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STUDY ON IMPROVING THE DECAPSULATION TECHNIQUE OF ARTEMIA CYSTS (*ARTEMIA SALINA*)

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Abstract:

Artemia salina is one of the most important live food sources used in the larviculture of fish and crustaceans. Removal of the cyst chorion can reduce the risk of microbiological contamination and improve their use, thus supporting efforts to refine the decapsulation technique. This study evaluated the effectiveness of several commercial sodium hypochlorite-based products for the decapsulation of *Artemia salina* cysts, focusing on the influence of product type, volume, and exposure time on the degree of decapsulation and hatching rate. Six commercial sodium hypochlorite-based products, free of fragrances or other odorizing agents and with different declared active chlorine concentrations, were tested. Volumes of 100 and 200 mL were used for 5 g cyst samples for a maximum treatment duration of 20 minutes. The degree of decapsulation was assessed after 5, 10, 15, and 20 minutes, while the hatching rate was evaluated after 21 and 26 hours of incubation. The results showed differences among the products and treatment conditions tested. Metro Professional Clor, used at a volume of 100 mL, achieved complete decapsulation after 15 minutes; however, the hatching rate after 26 hours was 34.5%. Aro Clor, used at a volume of 200 mL, achieved 94.44% decapsulation after 20 minutes and a hatching rate of 59.1%. The highest hatching rate, 67.1%, was obtained with Economy Clor at a volume of 200 mL, although the degree of decapsulation was only 30%. From a cost-effectiveness perspective, W5 Clor – Lidl emerged as an advantageous option. The results indicate that decapsulation efficiency depends on the commercial product, the volume used, and treatment duration. A high degree of decapsulation was not necessarily associated with a higher hatching rate, highlighting the need to achieve a balance between chorion removal efficiency, preservation of cyst viability, and treatment cost.

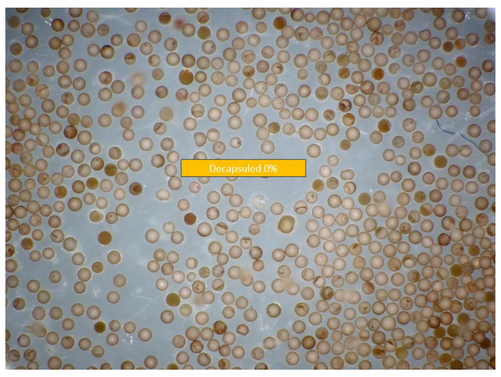
Keywords: live food, fish larviculture

•Material and method

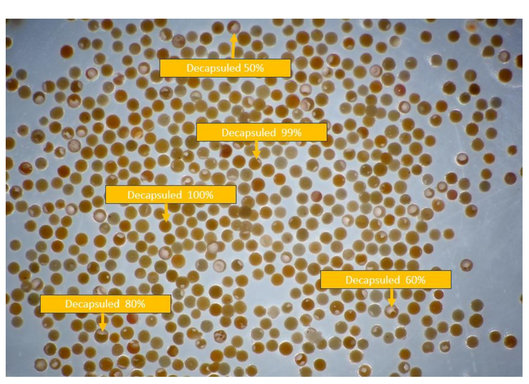
Biological material
Artemia salina cysts
Declared hatching efficiency: >240,000 nauplii/g (HIE >240,000 NPG)

Products used for decapsulation
Commercial sodium hypochlorite-based products, fragrance-free and without added odorizing agents**:** Metro Professional Clor (V1), Aro Clor (V2), Economy Clor (V3), Carrefour Essential Clor (V4), Auchan Clor (V5), W5 Clor – Lidl (V6)..

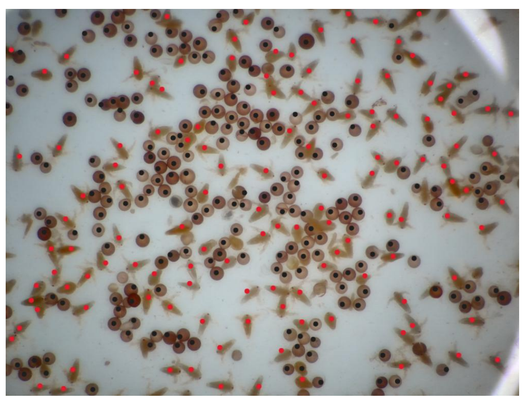
Experimental Procedure
- 5 g of *Artemia salina* cysts per sample
- 3 replicates per experimental variant
- Hydration in 100 mL water for 60 min
- Sodium hypochlorite treatment: 100 mL for V1–V6; 200 mL for V7–V10
- Decapsulation for 20 min under continuous aeration



Evaluation
- Sampling at 5, 10, 15, and 20 min
- Microscopic examination of 90 cysts/variant
- Decapsulation degree expressed as percentage



