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THEORETICAL MAXIMUM DAILY INTAKE OF PESTICIDE RESIDUES
IN THE NETHERLANDS - A MODEL FOR RISK ASSESSMENT

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- ANNEX 2: Attribute definitions Dutch TMDI model
- ANNEX 3: Output Dutch TMDI model pesticide chlorfenvinphos

ABSTRACT

Theoretische Maximale Dagelijkse Inname pesticiden residuen in Nederland - een model voor risico-evaluatie

Theoretical Maximum Daily Intake of pesticide residues in the Netherlands - a model for risk assessment

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5 tables, 13 references, 18 pages, 3 annexes, 1 figure

Setting Maximum Residue Limits (MRLs) for residues and contaminants is a responsibility of the government in order to guarantee public health and to stimulate fair trade practices. It is extremely important to set MRLs at the right level to ensure that potential risk to consumers is excluded and that criteria for agricultural products (e.g. Good Agricultural Practice) will be met. In order to reach a conclusion whether MRLs are set at the right level, it is necessary to predict the theoretical dietary intake of a particular residue in question. In a worst case scenario MRLs are applied for calculation a Theoretical Maximum Daily Intake (TMDI). In 1989 the WHO for the first time described this procedure for predicting dietary intake of pesticide residues [WHO, 1989]. Recently the WHO has recommended making calculations at the national level with available national consumption data [WHO, 1995]. In the Netherlands the Dutch National Food Consumption Survey (DNFCS) provides food consumption data of a representative sample of the Dutch population. These consumption data are expressed in foods as eaten by consumers, whereas MRLs are mainly established for primary agricultural products. Therefore RIKILT-DLO has transformed the average Dutch food consumption into average amounts of raw agricultural commodities. Software has been developed to perform automated TMDI calculations and comparisons with the Acceptable Daily Intake (ADI). This computer model can be very useful for policy makers in risk assessment of pesticides and for harmonisation of residue limits between countries in the European Union or worldwide.

Keywords: theoretical maximum daily intake (TMDI), risk assessment, pesticide residues, MRLs, model, food safety, diet, agricultural products

SAMENVATTING

Normstelling ten aanzien van residuen en contaminanten is in Nederland een verantwoordelijkheid van de overheid met als doel het optimaal waarborgen van de volksgezondheid en het bevorderen van de eerlijkheid in de handel. Belangrijk hierbij is dat Maximum Residu Limieten (MRL) op het juiste niveau worden gesteld om er zeker van te zijn dat de volksgezondheid niet in gevaar komt en dat aan criteria gesteld aan agrarische productiewijzen (bijvoorbeeld Good Agricultural Practice) wordt voldaan. Om uitspraken te doen met betrekking tot de aanvaardbaarheid van Maximum Residu Limieten (MRL's) wordt aanbevolen een voorspelling te doen van de theoretische inname van een pesticide aan de hand van (voor)gestelde MRLs en deze te vergelijken met de Aanvaardbare Dagelijkse Inname (ADI). In het kader van de hiervoor ontwikkelde WHO procedure voor bestrijdingsmiddelen, wordt als eerste stap, de zogenaamde 'worst case' benadering, een Theoretisch Maximale Dagelijkse Inname (TMDI) berekend [WHO, 1989, WHO, 1995].

Tot op heden worden in Nederland theoretische innameberekeningen voor pesticiden uitgevoerd met behulp van het hypothetische culturele dieet van Europa, afgeleid van Food Balance Sheets. Voor innameschattingen op nationaal niveau wordt aanbevolen om nationale voedselconsumptiegegevens te hanteren. In Nederland geeft de Voedsel Consumptiepeiling (VCP) inzicht in de consumptie van voedingsmiddelen van een representatieve steekproef uit de Nederlandse bevolking. MRL's hebben doorgaans betrekking op primaire agrarische producten en niet op voedingsmiddelen. De Nederlandse consumptiegegevens van voedingsmiddelen zijn daarom getransformeerd naar een gemiddelde consumptie van primaire agrarische producten. Een nationaal TMDI model op basis van de gemiddelde consumptie, uitgedrukt in primaire agrarische producten, is ontwikkeld. Software is ontworpen waarmee routinematige berekeningen van nationale TMDI's en vergelijkingen met de ADI kunnen worden gemaakt. Het nationale TMDI model kan worden ingezet voor risico-evaluatie van pesticiden en bij de harmonisatie van maximale residu toleranties tussen landen van de Europese Unie of de wereld.

1 INTRODUCTION

Risk assessment

In order to reach a conclusion towards the protection of public health it is necessary to predict the dietary intake of pesticides.

National and international calculations of dietary intake of pesticides are carried out for risk evaluation and management of potential risk to consumers [van Eck, 1995]. Information on the levels present in foods and the consumption of those foods by consumers is required to make these estimations.

WHO model

For risk evaluation of pesticides the WHO has developed a stepwise process for predicting dietary intake of pesticides [WHO, 1989; WHO, 1995]. This model consists of different steps, starting with the most exaggerated procedure, the so called worst case scenario, predicting the Theoretical Maximum Daily Intake (TMDI).

