EFFECTS OF SOME EON AQUA DRUGS IN IMPROVING WATER QUALITY PARAMETERS

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ABSTRACT

A study was conducted to determine the efficacy and performance of three most commonly drugs of Eon Animal Health Products Ltd, used almost all over in Bangladesh. The experiment was done in a polluted and derelict pond water situated in Bangladesh Agricultural University, Mymensingh. Three aqua drug such as JV Zeolite, Oxymax and Bio aqua-50 were selected to conduct this experiment. For each drugs three doses as less than recommended, recommended and more than recommended were used to assess their performance among them. Ammonia (mgL^{-1}), nitrite (mgL^{-1}), dissolved oxygen (mgL^{-1}), pH, hardness (mgL^{-1}) and alkalinity (mgL^{-1}) were measured by using different testing kits. Water quality parameters were recorded each hour for three hours after applying the drugs. JV Zeolite was used at doses as 2 mgL^{-1}, 4 mgL^{-1} and 6 mgL^{-1}. Oxymax, doses were 0.00012 gmL^{-1}, 0.00008 gmL^{-1} and 0.00016 gmL^{-1} used to measure only Dissolved oxyzen (DO), pH, Hardness, Alkanity, Ammonia and Nitrite whereas the doses of Bio aqua-50 were 0.00006 ml L^{-1}, 0.00005 ml L^{-1} and 0.00009 ml L^{-1} used to determine ammonia only. NH_3-N, NO_2-N, alkalinity, dissolve oxygen, hardness, and pH were found to be ranged from 0.7 to 4.0 mgL^{-1}, 0 to 0.2 mgL^{-1}, 150 to 180 mgL^{-1}, 3.0 to 4.5 mgL^{-1}, 100 mgL^{-1} and 7.3 to 8.2, respectively during the study period after using the drugs. The study revealed that the water quality parameters vary with different doses of each drug and different time intervals. The information using Bio aqua 50 and Oxymax of water quality parameters obtained from the study will be helpful to farmers for their better production of fish.

Key words: Alkalinity, drugs, hardness, pH, water quality, pH

INTRODUCTION

Water quality parameter plays an important role in aquaculture. As fish is a cold blooded animal, its growth, reproduction, maturity, survival and production mostly depend on water temperature. The physico-chemical attributes of a water body are principle determinants of fish growth rates and development (Jhingran 1991). Inadequate maintenance of water quality might cause severe problems in their production. Sometimes, lack of maintenance of water quality may cause a great loss for the farmer. It also serves as an important technique to increase the fish production by increasing the primary production in the water body. At present aquaculture is dealing with high amount of feed, fertilizers and chemicals those are responsible for water quality deterioration. Therefore, aquaculture requires a regular management of water for maintaining a suitable environment as well as to maximize the production.

There are several companies supplying various aqua drugs and chemicals for water quality management. These are Novartis Pharmaceuticals Ltd., ACI Animal Health Products Ltd., Eon Animal Health Products Ltd., Square Pharmaceuticals Ltd., Fish Tech (BD) Ltd., Organic Pharmaceuticals Ltd., SKF (Eskayf) Bangladesh Ltd., Rals Agro Ltd. etc. The present study was conducted to evaluate the efficacy of drugs of Eon Animal Health Products Ltd.

MATERIALS AND METHODS

Study area: The study was carried out in a polluted and derelict pond situated in Bangladesh Agricultural University campus, Mymensingh. The avaerage area of pond was 207 m^2 with 1.25 m depth.

Collection of water samples: A number of clear 2000 ml black bottles marked with water depth and sampling date were used for collection of water

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samples. The samples were collected from all layers (upper, middle and bottom) of the water column.

Selected drugs used for experiment: Three drugs were used for water quality management from Eon Animal Health Products Ltd. These are JV Zeolite, Oxymax and Bio aqua- 50. Sampled water was treated by JV Zeolite with recommended, less than recommended and more than recommended doses as 4 mgL^{-1}, 2 mgL^{-1} and 6 mgL^{-1}, respectively. For Oxymax recommended, less than recommended and more than recommended doses were 0.00012gm L^{-1}, 0.00008gm L^{-1} and 0.00016gm L^{-1}, respectively. For Bio aqua-50 recommended, less than recommended and more than recommended doses were 0.00006 ml L^{-1}, 0.00005 ml L^{-1} and 0.00009 ml L^{-1}, respectively.

Determination of water quality parameters: Water quality parameters were monitored at each hour interval for 3 hours with a certain time interval during experiment after using drugs and also measured before using the drugs. Safety doses and effectiveness were determined on the basis of desired water quality change .Water quality measurements and sample collection were made between 7.00 A.M. and 12.00 P.M. on each sampling day. Ammonia (mg L^{-1}), nitrite (mg L^{-1}), dissolved oxygen (mg L^{-1}), pH, hardness (mg L^{-1}) and alkalinity (mg L^{-1}) were measured by using different testing kits.