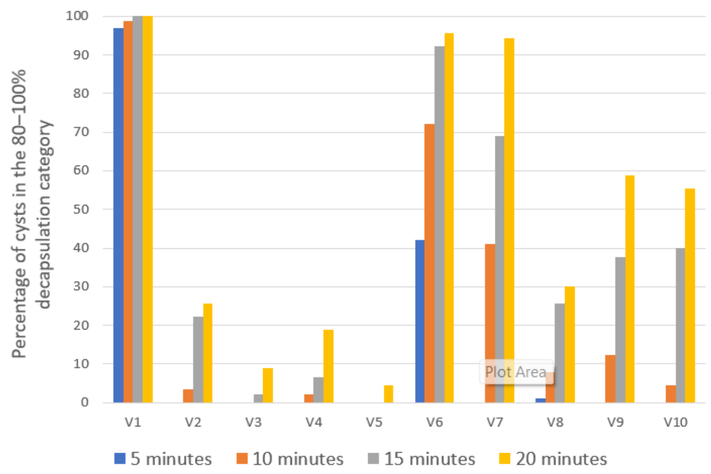
- Incubation in 400 mL of 35‰ saline solution
- Saline water prepared with 14 g non-iodized salt at 28°C
- Hatching evaluated after 21 and 26 h on at least 100 cysts + nauplii



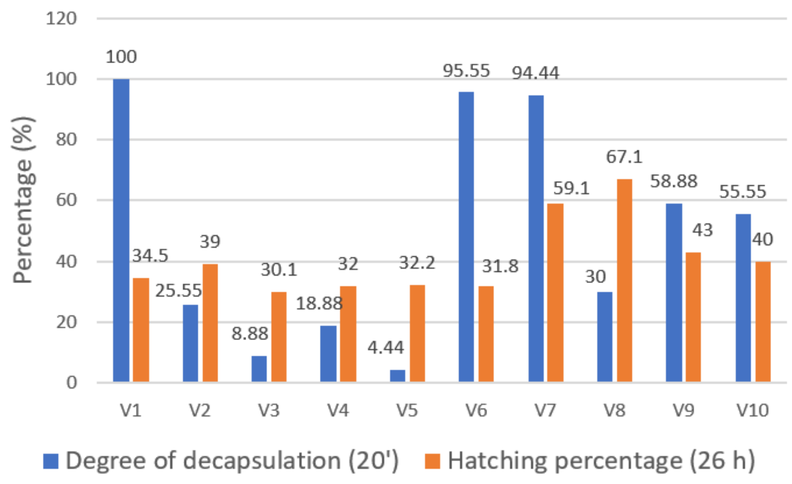
• Results and discussions

Decapsulation degree of *Artemia salina* cysts after 5, 10, 15, and 20 minutes of exposure to commercial sodium hypochlorite-based products.

Variant	Volume of product used (mL)	Decapsulation 80–100% (%)				Decapsulation 60–79% (%)				Decapsulation <60% (%)			
		after 5' of exposure	after 1' of exposure	after 15' of exposure	after 20' of exposure	after 5' of exposure	after 1' of exposure	after 15' of exposure	after 20' of exposure	after 5' of exposure	after 1' of exposure	after 15' of exposure	after 20' of exposure
V1	100	97	98.8	100	100	3	0	0	0	0	1.2	0	0
V2	100	0	3.33	22.22	25.55	0	0	0	0	0	0	5.55	1.11
V3	100	0	0	2.22	8.88	0	0	0	0	0	0	1.11	3.33
V4	100	0	2.22	6.66	18.88	0	0	0	0	0	1.11	2.22	8.88
V5	100	0	0	0	4.44	0	0	0	0	0	0	0	8.88
V6	100	42.2	72.2	92.22	95.55	0	0	0	0	8.88	10	6.66	4.44
V7	200	0	41.1	68.88	94.44	0	0	0	2.22	0	7.77	21.11	1.11
V8	200	1.11	7.77	25.55	30	0	0	3.33	7.77	0	5.55	66.66	4.44
V9	200	0	12.22	37.77	58.88	0	0	1.11	0	0	6.66	7.77	12.22
V10	200	0	4.44	40	55.55	0	1.11	3.33	2.22	0	7.77	10	14.44



Comparison of the percentage of *Artemia salina* cysts classified in the 80–100% decapsulation category according to the experimental variant and exposure time



Comparison of the decapsulation degree of *Artemia salina* cysts after 20 minutes of treatment and the hatching percentage after 26 hours of incubation for the experimental variants analyzed

Hatching percentage after 21 and 26 hours of incubation

Variant	Commercial product used	Volume of product used (mL)	Hatching percentage (%)	
			after 21 h of incubation	after 26 h of incubation
M	Control, without sodium hypochlorite treatment	0	40	50
V1	Metro Professional Clor	100	33	34.5
V2	Aro Clor	100	38	39
V3	Economy Clor	100	29.3	30.1
V4	Carrefour Essential Clor	100	31	32
V5	Auchan Clor	100	32.1	32.2
V6	W5 Clor – Lidl	100	30.6	31.8
V7	Aro Clor	200	45.6	59.1
V8	Economy Clor	200	66.9	67.1
V9	Carrefour Essential Clor	200	32.3	43
V10	Auchan Clor	200	39	40

• Conclusions

The commercial products showed different decapsulation efficiencies, even when similar concentrations of chlorine-based active compounds were declared. Both exposure time and product volume clearly influenced the decapsulation degree, with 200 mL improving the performance of some variants, particularly V7 (Aro Clor). A high decapsulation degree was not always associated with a high hatching percentage. V6 (W5 Clor – Lidl) showed the best cost-to-efficiency ratio, V7 (Aro Clor) provided the best balance between decapsulation and hatching, while V8 (Economy Clor) achieved the highest hatching percentage.