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Report of Pesticide Residue Monitoring Results of the Netherlands for 2008

Concerning Directive 90/642/EEC, 86/362/EEC, Regulation 396/2005/EC
and Recommendation 2008/103/EC

Food and Consumer Product Safety Authority (VWA)
Den Haag - Amsterdam

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Voedsel en Waren Autoriteit
Warenklachtenlijn VWA: (0800) 0488
E-mail: info@vwa.nl
Internet: www.vwa.nl

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SUMMARY

During 2008 about 4300 samples of fruits, vegetables, cereals and processed products of domestic and non-domestic origin were analysed in the national and co-ordinated monitoring program. With respect to fresh products, domestic produce made up 35,6 % of the samples, 28,2 % of the samples were from other EU countries and 35,5 % from non-EU countries. In general, products originating from other countries show higher percentages of MRL-violations than Dutch produce. For the fifth year EU products have shown a decrease in percentage non-compliances. In 2006 and 2008 imports from third countries too showed a decrease in MRL-violations. Probably this is related to the progressing harmonisation of MRL-legislation in the EU and increasing awareness of the trade sector.

Dutch products show residues above the reporting limit in about 46 % of the samples, whereas non-domestic products contain residues in 69 % (EU) and 68 % (non-EU) of the cases, respectively.

1. INTRODUCTION

Pesticide residue control has been a task of the Dutch Food and Consumer Product Safety Authority (VWA) and its predecesing organisational structures for many years. Therefore, a suitable infrastructure is present for the EU-monitoring as required by directives 90/642/EEC (products of plant origin), 86/362/EEC (cereals), regulation 396/2005/EC and Recommendation 2008/103/EU (the harmonised specific program 2008).

2. SAMPLING

The samples are taken without prior information about the presence of pesticides in the individual sample. Therefore, they represent the situation on the market for the product at that time. However, sampling is directed relatively more to products that need attention because of the violation rate in previous years. Therefore, high violation rates can indicate both an efficient sampling strategy and problems in the agricultural practice. As required by EU-directive 90/642/EU and regulation 396/2005/EC, a monitoring plan is made accordingly. The monitoring program is primarily directed to major products in the consumption pattern, but some capacity is reserved to minor products. The main sampling points are the premises of the auction system for Dutch products, importers, warehouses and distribution centres of retail chains for both domestic and non-domestic products. At those inspection points, it is clear who is responsible for the product, so that appropriate legal action can be taken in case of non-compliance. In 2008 a number of samples was taken in retail shops as part of a pilot project to provide public information on samples, results and responsible companies.

The sampling procedure, i.e. the number of subsamples taken from a lot is regulated by the Dutch Food and Commodity Law. This regulation is the implementation of the EC-directive 2002/63/EU. Inspectors of the five regional inspectorates are taking samples.

3. ANALYSIS AND QUALITY ASSURANCE

One regional laboratory (Northwest, in Amsterdam) performs the analyses of the samples taken by all five regional inspectorates.

The general strategy is detecting as many pesticides as possible in one analysis by using Multi-Residue-Methods (MRMs). The Dutch method consists of an acetone extraction, followed by a partition step of the residues into dichloromethane/petroleum ether. The extracts are analysed by a chromatographic separation and selective detection of residues. The main detection methods are Gas Chromatography (GC) - Ion-Trap Mass Spectrometric Detection (GC-ITD) and Liquid Chromatography – tandem Mass Spectrometry (LC-MS/MS). Only for some analytes that are not detectable sensitively enough by ITD, additionally GC with Electron Capture Detection (ECD) is used.

For some pesticides not amenable to GC, Single Residue Methods based on LC-MS/MS detection are used. In the 2008 program this was the case for chlormequat and propamocarb.

Dithiocarbamates are analysed as CS₂ using GC-FPD and GC-ITD after decomposing with acidic tin-chloride solution and extraction into iso-octane.

Together the scope of the methods is about 400 analytes.

The validity of the analytical results is governed by a quality assurance system under ISO17025 accreditation. The multi-residue methods are within the scope of the accreditation of the laboratory. The centralised laboratory has implemented the EU Guideline on Quality Control Procedures SANCO/2007/3131. It takes part in FAPAS and EU proficiency tests. In order to check system performance and to avoid false negative results, representative pesticide standard mixtures containing 76 and 156 analytes for GC-ITD and LC-MS/MS respectively are run in each batch of samples at the lowest calibration level (LCL), which corresponds to the reporting limit. For these mixtures, 4-point calibration and recovery checks are performed.

The average inter-laboratory relative standard deviation (RSD_R) has been estimated at 25 % based on EU-proficiency tests (see SANCO/2007/3131). The expanded measurement uncertainty applied to reported results is 50 %. In this report, all results above the MRL are considered to be violative. However, legal measures are taken after subtracting the measurement uncertainty from the analytical result.

