Egypt. J. Agric. Rres., 83 (1). 2005.



# BACTERIOLOGICAL AND PHYSICO-CHEMICAL STUDIES ON AQUATIC ENVIRONMENT AT ABBASSA FISH FARM

**M. A. A. MOUSA.[1] , T. A. KHATER[2] , G. E. M. MOHAMED [2], Z. A. NAGDY[1] AND E. A. ABD-EL-SAMAE[1]**

*1 Central Laboratory for Aquaculture Research, Abbassa, Abou-Hammad, Agricultural Research Centre, Ministry of Agriculture, Dokki-Giza-Egypt*

*2 Faculty of agriculture, Zagazig university, Sharkia, Egypt*

(Manuscript received 21 July 2004)

***Abstract***

The present study aimed to examine the bacteriological load in water of input-irrigation canal and fishponds of Abbassa fish farm as well as in gills, muscles and intestine of reared Nile tilapia, (*Oreochromis niloticus)*. Also, the study comprised determination of physico-chemical characters and some heavy metals (Cu, Fe, Mn & Zn ) of input-irrigation canal and fishponds water at the same periods to evaluate their hygienic conditions for good fish production. The samples of water and fish were examined one time every month.

The total bacterial counts, fecal coliform, *E. coli, Salmonella spp., Staphylococcus aureus* and *Aeromonas spp.* in the fishponds water were higher than those in the canal water. The maximum counts of total bacteria and *Staphylococcus aureus* were recorded in July. Coliform and *Salmonella spp.* recorded maximum counts in August, while, *E. coli* recorded maximum counts in June, and *Aeromonas spp.* showed the maximum counts in April. Moreover, the examined fish organs revealed that the total bacterial counts, coliform, *E. coli, Salmonella spp., Staphylococcus aureus* and *Aeromonas spp.* in the intestine > gills > muscle throughout the studied rearing season (started from April to November).

The physico-chemical characters (water visibility, dissolved oxygen, pH, total ammonia, unionized ammonia, nitrite-nitrogen, nitrate-nitrogen, total phosphorus and total hardness) and concentrations of the studied heavy metals (Cu, Fe, Mn & Zn) in water of fishponds were more different from those of input canal at the most time of the experimental period.

However, the conditions of input-irrigation source canal water and fishponds water of Abbassa fish farm during the period of study were safe for fish rearing and the produced fish were safe for human consumption.

## INTRODUCTION

Water quality in aquaculture encompasses all biological, chemical and physical variables that affect fish production and fish quality. So, any noxious material introduced in the water stream means water pollution which affect fish production. The problem of pollution of aquatic environment is due to the discharge of industrial effluents and domestic wastes into water system in addition to the disposal of dead bodies, cattle bathing and washing of clothes (Boyd, 1990). It is known that polluted water is often a common source of human and animal diseases. Moreover, several water-born disease outbreaks occur due to the presence of drug-resistant enteric pathogens, which occur due to the failure of patients to respond to treatment with antibiotics. Earlier studies indicated that fecal and soil-born bacteria are carried into the aquatic environment by runoff especially after heavy rains (Reddy *et al.*, 1986).

Fish are the most sensitive group of living organisms and serve as an indicator of metal bioaccumulation in polluted waters. Moreover, the potentiality for fish to act as carriers of food-born disease is large, especially if fish is caught from polluted waters (Ahmed *et al.*, 1986), and the counts and types of microorganisms recorded from fish varies significantly according to the method of life, degree of water pollution, season and methods of sampling.

The present work was carried out to monitor the bacteriological load in water of input-irrigation canal and fishponds of Abbassa fish farm as well as in gills, muscles and intestine of reared Nile tilapia (*Oreochromis niloticus).* Moreover, determination of physico-chemical characters and some heavy metals (Cu, Fe, Mn & Zn) in water of input canal and fishponds was carried out. This may serve as useful criteria to measure the suitability of fish cultivated and harvested in this area for human consumption.