In formula the TMDI calculation:

$$TMDI = \sum F_i \times MRL_i$$

F_i = the average food consumption for the relevant commodity, as derived from a hypothetical diet (kg product/person/day)

MRL_i = the (proposed) MRL for the relevant commodity (mg pesticide residue/kg product)

Dimension TMDI and ADI:

TMDI mg pesticide residue/person/day

ADI mg pesticide residue/kg body weight/day

A TMDI is calculated by multiplying the maximum residue level (MRL) by the average food consumption for each commodity and then summing the products. For TMDI calculations proposed Codex MRLs, EU MRLs, national MRLs and the average daily consumption of each product are used as an input. In order to predict pesticide residue intake at the international level average food consumption data given in FAO Food Balance Sheets [FAO, 1984] are recommended. These consumption data are based on production, import and export figures. When assembling national data to culturally related groups, hypothetical cultural diets can be

calculated. An average hypothetical global diet is then derived from these hypothetical cultural diets.

The five hypothetical cultural diets that are calculated now are the following:

Middle-East, Far-East, African, Latin American and the European diet.

In order to evaluate the TMDI a comparison with the Acceptable Daily Intake (ADI) is made. The TMDI is divided by an assumed average body weight (usually 60 kg) and expressed in a percentage of the ADI.

A TMDI calculation is a relatively straightforward procedure which gives a gross overestimate of the true pesticide intake. A TMDI calculation is useful for setting priorities such as re-evaluation of a selection of pesticides. It should be used as a screening process that may eliminate the need for further consideration of the intake of a pesticide residue.

National food consumption

International TMDI calculations are carried out with hypothetical food consumption data derived from Food Balance Sheets. FBS are subject to a number of uncertainties and limitations and only provide an approximate picture of the overall food situation in a country over a specified period of time. The amount of food actually consumed may be lower depending on the degree of losses of edible food e.g. during storage, in preparation and cooking as plate waste or quantities fed to domestic animals and pets, or thrown away.

An important refinement of intake estimation is using national food consumption data. In The Netherlands a large scale food consumption survey was carried out in 1987/88 and in 1992 [DNFCS, 1988; DNFCS, 1992]. Both food consumption surveys included about 6,000 persons constituting a representative sample of the Dutch population.

When national food consumption surveys are used for estimating national TMDIs it is possible to consider the acceptability of MRLs for the Dutch situation.

The Dutch TMDI model can be a useful tool for risk assessment of pesticides and harmonisation of residue limits in the European Union or worldwide (Codex).

Dutch TMDI model

This project provides the Dutch TMDI model, which can be used for risk assessment and reporting theoretical maximum daily intake of pesticides for the Dutch population.

For the development of the Dutch TMDI model a link is made between Dutch consumption data of foodstuffs and MRLs of primary agricultural commodities. This involves the calculation of the Dutch food consumption in terms of primary agricultural products.

A computer program is developed in order to execute routine TMDI calculations.

Chapter 2 reports the applied methodology for the realisation of a national diet of primary

agricultural products and the development of the TMDI model. Results are described in chapter 3. In chapter 4 the Dutch TMDI model is discussed. Finally conclusions and recommendations are given in chapter 5.

2 METHOD

The Dutch national TMDI model was designed to meet the international recommendations regarding dietary intake assessment of pesticide residues. During the realisation of the TMDI model a number of conditions were met. The subparagraphs below give the procedures followed:

- 1 *Average Dutch food consumption*
- 2 *Conversion of foodstuffs to primary agricultural products*
- 3 *Connection between MRLs and consumption*
- 4 *Plant classification of the European Union*
- 5 *MRLs for not consumed products*
- 6 *MRLs at limit of determination*
- 7 *Theoretical and acceptable daily intake*

2.1 *Average Dutch food consumption*

The Dutch National Food Consumption Survey 1992 [DNFCS, 1993] was used as a starting point for determining the Dutch dietary intake. This large scale food consumption survey was carried out in 1992 among a representative sample of the Dutch population. In total 6,218 respondents (2,475 households) participated. Information on the actual individual intake of foodstuffs was obtained with a 2-day diary method.

In order to formulate a national dietary pattern the average consumption of foodstuffs was calculated based upon the DNFCS 1992. As recommended by the Commission of the second DNFCS [Anonymous, 1993], weighing factors were taken into account to correct for the distribution of sex-age groups.

2.2 *Conversion of foodstuffs into primary agricultural products*

In global (Codex) recommendations and in European and national legislation Maximum Residue Limits (MRLs) of pesticide residues are set. These residue limits are related to primary agricultural products. In Dutch food consumption surveys the consumption is recorded in terms of prepared foods eaten by consumers; e.g. apple pie, French fries, pizza. In 1994 a Conversion model Primary Agricultural Products (CPAP) was developed in order to link foodstuffs to primary agricultural products [Van Dooren et al., 1995]. With this model it is possible to transform food consumption surveys, coded with the Dutch NEVO-code [Foundation NEVO

Dutch Nutrient Databank], to consumption amounts of raw primary agricultural products. Further the CPAP offers the possibility to derive consumption figures for individual components of primary agricultural products (e.g. milk fat, meat fat, germ, waste component vegetables). In order to derive the average Dutch consumption of primary agricultural products for TMDI calculations, specific product definitions are set in the CPAP. These definitions are linked with the product definitions in EC Directives, implemented in the 'Regulation residues of pesticides' of the Dutch Pesticide Act [Pesticide Act, 1996].

