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Extraction of astaxanthin from shrimp (*Parapenaeus longirostris*) waste in sunflower oil

Toni Jurić Šolto[1], Martina Čagalj[1], Danijela Skroza[2], Ivana Generalić Mekinić[2], Vida Šimat[1]*

[1]University Department of Marine Studies, University of Split, Ruđera Boškovića 37, 21000 Split, Croatia

[2]University of Split, Faculty of Chemistry and Technology, Ruđera Boškovića 35, 21000 Split, Croatia

*vida@unist.hr

AIM: Astaxanthin, a powerful antioxidant carotenoid pigment, occurs naturally in marine organisms, including shrimps, crabs and microalgae. It has a range of beneficial biological potentials, namely antioxidant, anti-inflammatory and anti-cancer activities. Astaxanthin can be extracted from the shells and waste of shrimp and other crustaceans by methods such as solvent extraction, enzymatic extraction, supercritical fluid extraction, etc.

Can it be extracted in cold pressed edible oil which would increase it safe use in food products?

MATERIALS & METHODS

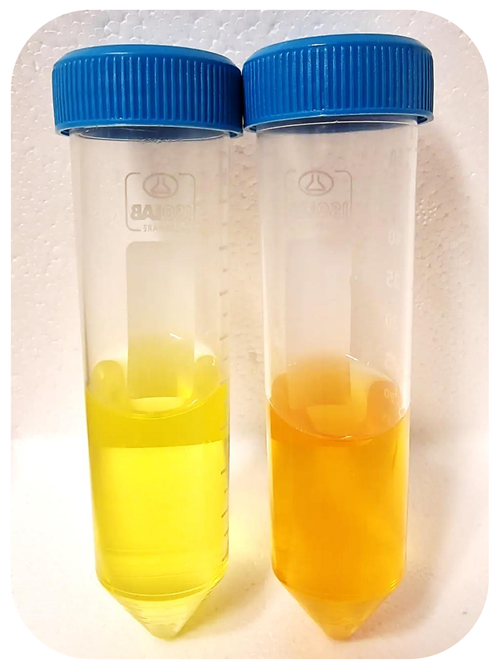
This study used three different methods to extract astaxanthin from shrimp (*P. longirostris*) waste.

The shrimp waste was freeze-dried, ground and extracted in cold-pressed sunflower oil: i) in a water bath at 40 °C and 60 °C for 1, 2 and 3 hours; ii) with continuous stirring at room temperature for 6 hours; and iii) using ultrasound-assisted extraction (UAE) at 40 kHz, 40 °C and 60 °C for 15, 30 and 45 minutes.

After extraction, the oils were centrifuged and filtered to remove the shrimp waste.

The amount of astaxanthin was measured by spectrophotometric analysis, and the results were expressed in μg astaxanthin/mL oil.

"Sunce Vinkovaca" cold pressed sunflower oil	Ratio 1:10	Time	Astaxanthin (μg/mL)
In water bath	40 °C	1h	2,66 ± 0,90
		2h	2,96 ± 0,01
		3h	1,97 ± 0,01
	60 °C	1h	2,84 ± 0,08
		2h	2,46 ± 0,13
		3h	2,98 ± 0,15
Mixing at room temperature	RT	6h	3,13 ± 0,03
Ultrasound-assisted extraction	40 °C	15 min	2,63 ± 0,00
		30 min	2,83 ± 0,00
		45 min	2,97 ± 0,00
	60 °C	15 min	2,91 ± 0,00
		30 min	3,68 ± 0,01
		45 min	4,03 ± 0,00



CONCLUSIONS

This result indicates that UAE is more efficient and less time-consuming in extracting higher concentrations of astaxanthin from shrimp waste, which could improve the economic and environmental sustainability of shrimp waste's utilization.

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