



1 Introduction



Crustacean production (2022):

10% of global capture and production from fisheries and aquaculture¹.

The shells represents approximately 47% of the animal. Contains liposoluble compounds (carotenoids)². Approximately 1 kg of molt shell per 100 kg of shrimp will be produced.



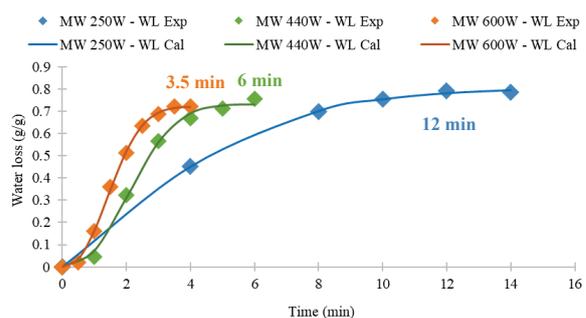
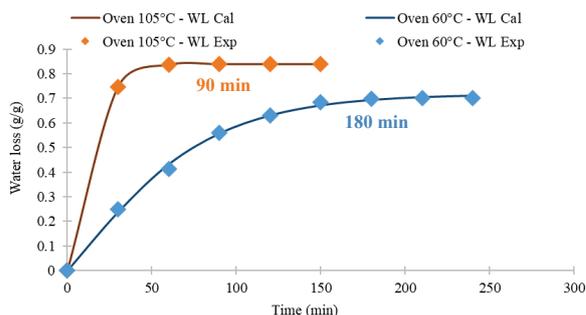
It needs cooking pretreatment to break the association of liposoluble compounds with macromolecules³. The literature has shown good extraction of lipid fraction with supercritical CO₂³.

Microwave pretreatment to increase the extraction yield of bioactive compounds has already been demonstrated with shorter processing time⁴.

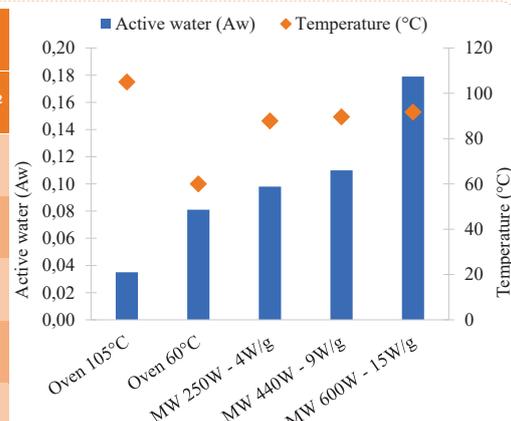


Study of the kinetics of drying *Litopenus vannamei* molt shell with microwaves at different powers to improve extraction yield of lipids and carotenoids (astaxanthin).

3 Results



Process	Pages Model ⁵ : $WL = WL_{\infty}(1 - e^{-kt^n})$			
	WL_{∞}	k	n	$\sum(WL_{exp} - WL_{cal})^2$
Oven 105 °C	0.84	0.017	1.43	$2.87 \cdot 10^{-7}$
Oven 60 °C	0.72	0.007	1.20	$7.81 \cdot 10^{-4}$
MW 250W	0.81	0.133	1.31	$1.99 \cdot 10^{-4}$
MW 440W	0.73	0.106	2.38	$2.18 \cdot 10^{-3}$
MW 600W	0.72	0.256	2.31	$5.09 \cdot 10^{-4}$



4 Conclusions and Future Work

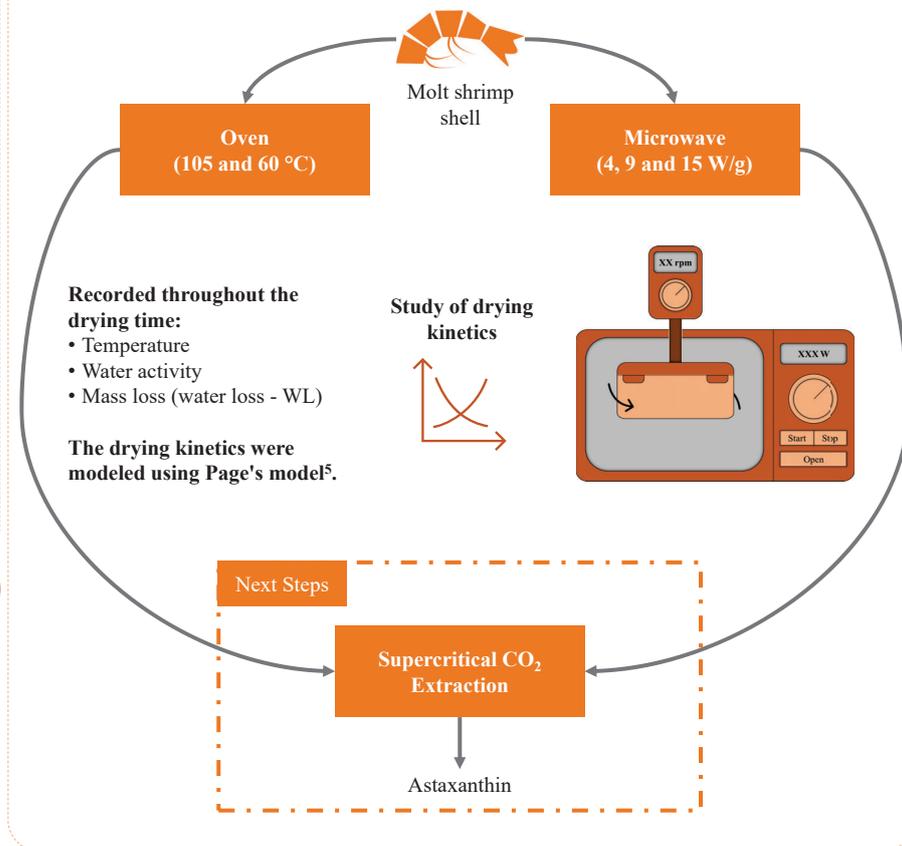
Conclusions:

- Microwaves (MW) decreased the drying time compared to the conventional oven (180-90 min to 12-3.5 min, depending on the power density).
- The oven drying process (105 and 60 °C) fitted Page's model better (variation from experimental result: $7.81 \cdot 10^{-4}$ – $2.87 \cdot 10^{-7}$) compared to the microwave process (variation from experimental result: $2.18 \cdot 10^{-3}$ – $1.99 \cdot 10^{-4}$).

Future Work:

- Dried materials will be extracted with supercritical CO₂ to verify the influence of the pretreatment method on the yield and extract composition.

2 Methods



Reference: ¹FAO, World Food and Agriculture – Statistical Yearbook 2022, FAO, Rome, 2022. ²N. Mezzomo, J. Martínez, M. Maraschin and S. R. S. Ferreira, Journal of Supercritical Fluids, 2013, 74, 22–33. ³N. Mezzomo, B. Maestri, R. L. dos Santos, M. Maraschin and S. R. S. Ferreira, Talanta, 2011, 85, 1383–1391. ⁴K. Sólyom, R. B. Mato, S. I. Pérez-Elvira and M. J. Cocero, Bioresour Technol, 2011, 102, 10849–10854. ⁵Karathanos, V. T., & Belessiotis, V. G., Journal of Agricultural Engineering Research, 1999, 74(4), 355–361.