Table 2.1 presents an overview of the applied primary agricultural product definitions specific for the Dutch TMDI model.

Table 2.1 Product definitions primary agricultural products in TMDI model.

vegetables	=	including shrink and waste amount
fruit	=	including peel, seed, stone, core and green waste amount
cereal	=	derived from the most important components of a grain which may be separately present in a foodstuff (starch/flour, germ, bran)
milk	=	sum of the casein, whey, milk fat, lactose and water amount present in foodstuffs

2.3 Connection between MRLs and consumption

The maximum allowable residue levels of pesticides in animal products (meat, milk and eggs) are often expressed in mg/kg fat. These MRLs are set on a fat basis for fat soluble pesticides. When predicting a TMDI this MRL should be related to the consumption of the fat component of a primary agricultural product.

To link this information the consumption of the fat component of a primary agricultural product is calculated through the CPAP. These fat consumption data are also recorded in the TMDI model.

With this the Dutch TMDI model offers a possibility to connect MRLs of both not-fat soluble and fat soluble pesticides respectively with consumption on product and fat basis.

Table 2.2 shows the groups of primary agricultural products from which the consumed fat component is calculated.

Table 2.2 Overview groups primary agricultural products with fat component.

primary agricultural product group
nuts*
oil containing seeds
vegetable oils**
grains*
cocoa
meat, liver, kidney
milk
egg (product)
game/poultry
fish
other animal products

* = fat based calculations not applicable for MRLs of pesticides
 ** = consumption product is equal to consumption fat

2.4 Plant classification of the European Union

MRLs are set at different product levels, namely for product groups, product subgroups and for individual products. For example a MRL can be set for the product lemon, the product subgroup citrus fruit or for the total product group fruit. When setting maximum residue levels for vegetable products, the EU uses a plant classification [PbEG L350, Directive 90/642/EEC]. In the Dutch TMDI model the primary agricultural products are classified according to this system.

The list of primary agricultural products is extended with a number of consumed animal products. This concerns a number of fish species and specific names of animals and poultry. Some products mentioned explicitly in the EU classification are transformed via the conversion model to one primary agricultural product. These particular products concern prepared, processed EU products, namely grain products, cocoa products and milk products. For example the EU product flour is converted in wheat and the EU product cheese in milk.

The EU classification is included in the TMDI model and makes it possible to fill in (proposed) MRLs at a product, product subgroup as well as product group level. The contribution of different product(sub)groups to the theoretical maximum daily intake of a pesticide can be generated.

2.5 MRLs for not consumed products

If food consumption data are not available for a commodity or a commodity is not consumed, the hypothetical diets of the WHO use the consumption value for a similar food. If no similar food is available, instead using zero, a default value of 0.1 g/day is used.

In the Dutch diet, derived from the DNFCS-1992, a number of primary agricultural products are not consumed. For TMDI calculations this consumption figure is adjusted to 0.1 g/day. These corrected consumption data are only applied to products which are implicitly mentioned by name in the EU plant classification. Products with a collective name of other products (e.g. other nuts, other malaceous fruit) and prepared, processed products (e.g. cheese, flour) are excluded from this procedure.

2.6 MRLs at limit of determination

When a pesticide residue is not allowed in/on a commodity the MRL is set at the Limit of Determination (LOD) of the analytical method. According to the guidelines of predicting dietary intake of pesticide residues 1989 [WHO, 1989] in intake calculations MRLs are set to zero. In a FAO/WHO Consultation for revision of these guidelines it is recommended to calculate the TMDI using a residue level equivalent to the LOD [WHO, 1995].

In the Dutch TMDI model a procedure is built in to give the user the opportunity to make both calculations with and without MRLs at LOD level. The user can enter the LOD level into the program.

2.7 Theoretical and acceptable daily intake

For evaluating the TMDI a comparison with the Acceptable/Tolerable Daily Intake (ADI) is necessary. The ADI is expressed in mg/kg body weight so the calculated TMDI should be divided by the mean body weight. Internationally a standard body weight of 60 kg is used. The mean body weight of the national population under research (DNFCS-1992) is 65 kg.

In the computer model the user can enter the ADI (in mg/kg body weight). The user can choose between the standard body weight or the body weight of the population under research. Using this input, the theoretical intake is automatically expressed as a percentage of the ADI. The contribution of the different products to the total theoretical intake is expressed in the same way.

3 RESULTS

3.1 Average consumption of primary agricultural products

The average consumption of 1,112 foodstuffs, as recorded with the DNFCs 1992, was transformed into consumption amounts of about 200 primary agricultural products, using the Conversion model Primary Agricultural Products [Van Dooren et al., 1995]. Along with primary agricultural products containing fat, the consumed amount of fat was calculated (e.g. milk consumption and milk fat consumption) and recorded in the average national diet. When deriving consumption amounts, according to TMDI procedures, specific product definitions were used (paragraph 2.2) and null consumption for a number of commodities was updated (paragraph 2.5).