The applied MRMs and SRMs are recorded and the results are stored. Because of the registration of MRMs and the known scope of the method, also the absence of a residue above the reporting limit can be established.

4. MONITORING RESULTS

During 2008 about 4300 samples, both domestic and non-domestic products, were analysed in the national and co-ordinated monitoring program. With respect to fresh products, domestic produce made up 35,6 % of the samples, 28,2 % of the samples came from other EU countries and 35,5 % from non-EU countries. In 2008 the complete EU harmonisation of MRLs came into force on September 1st. However, from February 1st

these MRLs have already been applied, when proven to be safe by EFSA. As a result the percentage of non-compliances of products from EU countries have decreased strongly. In 2008 imports from third countries showed a slight increase in MRL-violations. This is related to intensifying border control of higher risk products. Products from South-East Asia still often violate limits. Table 1 gives the most frequently non-complying pesticide/crop combinations with the main countries of origin. However, products from South-East Asia still often violate limits. In these cases frequently acute toxic organophosphorous pesticides are involved. It is remarkable that old organophosphates as EPN, monocrotophos and omethoate (without dimethoate) are still in use. Therefore, measures are taken to prevent imports at Schiphol airport.

Dutch products show residues above the reporting limit in about 46 % of the samples, whereas non-domestic products contain residues in 69% (EU) and 68 % (non-EU) of the cases, respectively. For non-EU-products this figure is higher than that of 2007. For Dutch and EU-products these percentages are comparable with the year before (figure 2). Table 3 gives results on main products in the year 2008. A comparison is made with the results of previous years. For the main products in the national program, fewer violations were observed with most of the products, as in general compliance increased.

Some minor products, not planned within the national program show still a considerable violation rate. Examples are tropical products, like herbs and egg plant.

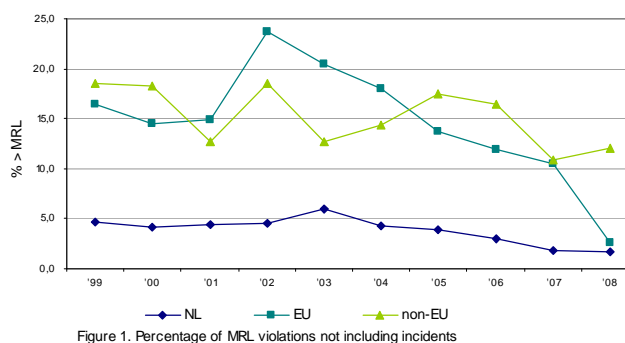
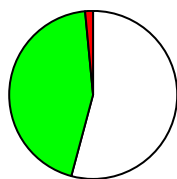


Figure 1. Percentage of MRL violations not including incidents



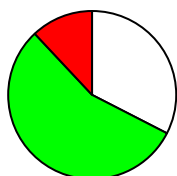
□ No residue ■ Res. <MRL ■ Res. >MRL

Figure 2a. Residues in Dutch products



□ No residue ■ Res. <MRL ■ Res. >MRL

Figure 2b. Residues in products from EU-countries



□ No residue ■ Res. <MRL ■ Res. >MRL

Figure 2c. Residues in products from non-EU-countries

In about 4300 samples about 7620 residues of 156 different analytes were found. The scope of the EU-coordinated program comprised 75 % of the residues found. For a majority of the results it has been established whether an Acute Reference Dose (ARfD) is necessary or not (table 3).. When food safety issues are involved in pesticide residues, it is mainly with respect to acute effects. Therefore, it is important to notice to what extent pesticides that give acute intake hazards are used. For product/pesticide combinations the Critical Crop/Pesticide Concentration (CCPC) has been evaluated. At this limit 100 % of the ARfD is reached based on a point-estimate and a product is considered to be unsafe and “injurious to health” in the meaning of the General Food Law (Regulation EC/178/2002). In such cases the product is recalled when possible, and a Rapid Alert is issued. The Netherlands issued nineteen rapid or information alerts on pesticide residues, as indicated in table 4.

