Comparison of hydro‑distillation, hydro‑distillation with enzyme‑assisted and supercritical fluid for the extraction of essential oil from pineapple peels

ABSTRACT

Pineapple peel is a potential feedstock for the extraction of essential oil due to the presence of aromatic compounds. To extract the essential oil from pineapple peels, three different methods were applied, i.e., (1) hydro-distillation (HD); (2) hydro-distillation with enzyme-assisted (HDEA); and (3) supercritical fluid extraction (SFE). SFE had successfully produced an essential oil with the yield of 0.17% (w/w) together with 0.64% (w/w) of concrete, whereby the HD and HDEA had only produced hydrosols with the yield of 70.65% (w/w) and 80.65% (w/w), respectively. Parameters' optimization for HD (substrate to solvent ratio, temperature, and extraction duration) and HDEA (cellulase loading and incubation duration) significantly affected the hydrosol yield, but did not extract out the essential oil. This is because only SFE had successfully ruptured the oil gland after observed under the scanning electron microscope. The essential oil obtained from SFE composed of mainly propanoic acid ethyl ester (40.25%), lactic acid ethyl ester (19.35%), 2-heptanol (15.02%), propanol (8.18%), 3-hexanone (2.60%), and butanoic acid ethyl ester (1.58%). In overall, it can be concluded that the SFE had successfully extracted the essential oil as compared to the HD and HDEA methods.

Keyword: Essential oil; Hydro-distillation; Hydro-distillation with enzyme-assisted; Pineapple peels; Supercritical fluid extraction