The primary agricultural products were grouped according to the system of EU plant classification. The list of primary agricultural products with the Dutch consumption data for national theoretical maximum daily intake calculations of pesticide residues is presented in Annex 1. A selection of this list is presented in table 3.1.

Table 3.1 Average Dutch consumption of primary agricultural products.

Product group	Product subgroup	Product	Consumption of	Consumption (g/day)
fruit, nuts	citrus fruit	grapefruit	PROD	5,28
		lemon	PROD	2,13
		lime	PROD	0,10
		mandarin orange, clementines and others	PROD	10,18
		orange	PROD	77,41
		pomelo	PROD	0,10
		other citrus fruit	PROD	0,00
		nuts	almonds	PROD
	FAT			0,45
	paranuts		PROD	0,05
			FAT	0,03
	cashew		PROD	0,42
			FAT	0,22
	fish products	molluscs	mussel	PROD
FAT				0,01
other animal products	honey	honey	PROD	0,82

3.2 *TMDI calculations in a computer model*

3.2.1 *Description of TMDI model*

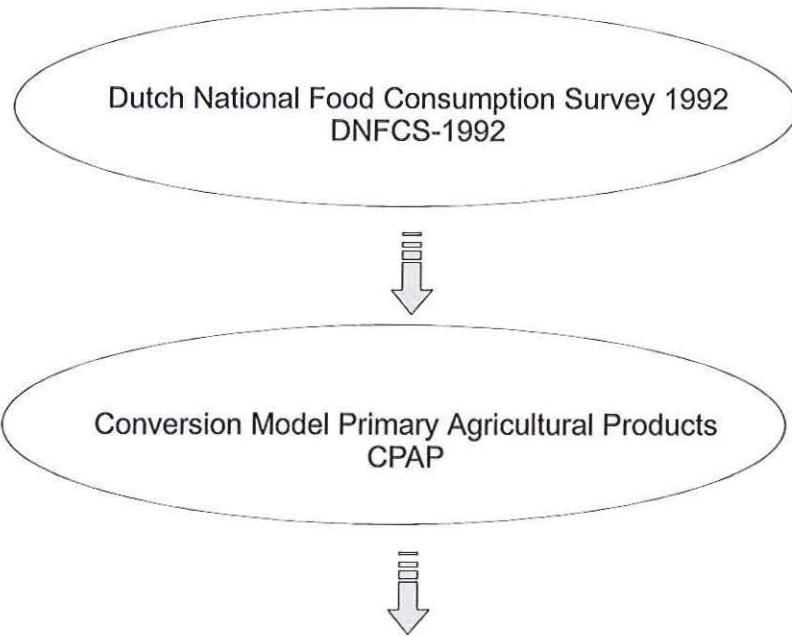
A schematic presentation of the entities related to the TMDI model are given in Figure I. The Dutch TMDI model is connected with 2 other entities: the Dutch National Food Consumption Survey (DNFCS-1992) and the Conversion model Primary Agricultural Products (CPAP). Consumption data from the DNFCS-1992 are transformed via the CPAP in consumption data of primary agricultural products.

The average Dutch consumption data of primary agricultural products are recorded in the entity CONSUMPTION_PAP. The consumption can be expressed on product basis and on fat basis. The user can choose whether the calculation should be made for fat soluble pesticides of water soluble pesticides. This choice should be made in the entity COMPONENT. This entity COMPONENT contains the codes PROD (=whole product) and FAT (=fat component). With this code a correct link between MRLs and consumption will be automatically achieved.

The entered input for a TMDI calculation is registered in the entities COMPOUND_ADI and COMPOUND_PAP_MRL. The computer user enters the name of a compound, the Acceptable Daily Intake, the average body weight and the limit of determination. This compound information is recorded in the entity COMPOUND_ADI. The MRLs with the correct component of a primary agricultural product are entered in the entity COMPOUND_PAP_MRL.

The entities PAP, EU_PRODUCTSUBGROUP and EU_PRODUCTGROUP contain the names and codes of the EU classification system of each primary agricultural commodity present in the TMDI model. With these codes products can be classified in categories of primary agricultural products. The computer user can enter MRLs per food category (productgroup and product subgroup) or per individual primary agricultural product.

More detailed definitions of terms and attributes of the entities are described in Annex 2.



