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- Arabic summary

LIST OF ABBREVIATIONS

1	Pb	Lead
2	Cd	Cadmium
3	Hg	Mercury
4	AOAC	Association Official Analytical Chemists
5	FAO	Food and Agriculture Organization
6	WHO	World Health Organization
7	ppb	Part per billion
8	ppm	Part per million
9	R.F	Responsive factor
10	OTC	oxytetracycline
11	HPLC	High Performance Liquid Chromatography
12	TLC	Thin Layer Chromatography

Recommendations

For heavy metal pollution:

- Education of fish handlers and consumers with the sources of food pollution, health hazard and the methods for controlling it through educational training programs.
- Administration of diets rich in proteins, vitamins as D, E, ascorbic acid and calcium, zinc and iron which, play an important role in decreasing the absorption and toxicity of heavy metals specially lead.
- Elimination of lead from gasoline in motoring of the different transport means and the use of natural gas to decrease lead concentrations in surface waters especially on highways.
- Raising the efficient of sewage treatment in industrial societies to involve industrial wastes to get rid of all the toxic materials.
- Strict application of measures or regulations on industrial plants which discharge the effluents directly in Nile river and its canals without treatment.

For getting rid of oxytetracycline residues in fish and shellfish tissues, there are several considerations should be applied as:

- Rapid tests for OTC detection will allow producers to reliably test fish before shipment assure the consumer of a safe residue free product.

- Antibiotic which have no adverse effect on the human he should be permitted to be used as food additives in fish farms.
- Administration of antibiotics should be done under the supervi of a veterinarians.
- The use of antibiotic for treatment is not desirable unless bases for their administration can be established.
- All pharmaceutical products used in fish cultures must registered and the official waiting period should be maintain befor marketing (withdrawal period)
- Oxytetracycline treatedt fish must be shopped for hun consumption after one month at least as withdrawal period.

There are many considrations which, should be appli in using trichlorfon as:

- for the health and welfare of workers and the general populatio the handling and application of trichlorfon should only be entrusted to compeletly supervised and will trained operators, who v follows adequate safety measures and apply trichlorfon accordi to good appliction practices.
- The manufacture, formulation, agricultural use, and disposal trichlorfon should be carfully manged to minimize contamination the enviroment, particulary surface water.
- Regulary exposed worker should undergo periodic heal evaluations especially blood cholinstrase level.

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- Application rates of trichlorfon should be limited and the insecticide should never be sprayed over water or streams.
 - Monitoring analysis of pesticides in food, environment and human biological samples.
 - Avoid use of pesticides in windy days.
 - Avoid the contamination of groundwater supplies with persistent and highly toxic pesticides.

SUMMARY

I- Survey study:

Eighty samples of fish (*O.niloticus* and *Cl.gariepinus*) and shellfish (*Shrimp spp.* and *P.clarkii*) 20 of each were examined for:

(A) Determination of heavy metal residues (lead, cadmium and mercury) in both fish and shellfish species and the results obtained were:

- **Lead:**

Lead concentrations in *O.niloticus* were ranged from 0.17 to 0.27 with a mean value of 0.2 ± 0.007 . For *Cl.gariepinus* they were ranged from 0.16 to 0.28 with a mean value of 0.219 ± 0.011 , in *Shrimp spp.* they were ranged from 0.16 to 0.27 with a mean value of 0.221 ± 0.009 and in *P.clarkii* they were ranged from 0.16 to 0.25 with a mean value of 0.185 ± 0.006 .

- **Cadmium:**

Cadmium concentrations in *O.niloticus* were ranged from 0.06 to 0.19 with a mean value of 0.104 ± 0.01 , for *Cl.gariepinus*, they were ranged from 0.05 to 0.17 with a mean value of 0.093 ± 0.009 , for *Shrimp spp.*, they were ranged from 0.07 to 0.220 with a mean value of 0.129 ± 0.011 and in *P.clarkii*, they were ranged from 0.07 to 0.16 with a mean value of 0.101 ± 0.007 .

- **Mercury:**

Mercury concentrations in *O.niloticus* were ranged from 0.43 to 2.56 with a mean value of 1.08 ± 0.095 , for *Cl.gariepinus*, they were

ranged from 0.31 to 0.96 with a mean value of 0.731 ± 0.04 , *shrimp spp.*, they were ranged from 0.11 to 0.87 with a mean value 0.386 ± 0.047 and for *P.clarkii*, they were ranged from 0.12 to 1 with a mean value of 0.597 ± 0.093 .

(B) Determination of oxytetracycline residue concentrations in fish and shellfish species:

Oxytetracycline residues were negative in all the examined species of fish and shellfish.

