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Water Quality Variation while Transporting Hypselobarbus Kurali Anesthetized with 2-Phenoxy Ethanol

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ABSTRACT

Transportation of fishes from study site to the laboratory needs lot of care as the fish is very sensitive to even minor changes in the surroundings. The prime response from the fishes was random running and hitting its head and body against the medium in which it is transported. Secondly it was found excreting a lot of ammonia waste which will degrade the water quality and there by lead to poor survival chances. Anesthetized transportation thus forms a boon in aquaculture. The fish meant for transportation is anesthetized hence it will not run and also will not eliminate wastes. A solution of 1 ml of 2- Phenoxy ethanol in 5 l of water was prepared and used for the transportation trials which were conducted in heavy duty poly bags. The average weight of brood fish was 200 g. Five numbers of brood fishes were accommodated in a bag for the transportation for 2 hours. Water quality parameters like temperature, pH, dissolved oxygen, ammonia and alkalinity were assessed following standard methods using water quantity analyzing probe (Eutech, S-660). The studies were carried out repeatedly four times during transportation so as to confirm results. The results have shown that as time proceeds the water quality of control changed drastically whereas the experiment retained the change in water quality towards a standard range throughout the transportation trial. As the fishes are anesthetized the biological activities will slow down which result in lesser consumption of oxygen, low excretory waste and so on. So anesthetizing H.kurali with 2- phenoxy ethanol is advisable.

Key words: Anesthesia, *Hypselobarbus kurali*, transportation, 2- phenoxyethanol, aquaculture.

Introduction

Transportation of fishes from study site to the laboratory needs lot of care as the fish is very sensitive to even minor changes in the surroundings. The prime response from the fishes was random running and hitting its head and body against the medium in which it is transported. Secondly it was found excreting a lot of ammonia waste which will degrade the water quality and there by lead to poor survival chances. Anesthetized transportation thus forms a boon in aquaculture. The fish meant for transportation is anesthetized hence it will not run and also will not eliminate wastes.

2-PE (2-Phenoxyethanol)[1-hydroxy -2-phenoxyethane] is a colourless, oily, aromatic liquid with a burning taste and has a solubility in water of 27*g/l*. at 20^{o}C (Merk and company, 1989). It is used as a topical anesthetic. It is a mild toxin and may cause some irritation to the skin, therefore any contact with the eyes should be avoided (Bell, 1987). Based on human toxicology data, it may also cause liver and kidney damage (Summerfelt and Smith, 1990).Anesthetic trials were performed. Four levels of anesthetics were evaluated which includes 300 *µl/l*, 400 *µl/l* , 500 *µl/l* and 600 *µl/l* with four repeats. Healthy fishes from the wild caught group were selected for transportation. Each level of anesthetics were measured out into a 50 *ml* reagent bottle, mixed with 30 *ml* of water and stirred to disperse the chemical before adding to the anesthesia inducing tub. Observation on 10 fishes were made at each level. The stages of anesthetization were differentiated as induction, maintenance and recovery (Sajan et al, 2012). The efficiency of the anesthetics were assessed by considering three stages of induction (I^1, I^2, I^3) and three stages of recovery (R^1, R^2, R^3) in *Hypselobarbus Kurali*. An induction time of 180 *sec* or less and complete recovery with in 300 *sec* suggested by Marking and Meyer 1985 and Trzebiaoto wski, 1996 was employed to assess the induction and recovery stage in the *Hypselobarbus Kurali*. Dosages of anesthesia adopted for various teleosts (Weber et al, 2009) were adopted as the base information. Both treatment and recovery water were taken from the natural ecosystem itself, where the fishes lived. When the fishes reached the stage three of aesthesia (I^3), it was immediately transferred to the recovery tub for recording the recovery stage (R^1, R^2 and R^3). The induction and recovery instance for each concentration was measured by using an electronic stop watch. Experiments were repeated four times to verify the findings. The recovered fishes were transferred to the observation tanks (100 *l)* and held for 7 days, to assess the post recovery mortality (Pawar et al, 2011)