## MATERIALS AND METHODS

### Bacteriological examination

Water samples were collected from 3 different sites of the irrigation canal in sterile glass bottles (500 ml) at 30 cm under water surface, mixed well together, placed into ice-box and examined within 6-8 hours after collection in the laboratory. By the same manner, other samples were collected from different 6 fishponds during the period of investigation where the area of each pond was 7 feddans, and its water depth ranged from 60 to 65 cm, and stocked with 8000 *Tilapia spp,* 1200 common carp (*Cyprinus carpio*), 600 grass carp (*Ctenopharyngodon idella*), 1200 silver carp (*Hypophthalmichthys molitrix*) and 600 mullet (*Mugil cephalus*). Samples of Nile tilapia ( *Oreochromis niloticus* ) were collected from the fishponds every month and their gills, muscles and intestine were prepared for the bacteriological examinations according to the technique recommended by Thatcher and Clark (1975). The bacteriological examinations (Total bacterial count, fecal coliform, *E. coli, Salmonella spp., Staphylococcus aureus* and *Aeromonas spp.*) were carried out on water samples and fish organs according to the methods of Harrigan and McCance-Margart (1966) and Baird-Parker and Davenport (1965) using a specific media for each bacteria species.

**Physico-chemical analysis of water**

Water samples were collected with a water sampler from the same 3 sites of the input canal and 6 fishponds of Abbassa fish farm. The samples were taken from 3 sites of each pond between 9.00 and 10.00 AM at a depth of 30 cm below water surface, and mixed together in a plastic container. Then, water sample was placed in a clean sampling glass bottle (1000-ml capacity) and total ammonia, unionized ammonia, nitrite-nitrogen, nitrate-nitrogen, and total hardness were determined according to Boyd (1984), while, the total phosphorus was determined according to APHA (1985). The water visibility, dissolved oxygen and pH were measured at the same time of sampling in the same sites in the field.

**Metals residues in water**

Copper, iron, manganese and zinc in water samples were estimated by atomic absorption spectrophotometer (Perkin Elmer 2280). The samples were prepared and analyzed according to APHA (1985). All the analysis were carried out in 3 replicates and average value was taken for consideration.

**Statistical analysis**

Data of water quality and metal residues were subjected to statistical analysis of variances, and significant differences between means were done using Duncan's multiple range test (Duncan, 1955).

## RESULTS AND DISCUSSION

Fish is one of the main sources of animal protein and could be considered as a good replacer of cattle meat and poultry in the human diet for its high nutritive value. The potential for fish to act as carriers of food-borne disease is large. This is true if fish caught from polluted water (Ahmed *et al.* 1986).

From a microbiological point of view, the main bacterial bioindicators are usually applied for justification of water quality e.g. viable bacterial counts, total coliform, *E. coli* and widely distributed pathogens e.g. *Salmonella spp.*, *Staphylococcus aureus* and *Aeromonas spp.*

Data in Fig. 1 reflect the monthly variation in the total bacterial counts in water samples collected from input canal and fishponds as well as gills, muscles and intestine of *Oreochromis niloticus* reared in the fishponds of Abbassa fish farm throughout rearing season. The total bacterial counts in fishponds were higher than those in input water. Moreover, intestine of reared *Oreochromis niloticus* recorded high counts, while, the muscles recorded very low counts compared to the intestine or gills. The maximum levels were recorded in July, while, the minimum levels were recorded in November.The increase of total bacterial counts in the fishponds might be attributed to the accumulation of the organic and inorganic nutrients and the relatively high temperature, which induce active proliferation of bacteria.

