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(71) Applicant (for all designated States except US):
CAROTECH SDN.BHD. [MY/MY]; Lot 56442, 7/12 Mile, Jalan Ipoh Chemor, 31200 Chemor, Perak (MY).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BRUNNER, Gerd** [DE/DE]; Hagedornstrasse 24, 20149 Hamburg (DE). **GAST, Kai** [DE/DE]; Peiffersweg 7, 22307 Hamburg (DE). **CHUANG, Meng-Han** [—/DE]; Alter Postweg 26, 21075 Hamburg (DE). **KUMAR, Sendil** [IN/DE]; Adolf-Wagner-Strasse 10, 21073 Hamburg (DE). **CHAN, Philip** [DE/DE]; Flottkamp 38a, 24568 Kaltenkirchen (DE). **CHAN, Wan, Ping** [MY/MY]; 51 Jalan Chin HWA, Taman Chateau, Ipoh, 30250 Perak (MY).

(74) Agent: **FLECK, Thomas**; Geffckenstrasse 6, 20249 Hamburg (DE).

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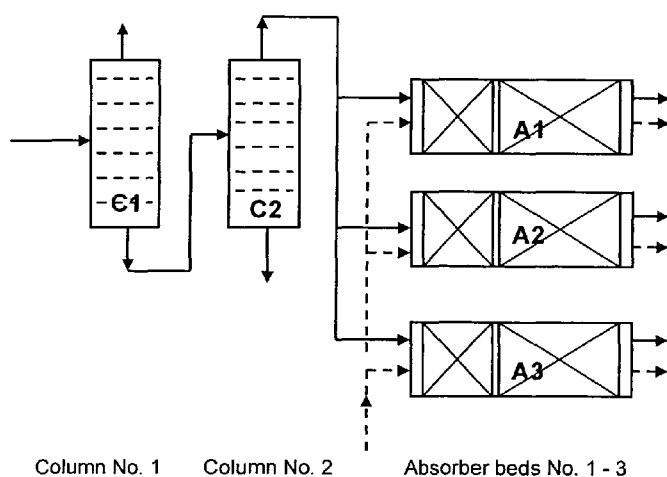
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(54) Title: PROCESS FOR PRODUCTION OF HIGHLY ENRICHED FRACTIONS OF NATURAL COMPOUNDS FROM PALM OIL WITH SUPERCRITICAL AND NEAR CRITICAL FLUIDS



(57) Abstract: From palm oil valuable compounds like the tocopherols, carotenoids, phytosterols, and others can be derived. Enrichment to highly concentrated fractions is hindered by the enormous number of components involved, the very low volatility, the very low solubility of many of the compounds in organic solvents, and the high viscosity of the mixtures to be processed. Starting materials for the new process are enriched fractions of tocopherols (about 20 to about 50 wt.-%) and/or carotenoids (about 10 to 30 wt.-%) from palm oil obtained by conventional processes, or by counter current multistage processes with supercritical carbon dioxide. These processes, not addressed here, may comprise: Removal of free fatty acids, transesterification of the triglycerides to methyl or ethyl esters, removal of the esters, e.g. by short path distillation, separation of the tocopherol fraction

from the carotenoid fraction by cooling. In the new process, fractions derived from crude palm oil, already enriched to some extent in tocopherols, carotenoids, phytosterols, and others, are being treated by supercritical fluid technology in a unique combination of counter current separation with selective adsorption and desorption using supercritical fluids. A first enrichment, comprising one or more separation steps by application of a near critical or a supercritical fluid in a single or multistage (counter current) separation process is combined appropriately with a second enrichment step wherein the product of the first enrichment step is directly adsorbed on an adsorbent (silicagel) by passing the product flow over a fixed bed of adsorbent without substantial pressure change, and subsequent desorption with the same (or an other) near critical or supercritical fluid at the same or a different pressure as in the first separation, or by a pre-designed sequence of pressures and temperatures. For the tocopherol enrichment, carbon dioxide at near critical conditions above the critical temperature of carbon dioxide is used. For the carotenoid enrichment, propane at near critical conditions below the critical temperature of propane is used.

WO 2007/090545 A1



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