Methodology

A solution of 1 *ml* of 2- Phenoxy ethanol in 5 *l* of water was prepared and used for the transportation trials which were conducted in heavy duty poly bags. The average weight of brood fish was 200 *g*. Five numbers of brood fishes were accommodated in a bag for the transportation for 2 hours. Water quality parameters like temperature, pH, dissolved oxygen, ammonia and alkalinity were assessed following standard methods using water quantity analyzing probe (Eutech, S-660). The studies were carried out repeatedly four times during transportation so as to confirm results

Result and Discussion

To understand the water quality variation with respect to variation in time and the influence of anesthetics on water quality maintenance, group statistics and independent sample test were performed. Control was set in which no anesthetic agents were added and experiment was set with anesthetizing agents added into it. Water quality parameters like temperature, pH, dissolved oxygen, ammonia and alkalinity were assessed. The dissolved oxygen (Fig.1) level for first time boundary (30 *mnts*) was 4.54 *mg/l* for control and 4.52 *mg/l* for experiment. At 60 *mnts* the dissolved oxygen level varied and it was 3.53 *mg/l* for control and 3.72 *mg/l* for experiment. For 90 *mnts* observation it was found that dissolved oxygen level was 2.61 *mg/l* for control and 3.59 *mg/l* for experiment. For 120 *mnts* observation the oxygen level was 2.15 *mg/l* for control and 3.62 *mg/l* for experiment. Thus from the trend of the values analyzed it was observed that the control showed decreased value in dissolved oxygen concentration drastically when compared to that of experiment which exhibits a slow variation, that also in a mild range. As the fishes in the experiment were anesthetized their physical and biological activities got slowed down and so they used less amount of oxygen compared to the control. pH (Fig.2) is one among the important water quality parameter which governs several other water quality parameters. The values observed for 30 *mnts*, 60 *mnts*, 90 mnts and 120 *mnts* time scale were 7.07, 8.68, 8.70 and 8.72 for control and 7, 7.21, 7.57 and 7.70 for experiment respectively. As the fishes in the experiment set up were anesthetized the rate of elimination of excretory wastes was negligibly low and thus the rate of change of pH was also low. Alkalinity (Fig.3) was measured for each concentrations of the anesthetic 2-phenoxy ethanol and it was observed that for 30 *mnts* the alkalinity was 85.50 *ppt* for control and 85.75 *ppt* for experiment set up. In the case of 60 *mnts* time scale the alkalinity was fluctuating around 93.00 *ppt* for control and 86.50 *ppt* for experiment. For 90 *mnts* the alkalinity was 99.25 *ppt* for control and 87.25 *ppt* for experiment. At a concentration of 120 *mnts* the alkalinity was 108.50 *ppt* and 89 *ppt* respectively. Here also the excretory waste reduction in the transportation system due to anesthesia may be the reason for reduction in the increase of alkalinity. For all the four time scales *viz* 30 *mnts*, 60 *mnts*, 90 *mnts* and 120 *mnts*, the temperature (Fig.4) for control was 24.48^oC, 26.20^oC, 28.65^oC, and 28.66^oC respectively. For experiment it was 23.28^oC, 24.45^oC, 25.12^oC, and 25.34^oC. For both control and experiment there was no need for the increase in temperature as the fish was transported in air conditioned atmosphere. But due to the rash movement of fishes within the control set up the temperature rise might have happened. The ammonia concentration (Fig.5) in the experiment and control bags for the present study is as follows. For control it was 0.05 *ppt* at 30 *mnts* and 0.04 *ppt* for experiment at same time scale. For 60 *mnts* the ammonia level was 0.07 *ppt* for control and 0.04 *ppt* for experiment. Control had 0.098 *ppt* and 0.05 *ppt* for experiment at 90 *mnts*. At 120 *mnts* the control and experiment had an ammonia range of 0.12 *ppt* and 0.06 *ppt* respectively. As the fish excretes its nitrogenous waste in the form of ammonia, the water surrounding it will have a hike in ammonia concentration and here the control had high concentration compared to experiment as in experiment anesthetized fish had released only negligible amount of waste. The water quality parameters observed in the experiment were temperature, pH, dissolved oxygen, alkalinity and ammonia which are comparable with the observations of Sajan *et al.* (2012).