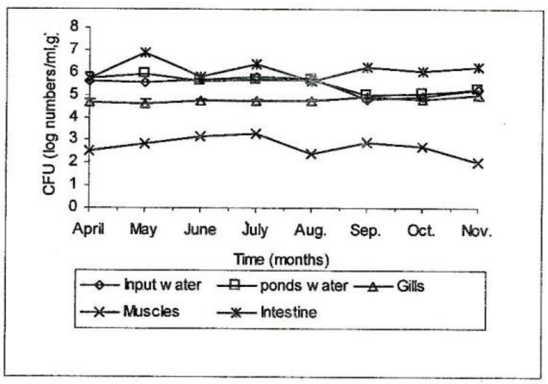


Fig 1. The log numbers of total bacterial counts in water of input and fishponds as well as gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish farm during one rearing season

The counts of coliform in water of input canal and fishponds were fluctuated irregularly and didn't take a clear trend. The maximum counts were recorded in the fishponds (0.46 x 105 CFU/ml) in August (Fig. 2). The muscles of reared *Oreochromis niloticus* had few counts of coliform throughout the rearing season. Similarly, *E. coli* counts were fluctuated irregularly and the differences between input and fishponds water were very low. Moreover, the presence of *E. coli* in the muscles of reared *Oreochromis niloticus* was rare and very low (Fig. 3).

Generally, the total coliform is directly proportional with the total number of viable bacteria in water samples and the percentage of coliform and *E. coli* in water indicate fecal pollution. Poikolain *et al.* (1993) mentioned that *E. coli* and total coliform were found in water enriched with droppings of poultry and animal manure. Zaki (1989) found that the total coliform in the input canal at Abbassa fish farm reached 0.02 x 105 CFU/ml and in fishponds 0.03 x 105 CFU/ml. When comparing our findings with the findings of Zaki (1989), it can be concluded that the fecal pollution was increased due to the excess use of manure in fertilization of the fish farm, which is the main reason of this pollution.

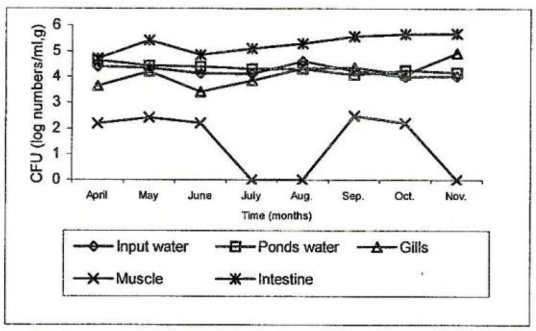


Fig 2. The log numbers of coliform in water of input and fishponds as well as gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish farm during one rearing season

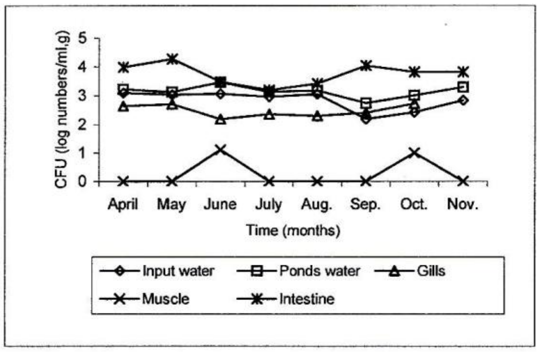


Fig 3. The log numbers of *E. coli* in water of input and fishponds as well as gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish farm during one rearing season

Data in Fig. 4 revealed that the counts of Salmonella *spp.* were clearly fluctuated between increasing and decreasing since the maximum counts recorded in spring and summer were obtained in both input canal and fishponds water. The Salmonella spp. were manifested wherever sewage pollution occurred, showing favorite effect of summer temperature. Essa (1996) found significant correlation between Salmonella and either of total coliform, fecal coliform or fecal streptococci counts in sewage-contaminated river water. The muscles of reared tilapia were completely free from Salmonella spp. throughout all the rearing season except few numbers recorded in October and November, this might be due to the handling.

