

Extraction of carotenoids from crude palm oil using silica based normal phase column chromatography

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Over several decades various methods have been used in order to recover carotenoids from Crude Palm Oil (CPO), which include saponification, selective solvent extraction, trans-esterification followed by molecular distillation and further purification by adsorption using synthetic resins, silica gel, reverse phase C18 silica, adsorption chromatography and membrane technology. However, it is found that the recovery of carotenoids from CPO is difficult, inefficient and at higher cost in most of the reported methods. In this research, carotenoids from CPO was successfully extracted by using normal phase column chromatography using commercially available silica gel as the adsorbent. Transesterification, saponification by 10% (w/v) methanolic KOH with and without solidification of fatty acids were used as chemical conversion methods prior to extraction. All three methods produced more than 90% carotene recovery. The highest carotene concentrates was achieved when 10% methanolic KOH was used for saponification. The optimum solvent system for the extraction of carotenoids from chemically altered CPO was found as 10% acetone in hexane. The characterization of the product was done by UV-visible spectroscopy considering the characteristic absorption bands at 448 and 472 nm for β -carotene. Here, it requires minimum amount of solvent for the extraction because the first elution component is carotenoid, which is an advantage compared to the above methods in terms of cost and time. Therefore, it indicates that the present method can be used as an efficient and economical way to recover carotenes from chemically altered crude palm oil.

Keywords: crude palm oil, carotene extraction, normal phase column chromatography

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