Conclusion

Anesthetizing fishes for easy transportation is becoming a common practice these days. The appropriate use of these anesthetic will definitely be of great help in facilitating easy handling, propagation and stock revival of this endangered indigenous fish. Once the fish is anesthetized, the rate of physical stress for the fish could be reduced which ultimately provide better results. As the fishes are anesthetized the biological activities will slow down which result in lesser consumption of oxygen, low excretory waste and so on. So anesthetizing H.kurali with 2- phenoxy ethanol is advisable.

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Supplementary Section: Figures

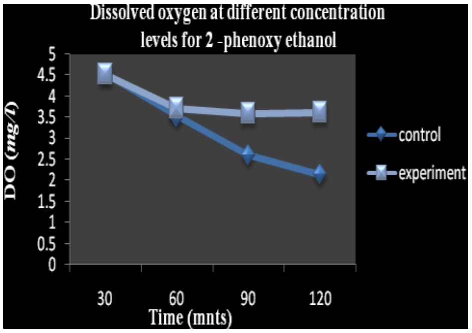

Fig.1

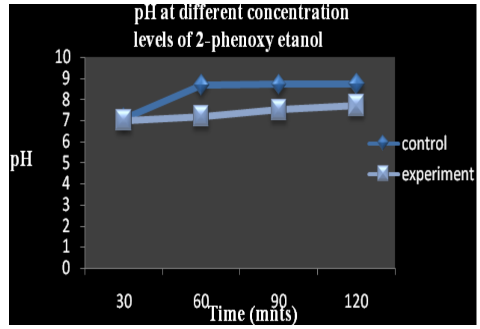

Fig.2

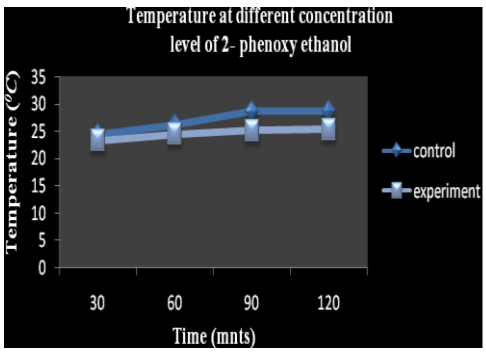

Fig.3

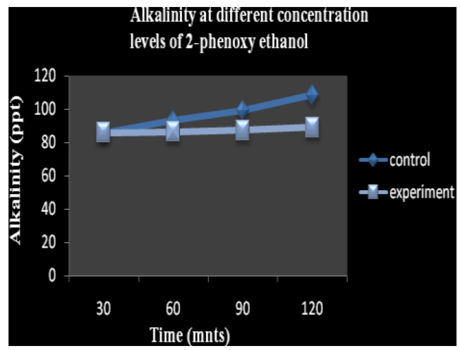

Fig.4

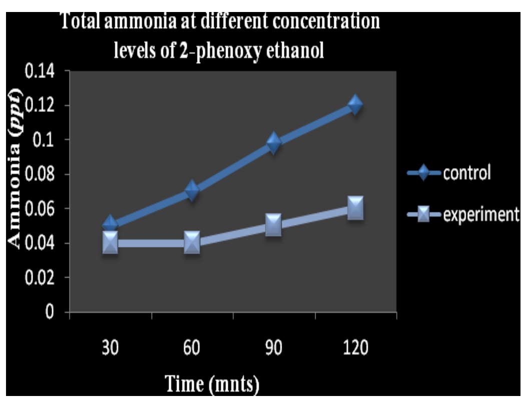

Fig.5