Summary

SUMMARY

This work was carried out to monitor the residues of chlorinated hydrocarbon pesticides (lindane, α and β-hexachlorocyclohexane, total DDT, aldrin, dieldrin and endrin) and two organophosphorus compounds namely malathion and pirimiphos-methyl in three cereal grains (wheat, maize and shelled & paddy rice); in one legume seeds (faba beans); in four fruits (apple, apricot, peach and prune), and also in four vegetables (tomatoes fruits, stored & new harvested potato tubers, cucumbers and green pepper fruits). The samples of these products were purchased from the markets located in the Kalyubia Governorate (Tukh, Kaha & Banha) and from Cairo city during the period from May 1996 to October 1998. Residues analysis was carried out at the Laboratory of Pesticides, Plant Protection Department of the Faculty of Agriculture, Moshtohor Zagazig University.

Results showed the following:-

All wheat, paddy rice, the majority of maize and shelled rice samples contained different amounts of lindane below the maximum residue limits of the FAO (MRLs). Residues of α and β-HCH were found in nearly all samples of cereal grains (wheat, maize and shelled & paddy rice) and faba bean at various level equal to or lower than the MRLs.

Data indicate that 71.9 % of the wheat, 62.5 % of maize, 55.6 % of shelled rice, 88.9 % of paddy rice and all faba bean samples contained different amounts of DDT derivatives in range from 0.001 to 0.04 mg/kg and these values were lower than the MRL.

The cyclodiens compounds (aldrin, dieldrin and endrin) were not detected in any analyzed grains and legume samples.

The residues of the organophosphorus insecticide pirimiphos-methyl and malathion were detected in around 38 % & 56 % of the wheat, 18.8 % & 68.8 % of the maize, 22.2 % & 87.5 % of the shelled rice, 0.0 % & 88.9 % of the paddy rice and 16.7 % & 100 % of faba bean samples, respectively. The amounts of residues were in all cases within the permitted limits.

Furthermore, the obtained results revealed clearly, that none of the analyzed grain or legume samples contained amounts of the organochlorine/or organophosphorus pesticide residues exceeded their MRLs of the FAO.

A total of 12 samples were examined for pesticide residues in apple, apricot, peach and prune fruits. The results revealed that all samples except one apricot sample contained different amounts of lindane in range from 0.01 to 0.02 mg/kg within the permitted limits.

All tested apple, peach, and 75 % of apricot samples contained, α and β-HCH residues in range from 0.001 to 0.02 mg/kg within the permitted levels.

Data indicate that 66.7 %, 50 %, 91.7 % and 91.7 % of the apple, apricot, peach and prune samples, respectively contained different amounts of DDT derivatives in range from 0.001 to 0.04 mg/kg and these values were lower than the MRL.

The residue of cyclodiens compounds (aldrin, dieldrin and endrin) were not detected in any analyzed fruit samples.

The organophosphorus insecticide pirimiphos-methyl residues were detected only in 4, 6, 3, and 0.0 of the apple, apricot, peach and prune samples, respectively. The residues were found at a range of 0.01 to 0.1 mg/kg. Malathion was detected in 41.7 %, 58.3 %, 41.7 % and 16.7 % of the tested apple, apricot, peach and prune samples, respectively. The residues were found at range of 0.02 to 0.3 mg/kg. The amounts of residues of both compounds were in all cases lower than the permitted limits.

Furthermore, the obtained results revealed clearly, that none of the analyzed apple, apricot, peach and prune fruit samples contained amounts of the organochlorine/or organophosphorus pesticide residues exceeded their MRLs of the FAO.

Thirty-two of tomato, 20 of cucumber and 16 green pepper fruit samples were examined for pesticide residues. Results revealed that all samples contained different amounts of lindane in range from 0.001 to 0.1 mg/kg within the permitted limits. Seventy eight percent of the tomato, 90 % of the cucumber and 93.8 % of green pepper fruit samples contained α and β-HCH. The levels of α and β-HCH in tomato samples ranged from 0.001 to 0.012 mg/kg, which were below the maximum residue limits MRL. These values were from 0.001 to 0.1 mg/kg in the cucumber samples. The highest amount of 0.1 mg/kg was detected only on one sample from Kaha market and this value was five times higher than the MRL. However, the other samples contained residues lower than the permissible levels. Alpha and Beta

fruits were from 0.001 to 0.03 mg/kg. Only one sample from Tukh market shows the highest amount of 0.03 mg/kg, which was slightly higher than the MRL. Residues of the other samples were lower than the MRL.

