Disinfection of live prey for fish larval feeding using Ox-Aquaculture

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Abstract

The disinfection effect of a hydrogen-peroxide commercial product (Ox-Aquaculture) was tested on rotifer (*Brachionus plicatilis*, S-1 strain) and *Artemia* sp (Utah Strain, INVE), the live prey generally used for larval fish rearing. Dosage and treatment time for both live prey are presented as well as a practical protocol of use of this product in experimental conditions

Introduction

Live prey are the main bacterial input in larval rearing systems. The reduction of this bacterial load is of paramount importance especially at early stages of development when larvae are more prone to bacterial disease, and disinfection of live prey is a good alternative to the use of antibiotics. Rotifers and newly hatched *Artemia* nauplii before being enriched, were used to test the disinfection effects of a hydrogen peroxide-based commercial product (Ox-Aquaculture) and set a practical protocol to be used in an industrial scale.

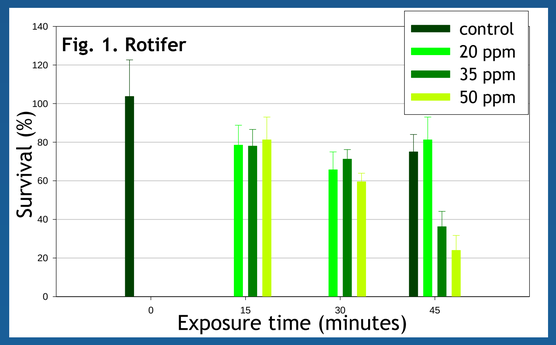
Materials and methods

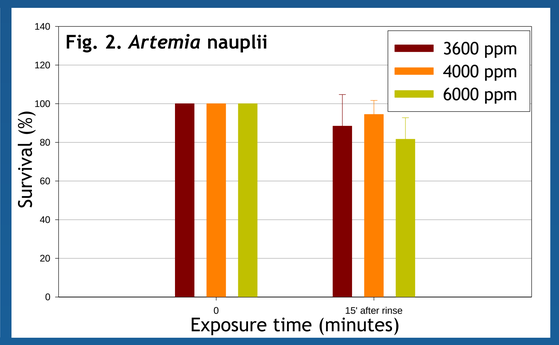
Rotifers and *Artemia* nauplii at a density of 150-200 and 250 ind ml^{-1}, respectively, were maintained at 20ºC in 1.5 litre cylindro-conical flasks with vigorous aeration. A defined quantity of live prey from triplicate control non-treated flasks and from triplicate flasks treated with different doses of the product were harvested, transferred to a hand homogenizer with sterile seawater, homogenized, and plated onto TSA and TCBS covered plates. After 24h incubation at 25ºC, bacterial colonies were quantified by direct count method. The time of exposure to the product and dosage varied among tests. Statistical differences were examined by ANOVA ($p \leq 0.05$) and Tukey post-hoc test.

Results

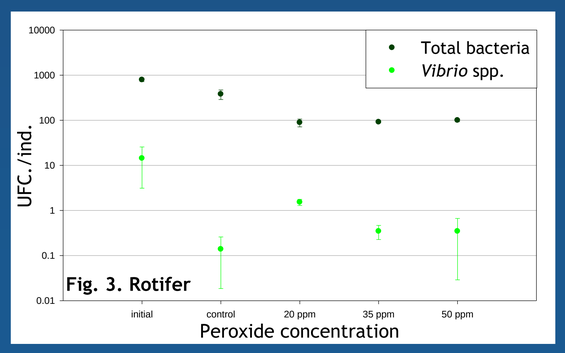
Figures 1 and 2 show the results (mean ± SD, n=3) of live prey survival after treatment with different doses of the product in order to determine the duration of the treatment for rotifers (Fig. 1) and for nauplii (Fig. 2)

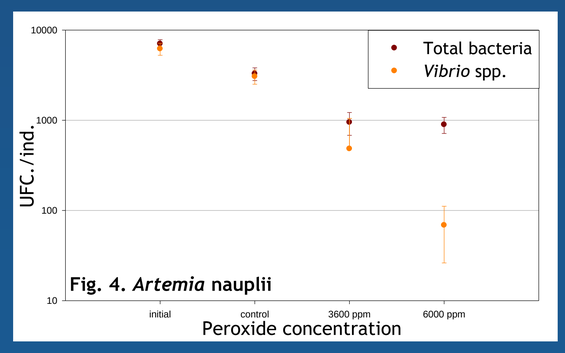
	Ox-Aquaculture doses	Sampling time
Rotifer	20 ppm 35 ppm 50 ppm	Each 15' within 45' of exposure
Artemia nauplii	3600 ppm 4000 ppm 6000 ppm	15' after 5' of exposure and subsequent rinse