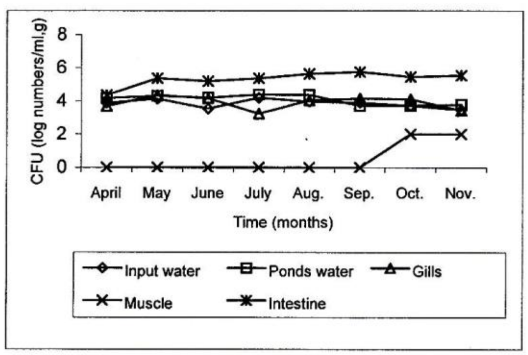


Fig 4. The log numbers of Salmonella *spp.* in water of input and fishponds as well as Gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish farm During one rearing season

Data in figs. 5&6 showed that the counts of *Staphylococcus aureus* and *Aeromonas hydrophila* were fluctuated throughout all months in water samples collected from input canal and fishponds as well as gills, muscles and intestine of *Oreochromis niloticus* reared in the fishponds of Abbassa fish farm throughout rearing season. These fluctuations might be due to the presence of adverse conditions in the drain and/or to remote pollution. *Staphylococcus aureus* is sometimes introduced directly to water body through waste-water disposal or other human activities (Gray, 1989) and *Aeromonas hydrophila* are known to multiply in water especially if sufficient nutrients are present as in aquatic environments.

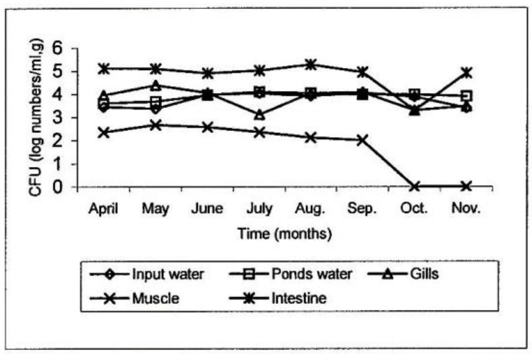


Fig 5. The log numbers of *Staphylococcus spp.* in water of inputand fishponds as well as gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish farm during one rearing season

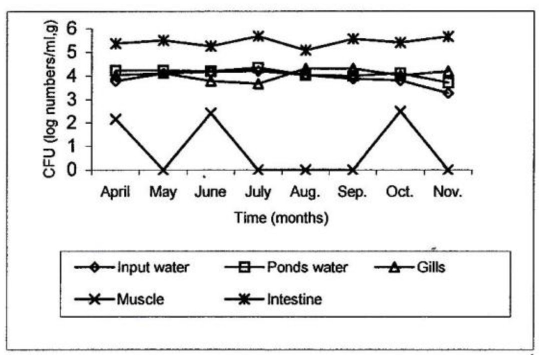


Fig 6. The log numbers of *Aeromonas aureus* in water of input and fishponds as well as gills, muscle and intestine of reared *Oreochromis niloticus* in Abbassa fish ] farm during one rearing season

Data in Table 1. reflect the monthly variation in the water quality of input canal and fishponds water of Abbassa fish farm throughout one rearing season. Water visibility indicated by the readings of secchi disk was lowered significantly in fishponds than that in the canal. The lowering of water visibility in fishponds than the input canal was graduated with time, this might be due to the gradual accumulation of plankton density and increase of suspended matter due to ponds fertilization as previously mentioned by Boyd (1990). Dissolved oxygen was fluctuated and didn't take a clear trend between input canal and fishponds except in August whence it recorded the minimum level (2.9±0.23 mg/l) in the fishponds, this may be due to the high accumulation of the organic matter and bacterial growth in this period. However, all the recorded levels of dissolved oxygen in this study were favourable for fish culture according to Boyd (1990). The pH values in all examined samples of input and fishponds water were always at alkalinity side and lay within the favourable limits needed for fish growth and survival, and comply with results of Boyd (1990) and Saeed (2000).

Total ammonia ($NH_4$+$NH_3$-N) concentrations showed higher levels in the fishponds water than those in the input canal water, this may be due to organic fertilization with manure which in turn increased the metabolic activities of fish. Moreover, it may be due to the increase of fish excretion and decomposition of dead planktonic organisms (Boyd, 1990).