RESULTS AND DISCUSSIONS

Water quality parameters: Through the study it was observed that the applied various drugs and chemicals of Eon Animal Health Products Ltd. maintained definite water quality. The outcomes of different water quality parameters are shown in Table 1 and in Table 2.

Ammonium (NH_4): The ammonium content in water of the observed ponds found by applying the recommended dose (5mgL^{-1}) is good than other doses that were applied before starting the experiment. The mean value of ammonium content after 1, 2, 3 hour of using JV zeolite at a dose of 6 mg L^{-1} were 2.33 ± 0.57 mg L^{-1}, 2.66 ± 0.57 mg L^{-1}, 2.00 ± 0.00 mg L^{-1} respectively (Table 1). According to Boyd (1998), optimum range of ammonium is 0. 2 to 2 mgL^{-1}. In the present study, improved ammonium content ranged from 0.7 to 1 mg L^{-1} with the mean value of 1.67 ± 0.67, 1.78 ± 0.69 and 1.52 ± 0.56 m gL^{-1} after 3 hours of applying Bio aqua-50, at a dose of 0.00009 mg L^{-1} (Table 2) which was more or less agreed to the findings of Begum (2003) who found the range of ammonia content of 0.23 to 1.82 mgL^{-1} in during her study.

Nitrite (NO_2): The nitrite content in water of the observed ponds was found to be 0.3 mgL^{-1} before using JV Zeolite. The mean values of nitrite content was 0.10 ± 0.00 mgL^{-1}, 0.33 ± 0.00 mgL^{-1} and 0.00 ± 0.00 mgL^{-1} after 1, 2, 3 hours of study period, respectively by applying the JV Zeolite drug at a dose of 2 mgL^{-1}, 4mgL^{-1} and 6 mgL^{-1} (Table 1) respectively. The lowest value of 0.0 mgL^{-1} was found after using the drug at the dose of 6 mgL^{-1} after 1,2 and 3 hours (Table 1).It is reported that less than 0.3 mgL^{-1} of nitrite is optimum for aquaculture (Boyd, 1998). In the present study, improved nitrite content ranged from 0 to 0.2 mgL^{-1} in JV Zeolite treatment (Table 1) which was

much higher than the findings of Begum (2003) who found that nitrite-nitrogen vary from 0.0 to 0.2 mgL^{-1}. Islam (2007) found that nitrite-nitrogen in different treatments is varied from 0.004 to 0.077 mgL^{-1} that was not consistent to the findings of present study.

Dissolved Oxygen (DO): The dissolved oxygen content in water of the observed ponds was found to be 2 mgL^{-1} before the use of JV-Zeolite and Oxymax. The mean values of dissolved oxygen content were 4.16 ± 0.29 mgL^{-1}, 4.33 ± 0.60 mgL^{-1} and 4.00 ± 0.51 mgL^{-1} after 1, 2, 3, hours of study period, respectively by using JV Zeolite at the dose of 6 mgL^{-1} (Table 1) and.The suitable dissolved oxygen content were found to be 6.67 ± 0.58, 6.17 ± 0.29 and 7.00 ± 0.00 mgL^{-1} after 1,2 and 3 hours respectively using Oxymax at a dose of 0.00016gmL^{-1}.The highest 7.0 mgL^{-1} was found after use of the drug at the same dose of 3 hours. The values of dissolved oxygen obtained after using Oxymax durg are more or less similar to the findings of Hossain (2000), who observed dissolved oxygen content from 4.65 to 5.89 mg L^{-1} during their experiment in BAU campus, Mymensingh.

Rahman (1992) showed that dissolved oxygen concentration in pond water ranged from 1.70 to 5.83 mgL^{-1}, which is also more or less similar to the findings of the present study. According to the study of Kohinoor *et al* (2000), Begum (2003), and Alim (2009) the dissolved oxygen content varied from 3.8 to 6.9 mg L^{-1}, 2.04 to 5 mg L^{-1}, 3.50 to 7.50 mg L^{-1}, 2.15 to 6.74 mg L^{-1} and 1.62 to 8.6 mg L^{-1} respectively.

pH: The pH content in water of the observed ponds was found to be 6.1 before the use of JV Zeolite. The mean value of pH content was 7.90 ± 0.00, 8.00 ± 0.17, and 8.10 ± 0.17 after 1, 2, 3 hours of study period, respectively with the range 7.9 to 8.2 after using JV-Zeolite at the dose of 6 mgL^{-1} (Table 1). The highest value of 8.2 was found after using the drug at the dose of 6 mgL^{-1} after 3 hours.In the present study, the pH content ranged from 7.3 to 8.2 after using JV Zeolite

at different doses. Rahman (2005) reported that pH is ranged from 6.5 to 7.4 in farmers prawn ponds. Hossain (2000) stated that pH ranges from 6.8 and 8.4 in his study. Therefore, the pH values found in the present study were more or less agreed the above authors. According to Boyd (1998) that were found in the pond after using JV Zeolite at one hour interval for 3 hours at a dose of 6 mg L^{-1}.

