

Pathophysiological Implications in Immersion Treatment Methods of Ichthyophthiriasis Disease in African Catfish (*Clarias gariepinus*) Using *Moringa oleifera* Extract

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Abstract : Ichthyophthiriasis is a prevalent protozoan (ectoparasite) mostly affecting cultured and aquarium fishes. The majority of the chemotherapeutants lack efficacy for completely eliminating Ich parasite without affecting the environment and they are not safe for human health. The present work is focused on the evaluating different immersion treatments of African catfish (*Clarias gariepinus*) infected with ichthyophthiriasis and treated with a non-chemical and environmental friendly parasiticides *Moringa oleifera*. A total number of 800 apparently healthy parasites free (examined) post juvenile catfish were obtained from a reputable farm, disinfected with potassium permanganate in a quarantine tank to remove any possible external parasites. The fish were further challenged with approximately 44,000 infective stages of theronts which were obtained through serial passages by cohabitation. Seven groups (A-G) of post Juvenile were used for the experiment which was carried out into three stages; Dips (60minutes), short term treatment (24-96h) and prolong bath treatment (0-15 days). The concentrations selected were dependent on the outcome of the LC50 of the plant material from which dose-dependent factors were used to select various concentrations of the treatment. In Dips treatment, group D-G were treated with 1,500mg/L, 2500mg/L., 3500mg/L and 4500mg/L, short-term treatment was treated with 150mg/L, 250mg/L, 350mg/L and 450mg/L and prolong bath was treated with 15mg/L, 25mg/L, 35mg/L and 45mg/L of the plant extract whereas group A, B and C were normal control, Ich- infested not treated and Ich- infested treated with standard drug (Acriflavin), respectively. The various types of treatment applied with corresponding concentrations showed almost complete elimination of the adult parasites (trophonts) both in the gills and the body smear, thereby making *M. oleifera* a potential parasiticides. There were serious pathological alterations in the skin and gills which are usually the main point for Ich parasites invasion but no significant morphological characteristics was noted among the treated groups subjected to different immersion treatment patterns. Epitheliocystis, aneurysm, oedema, hemorrhage, and localization of the adult parasite in the gills were the overall common observations made in the gills whereas degeneration of muscle fibre, dermatitis, hemorrhage, oedema, abscess formation and keratinisation were observed in the skin. However, there are no pathological changes in the control group. Moreover, biochemical parameters such as urea, creatinine, albumin., globulin, total protein, ALT, AST), blood chemistry (sodium, chloride, potassium, bicarbonate), antioxidants (CAT, SOD, GPx, LPO), enzymatic activities (myeloperoxidase, thioredoxin reductase), Inflammatory response (C-reactive protein), Stress markers (lactate dehydrogenase), heamatological parameters (RBC, PCV, WBC, HB and differential count), lipid profile (total cholesterol, tryglycerides , high density lipoprotein and low density lipoprotein) all showed various significant ($P < 0.05$) and no significant ($P > 0.05$) responses among the Ich-infested fish treated under three immersion treatments. It is suggested that *M. oleifera* may serve as an alternatives to chemotherapeutants for control of Ichthyophthiriasis in African catfish *Clarias gariepinus*.

Keywords : Ichthyophthirius multifilis, immersion treatment, pathophysiology, African catfish

Conference Title : ICAAH 2016 : International Conference on Aquatic Animal Health

Conference Location : London, United Kingdom

Conference Dates : April 22-23, 2016