed oil is submitted to a liquid/liquid extraction at 90°C to get the minors out of the oil directly. Among the solvents examined formylmorpholine was found to perform best. Fast phase separation and sufficient difference of specific gravity allow multistage columns to be applied. After six stages including reflux the extract had 3 wt% of carotene; higher concentrations can be obtained by crystallisation.

In the same process the tocos are concentrated to about 6 wt%. It was found that the solvent extracts tocotrienols in preference to tocopherols. Thus it was possible to reach 92% tocotrienols of total tocos, i.e. pharmaceutical grade. The yield was > 90% of theoretical. Using the prices mentioned the value of the oil will double or more. The cheaper tocopherols are recycled to regain the oxidative stability of the oil.

Daka, a major Scandinavian rendering company has built a pilot plant with a capacity of 500 to 1000 kg/hr. for upscaling and demonstration of the processes. They are covered by world wide patents and are considered as the first proposal to extract the minor components leaving the palm oil in its natural structure.

Other tropical oils contain unsaponifiables of a similar molecular composition as tocopherols, e.g. sheabutter and hard butters as illipé butter. They may be extratable by a modified process.

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