Alkalinity: The alkalinity content in water of the observed ponds was found to be 120 mgL^{-1} before the use of drug. The mean values of alkalinity content was 160.0 ± 0.00 mg L^{-1}, 165.5 ± 5.77 mg L^{-1}, and 170.0 ± 5.77 mg L^{-1}.

Table 1. The result of nitrite, ammonia, alkalinity dissolved oxygen, pH, hardness after using of JV Zeolite

Parameter	Dose	After 1 hour	After 2 hours	After 3 hours
Nitrite	2 mgL^{-1}	0.1±0.0	0.13±0.057	0.16±0.057
	4 mgL^{-1}	0.66±0.0	0.33±0.0	0.33±0.0
	6 mgL^{-1}	0.0±0.0	0.0±0.0	0.0±0.0
Ammonia	2 mgL^{-1}	3.33±0.57	3.0±0.0	3.0±0.0
	4 mgL^{-1}	2.66±0.57	2.33±0.57	2.33±0.57v
	6 mgL^{-1}	2.33±0.57	2.66±0.57	2.0±0.0
Alkalinity	2 mgL^{-1}	150±0.0	156±5.77	156±5.77
	4 mgL^{-1}	153±5.77	160±0.0	163.33±5.77
	6 mgL^{-1}	160±0.0	165±5.77	170±5.77
Dissolved Oxyzen	2 mgL^{-1}	3.0±0.0	3.17±0.29	3.0±0.0
	4 mgL^{-1}	3.83±0.29	3.5±0.0	3.83±0.29
	6 mgL^{-1}	4.16±0.29	4.33±0.29	4.0±0.0
P^{H}	2 mgL^{-1}	7.3±0.0	7.5±0.17	7.3±0.0
	4 mgL^{-1}	7.7±0.17	7.6±0.0	7.7±0.17
	6 mgL^{-1}	7.9±0.0	8.0±0.17	8.1±0.17
Hardness	2 mgL^{-1}	100±0.0	100±0.0	100±0.0
	4 mgL^{-1}	100±0.0	100±0.0	100±0.0
	6 mgL^{-1}	100±0.0	100±0.0	100±0.0

**2mgL^{-1}=Less than recommended, 4mgL^{-1}=Recommended, 6mgL^{-1}=More than recommended

Table 2. Mean values of ammonia and dissolved oxygen after using Bio Aqua-50 and Oxymax, respectively

Parameters	Dose		After 1 hour	After 2 hours	After 3 hours
Bio Aqua-50					
NH$_3$	Less than recommended	0.00005ml L^{-1}	2.33±0.58	2.33±0.58	2.0±0.0
	Recommended	0.00006ml L^{-1}	1.67±0.58	2.0±0.0	1.67±0.58
	More than recommended	0.00009ml L^{-1}	1.0±0.0	1.0±0.0	1.0±0.17
Oxymax					
O$_2$	Less than recommended	0.00008gm L^{-1}	4.67±0.58	5.0±0.0	4.83±0.29
	Recommended	0.00012 gm L^{-1}	6.0±0.0	5.83±0.29	6.16±0.29
	More than recommended	0.00016gm L^{-1}	6.67±0.58	6.17±0.29	7.0±0.0

after 1, 2, 3 hours of study period respectively after applying of JV-Zeolite drug at a dose of 6 mgL-1. The highest value of alkalinity 180 mgL-1 was found after use of the drug at the doses of 6 mgL-1 after 3 hours. In the present study, improved alkalinity content was ranged from 150 to 180 mgL-1 which is more or less similar to the findings of Ahmed *et al.* (1993), Alim (2009), and Kunda *et al.* (2008). Therefore, it can be concluded that the total alkalinity was within suitable range for fish culture.

Hardness: According to Boyd (1998) optimum range of hardness is 40 to 400 mgL-1. The mean value of hardness were same as 100mgL^{-1} after 1,2 and 3 hours respectively by using JV-Zeolite at a dose of 2mg L^{-1} 4mgL^{-1} and 6mgL^{-1} respectively (Table 1), which was suitable according to the previous study.

CONCLUSION

The present study was conducted to determine the performance of three most commonly used drugs of Eon Animal Health Products Ltd. These are mainly used for the water quality management in aquaculture pond. This study revealed that these products are effective for maintaining the water quality in aquaculture. Further research could be conducted for the efficacy study of other commonly used aqua drugs and chemicals of different companies.

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