

Enrichment of minor components from crude palm oil and palm-pressed mesocarp fibre oil via sequential adsorption-desorption strategy

ABSTRACT

Crude palm oil (CPO) and palm-pressed mesocarp fibre oil (PPMFO) consist of minor components such as Vitamin E, phytosterols, squalene, and carotene that play numerous health function in human. However, limitations are present in current separation processes to separate or enrich minor components from plant sources. In this study, interest is focusing on the enrichment efficiency of the minor components from CPO and PPMFO through proposed sequential adsorption-desorption strategy. The strategy started with the adsorption-desorption properties evaluation of six adsorbents. Both Diaion HP20 and Sepabeads SP850 showed better adsorption-desorption properties than silica gel, Florisil, Diaion HP2MG and Amberlite XAD-7HP. Diaion HP20 was selected as the suitable adsorbent to perform a series of selective desorption process using three different solvents: methanol, IPA, and n-hexane in Soxhlet extraction. Vitamin E, phytosterols, and squalene from CPO were obtained in the 1st fraction using methanol solution and their concentration increased from the initial concentration with the enrichment factor (EF) of 3.4, 3.9, and 1.8, respectively, which slightly higher than those minor components obtained from PPMFO, 1.2, 1.8, and 1.4, respectively. The carotene from both CPO and PPMFO was enriched in the 3rd fraction by using n-hexane solution with an enrichment factor of 1.1 and 1.5, respectively. In conclusion, the obtained result revealed the efficiency of the proposed sequential adsorption-desorption strategy to enrich the minor components from CPO and PPMFO.

Keyword: Minor components; Crude palm oil; Palm-pressed mesocarp fibre oil; Adsorption-desorption