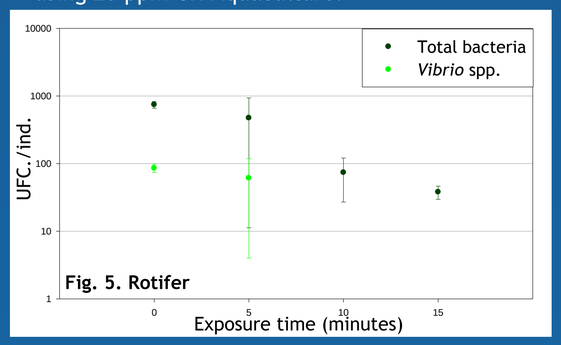
Figures 3 and 4 show the results (mean±SD, n=3) of total bacterial counts and Vibrionaceae (UFC ind^{-1}) after 22 (rotifers) and 5 (nauplii) min treatment with different doses of the product.





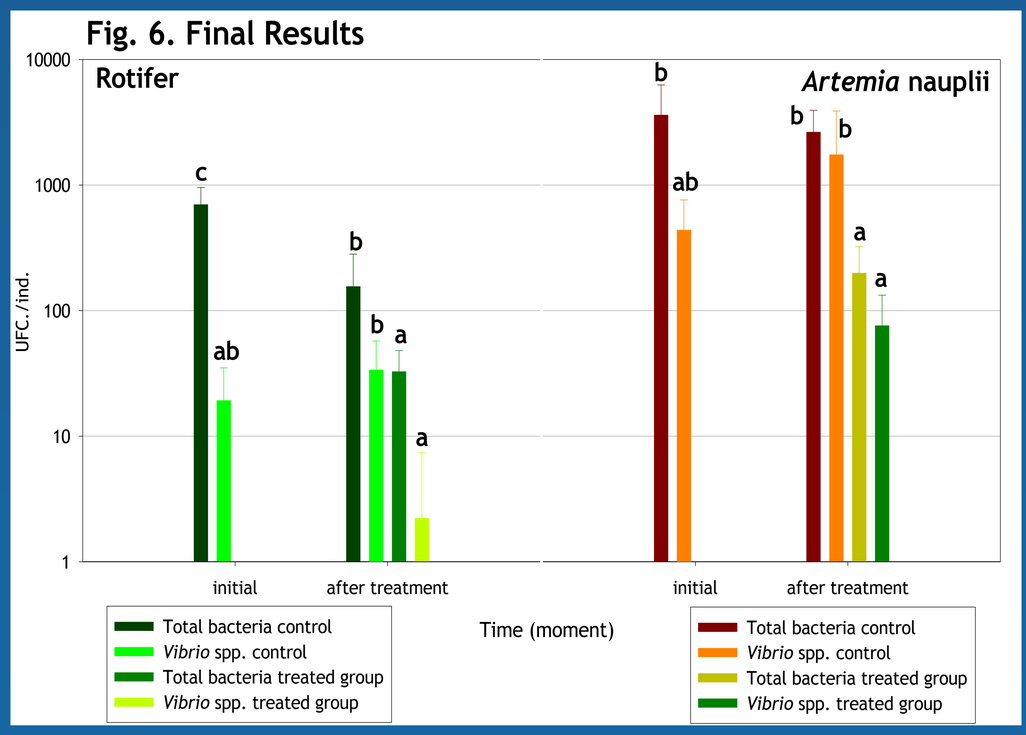
	Ox-Aquaculture doses	Exposure time
Rotifer	20 ppm 35 ppm 50 ppm	22'
Artemia nauplii	3600 ppm 6000 ppm	5'

Fig. 5 shows the results of rotifer disinfection using 20 ppm Ox-Aquaculture.



Final results obtained after 15 min exposure to 20 ppm of the product for rotifers and 5 min exposure to 4000 ppm for nauplii are shown in Fig. 6. In this case the experiment was carried out twice using triplicates for both control and treated groups.

	Ox-Aquaculture dose	Exposure time
Rotifer	20 ppm	15'
Artemia nauplii	4000 ppm	5'



Final Conclusion

The doses and exposure times that did not affect survival of the live prey (80% initial number) and showed to be effective in reducing the bacterial load were selected. In the case of the rotifers 20 ppm and 15 min exposure time were adequate for disinfection (total bacterial reduction was 95.3%, Vibrionaceae reduction was 90 %) whereas for *Artemia* nauplii 4000 ppm and 5 min exposure time provided the best results (total bacterial reduction was 94.5%, Vibrionaceae reduction was 82.8%). Short exposure times were selected in order to use these protocols before enrichment.

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