Nitrite ($NO_2$-N) and nitrate ($NO_3$-N) concentrations in the fishponds water were higher than those in the input canal water in the most of the studied rearing seasons. This might be attributed to the continuous addition of inorganic fertilizers and manure to the fishponds as previously mentioned by Joy *et al.* (1990) and nitrite contents showed a good correlation with different types of fertilizers added, in addition to other environmental factors in fishponds. However, the lowering of nitrite contents in water of input or fishponds were favourable for fish culture because higher contents of $NO_2$ are toxic for fish.

Total hardness showed insignificant changes between water of input canal and fishponds. By regarding to the previous studies of Boyd (1990), the recorded limits of total hardness in this study lie within the suitable limits for fish culture. In addition, these results agreed with Zaki (1989) and Saeed (2000).

Total phosphorus contents showed insignificant differences between water of input canal and fishponds during spring months (beginnig of fish culture season), while, in summer and autumn months, it increased significantly in the fishponds than that in the input canal. The increasing in the fishponds was attributed to the continuous addition of manure and inorganic fertilizers and growth of phytoplankton. These results coincided with those of Saeed (2000).

Metals are persistent contamination in the environments and come to the forefront of dangerous substances causing serious health hazard to human. Copper, iron, manganese and zinc are among the most dangerous of these elements. Generally, data in Table 2 revealed that the residues of these elements were increased during low-temperature months and decreasing during summer months.The levels were elevated significantly in the fishponds than in the input canal throughout all the rearing season. These results were in agreement with those of Rizkalla and Abo-Donia (1996) who attributed these results to the inorganic pond bottom limiting and phytoplankton growth. However, according to USEPA (1986), the recorded limits of copper, manganese and zinc were under the permissible limits, while, the limits of iron, spécially in the ponds were above the permissible limits.

Table 1. Changes in water quality of input canal and fishponds of Abbassa fish farm throughout one rearing season.