Table 1. Main products with high percentages of non-compliances, with corresponding pesticides and countries of origin.

| Product | Pesticides | %>MRL | Countries |
|---------------------|--|-------|-----------------------------------|
| Pepper | carbendazim, carbofuran, dimethoate, chlorpyrifos, various | 34,5 | Thailand, Dominican Rep., Surinam |
| Legume vegetables | dimethoate, methomyl, epn, carbendazim, various | 15,7 | Thailand, Dominican Rep. |
| Aubergine/egg plant | methiocarb, dimethoate | 13,0 | Surinam, Thailand, Dominican Rep. |
| Mango | imazalil | 8,6 | Thailand |
| Kiwi fruit | Fenhexamid | 6,5 | Italy, France |
| Cucumber, Sopropo | Methiocarb, methomyl, endosulfan | 6,0 | Dominican Rep. |
| Grape | methomyl, imazalil, various | 4,9 | Turkey, Italy, India |

Table 2. Pesticide residues detected in the EU-coordinated and Dutch monitoring program, with or without an Acute Reference Dose. Table 2a by pesticide, table 2b by residue.

| table 2a | number of pesticides (active substances) | | | |
|---------------------------|--|-----------|----------------|--------------|
| | total | with ARfD | no ARfD needed | ARfD unknown |
| EU-coordinated monitoring | 74 | 50 | 24 | |
| Dutch national program | 82 | 56 | 23 | 3 |
| Total | 156 | 106 | 47 | 3 |

| table 2b | number of residues of pesticides in samples | | | |
|---------------------------|---|-----------|----------------|--------------|
| | total | with ARfD | no ARfD needed | ARfD unknown |
| EU-coordinated monitoring | 5716 | 3629 | 2087 | 0 |
| Dutch national program | 1904 | 1323 | 797 | 3 |
| Total | 7620 | 4952 | 2884 | 3 |

Table 3. Samples of crops taken in monitoring program 2008, with trends in percentage MRL violations, comparing origin and previous years.

| PRODUCT | Consumption (g/day) | Year EU-coordinated program | Dutch program 2008 | samples realised 2008 | % samples > MRL 2008 | % samples > MRL 2008 Dutch | % samples > MRL 2008 EU | % samples > MRL 2008 non -EU | samples a year 2003-2007 | % samples > MRL 2003-2007 |
|------------------------|---------------------|-----------------------------|--------------------|-----------------------|----------------------|----------------------------|-------------------------|------------------------------|--------------------------|---------------------------|
| Tangerines | 13,4 | 97/02/05/08 | 200 | 137 | 2,2 | 0,0 | 2,4 | 1,9 | 68 | 16,3 |
| Orange | 93,7 | 98/02/05/08 | 200 | 184 | 4,3 | 0,0 | 1,4 | 6,4 | 133 | 9,5 |
| Apple | 74,4 | 96/01/04/07 | 125 | 158 | 2,5 | 2,8 | 2,2 | 2,4 | 110 | 4,6 |
| Pear | 10,8 | 97/02/05/08 | 100 | 91 | 2,2 | 1,3 | 25,0 | 0,0 | 66 | 2,1 |
| Peach/nectarine | 3,5 | 98/02/07 | 150 | 43 | 4,7 | 0,0 | 2,4 | 100,0 | 56 | 15,2 |
| Plum, including damson | 2,2 | | 50 | 48 | 0,0 | 0,0 | 0,0 | 0,0 | 31 | 4,5 |
| Grape | 14,4 | 96/01/06 | 250 | 224 | 4,9 | 0,0 | 3,4 | 6,7 | 208 | 26,6 |
| Strawberry | 4,8 | 96/01/04 | 150 | 101 | 1,0 | 1,6 | 0,0 | 0,0 | 129 | 12,7 |
| Banana | 19,7 | 97/02/06 | 75 | 54 | 0,0 | 0,0 | 0,0 | 0,0 | 41 | 0,0 |
| Kiwi fruit | 2,9 | | 50 | 62 | 6,5 | 0,0 | 14,3 | 0,0 | 32 | 4,9 |
| Beetroot | 4,4 | | 50 | 34 | 0,0 | 0,0 | 0,0 | 0,0 | 17 | 3,5 |
| Carrot | 13,6 | 98/02/05/08 | 125 | 93 | 2,2 | 2,5 | 0,0 | 0,0 | 70 | 3,4 |
| Onion | 14,5 | 04 | 75 | 54 | 0,0 | 0,0 | 0,0 | 0,0 | 43 | 2,8 |
| Tomato | 26,9 | 96/01/04 | 125 | 148 | 4,7 | 1,0 | 10,8 | 22,2 | 115 | 5,4 |
| Sweet pepper | 4,2 | 99/03/06 | 250 | 143 | 4,2 | 0,0 | 7,4 | 6,5 | 123 | 15,4 |
| Pepper | 0,0 | 99/03 | 150 | 116 | 34,5 | 0,0 | 0,0 | 41,7 | 85 | 34,0 |
| Cucumber | 7,9 | 00/03/05/08 | 125 | 149 | 6,0 | 2,6 | 3,2 | 14,6 | 77 | 7,8 |
| Melon | 3,3 | 99/03 | 50 | 63 | 1,6 | 100,0 | 0,0 | 0,0 | 52 | 6,1 |
| Broccoli | 4,9 | | 50 | 70 | 1,4 | 0,0 | 2,2 | 0,0 | 38 | 3,2 |
| Cauliflower | 14,9 | 99/03/06 | | 70 | 0,0 | 0,0 | 0,0 | 0,0 | 51 | 0,8 |
| Red Cabbage | 4,2 | | 18 | 17 | 0,0 | 0,0 | 0,0 | 0,0 | 15 | 0,0 |
| White Cabbage | 6,2 | 00/04/07 | 17 | 17 | 0,0 | 0,0 | 0,0 | 0,0 | 19 | 0,0 |
| Lettuce | 4,2 | 96/01/04 | 200 | 105 | 1,0 | 0,0 | 3,6 | 0,0 | 121 | 10,8 |
| Iceberg lettuce | 3,3 | 96/01/04 | 0 | 98 | 4,1 | 3,0 | 4,8 | 0,0 | 65 | 7,4 |
| Endive | 7,3 | | 150 | 94 | 1,1 | 0,0 | 5,9 | 0,0 | 83 | 7,2 |
| Spinach | 8,9 | 98/02/05/08 | 125 | 56 | 1,8 | 3,1 | 0,0 | 0,0 | 57 | 8,7 |
| Beans(fresh) | 3,2 | 97/02/05/08 | 175 | 228 | 15,8 | 2,6 | 13,6 | 19,0 | 107 | 12,7 |
| Peas (fresh) | 12,6 | 00/03/06 | 100 | 41 | 12,2 | 0,0 | 0,0 | 12,2 | 38 | 10,5 |
| Leek | 12,3 | 04/07 | 75 | 73 | 1,4 | 1,4 | 0,0 | 0,0 | 50 | 4,0 |
| Potato | 172,6 | 97/02/05/08 | 75 | 70 | 0,0 | 0,0 | 0,0 | 0,0 | 56 | 3,9 |
| Rice | 10,1 | 00/03/05/08 | 50 | 36 | 2,8 | 0,0 | 0,0 | 3,2 | 17 | 0,0 |
| Wheat | 130,6 | 00/03/04/06 | 50 | 30 | 3,3 | 5,6 | 0,0 | 0,0 | 29 | 0,0 |
| Babyfood | | | 125 | 75 | 0,0 | 0,0 | 0,0 | 0,0 | 0 | 0,0 |
| Processed products | | | 175 | 377 | 4,2 | 4,8 | 0,0 | 6,3 | 0 | 0,0 |
| Products in program | 695,4 | | 3725 | 3359 | 5,0 | 1,6 | 3,3 | 10,7 | 2201 | 10,6 |
| Total | 838,8 | | 4500 | 4344 | 5,9 | 1,6 | 3,1 | 12,4 | 3550 | 10,7 |

