

**-47- Summary of**

Toxicity of Pesticide Residues in Some of the Water Resources in El-  
Behira Governorate

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By

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## SUMMARY

The major source of environmental contamination by pesticides is the deposits resulting from application of these chemicals to control agricultural pests and pests causing public health problems. Other sources of contamination could be pesticides used in urban areas and industrial wastes. Many researches was done to determine the presence of pesticides in surface water after its extraction using the traditional methods of extraction which consume large amount of solvents leading to toxic effects on the author and also consume a lot of money. The current study determine the pesticide residues in surface water using new methods of extraction using little amount of solvents

This study was carried out to assess the levels of OC and OP pesticide residues in surface water from different sources, from El-Behera : Governorate

El-Khairy drainage canal, from Kobry Ashour to its end at Edko -١  
(lake. (ten samples from S1 to S10

(El- Khandk canal (one sample, number S11 -٢

(Tap water at Damanhour (one sample, number S12 -٣

This study has included using new methods for extraction pesticides residues from water samples which collected, these methods were a- Solid phase extraction (SPE). b- Micro Liquid Liquid extraction (MLLE).

Collection of water samples was repeated at January (winter) July (summer) in 2008

.Research objectives could be summarized as follow

To compare the efficiency of two methods of extraction of -١  
.pesticides residues of water

To determine or monitor the residues of some pesticides in tap, river -٢  
.and drain water

To study the effect of pesticide residues on some hematological and -٣  
.biochemical parameters in male and female rats

:The following points provide a summary of such study

The average recovery percentages for the OCs ranged from  $89.9 \pm 6.5$  to  $100.5 \pm 6.5$  % and from  $85.5 \pm 8.1$  to  $98.1 \pm 6.5$  % for MLLE and SPE methods, respectively. The corresponding average recovery percentages for OPs ranged from  $92.3 \pm 7.5$  to  $103.4 \pm 7.5$  % and from  $89.2 \pm 5.5$  to  $98.2 \pm 7.3$  % for MLLE and SPE methods, respectively. these values are approximately similar to the reference values reported in the EPA methods

All the compounds exhibit good linearity in the studied range (( $R^2=0.9969$  to  $0.9999$  for OCs and  $0.9891$  to  $0.9999$  for Ops

The minimum detection limits for the OC compounds were ranged from 10 to 25 and from 12 to 30 ng / l by using MLLE and SPE methods, respectively . The corresponding values for the OP compounds were ranged from 12 to 22 ng / l for MLLE method and from 10 to 20 ng / l for SPE method

Analysis of water samples of El- Khairy drain revealed the presence of OC and OP insecticides in 41.11 and 17% of the samples. Only organochlorines were present in 44.4 and 38.9% of the water samples of El-Khandk canal and tap water

In water samples of drain, dieldrin, heptachlorepoxyde, endrin aldehyde, endosulfan sulfate, and endrin ketone were present in 100 % of the samples. However, p,p DDD, p,p DDE and beta- HCH were present in 90, 80, and 70, % of the samples, respectively. On the other hand, the OP insecticides, ethoprophos, diazinon and fenthion were present in 80, 60, and 30 % of the samples

The most polluted water were collected at summer season of 2008 (mean of OCs was 4.065 in winter and 4.395 in summer. However, mean of Ops was 8.792 in winter and 10.021 in summer

The levels of heptachlor epoxyde , dieldrin were 0.16 , 0.039  $\mu\text{g/l}$  and 0.235 , 0.046  $\mu\text{g / l}$  in winter and summer samples , respectively .However , p,p DDE , and p,p DDD were dominant in 80 and 90 % of drain water samples, respectively . Their levels were 1.9 , 1.55  $\mu\text{g / l}$  and 2.06 , 1.58  $\mu\text{g / l}$  in winter and summer , respectively . On comparison of these results with that of water pollution rule of WHO 1995 and EMHR 2007 , it is clear that

heptachlor epoxide , p,p DDE , dieldrin and p,p DDD concentrations were more than the permissible limits of these compounds as recommended by (EMHR (2007

Analysis of water samples of El- Khandk drinking water and tap water revealed the presence of gamma- HCH, beta- HCH, heptachlorepoxide, p,p DDE, dieldrin, endrin aldehyde, endosulfane sulfate, and endrin ketone. The average of concentrations of heptachlorepoxide in El-Khndk canal water and tap water were 0.14 and 0.155 µg/l., respectively. The corresponding values for p,p DDE were 3.15 and 1.25 µg/l., respectively