| Parameter | Site | April | May | June | July | August | Sept. | Oct. | Nov. |
|---|---|---|---|---|---|---|---|---|---|
| Water visibility | Input | 23.4±1.3a | 22.0±1.5 a | 20.0±1.2 a | 25.0±1.2 a | 24.0±0.6 a | 21.3±0.3 a | 25.0±1.2 a | 26.3±0.9 a |
| cm | Fishponds | 16.2±0.4b | 17.2±0.4 b | 13.5±1.8 b | 11.6±0.4 b | 15.1±1.7 b | 16.8±0.5 b | 16.2±0.3 b | 17.8.±0.7 b |
| Dissolved | Input | 7.2±0.1a | 8.1±0.1a | 5.0±0.1 b | 7.2±0.1 a | 6.7±0.1 a | 4.5±0.1 b | 5.0±0.1 a | 8.1±0.2 a |
| oxygen mg/l | Fishponds | 5.9±0.3b | 7.7±0.3a | 6.3±0.2 a | 7.0±0.5 a | 2.9±0.2 b | 5.1±0.1 a | 4.8±0.2 a | 7.3±0.1 b |
| | Input | 8.6±0.1a | 8.6±0.0 a | 8.4±0.2 a | 8.1±0.2 a | 8.2±0.2 a | 8.4±0.1 a | 8.1±0.1 a | 8.1±0.2 a |
| pH | Fishponds | 8.9±0.1a | 9.0±0.1 a | 8.7±0.0 a | 8.5±0.1 a | 8.7±0.1 a | 8.7±0.1 a | 8.9±0.1 a | 8.3±0.2 a |
| Total ammonia | Input | 1.1±0.2 b | 1.2±0.3 b | 1.2±0.0 b | 1.4±0.1 b | 1.7±0.1 b | 1.2±0.0 b | 0.8±0.1 a | 1.2±0.1 b |
| mg/l | Fishponds | 2.1±0.2 a | 1.7±0.2 a | 1.5±0.1 a | 1.8±0.0 a | 2.1±0.1 a | 1.9±0.1 a | 0.92±0.1 a | 1.6±0.1 a |
| Unionized | Input | 0.28±0.1 [illegible] | 0.16±0.1 b | 0.13±0.1 b | 0.17±0.1 b | 0.23±0.1 b | 0.24±0.0 b | 0.05±0.0 b | 0.13±0.0 a |
| ammonia mg/l | Fishponds | 0.46±0.1 a | 0.55±0.1 a | 0.28±0.0 a | 0.42±0.1 a | 0.56±0.1 a | 0.50±0.1 a | 0.29±0.0 a | 0.16±0.1 a |
| Nitrite-nitrogen | Input | 0.01±0.0 a | 0.01±0.0 a | 0.05±0.0 a | 0.08±0.0 a | 0.09±0.0 a | 0.03±0.0 b | 0.03±0.0 b | 0.03±0.0 b |
| mg/l | Fishponds | 0.01±0.0 a | 0.01±0.0-a | 0.06±0.0 a | 0.09±0.0 a | 0.10±0.0 a | 0.12±0.0 a | 0.09±0.0 a | 0.07±0.0 a |
| Nitrate- | Input | 0.28±0.0b | 0.21±0.0 b | 0.20±0.1 b | 0.78±0.1b | 0.60±0.0 b | 0.34±0.0 b | 0.34±0.1 b | 0.31±0.0 b |
| nitrogen mg/l | Fishponds | 0.57±0.1 a | 0.61±0.1 a | 0.66±0.1 a | 0.97±0.2 a | 1.03±0.2 a | 0.69±0.1 a | 0.49±0.1 a | 0.41±0.0 a |
| Total hardness | Input | 292±0.7 a | 287±8.8 a | 280±1.5 a | 233±8.8 a | 285±2.9 a | 257±8.8 a | 283±3.3 a | 223±6.7 a |
| mg/l | Fishponds | 275±5.3 a | 273±7.1 a | 280±1.8 a | 268±3.3 a | 272±4.8a | 270±3.7 a | 265±5.0 a | 260±7.0 a |
| Total phosph. | Input | 0.50±0.0 a | 0.54±0.0 a | 0.50±0.0 b | 0.50±0.0 b | 0.38±0.0 b | 0.32±0.0 b | 0.24±0.0 b | 0.41±0.0 b |
| mg/l | Fishponds | 0.55±0.0 a | 0.61±0.0 a | 0.81±0.0 a | 1.00±0.1 a | 0.70±0.0 a | 0.98±0.0 a | 0.77±0.0 a | 0.90±0.0 a |

Means with the same letters in the same square are significantly different ($P \leq 0.05$)

Water Quality Limitation for Aquaculture according to Boyd (1990)

| Items | Water visibility cm | Dissolved oxygen mg/l | pH | Total ammonia mg/l | Unionized ammonia mg/l | Nitrite-nitrogen mg/l | Nitrate - nitrogen mg/l | Total hardness mg/l | Total phosph. Mg/l |
|---|---|---|---|---|---|---|---|---|---|
| Limits | 15 - 50 | More than 4 | 7 – 9 | 0.5 -1.5 | 0.5 -1.5 | 0.05 - 0.15 | 0.2 - 3 | 20 - 200 | 0.1 - 0.5 |

Table 2. Changes in residues of copper, iron, manganese and zinc of input canal and fishponds water of Abbassa fish farm throughout one rearing season.

