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Reduction in *Chaetoceros* populations by furanace

By

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One of the most promising prophylactic agents being tested to control *Penaeus monodon* larval diseases is furanace /6-hydroxymethyl-2 2(5-nitro-2-furyl) vinyl pyridine/. Earlier studies on the use of furanace as a chemotherapeutic agent against bacterial and fungal diseases of fish and freshwater prawn revealed that low concentrations of this chemical are nontoxic to the host as well as effective against its diseases (1, 2, 3). The effects of low concentrations of this chemical for specific durations of exposure on *P. monodon* larvae have already been reported (4). To evaluate further its suitability as a chemotherapeutic agent, its effects on the population growth of *Chaetoceros calcitrans,* the diatom used as feed for the zoeal stages, was examined.

Chaetoceros populations of uniform density (initial density in all runs: $130\text{-}141 \times 10^3$ cells/mL) were placed in nine white, circular (382 sq cm), plastic basins. The physio-chemical characteristics of the culture water were as follows: salinity, 28.5-30.0, ppt; pH, 8.62-8.72; temperature, 23-25.5°C; dissolved oxygen, 7.1-9.3 ppm; nitrite, 0.03-0.07 ppm; and ammonia, 0.005-0.03 ppm. Preweighed furanace granules were dissolved in the culture water, with resulting concentrations of 1 and 2 mg/L (3 replicates each). A set of replicates without furanace served as the control. Population counts of the diatom were taken after 2, 4, 6, 8, and 10 hr exposures.

After 4 hr, the population decreased in all three levels. The population in 2 mg/L furanace showed the lowest count and that in control the highest. The population means are not statistically different from one another.

The population counts steadily declined in the furanace baths and after a 6-hr exposure, the mean population density in 2 mg/L was already below the initial density. Population counts in 1 and 2 mg/L are both statistically different from the control but not from each other.

After 8 hr, populations in the control and 1 mg/L decreased while that in 2 mg/L was almost the same. No statistical differences exist among the population counts.

The furanace baths caused further reduction in population after 10 hrs exposure. The mean density in the control again increased a little. The population counts in the furanace baths differed significantly from that in the control. Again, no statistical difference exists between the counts in 1 and 2 mg/L. The population mean in 1 mg/L was slightly lower than that in 2 mg/L furanace.

The mean densities of the diatom populations computed from a total of 19 trials are shown in Table 1. The populations increased in all treatments (control, 1 mg/L, 2 mg/L) after a 2-hr exposure. The population in the control showed the highest count, followed by those in 1 mg/L and 2 mg/L. Differences were not statistically significant.

Table 1. Mean densities of *Chaetoceros* populations (x^{10-3} cells/mL) exposed to different levels of furanace based on 19 trials

Duration of Exposure (hr)	0 mg/L	1 mg/L	2 mg/L
0	136	136	136
2	172.47	166.21	165.42
4	163	150.5	150
6	163.28	138.16[1/]	121.16[1/]
8	136.56	125.12	121.78
10	141.1	97.58[1/]	113.32[1/]

1/ Statistically different from control at 5% significance level.

The results of the present study show that furanace causes reductions in *Chaetoceros* population at all durations of exposure. Population growth in the control tended to fluctuate, although gradually decreasing also towards the end of 10 hr. Data estimates indicate that the mean densities of the populations fall below the mean initial density after 5 hr in 2 mg/L and 6 hr in 1 mg/L furanace. The populations in the control did not fall below the initial density within 10 hr. The initial density of the diatom has to be maintained when used as feed. It appears that furanace could be considered to have adverse effects on the population only after about 5 and 6 hr in 2 mg/L and 1 mg/L, respectively. After such time, the feed will have to be replenished. The degree of reduction was found to vary directly with the furanace concentration at exposures up to 8 hr.

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