

The influence of different extraction parameters on the concentration of astaxanthin extracted from shrimp (*Parapenaeus longirostris*) by-products

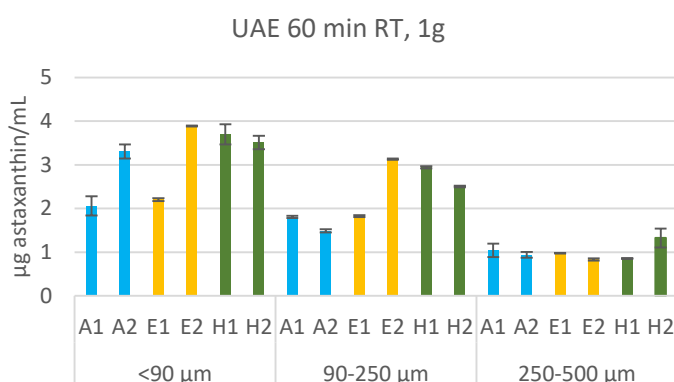
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INTRODUCTION

- Astaxanthin occurs naturally in various marine organisms, particularly shrimps.
- It has beneficial biological potentials as a powerful antioxidant carotenoid pigment.
- The production of shrimp meat generates large amounts of shrimp by-products that can be used for astaxanthin extraction.
- It can be extracted using different extraction methods, including ultrasound-assisted extraction (UAE).

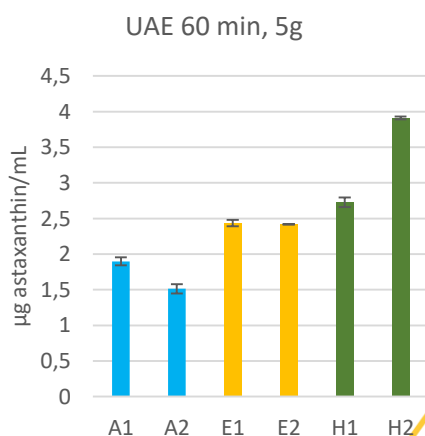
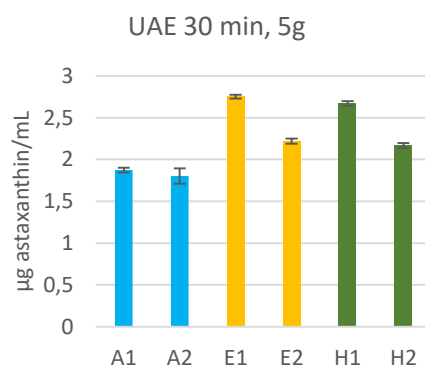
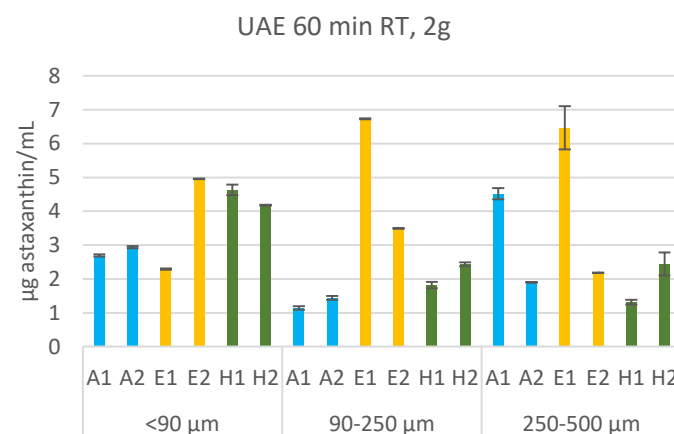
AIM: to investigate the effect of different organic solvents (acetone, ethanol, and hexane) and extraction time on the astaxanthin extraction from shrimp by-products using ultrasound-assisted extraction.



MATERIALS & METHODS

Fresh shrimp waste (cephalothorax and tail shells) was collected from Centaurus d.o.o. Mravince, freeze-dried and homogenized. The powder was sieved, and fractions <90, 90–250, and 250–500 µm were collected. Different mass (1 and 2 g) of the three obtained fractions were extracted in duplicates (1 and 2) in acetone (A), ethanol (E), and hexane (H) (1:10 w:v), using UAE for 60 min at room temperature. The extracted amount of astaxanthin was measured in triplicate spectrophotometrically, and the results were expressed in µg astaxanthin/mL of extract.

Having the highest astaxanthin content, the 90–250 µm fraction was additionally extracted from a larger mass, 5 g of shrimp by-product, following the same protocol. To test the effect of time on the astaxanthin concentration, extractions were performed over 30 and 60 minutes.



RESULTS & CONCLUSIONS

The concentration of astaxanthin ranged from $0,83 \pm 0,02$ to $6,73 \pm 0,02$ µg/mL, with the highest amount recorded in the 90–250 µm fraction when 2g were extracted in ethanol. Overall, ethanol was the best solvent choice for the extraction of astaxanthin for all fractions, when compared to acetone and hexane. The results for 5 g showed that extraction for 30 minutes yielded higher astaxanthin concentration in acetone and ethanol extracts, $1,87 \pm 0,03$ and $2,75 \pm 0,02$ µg/mL, respectively, while astaxanthin concentration was higher in hexane extracts ($3,91 \pm 0,02$ µg/mL) after 60 minutes. It can be concluded that all tested parameters influence the concentration of astaxanthin; thus, solvent choice and extraction time should be considered and further optimized based on the extracts' future use and application (pharmaceuticals, nutraceuticals, food).



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.