Table 4. Alerts to the RASFF system issued by the Netherlands.

| Product | Pesticide | Country |
|----------------------|--|----------|
| Aubergine (eggplant) | omethoate (0.22 mg/kg) | Thailand |
| Cactus pears | omethoate (0.06 mg/kg) and dimethoate (0.19 mg/kg) | Italy |
| Chilli pepper | carbofuran (1.2 mg/kg) | Thailand |
| Coriander | carbofuran (2.9 mg/kg) | Thailand |
| Cucumber | 0.02 mg/kg) and dimethoate ; 0.04 mg/kg) | Thailand |

| Product | Pesticide | Country |
|----------------|--|--------------------|
| Cucumber | methomyl (0.11 mg/kg) | the Netherlands |
| Mango | omethoate (0.09 mg/kg) | Thailand |
| Pepper (red) | carbofuran (0.59 mg/kg) and methomyl (1.1 mg/kg) | Thailand |
| Slicing bean | omethoate (0.21 mg/kg) and dimethoate (0.73 mg/kg) | Spain |
| Soprogo | methamidophos (0.11 mg/kg) | Suriname |
| Sweet pepper | oxamyl (0.79 mg/kg) | Turkey |
| Yard long bean | methomyl (0.15 mg/kg), carbendazim (0.61 mg/kg) and omethoate (0.73 mg/kg) | Thailand |
| Yard long bean | methomyl (0.92 mg/kg) | Thailand |
| Yard long bean | omethoate (0.20 mg/kg) and dimethoate (sum: 0.22 mg/kg) and EPN (0.54 mg/kg) | Thailand |
| Yard long bean | carbofuran (0.13 mg/kg) | Thailand |
| Yard long bean | methomyl (0.49 mg/kg) and dimethoate (0.05 mg/kg) | Thailand |
| Yard long bean | carbendazim (2.1 mg/kg) | Dominican Republic |
| Yard long bean | monocrotophos (1.9 mg/kg) | Dominican Republic |