Dutch TMDI model

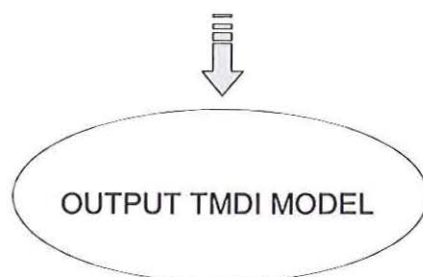
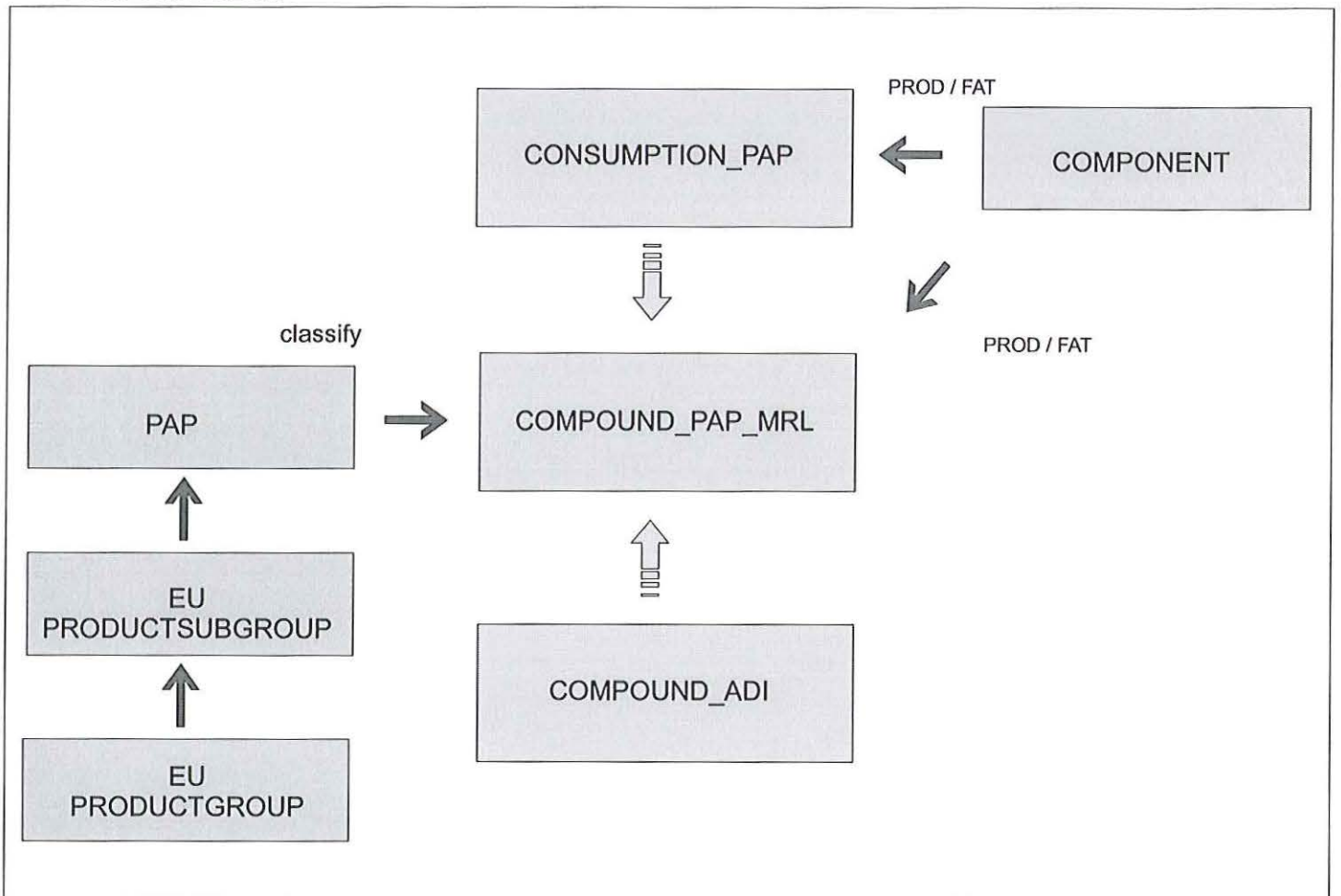


Figure 1: Entities of the Dutch TMDI model.

3.2.2 Application of TMDI model

The procedure for calculating a TMDI of a particular pesticide can be distinguished in management of input and selection of output:

1) Input management TMDI calculation

- Registration of the name of a compound with accompanying Acceptable Daily Intake (ADI) (in mg/kg body weight) and Limit Of Determination (LOD) (in mg/kg product)
- Registration of average body weight:
 - standard 60 kg
 - national Dutch food consumption survey 1992 65 kg
- Registration of (proposed) MRLs. The computer user can fill in MRLs (mg/kg) at different product levels: productgroup, productsubgroup or for one individual product. When registering a MRL for example for the productsubgroup citrus fruit, all commodities in this productgroup (grapefruit, lemon, lime, mandarin orange, orange, pomelo) automatically get the same tolerance level.
- Registration of the valid component of primary agricultural product for which a MRL is established: A MRL can be established for a whole product or for the fat component of a product. For example a tolerance level can be set for the whole product meat or for the component fat in meat. Choosing the component fat (FAT) the MRL is automatically linked to the consumption of the fat component of a commodity. The component whole product (PROD) connects the MRL to the consumption of the whole primary agricultural product.

2) Output TMDI calculation

To illustrate the use of the Dutch TMDI model, the input and output of the pesticide chlorfenvinphos are presented. MRLs of this pesticide residue are stated in the Dutch Pesticide Act. Table 3.2.3a presents the gathered input for entering into the Dutch TMDI model. A selection of the generated information of the TMDI calculation of chlorfenvinphos is given in Table 3.2.3b. The complete output is presented in Annex 3.

