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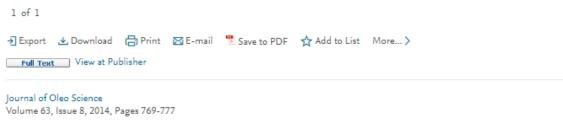
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Co-solvent selection for supercritical fluid extraction of astaxanthin and other carotenoids from Penaeus monodon waste (Article)

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In recent years, astaxanthin is claimed to have a 10 times higher antioxidant activity than that of other carotenoids such as lutein, zeaxanthin, canthaxanthin, and  $\beta$ -carotene; the antioxidant activity of astaxanthin is 100 times higher than that of  $\alpha$ -tocopherol. Penaeus monodon (tiger shrimp) is the largest commercially available shrimp species and its waste is a rich source of carotenoids such as astaxanthin and its esters. The efficient and environment-friendly recovery of astaxanthins was accomplished by using a supercritical fluid extraction (SFE) technique. The effects of different co-solvents and their concentrations on the yield and composition of the extract were investigated. The following co-solvents were studied prior to the optimization of the SFE technique: ethanol, water, methanol, 50% (v/v) ethanol in water, 50% (v/v) methanol in water, 70% (v/v) ethanol in water, and 70% (v/v) methanol in water. The ethanol extract produced the highest carotenoid yield (84.02  $\pm$  0.8  $\mu$ g/g) dry weight (DW) with 97.1% recovery. The ethanol extract also produced the highest amount of the extracted astaxanthin complex (58.03  $\pm$  0.1  $\mu$ g/g DW) and the free astaxanthin content (12.25  $\pm$  0.9  $\mu$ g/g DW) in the extract. Lutein and  $\beta$ -carotene were the other carotenoids identified. Therefore, ethanol was chosen for further optimization studies. © 2014 by Japan Oil Chemists' Society.

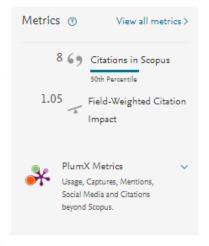
#### Author keywords



#### Chemicals and CAS Registry Numbers:

alcohol, 64-17-5; astaxanthin, 472-61-7; beta carotene, 7235-40-7; canthaxanthin, 514-78-3; xanthophyll, 127-40-2, 52842-48-5; astaxanthine; beta Carotene; Canthaxanthin; Ethanol; Lutein; Solid Waste; Solvents; Xanthophylls

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