Data indicate that 59.4 %, 40 % and 81.3 % of the tested tomato, cucumber and green pepper fruit samples contained different amounts of DDT derivatives in range from 0.001 to 0.04 mg/kg and these values were lower than the MRL.

None of the tomato, cucumber and green pepper fruit samples contained any detectable residues of the cyclodiens compounds (aldrin, dieldrin and endrin).

The organophosphorus insecticide pirimiphos-methyl residues were detected only in 43.3 %, 50 % and 37.5 % of the tested tomato, cucumber and green pepper fruit samples, respectively. The pirimiphos-methyl residues ranged from 0.02 to 0.5 mg/kg. The organophosphorus insecticide malathion was detected also in 43.3 %, 45 % and 37.5 % of the tested tomato, cucumber and green pepper fruit samples, respectively. The residue levels ranged from 0.02 to 0.5 mg/kg. The amounts of residues of both compounds were in all cases below the permitted limits.

Furthermore, the obtained results revealed clearly, that none of the analyzed tomato fruit samples contained amounts of the organochlorine/or organophosphorus pesticide residues exceeded their MRLs of the FAO. However, the organochlorine α and β-HCH were detected in one cucumber sample at 0.1 mg/kg and one green pepper fruit samples at 0.03 mg/kg which, were higher than the permissible limits of 0.02 mg/kg.

Twenty samples of stored potato tubers were tested for pesticide residues, results revealed that all samples contained different amounts of lindane in range from 0.01 to 3.4 mg/kg. The highest amounts of lindane residues 1.5 and 3.4 mg/kg that are 15 to 34 times higher than the MRL were detected in two samples of stored potato obtained from Cairo City markets. Also all stored potato tubers samples contained α and β-HCH. The levels of α and β-HCH ranged from 0.001 to 2.6 mg/kg. Seventy percent of the tested samples contained residue levels that are higher than the MRL. The highest amounts of α and β-HCH residues of 2.6 mg/kg that is a 130 times higher than the permissible limit of 0.02 mg/kg was detected in one sample obtained from Cairo City markets. All samples also contained different amounts of DDT derivatives in range from 0.004 to 2.24 mg/kg. Sixty five percent of the tested samples contained residue values above the MRL. The highest residue values were from 2 to 44.8 times higher than the permissible limit of 0.05 mg/kg. The highest amounts of DDT (2.2 to 2.24 mg/kg) residues were detected in two samples obtained from Tukh and Cairo markets.

None of the 20 tested stored potato tubers samples contained any detectable residues of the cyclodiens compounds (aldrin, dieldrin and endrin).

Besides, twenty samples of new harvested potato tubers were analyzed for pesticide residues. Results showed that all samples contained different amounts of lindane in range from 0.001 to 0.1 mg/kg within the permitted limit. Eighty five percent of the tested samples contained α and β-HCH in range from 0.001 to 0.006 mg/kg lower than the MRL. DDT derivatives were found in 70 % of the new harvested potato samples.

Amounts were in range from 0.001 to 0.04 mg/kg below the MRL. None of the samples contain residues of aldrin, dieldrin and endrin.

Results of the organophosphorus insecticide residues revealed that pirimiphos-methyl was found only in 40 % and 10 % of stored and new harvested potato samples, respectively. The pirimiphos-methyl residues were from 0.01 - 0.1 mg/kg. The amounts of residues of pirimiphos-methyl were in all cases lower than the permitted limits. Malathion was detected in 80 % and 35 % of the stored and new harvested potato tuber samples, respectively. The residue levels ranged from 0.002 to 2.4 mg/kg. Two samples of stored potato tubers are above the permissible limit of 0.5 mg/kg. The highest residue level of 2.4 mg/kg was detected in one stored potato sample obtained from Cairo City markets. The other tested samples of stored and new harvested potato tubers contained residue values below the permitted limits.