Efficacy of Filter Water with Nanosilver-coated Natural Zeolite in Controlling Water Molds Infection on Bunnei (Barbus Sharpeyi) Eggs

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ABSTRACT
The effect of indirect use of nanosilver particles (AgNPs) was studied for control water molds infection on Bunnei eggs during incubation period in the hatchery. This effect was studied with different concentrations of nanosilver-coated natural zeolite (0.5, 1, and 2 % AgNPs) and these concentrations were compared with unmodified natural zeolite as water filter in semi-circulatory incubation system. All incubators were inoculated with water molds-infected Bunnei eggs for testing the effect of AgNPs on inhibition of fungal infection. Dead and infected eggs were removed periodically, and the efficacy of the filters was assessed by estimation of the survival rates from fertilization to accomplishment of the yolk-sac absorption stage. Survival rate was increased about 5.3% (filters with 0.5% AgNPs) from fertilization to larvae compared to control (P<0.05). The additional option of active carbon (absorbent media) along with AgNP-coated zeolite filters caused an increase of about 13.5% in the survival rate for the larval stage (P<0.05). No infection with water mold were observed in the incubators during the incubation period in the incubators with water supply from filters with AgNP-coated zeolite in contrast to the control group with about 12% water mold infection. The end results enhanced that the indirect usage of AgNPs in the aforementioned filters were significantly effective for control water mold infections on semi-circulation system for incubation of Bunnei’s eggs, making them a candidate for exchange the chemical reagents currently used in eggs incubation in hatchery system. The indirect use of nanosilver materials for the disinfection of water for eggs incubation was applied for the first time in fish hatchery in Iraq.

Keywords: Silver nanoparticles, coated natural zeolite, Bunnei, water mold, water filter, fish hatchery.