- The computer program produces a well-organised output, presenting per primary agricultural product the entered MRLs (mg/kg), the selected component, the Theoretical Maximum Daily Intake (ug/person/day) and the intake as a percentage of the ADI. At the end of the list the total amount of the TMDI and percentage of the ADI is printed.
- The output can be produced with the entered MRLs only or with the entered MRLs and the level of determination for the remaining products.

Table 3.2.3a Input TMDI calculation chlorfenvinphos.

Input		Value
Name of compound		CHLORFENVINPHOS
Body weight (kg)		65
ADI (mg/kg body weight/day)		0,0005
Consumption of		PROD & FAT
Limit of Determination (mg/kg)	prod	0,05
MRLs (mg/kg)		
citrus fruit	PROD	1
roots and tubers	PROD	0,5
bulbous plants	PROD	0,5
celery	PROD	0,5
parsley	PROD	0,5
(bleach)celery	PROD	0,5
other vegetables	PROD	0,1
tea	PROD	0,2
meat	FAT	0,2
milk	PROD	0,008

Table 3.2.3b Output of Dutch TMDI model chlorfenvinphos.

ADI = Acceptable Daily Intake (mg/kg body weight)
Consumption = Average consumption (g/person/day) of primary agricultural products derived from DNFCs 1992
MRL = Maximum Residue Limit (mg/kg)
TMDI = Theoretical Maximum Daily Intake (ug/person/dag)
ADI % = Percentage of ADI
* = Calculation including MRL at limit of determination (MRL*)

=====

COMPOUND CHLORFENVINPHOS - ADI-value: 0.0005

=====

Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*	
fruit, nuts	citrus fruit	grapefruit	PROD	5,28	1,00	1,00	5,28	5,28	16,23	16,23	
		lemon	PROD	2,13			2,13	2,13	6,55	6,55	
		lime	PROD	0,10			0,10	0,10	0,31	0,31	
		mandarin, clementine and others	PROD	10,18			10,18	10,18	31,33	31,33	
		orange	PROD	77,41			77,41	77,41	238,18	238,18	
		pomelo	PROD	0,10			0,10	0,10	0,31	0,31	
		other citrus fruit	PROD	0,00			0,00	0,00	0,00	0,00	
		nuts	almond	PROD	0,81	0,00	0,05	0,00	0,04	0,00	0,13
	paranut		PROD	0,05			0,00	0,00	0,00	0,01	
	cashew		PROD	0,42			0,00	0,02	0,00	0,07	
	
	
	meat, poultry, fat, edible offal		meat, liver, kidney, fat of cow, pig, sheep, goat, horse	meat of cow	FAT	3,83	0,20	0,20	0,77	0,77	2,35
			liver of cow	FAT	0,08			0,02	0,02	0,05	0,05
		kidney of cow	FAT	0,00			0,00	0,00	0,00	0,00	
		fat of cow	FAT	1,16			0,23	0,23	0,71	0,71	
		
		
fish products	molluscs	muschel	PROD	0,27	0,00	0,05	0,00	0,01	0,00	0,04	
		
other animal products	honey	honey	PROD	0,82	0,00	0,05	0,00	0,04	0,00	0,13	
<i>Total</i>							139,49	175,49	429,24	539,98	

Dutch TMDI model

The developed Dutch TMDI model is a first refinement of consumption data for estimating Theoretical Maximum Daily Intake. The average consumption of primary agricultural products, derived from the Dutch National Food Consumption Survey 1992, is incorporated in the Dutch TMDI model. Calculation of a theoretical maximum daily intake at a national level is now possible and can be useful for registration decisions, risk assessment and harmonisation of international maximum residue levels for pesticides.

The calculation of a TMDI is a worst case approach, with the assumption that all consumed foods are treated with pesticides and contain residues at MRL level. The proportion of crops treated with a pesticide is usually far less than 100% and the true pesticide residue intake will be much lower because of losses during processing or cooking of treated commodities. A TMDI calculation should be used only as a screening procedure that may eliminate the need for further consideration of the intake of a pesticide residue.

When a TMDI calculation exceeds the ADI more refined predictions of pesticide residue intake are necessary. For a more realistic intake estimation (Estimated Daily Intake = EDI) it is recommended to use as much available relevant information as possible [WHO, 1995]. These factors are on the one hand related to a further refinement of food consumption data and on the other hand to refinement of expected residue levels.

Food consumption data

The application of national food consumption data to dietary intake calculations of potentially harmful substances in foods is established in the present Dutch TMDI model. National food consumption data provide an important refinement of dietary intake assessment of pesticide residues. Internationally most countries use the hypothetical cultural diets derived from Food Balance Sheets in their assessments. In reporting TMDI calculations to the WHO/FAO Finland, Norway, Spain and Sweden use the average national diet. Only a small number of countries apply food consumption data of subpopulations of the national population. For dietary intake assessment of pesticides the United Kingdom uses food consumption data of 3 subpopulations; adults (age 16-65), children (age 10-15) and babies (6-12 months). In Germany the average diet of a 4-6 year old girl is utilised.

From the Dutch National Food Consumption Survey information regarding dietary intake of foodstuffs from different subpopulations can be obtained, e.g. gender, age, lifestyle, pregnancy. Splitting up consumption data for different subpopulations could be very useful for

identifying vulnerable groups of the population. Further this method provides new prospects for international comparisons of intake calculations.

