Efficacy of Some Antibiotics used for the Treatment of Diseased Koi (*Anabas Testudineus*) Fish

Md. Mamnur Rashid1*, Muhammad Forhad Ali2, Muhammad Mamunur Rahman3 and Ashish Kumar Saha4

1Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh.
2Department of Aquaculture, Sheikh Fajiltunnessa Mujib Fisheries College, Melandah, Jamalpur, Bangladesh.
3Gazi Fish Limited, Dakup, Khulna, Bangladesh.
4Agomi Bank Limited, Khulna Corporate Branch, Khulna, Bangladesh.

*Corresponding author’s email: mamun_aqua@yahoo.com

**ABSTRACT**

Naturally diseased climbing perch *Anabas testudineus* was confirmed to be caused by *Aeromonas hydrophila* bacteria by aeromonas isolation medium (AIM), 0/129 vibriostatic agent and esculin hydrolysis. Such naturally diseased koi fish were treated with four antibiotics: captor (chlortetracycline hydrochloride BP 45%), renamox 15% -Vet (amoxicillin trihydrate BP), oxytetracycline 20% and + doxycycline (20%), renaquine 20% -Vet (flumequine) at lower, recommended and higher doses were performed to examine the efficacy of the drugs. Captor was given at doses of 0.8, 1.0 and 1.2 g/3 litres of water separately. Doses of renamox 15% -Vet were given at 0.8, 1.0 and 1.2 g/litre of water. Doses of oxy-Dox F were 0.8, 1.0 and 1.5 g/Kg body weight and doses of renaquine were 10, 12, and 15 mg/Kg body weight. Among the four antibiotics, effect of captor and renaquine at recommended dose showed the best result where 100% fish were recovered. However, renamox and oxy-Dox-F showed best result at higher dose.

**Key Words:** Climbing perch, *Anabas testudineus*, Antibiotics.

Received: 10th February, 2014. Accepted: 7th July 2014.

Introduction

With the expansion of aquaculture especially intensive culture, fish folk have become susceptible to diseases. In these conditions drugs, especially antibiotics are fruitful for cure (Mamnur Rashid et al., 2008). But in Bangladesh there is no ban on antibiotics. Using this opportunity many different pharmaceutical companies have been established and they are producing a huge numbers of antibiotics, whose doses and dosages are not clear. Many marginal farmers face the lack of the efficacy of the them. They are not truly benefited through using the recommended dose of drugs from different pharmaceutical companies. On the other hand, if the dose of antibiotic is too low or treatment time is too short, the bacteria will not be killed and this greatly increases the risk of the bacteria developing resistance against the antibiotic. Therefore, when bacteria become resistant to a specific antibiotic, even high concentrations of that drug will not be effective (Mamnur Rashid, 1997). Lipton (1991) studied the effect of antibiotic compounds on the growth inhibition of fish pathogen Aeromonas hydrophila isolated from the haemorrhagic lesions of *Labeo rohita*. He found that among the ten antibiotics, gentamycin, tetracycline, streptomycin, penicillin and neomycin inhibited the growth of the bacteria. Antibiotics such as, gentamycin, tetracycline and streptomycin were effective at 10 mg/ml. Tetracycline was effective at 20 mg/ml and gentamycin, neomycin and streptomycin, at 50 µg/ml for *A. hydrophila*. Chowdhury et al., (2003) reported that the antibiotic, renamycin (oxytetracycline), had positive effect against bacterial infection at a dose of 50ng/Kg body wt/day applying four days and 80-90% fish were recovered under laboratory condition. Islam (2010) examined the effects of different chemotherapeutics against *A. hydrophila* infection in climbing perch. Only oxytetracycline showed the best result where 100% fish were recovered. Mahmud (2011) studied the efficacy of some antibiotics used for treatment of naturally diseased koi fish and observed that combined use of oxytetracycline 20% and doxycycline 10% showed expected result at recommended dose (100% recovery of fish) than single use of oxytetracycline and amoxicillin. The present work was undertaken to check the efficacy of four different well known antibiotics.