| Date | Site | Copper µg/l | Iron µg/l | Manganese µg/l | Zinc µg/l |
|---|---|---|---|---|---|
| April | Input | 35.57±1.11b | 228.39±1.11b | 1.30±0.16b | 47.75±1.96b |
| | Fishponds | 231.97±2.09a | 576.60±3.36a | 3.29±0.11a | 282.43±3.20a |
| May | Input | 34.57±1.48b | 213.36±3.48b | 097±0.01b | 42.76±3.20b |
| | Fishponds | 236.17±2.88a | 601.63±9.63a | 2.96±0.05a | 288.20±2.65a |
| June | Input | 20.59±0.86b | 201.23±2.09b | 0.87±0.03b | 33.94±1.11b |
| | Fishponds | 200.53±2.16a | 493.40±2.05a | 2.54±0.05a | 185.93±3.03a |
| July | Input | 19.61±0.36b | 188.80±5.86b | 0.64±0.05b | 27.71±1.54b |
| | Fishponds | 197.83±6.04a | 409.35±7.15a | 2.04±0.05a | 132.15±2.14a |
| August | Input | 22.16±1.14b | 191.65±2.50b | 0.67±0.03b | 22.14±0.83b |
| | Fishponds | 193.07±4.27a | 390.43±9.84a | 2.63±0.26a | 142.03±3.78a |
| September | Input | 11.41±0.59b | 170.97±3.71b | 1.20±0.03b | 25.98±2.47b |
| | Fishponds | 196.37±8.34a | 415.78±5.94a | 2.65±0.04a | 165.70±6.14a |
| October | Input | 13.88±0.43b | 183.94±3.25b | 1.10±0.03b | 26.37±2.50b |
| | Fishponds | 211.43±4.47a | 439.07±10.80a | 2.58±0.09a | 155.78±0.35a |
| November | Input | 16.84±1.20b | 195.81±2.20b | 1.12±0.05b | 35.84±1.09b |
| | Fishponds | 230.67±11.72a | 492.47±2.74a | 2.41±0.07a | 152.53±3.17a |

Means with the same letters in the same square are significantly different ($P \leq 0.05$)

Permissible limits of the studied heavy metals according to WHO (1984) and USEPA (1986).

| Items | Copper | Iron | Manganese | Zinc |
|---|---|---|---|---|
| Permissible limits µg/l | 1000 | 300 | 5000 | 5000 |

## REFERENCES


1. Ahmed, L, R. Dosoky, Y. Kamel, T. Abdellah and A. Ismail .1986. Bacteriological studies on fresh water fish (T. nilotica) in upper Egypt. Assiut Vet. Med. J., 5: 30-205.

2. American Public Health Association (APHA). 1985. Standard Methods for the Examination of Water and Wastewater, 16th ed., Washington, D. C. pp. 1268.

3. Baird-Parker A. C. and R. R. Davenport. 1965. The effect of recovery medium on isolation of Staphylococcus aureus after heat treatment and after the storage of frozen or dried cells. J. Appl. Bacteriol., 28: 390-402.S

4. Boyd, C. E. 1984. Water Quality in Warmwater Fishponds. Auburn Univ. Agri. Exp. Station, Auburn, Alabama, USA.

5. Boyd, C. E. 1990. Water Quality in Ponds for Aquaculture. Birmingham Publishing Co., Birmingham, Alabama, USA.

6.Duncan, D. B. 1955. Multible range and Multible F tests. Biometrics, 11: 1-42.

7. Essa, N. A. S. (1996): Bacteriological and chemical studies on drainage water in Egypt. Thesis, M. Sc., Fac. Agric., Cairo Univ.

8. Gray, N. F. 1989. Public health. In: Biology of wastewater Treatment. P 594. Oxoford Science Publications, London.

9. Harrigan W. F. and E. McCance-Margart. 1966. Laboratory Methods in Microbiology. Academic Press, London and New York.

10. Joy C. M., K. P. Balakrishnan and A. Joseph. 1990. Effect of industrial discharges on the ecological of phytoplankton production in the River Periyar (India). Water Res., 24: 787-796.

11.Poikolain, M. L., J. S. Niemi and V. Malin 1993. Fecal contamination of Finnish freshwater in 1962-1984. Water, Air and Soil Pollution, 81: 37-47.

12.Rizkalla, E. H. and M. A. Abo-Donia. 1996. Some industrial heavy metals pollutants in River Nile and their effect on *Ictalarus punctatus* following hypoxia. J. Wildlife Disease, 12: 247-253.

13.Reddy, G. B., E. Ford and D. Aldridg 1986. Seasonal changes in bacterial numbers and plant nutrients in point and non-point source ponds. Environ. Pollution (Series A), 40: 459-467.

