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Determination of anesthetic, lethal concentration and effects of *Eugnia caryophyllata* on hematological indices of *Barbus barbulus*

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Abstract

This study was conducted to determine different concentrations of clove oil (*Eugenia caryophyllataon)* on anesthesia, lethal stage and effect on hematological parameters on *Barbus barbulus*, 78 pieces of fish with average weight of 100±3 gr, were arranged in 5 treatments: the treatment 1(control group) was not exposed to any type of anesthesia material, four treatments were exposed to clove oil with different concentrations of (50, 100,150, 200 mgl^{-1}) of anaesthesia, and (1000, 2000, 3000 mgl^{-1}) doses used for lethal stage, each treatment was divided in to tree replicates. The pH, temperature of water and dissolved oxygen were 7/5-8, 20±2/65 ºC and 10±1/2 ppm, respectively. The 200 $mgl^{-1}$of clove oil was determined as the best concentration for anesthesia and recovery. The lethal dose was 13 times of the effective dose of anesthesia and was 2600 mgl^{-1}. Blood samples were obtained at 0, 6, 12, 24h after anaesthesia, hematological parameters (number of red blood cells, hematocrit, hemoglobin, mean corpuscular hematoglobin (MCH), mean corpuscular volume (MCV), mean corpuscular hemogolobin concentration (MCHC), number of white blood cells, lymphocytes, neutrophils, eosinophils and monocytes) were measured. Hematocrit showed significant difference between lethal treatment and control group (P<0/5) but hemoglobin, MCHC, MCV, number of red blood cells, number of white blood cells, lymphocytes, eosinophils and monocytes did not show any significant difference between treatments (P>0.05), and the increasing trend of MCV was observed between treatments from control treatment to lethal treatment, respectively. Regarding the MCHC, there was a significant increase in lethal treatment with other treatments (except for 24 hours treatment) (P <0.05). Finally, given that the anesthetic substance of the clove oil has no lasting negative effects on hematological parameters on *B. barbulus*, and this effect has almost returned to its original state after 24 hours and due to the safety of this anesthetic for fish, as well as its negative effects on the environment, this anesthetic agent recommended for fisheries purposes.

Keywords: Clove oil, *Barbus barbulus*, Anaesthesia, Hematological parameters, Lethal

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