Materials and Methods

Experimental fish. A total of 24 naturally diseased climbing perch *Anabas testudineus* were collected from various parts of Tarakanda Upazila, Mymensingh district and observed for clinical disease symptoms. Secondly, the internal organs of representative fish were homogenized and 100 µl were plated and incubated to observe the growth of the pathogenic bacteria, for confirmation of the infection.

**Bacterial identification.** Shortcut identification technique was adopted to identify the pathogenic bacteria. The colonies were sub-cultured on *Aeromonas* isolation medium (AIM) plates. The grown colonies were tested with 0/129 vibriostatic agent and growth on esculin for the identification.

**Antibiotics tested.** Four different types of antibiotic preparations were used in this study. The pharmaceutical company Novertis produced captor (chlortetracycline hydrochloride BP 45%) with a recommended dose of 1.0 g/3 litres of water for 5-7 days. Renamox 15% -Vet (amoxicillin trihydrate BP) with a recommended dose of 1.0 g/litre of water for 3-5 days, and renaquine 20% -Vet (flumequine) with 12 mg/kg fish for 3-5 days. ACI had oxy-Dox F (oxytetracycline 20% + doxycycline 10%) with a recommended dose of 1 g/ 4 Kg body weight for 7-10 days.

**Experimental setup.** The trial was conducted in twelve separate aquaria. For each drug, three aquaria were set for three different doses with two fish in each. The used doses of four different antibiotics are shown in Table 1. Each aquarium was filled with 20 litres of ground water and then antibiotics were added to the aquarium. Total medicinal trial period was 10 days. However, the recommended dosages were followed.

**Results**

Gross clinical features of the diseased fish. Diseased climbing perch showed external haemorrhagic lesion, erosion of anal region and fins, loss of scales, darkening body colour and exophthalmia. From the inoculated plates of internal organs, heavy monoculture type growths of bacterial colonies were evident, confirming bacterial infection in the experimental fish.

**Bacteria identified.** The colonies on AIM medium grown on 0/129 vibriostatic agent and hydrolyzed esculin confirming them as *Aeromonas hydrophila* bacteria.

**Antibiotic test results.** Results found after treatment with antibiotics are shown in Table 2. After captor treatment by recommended dose, hemorrhagic lesions were recovered. Higher doses of renamox and oxy-Dox-F Vet could cure erosion in anal region and caudal fin ray loss. Ulcerative lesions did not exist, feeding affinity was increased and...
Table 1. Lower, recommended and higher dose of four different antibiotics for their efficacy test

<table>
<thead>
<tr>
<th>Name of antibiotics</th>
<th>Lower dose</th>
<th>Recommended dose</th>
<th>Higher dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capitor</td>
<td>0.8 g/L of water</td>
<td>1.0 g/L of water</td>
<td>1.2 g/L of water</td>
</tr>
<tr>
<td>Renamox 15% - Vet</td>
<td>0.8 g/L of drinking water</td>
<td>1.0 g/L of drinking water</td>
<td>1.2 g/L of drinking water</td>
</tr>
<tr>
<td>Oxy-Dox-F</td>
<td>0.8 g/kg fish</td>
<td>1 g/kg fish</td>
<td>1.5 g/kg fish</td>
</tr>
<tr>
<td>Renaequine 20% - Vet</td>
<td>0.8 g/kg fish</td>
<td>1 g/kg fish</td>
<td>1.5 g/kg fish</td>
</tr>
</tbody>
</table>

Table 2. Effects of antibiotics on Anabas testudineus naturally infected with bacteria

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Selected dose</th>
<th>No. of fish treated</th>
<th>No. of fish cured</th>
<th>No. of fish not recovered</th>
<th>% of recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>0.8 g/L of water</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Recommended</td>
<td>1.0 g/L of water</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Higher</td>
<td>1.2 g/L of water</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Lower</td>
<td>0.8 g/L of drinking water</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Recommended</td>
<td>1.0 g/L of drinking water</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>Higher</td>
<td>1.2 g/L of drinking water</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Lower</td>
<td>0.8 g/kg fish</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0%</td>
</tr>
<tr>
<td>Recommended</td>
<td>1 g/kg fish</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>50%</td>
</tr>
<tr>
<td>Higher</td>
<td>1.5 g/kg fish</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Lower</td>
<td>10 mg/kg fish</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Recommended</td>
<td>12 mg/kg fish</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Higher</td>
<td>15 mg/kg fish</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>100%</td>
</tr>
</tbody>
</table>

there was no more dark discoloration. Byenaqueine at recommended dose, hemorrhagic ulcerative lesions on skin were cured.