Residue data

Many countries have a considerable amount of residue data available from national monitoring programs and surveys. These monitoring data provide actual pesticide residue levels in imported products and products available on the national market [Van Klaveren, 1995]. These data can be an important refinement for more accurate intake calculations of pesticide residues.

When calculating a TMDI, processing effects are not taken into account. Residues on raw commodities are normally dissipated during storage, transport, preparation, commercial processing and cooking. Usually data on the effects of processing on residues are scarce. Available processing studies should be used for determining reduction and concentration factors. Processing data can be used for deriving more realistic estimates of dietary intake of pesticides.

5 CONCLUSION AND RECOMMENDATIONS

Tolerance setting of pesticides is intended to ensure public health and free movement of food in international trade. In order to reach a conclusion regarding the acceptability of a Maximum Residue Limit (MRL) it is necessary to predict the theoretical maximum daily intake of a pesticide residue and compare this prediction with the Acceptable Daily Intake (ADI).

According to the stepwise WHO procedure, the so called worst case scenario, a Theoretical Maximum Daily Intake (TMDI) is calculated. The current report describes a procedure to calculate Theoretical Maximum Daily Intakes by transforming data of the Dutch National Food Consumption Survey to data for primary agricultural products. This model can be used for risk assessment of pesticides and for harmonisation of residue limits between countries in the European Union or worldwide.

A TMDI is a worst case approach which results in a theoretical intake estimate. In cases where the TMDI exceeds the ADI it is essential to make more refined predictions of pesticide residue intake. For a more realistic intake estimation it is recommended to use as much available relevant information as possible. Available residue data from national monitoring programs and surveys should be taken in consideration. Data on processing effects are also an important refinement for intake estimation of pesticide residues. Intake calculations of subpopulations could be useful for identifying vulnerable groups of the population.

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ANNEX 1: Average consumption of primary agricultural products in the Dutch TMDI model.

Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption	
1	1	1	FRUIT, NUTS	CITRUS FRUIT	GRAPEFRUIT	5.28 whole product	
1	1	2			LEMON	2.13 whole product	
1	1	3			LIME	.10 whole product	consumption in survey is 0
1	1	4			MANDARIN ORANGE, CLEMENTINE AN	10.18 whole product	
1	1	5			ORANGE	77.41 whole product	
1	1	6			POMELO	.10 whole product	consumption in survey is 0
1	1	99			OTHER CITRUS FRUIT	.00 whole product	

					95.19		
1	2	1	NUTS	ALMOND	.81 whole product		
1	2	2			PARANUTS (BRAZILNUT)	.05 whole product	
1	2	3			CASHEW	.42 whole product	
1	2	4			SWEET (EDIBLE) CHESTNUTS	.02 whole product	
1	2	5			COCONUT	.62 whole product	
1	2	6			HAZELNUT	.77 whole product	
1	2	7			MACADAMIA NUT	.10 whole product	consumption in survey is 0
1	2	8			PECAN	.10 whole product	consumption in survey is 0
1	2	9			PINE CONE	.10 whole product	consumption in survey is 0
1	2	10			PISTACHIO NUTS	.10 whole product	consumption in survey is 0
1	2	11			WALNUTS	.26 whole product	
1	2	99			OTHER NUTS	.00 whole product	

					3.35		
1	2	1			ALMOND	.45 fat part of product	
1	2	2			PARANUTS (BRAZILNUT)	.03 fat part of product	
1	2	3			CASHEW	.22 fat part of product	
1	2	4			SWEET (EDIBLE) CHESTNUTS	.00 fat part of product	
1	2	5			COCONUT	.25 fat part of product	
1	2	6			HAZELNUT	.53 fat part of product	
1	2	7			MACADAMIA NUT	.00 fat part of product	
1	2	8			PECAN	.00 fat part of product	
1	2	9			PINE CONE	.00 fat part of product	
1	2	10			PISTACHIO NUTS	.00 fat part of product	
1	2	11			WALNUTS	.17 fat part of product	
1	2	99			OTHER NUTS	.00 fat part of product	

Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption	
				1.64		
1	3	1 FRUIT, NUTS	MALACEOUS FRUIT	APPLE	81.05 whole product	
1	3	2		PEAR	9.49 whole product	
1	3	3		QUINCE	.11 whole product	
1	3	99		OTHER MALACEOUS FRUIT	.00 whole product	

				90.65		
1	4	1	STONE FRUIT	APRICOT	2.23 whole product	
1	4	2		SWEET CHERRIES	2.17 whole product	
1	4	3		PEACH, NECTARINE	2.79 whole product	
1	4	4		PLUM	1.94 whole product	
1	4	99		OTHER STONE FRUIT	.00 whole product	