These detected OCs residues in drinking water were more than the maximum residue levels (MRL) for these two OCs (EMHR 2007, EEC and (WHO 1995

As regards to the organophosphorus insecticides , ethoprophos , diazinon and fenthion were dominant in 80 , 60 and 30 % of drain water samples, respectively . Ethoprophos was detected in samples collected at winter and summer season of 2008 at the levels of 3.16 and 3.28 µg /l , respectively . Diazinon was also found at the levels of 3.03 and 3.63 µg /l in samples obtained in winter and summer , respectively. Fenthion was detected in only 30 % of drain water samples . It was found to be at levels of 2.53 and 3.1 µg /l in samples collected at winter and summer , respectively

The rest of the OP insecticides, mevinophos , methyl- parathion , tetrachlorvinphos , fensulfothion , sulprofos and coumaphos did not detected in all of the tested drain water samples

The overall results of this part of study revealed the presence of organochlorine residues in both drain and drinking waters, However the OP insecticides were detected only in drain water

The concentrations of these OC compounds were more pronounced in drain water than El- Khandk drinking water and tap water

Study investigates the side effects of pesticides residues in tap water and canal water on some hematological parameters and some biochemical targets in the blood of rats given single oral dose equal to the pesticide

residues in 1.5 ml from extract of canal and tap water to study acute  
.toxicity

No statistically significant difference was found regarding - .10  
haemoglobin (Hb), red blood cells (RBC) in male treated rats and packed  
.cell volume (PCV) in both male and female rats relative to control

The increase of Hb and the decrease in RBC counts in the treated .16  
females were statistically significant

GOT and GPT of test rats are not significantly different from those of .17  
control rats. Although, not significant, GOT and GPT are slightly higher in  
rats given the lower dose of OCs in tap water or slightly lower in rats  
.given the higher dose of OCs in canal water relative to controls

Alkaline phosphatase (ALP) activity in male rats is not significantly .18  
different from that of control. In contrast, significantly higher activity of  
.ALP was observed in the female treated rats relative to the control

ALP activity in the test female rats is about 2.4 folds than that in the .19  
.control rats

Gamma glutamyl transferase (GGT) activity was reduced in OCs .20  
treated male rats with a percentage of reduction ranged from 17.2 to 26.4 %  
Conversely, GGT activity in the serum of treated female rats showed 2.4  
.fold increase in comparison to control rats

Uric acid increased significantly in the serum of male rats given OCs .21  
(0.0224  $\mu$ /Kg) in tap water. However, creatinine slightly increased in both  
.male and female rats relative to the control

Total protein reduced significantly in female test rats relative to .22  
control and there is no significant difference in total protein in male test  
rats relative to control. Regarding to albumin, no significant difference was  
.observed in albumin in OCs treated females relative to control

Albumin concentration increased significantly in the serum of male .23  
(rats relative to the control)

Administration of OCs to rats had no significant effect on .24  
progesterone in the serum of both male and female rats relative to the  
.control

Testosterone is significantly increased in the serum of test females .٢٥  
.and decreased in the serum of test males relative to the control

No significant difference was found regarding the concentration of .٢٦  
follicle stimulation hormone (FSH) in male treated rats. However, FSH was  
increased with a percentage of 30.8 % in treated females in comparison to  
.control

No statistically significant difference was observed in T4 levels .٢٧  
between the control and treated females. However, T4 level was increased  
significantly with a percentage of 113.89 % in the males administered high  
dose of OCs in canal water. On the other hand, T3 levels were decreased in  
the serum of male and female rats when compared with controls. The  
decrease of T3 levels was significant in the test males with 26.5% decrease  
seen in the highest dose of OCs. Similar to males, T3 levels in OCs treated  
females decreased non- significantly with a 14.7% decrease seen at the  
.highest dose of OCs

In the present study, the effect of OCs on circulating thyroid .٢٨  
hormones, thyroxine (T4) and triiodothyronine (T3) were investigated in  
the rats given low and high doses of OCs in tap water (0.0224 µg/Kg) and  
(canal water (0.0448 µg/Kg