14.Saeed, S. M. 2000. A study on factors affecting fish production from certain fish farms in the Delta. Thesis, M. Sc., Institute for Environmental Studies and Research, Ain Shams Univ.

15.Thatcher, F. S. and D. S. Clark. 1975. ICMSF, Microorganisms in food. Academic Press, New York.

16.United States Environmental Protection Agency (USEPA). 1986.Quality criteria for water. EPA 440/5-86-001.

17.World Health Organization (WHO). 1984. Guidelines for Drinking water Quality. Vol. 1, Recommendation. WHO, Geneva., p: 19.

18. Zaki, M. S. A. 1989. Sanitary studies on freshwater fish plant. Thesis M. Sc., Fac. Vet. Med., Zagazig Univ.

# دراسات بكتريولوجية وفيزيو– كيميائية على مياه المزرعة السمكية بالعباسة

ممدوح عبدالعزيز على موسى١ ، تحية عبدالعزيز خاطر٢، جمال الدين مصطفى محمد٢
زينب عطية نجدى١، ايمان عطية عبدالسميع عبدالحميد١

*١ .المعمل المركزى لبحوث الثروة السمكية بالعباسة – محافظة الشرقيـة– مركز البحوث الزراعية–وزارة الزراعة– الدقى–جيزة– مصر*
*٢ .كلية الزراعة – جامعة الزقازيق*

أجريت هذه الدراسة خلال موسم استزراع واحد بدأ فى أبريل وانتهى فى نـوفمبر، وهـدفت الدراسة لعمل مقارنة بين مياه الأحواض السمكية ومياه ترعة المصدر. وقد أوضحت النتائج ارتفاعا ذا دلالة فى المحتوى البكتيرى الكلى وكـذا الكوليفـورم والكـولاى والسـالمونيلا والاسـتافيلوكوكس والإيرومونس فى مياه الأحواض عنه فى مياه ترعة المصدر خلال الموسم كله ، وكذلك فـى أمعـاء وخياشيم سمكة البلطى النيلى المستزرعة بهذه الأحواض ، فى حين أن لحوم نفس السمكة احتوت أعدادا كاد ت تنعدم فى معظم الأحيان، وقد سجل المحتوى البكتيرى وكذا الاستافيلوكوكس أقصى قيمة لهما فى الأحواض فى شهر يوليو، بينما سجلت مجموعات الكوليفورم والسالمونيلا أقصى مدى لهمـا فى شهر أغسطس أما الكولاى فكان أقصى قيمة لها فى يونيو ، بينما سجلت أعداد الإيرومونس أقصى قيمة لها فى شهر أبريل.

كذلك أظهرت الدراسة أن هناك فروقا ذات دلالة معنوية بين الصفات الفيزيقيـة والكيميائيـة لمياه الأحواض ومثيلتها فى ترعة الرى ، حيث كانت الشفافية ونسبة الأكسجين أعلى فى مياه ترعـة المصدر عن مياه الأحواض فى معظم الأحيان، أما قيمة الـ pH والآمونيا والنتريت والنترات والعسر والفوسفور فكانت أعلى نسبيا فى مياه الأحواض عن مياه الترعة. كما سجلت النتائج زيادة كبيرة فـى تركيز النحاس والمنجنيز والزنك فى مياه الأحواض مقارنة بمياه الترعة الا أنها كانت فـى الحـدود الآمنة ، أما نسبة الحديد فقد تجاوزت الحد المسموح به عالميا فى مياه الأحواض. وعليه فاننا نوصى بالحد من استعمال المخصبات العضوية والكيماوية فى تسميد الأحواض السمكية حيث أنها تسبب تلوثا بها مؤثرة بذلك على الخواص الطبيعية والكيميائية للمياه ، كما نوصى بشدة بعدم القاء أى مخلفات فى مياه نهر النيل للحد من هذا التلوث حفاظا على الثروة المائية وكذا الصحة العامة للإنسان.