

The stability of astaxanthin extracted from shrimp (*Parapenaeus longirostris*) by-products under different storage temperatures

Martina Čagalj^{1*}, Toni Jurić Šolto¹, Vida Šimat¹

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

*mcagalj@unist.hr



Can astaxanthin stay stable in cold pressed edible oil and at what temperature?

Astaxanthin is a carotenoid with strong antioxidant properties, but it is chemically unstable when exposed to oxygen, light, and temperature because of its highly conjugated double-bond structure. Also, it's stability is influenced by the type of matrix in which it is stored. When incorporated into cold-pressed, it dissolves well due to its lipophilic nature. The aim of this study was to investigate the stability of astaxanthin extracted from shrimp by-products in cold-pressed sunflower oil under different storage temperature: i. room temperature (RT), ii. refrigerated at $4 \pm 2^\circ\text{C}$ and iii. freezed at -18°C . All samples were kept in the dark to eliminate the effect of light.



MATERIALS & METHODS

The shrimp (*P. longirostris*) by-products were freeze-dried and ground. The powder was extracted by ultrasonic-assisted extraction (UAE) in "Sunce Vinkovaca" cold pressed sunflower oil (1:10) at 60°C for 30 min and filtered. The samples were stored for 31 days (one month) and the concentration of astaxanthin in the oils was measured spectrophotometrically at 479 nm against astaxanthin standard at regular intervals, the results were expressed in μg astaxanthin/mL oil.

	Temperature	Storage	Storage day								
			0	3	6	10	13	17	21	24	31
Ultrasound-assisted extraction (30min)	40°C	Dark, RT	3.57 ± 0.01	3.60 ± 0.00	3.47 ± 0.03	3.48 ± 0.00	3.45 ± 0.02	3.43 ± 0.01	3.47 ± 0.02	3.46 ± 0.00	3.47 ± 0.01
			2.58 ± 0.00	2.72 ± 0.03	2.51 ± 0.00	2.49 ± 0.00	2.52 ± 0.01	2.45 ± 0.00	2.59 ± 0.14	2.63 ± 0.15	2.55 ± 0.01
		Fridge, 4°C	2.32 ± 0.01	2.73 ± 0.01	2.46 ± 0.01	2.32 ± 0.01	2.32 ± 0.01	2.27 ± 0.00	2.21 ± 0.01	2.43 ± 0.01	2.11 ± 0.03
			2.35 ± 0.01	2.64 ± 0.14	2.58 ± 0.01	2.34 ± 0.01	2.44 ± 0.00	2.51 ± 0.00	2.06 ± 0.01	2.30 ± 0.00	2.10 ± 0.00
		Freezer, 18°C	2.03 ± 0.01	1.94 ± 0.02	2.15 ± 0.01	1.86 ± 0.00	1.84 ± 0.02	1.78 ± 0.03	1.78 ± 0.00	1.76 ± 0.00	1.75 ± 0.00
			2.01 ± 0.01	1.92 ± 0.09	1.93 ± 0.01	1.82 ± 0.00	1.81 ± 0.00	1.75 ± 0.00	1.76 ± 0.00	1.76 ± 0.01	1.74 ± 0.00
	60°C	Dark, RT	4.92 ± 0.01	5.16 ± 0.27	5.00 ± 0.01	4.98 ± 0.00	4.98 ± 0.00	4.95 ± 0.01	4.96 ± 0.00	4.95 ± 0.01	4.96 ± 0.00
			4.33 ± 0.00	4.48 ± 0.08	4.34 ± 0.02	4.33 ± 0.00	4.34 ± 0.00	4.32 ± 0.01	4.34 ± 0.00	4.34 ± 0.02	4.36 ± 0.00
		Fridge, 4°C	3.98 ± 0.01	3.60 ± 0.00	3.66 ± 0.00	3.62 ± 0.01	3.77 ± 0.01	3.86 ± 0.00	3.73 ± 0.03	3.67 ± 0.00	3.64 ± 0.01
			3.93 ± 0.00	3.28 ± 0.01	3.36 ± 0.06	3.29 ± 0.00	3.35 ± 0.00	3.37 ± 0.02	3.33 ± 0.00	3.30 ± 0.00	3.27 ± 0.00
		Freezer, 18°C	4.01 ± 0.01	4.50 ± 0.08	4.12 ± 0.03	3.86 ± 0.00	3.91 ± 0.00	3.79 ± 0.00	3.84 ± 0.02	3.82 ± 0.00	3.91 ± 0.01
			3.89 ± 0.00	3.99 ± 0.01	4.06 ± 0.02	3.70 ± 0.00	3.78 ± 0.00	3.51 ± 0.19	3.71 ± 0.00	3.68 ± 0.00	3.68 ± 0.00

RESULTS & CONCLUSIONS

The concentration of astaxanthin in the samples stored in the refrigerator and in the freezer decreased by 9 and 3 %, respectively, by the end of the storage period. Samples stored in the dark at RT showed the best stability, the astaxanthin concentration did not decrease. These results show that the best storage conditions for astaxanthin extracted in vegetable oils are a place in the dark at RT.



This project is part of the PRIMA programme supported by the European Union

This project received funding from the Ministry of Science and Education – MSE.