(C) Determination of trichlorfon residue concentrations in fish and shellfish species:

All the examined samples of *O.niloticus*, *shrimp spp.* and *P.clarkii* were negative for trichlorfon residues, except in *Cl.gariepinus*, they were ranged from 0.02 to 0.31 with a mean value of 0.093 ± 0.027 .

From the obtained results of survey study, it's shown that lead concentrations in all the examined fish and shellfish samples were within the permissible limits of **EOS, 1991** (1ppm) and **FAO/WHO, 1992** (1ppm).

Concerning cadmium concentrations in *O.niloticus*, (80%) were within the permissible limits and (20%) were over the permissible limits of **EOS, 1991** (0.1 ppm) and all the examined samples (n=20) were over the permissible limits of **FAO/WHO, 1992** (0.05 ppm), While *Cl.gariepinus* 80% of the examined samples were within the permissible limits and (20%) were over the permissible limits of **EOS, 1991** and 10% of the samples were within the permissible limits and 90% were over the permissible limits of **FAO/WHO, 1992**. For *shrimp*

spp., 60% of the examined samples were within the permissible limits and 40% were over the permissible limits of **EOS, 1991** and all the examined samples (n=20) were over the permissible limits of **FAO/WHO, 1992** and for *P.clarkii*, all the examined samples were within the permissible limits of **EOS, 1991 and FAO/WHO, 1992**.

Mercury concentrations in *O.niloticus*, 5% of the examined samples were within the permissible limits and 95% were over the permissible limits of both **EOS, 1991** (0.5 ppm) and **FAO/WHO, 1992** (0.5ppm). Also in *Cl.gariepinus*, 5% of the examined samples were within the permissible limits and 95% were over the permissible limits of both **EOS, 1991 and FAO/WHO, 1992**. For *shrimp spp.* 85% of the examined samples were within the permissible limits and (15%) of the examined samples were over the permissible limits of both **EOS, 1991 and FAO/WHO, 1992**, and for *P.clarkii*, 55% were within the permissible limits and 45% of the examined samples were over the permissible limits of both **EOS, 1991 and FAO / WHO, 1992**.

Only *Cl.gariepinus* fishes were positive to trichlorfon and all the examined samples were within the permissible limits (0.05 - 2 mg/kg product) given by **FAO/WHO, 1986 and WHO, 1992c**.

Public health hazards for heavy metals (lead, cadmium and mercury) were discussed.

II- Experimental part:

One hundred and ten samples of *Cl.gariepinus* were used for determination of

(A) Oxytetracycline residues in laboratory after dosing mg/kg/day for 10 days and determination of oxytetracycline residue during withdrawal period.

At 3rd day after ending of treatment, residue Concentrations were ranged from 2.5 to 4.45 with a mean value of 3.71 ± 0.217 10th day were ranged from 0.31 to 0.66 with a mean value of 0.46 0.035 and at 21 days of withdrawal period, they were ranged from 0.18 to 0.28 with a mean value of 0.223 ± 0.035 .

(B) Determination of trichlorfon residue concentrations *Cl.gariepinus* muscles after treatment by 3 doses with, 10 day interval between doses. The first dose was 0.25 mg/kg, 2nd dose was 0.5 mg/kg and the 3rd dose was 0.5 mg/kg.

Trichlorfon concentrations at the 3rd day of 1st dose were ranged from 0.025 to 0.21 with a mean value of 0.071 ± 0.017 , at 10th day from the first dose, they were ranged from 0.075 to 0.13 with a mean value of 0.1 ± 0.009 , after 2nd dose at the 10th day, the residue concentrations were ranged from 0.17 to 0.25 with a mean value of 0.206 ± 0.008 , and at the 10th day from the 3rd dose residue concentrations, they were ranged from 0.21 to 0.39 with a mean value of 0.295 ± 0.019 .

At clearance period after ending the treatment by 10 day residue concentrations were ranged from 0.035 to 0.2 with a mean value of 0.086 ± 0.018 , at 20th day of clearance period residue concentrations were ranged from 0.001 to 0.031 with a mean value of 0.014 ± 0.004 .

From this results it's concluded that oxytetracycline residue were detected after the withdrawal period (21 day) and the residue concentrations were over the maximum permissible limits (0.1ppm) given by FDA (**Ruth and Reed, 1991**). While trichlorfon results after clearance period were within the permissible limits (0.05 – 2 mg/kg product) given by **FAO/WHO, 1986** and **WHO, 1992c**.

- Public heath hazards for oxytetracycline and trichlorfon were discussed.