

OPTIMIZATION OF TRIPLOIDY INDUCTION USING COLD SHOCK IN AFRICAN CATFISH, *Clarias gariepinus*

¹Normala Jalil, ¹Shahreza Md Sheriff and ²Abol Munafi Ambok Bolong

¹Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu

²Institute of Tropical Aquaculture (AQUATROP), Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu

(shahreza@umt.edu.my)

ABSTRACT

Triploid is one of the biotechnology methods in aquaculture that uses genetic manipulation which alters chromosome structure during fish breeding. Triploidy is the genomic state of having three complete sets of chromosomes and due to this it can lead to sterility. Sterile fish may spend a greater part of the nutrients absorbed on body weight gain and therefore may attain a higher growth rate and a more efficient feed conversion. However, the production needs proper optimisation in terms of induction parameters in order to obtain higher triploid yield. Due to this, a study has been done to optimise the production of triploid African catfish. In this study, triploid was induced by cold shock method through induced breeding. The egg and sperm of African catfish was fertilised artificially and were exposed to four different induction temperatures (3, 5, 7 and 10°C). The fertilised eggs from each induction temperature were then exposed to four different times after fertilisation (3, 5, 7 and 10 min) where cold shock was exposed to 20, 40, and 60 min, respectively for each treatment. After that, the eggs were incubated at ambient temperature until hatching. A total of 20 juveniles from each treatment were collected after two weeks hatching. Triploid was assessed by erythrocyte measurement where blood samples were taken by cutting the caudal fin of the juvenile fish. The erythrocyte was observed under compound microscope to measure the cell major axis, cell minor axis, nucleus major axis and nucleus minor axis. Data was analysed by statistical analysis (t-test) comparing between triploid and normal African catfish to determine the percentage of triploid produced. Results show that the production of triploid fish in all parameter was between 60% - 100%. A 100% triploidy was successfully produced when the fertilised eggs were exposed at 5°C, 3 min after fertilisation for 20 min. However the hatching rate and survival rate was low (55% and 36%, respectively) compared to diploid (83% and 91%, respectively). The result of this experiment shows that there is a possibility to obtain 100% triploid African catfish by optimising three important parameters (temperature, time beginning cold shock after fertilisation and cold shock duration). However further research needs to be done to obtain higher hatching and survival rate. Overall, this research shows that there is a potential to mass produce triploid African catfish for commercial purpose. This can provide an alternative product to farmers in increasing the product through the production of triploid African catfish.