

Extraction and purification of phytosterols mixture from Palm Fatty Acid Distillate (PFAD) using multistage extraction processes

ABSTRACT

Phytosterols are among the bioactive compounds naturally present in vegetable oils and their by-products or derivatives. A phytosterol resource (PSR), solid by-product from the extraction of vitamin E in palm fatty acid distillate (PFAD), contains 2%-4% (w/w) total sterols. Therefore, the extraction of phytosterols from the PSR in a mini-pilot scale involving multistage extraction processes was developed to recover the valuable minor component. The multistage extraction and purification processes comprised of solid-liquid extraction (SLE) with hexane at 35°C in 1 hr, saponification reaction at the reflux temperature of 80°C for 1 hr, liquidliquid extraction (LLE) with hexane and water, and crystallisation and vacuum filtration at -5°C for 20 hr. On average, gas chromatographic (GC) analysis showed the phytosterols recovered from the extraction and purification process had more than 80% purity. The recovery of total sterols from the PSR was 84% composed of β -sitosterol (21%-22%), campesterol (13%-20%) and stigmasterol (59%-64%). This extraction process is technically feasible to extract and produce crude phytosterols from a PFAD by-product.

Keyword: Multistage extraction; Palm Fatty Acid Distillate (PFAD); Palm oil by-product; Phytosterols