

## Final report for IFAR project 2008

**Proposal code: 267IFAWAN.**

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### **1. Proposed Work Program:**

**The possible impact of common zoonotic and food borne bacteria on fish and human health with suggestive control measures**

#### **The Objectives of the study:**

- 1: Assessment of the epidemiology of zoonotic and food borne bacteria:
- 2: Survey of antimicrobial usage in Egyptian aquaculture:
- 3: Investigating the prevalence of antimicrobial residues in cultured fish:
- 4: Investigating the prevalence of antimicrobial resistance in fish bacteria:
- 5: Developing fish health management plan (preventive measures):

#### ***Summary to the achieved Work.***

##### **1: Assessment of the epidemiology of zoonotic and food borne bacteria:**

- Zoonotic bacteria were isolated and identified as *Aeromonas spp.*, *Pseudomonas spp.* & *Yersinia sp.* with a total percentage of 21.6, 18.33 & 10.0%, respectively.
- Food borne bacteria were isolated and identified as *Salmonella sp.*, *E. coli*, *Staph. sp.*, and *Bacillus cerus*, with a total percentage of 7.5, 5.8, 15.8 & 5.0%; respectively.
- Polymerase Chain Reaction (PCR) was used to identify *A. hydrophila* as a most common zoonotic bacteria where PCR showed a sequence of **GAGCGGCTGGATGCGGTTGT**, which is *A. hydrophila1* (target gene is *ahh1a*).
- The *Pseudomonas* infected group exhibited signs of anemia. . Leukocytosis was observed in all infected groups (*Aeromonas spp.*, *Pseudomonas spp.* and *Yersinia sp.*), with significant differences between the groups.

Regarding biochemical parameters, liver dysfunction was recorded in all infected groups (increase ALT, AST). A decrease in total protein and albumin was also observed in some of the *Pseudomonas* and *Yersinia* infected groups. Renal dysfunction, including elevated creatinine and uric acid blood levels, was observed in all infected groups.

## **2: Survey of antimicrobial usage in Egyptian aquaculture:**

- Antimicrobial treatment during the disease course is expensive; the use of oxytetracycline as a therapeutic dose for 1 h will typically cost a farm 150LE, while the use of ciprofloxacin for the same farm costs 450LE.
- We investigated antimicrobial misuse in aquaculture, in which many farmers used oxytetracycline as a prophylactic and as a growth promoting drug.

## **3: Investigating the prevalence of antimicrobial residues in cultured fish:**

- Antimicrobial residues in the muscles of cultured fish during the field study were undetectable in some cases. However, tetracycline was detected at a higher rate than ciprofloxacin, which was minimal.
- Fish treated with these antimicrobials showed some haematology and serum biochemistry changes, such as haemolytic anaemia, and mild renal disorders (ciprofloxacin), mild liver impairment and elevation of liver transaminase, (tetracycline group) and marked renal impairment with anaemia (sulpha treatment).
- The study of elimination rates for antimicrobials established that these varied from 41 to 180  $\mu\text{g}$  ciprofloxacin/kg fish tissue weight/week, while for tetracycline this was 51 to 265  $\mu\text{g}$ /kg fish tissue weight per week. Highest values were typically observed during the first week, and the lowest values during the 3d week post-treatment, but varied according to type of antibiotic, water temperature, water quality, health condition of fish (especially liver and kidney function). Catfish showed higher clearance rates of antimicrobials than tilapia. Our preliminary conclusions are that antimicrobials should not be used with fish for a period of at least 3 weeks prior to harvest.

**4: Investigating the prevalence of antimicrobial resistance in fish bacteria:**

- Isolated zoonotic and food borne bacteria were found to be resistant to oxytetracycline.
- It was obvious that there was some cross resistance between bacterial isolates from both the same and different environments.

**5: Developing fish health management plan (preventive measures):**

- Two experiments using immunostimulants and probiotics were carried out to improve fish resistance to bacterial infections. Promising results were achieved.
- It is recommended that a biological filter be used and that use of chicken manure and poultry byproduct are avoided in order to limit the entry of zoonotic and food-borne bacteria to aquaculture facilities.
- If manure is to be used, chemical, biological or physical treatment should be applied.

As evidenced by these findings, the work was completed and the funds received were spent as stated in the candidate's budget. Currently, future collaboration between WorldFish and the Faculty of Veterinary Medicine, El Mansoura University is in operation and two scientific papers are being under development.

**Project Leader**  
**Dr Salah Mesalhy**