Discussion

During the present study use of two antibiotics at their recommended doses showed good results against Aeromonas hydrophila bacteria, but other two did not. The doses of antibiotics reduced the level of infection. These findings correspond to the findings of Olagb and Farkas (1978). The present doses differed from those of the other two, but the results found to be very similar. Lio-Po and Sanvictores (1987) found positive effect of oxytetracycline in controlling Pseudomonas sp. in tilapia fry. Chowdhury et al. (2003) found positive effect of renamycin (oxytetracycline) against bacterial infection. It was found that the best result was obtained with 100% recovery of infected fish when the antibiotic oxytetracycline, was used at a higher dose than the recommended dose in laboratory condition. Treatments using antibiotic have to be administered at the effective dosage to ensure elimination of bacteria (De Kinkelin et al., 1985). As a consequence of inappropriate use of an antibiotic, the bacteria, such as Aeromonas hydrophila (Aoki et al., 1971) and A. salmonicida (Popoff and Davaine, 1971) developed resistance to this antibiotic which was transmitted to the next generations. In this aspect, the fate of unused antibiotics or their effect in the environment is very important. Obviously, the present exists for the antibiotics to affect natural bacterial communities adversely.

Studies of freshwater salmonid farms by Austin (1985) showed that bacterial numbers decreased in effluent during chemotherapy. Moreover, it took many weeks for compounds such as oxytetracycline to be breakdown, depending upon temperature, oxygen and light levels (Samuelson, 1988). It was observed that farmers were not aware about the mode of action of particular chemical. As a consequence, during disease treatment first they were reported to try with one chemical and if it did not work, they tried for another. They used doses of particular chemical either from their own experiences or from the instruction of the packet, if there is any and from the suggestion of chemical’s sellers. Sometimes it was found that they did not complete the full course of the antibiotics. They thought it was loss of money, as the full course was quite expensive. Small farmers did not agree to use the antibiotics. At that situation medicine sellers convinced the ignorant farmers to use antibiotics once or twice in case of 7 or 10 times. This type of insincere practice of the seller was their benefit of selling the medicine merely. Darwish and Ismaiel (2003) found positive effect of amoxicillin in controlling Streptococcus iniae infection in hybrid striped bass Morone chrysops female & Morone saxatilis male. Amoxicillin are most effective against gram-positive bacteria such as Streptococcus species. In the present study, the negative effect was found by the recommended dose of amoxicillin (renamox) and oxy-Dox-F, but at higher dose, satisfactory result was found. However, captor and renaqueine showed the best result at recommended doses. Mahmud (2011)treated naturally diseased koi fish and observed that combined use of oxytetracycline 20% and doxycycline 10% showed expected result at recommended dose (100% recovery of fish) than single use of oxytetracycline and amoxicillin. However, the present study was carried on limited population of fish and application of selected antibiotics. A further detail study involving larger population size and wide range of antibiotic are crucial for more accurate results.

Conclusions

Aeromonas hydrophilawas confirmed as the etiology of Naturally diseased climbing perch Anabas testudineus. Such naturally diseased koi fish were treated with four antibiotics: captor (chlorotetracycline hydrochloride BP 45%), renamox 15% -Vet (amoxicillin trihydrate BP), oxy-Dox-F (oxytetracycline 20% and doxycycline 10%), renaqueine 20% -Vet (flumequine) at lower, recommended and higher doses and among them captor and renaqueine at recommended dose showed the best result. However, renamox and oxy-Dox-F showed best result at higher dose.

References


Islam MT, 2010. Effects of chemotherapeutics against Aeromonas hydrophila infection in climbing perch Anabas testudineus. MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh.