				9.12		
1	5	1	BERRIES AND SMALL FRUIT	TABLE GRAPES	15.20 whole product	
1	5	2		WINE GRAPES	34.82 whole product	
1	5	3		STRAWBERRY	4.33 whole product	
1	5	4		BLACKBERRY	.32 whole product	
1	5	5		DEWBERRY	.10 whole product	consumption in survey is 0
1	5	6		LOGANBERRY	.10 whole product	consumption in survey is 0
1	5	7		RASPBERRY	.81 whole product	
1	5	8		BLUE BILBERRIES	.25 whole product	
1	5	9		CRANBERRIES	.00 whole product	
1	5	10		CURRANT (RED, WHITE, BLACK)	1.38 whole product	
1	5	11		GOOSEBERRIES	.05 whole product	
1	5	12		COWBERRY	.00 whole product	
1	5	13		ELDERBERRY	.26 whole product	
1	5	15		ROSE HIP	.40 whole product	
1	5	79		OTHER RUBUS VARIETIES	.00 whole product	
1	5	89		OTHER SMALL FRUIT AND BERRY FR	.00 whole product	
1	5	99		WILD BERRY FRUITS AND WILD FRU	.00 whole product	

				58.03		

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
1	6	1	FRUIT, NUTS	VARIOUS FRUITS	AVOCADO	.02 whole product	
1	6	2			BANANA	21.59 whole product	
1	6	3			DATE	.03 whole product	
1	6	4			FIGS	.02 whole product	
1	6	5			KIWI FRUIT	3.05 whole product	
1	6	6			KUMQUAT	.10 whole product	consumption in survey is 0
1	6	7			LYCHEE	.03 whole product	
1	6	8			MANGO	.84 whole product	
1	6	9			OLIVES (TABLE OLIVES)	.25 whole product	
1	6	10			OLIVES (FOR OIL-EXTRACTION)	.00 whole product	included in olives (table ol
1	6	11			PASSIONFRUIT	.54 whole product	
1	6	12			PINEAPPLE	4.51 whole product	
1	6	13			POMEGRANATE	.10 whole product	consumption in survey is 0
1	6	14			GUAVA	.00 whole product	
1	6	15			PAPAYA	.10 whole product	consumption in survey is 0
1	6	17			KAKI	.02 whole product	
1	6	99			OTHER MISCELLANEOUS FRUIT	.00 whole product	
						----- 31.21	
1	6	9			OLIVES (TABLE OLIVES)	.03 fat part of product	
						----- .03	
2	1	1	VEGETABLES	ROOTS AND TUBERS	BEETROOT	5.15 whole product	
2	1	2			CARROT	13.43 whole product	
2	1	3			CELERIAC	.78 whole product	
2	1	4			HORSERADISH	.10 whole product	consumption in survey is 0
2	1	5			TOPINAMBUR	.10 whole product	consumption in survey is 0
2	1	6			PARSNIP	.10 whole product	consumption in survey is 0
2	1	7			ROOTED PASLEY	.10 whole product	consumption in survey is 0
2	1	8			RADISH	.43 whole product	
2	1	9			SALSIFY	.06 whole product	
2	1	10			SWEET POTATO	.04 whole product	
2	1	11			SWEDISH TURNIP, SWEDE	.81 whole product	
2	1	12			TURNIP SHOOTS	.10 whole product	consumption in survey is 0

Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU Nr	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
2	1	13	VEGETABLES	ROOTS AND TUBERS		
				YAM	.10 whole product	consumption in survey is 0
				WINTER CARROT	.16 whole product	
				CASSAVA	.02 whole product	
				BLACK RADISH	.03 whole product	
				OTHER ROOT AND TUBER VARIETIES	.02 whole product	

					21.51	
2	2	1	BULBOUS PLANT	GARLIC	.01 whole product	
				ONION	16.81 whole product	
				SHALLOT	.10 whole product	consumption in survey is 0
				ONION (SMALL)	.10 whole product	consumption in survey is 0
				OTHER BULBOUS PLANTS	.00 whole product	

					17.02	
2	3	1	FRUITING VEGETABLES	TOMATO	26.07 whole product	
				SWEET PEPPER	3.97 whole product	
				AUBERGINE/EGG PLANT	.26 whole product	
				CUCUMBER	8.03 whole product	
				GHERKIN/PICKLE	1.54 whole product	
				COURGETTE	.54 whole product	
				MELON	2.23 whole product	
				PUMPKIN	.02 whole product	
				WATERMELON	.48 whole product	
				SWEET CORN	1.41 whole product	
				OTHER SOLANACEAE	.00 whole product	
				OTHER CUCURBITACEAE WITH EDIBL	.00 whole product	
				OTHER CUCURBITACEAE WITH NOT E	.00 whole product	

					44.55	
2	4	1	CABBAGES	BROCCOLI	1.98 whole product	
				CAULIFLOWER	16.00 whole product	
				BRUSSEL SPROUTS	4.66 whole product	
				RED CABBAGE	5.13 whole product	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption	
2	4	7 VEGETABLES	CABBAGES	OXHEART/CONICAL CABBAGE	2.03 whole product	
2	4	8		WHITE CABBAGE	6.98 whole product	
2	4	9		SAVOY CABBAGE	1.20 whole product	
2	4	10		CHINESE CABBAGE	.92 whole product	
2	4	11		CURLY KALE	4.93 whole product	
2	4	13		KOHLRABI	.15 whole product	
2	4	79		OTHER CAULIFLOWER VARIETIES	.00 whole product	
2	4	89		OTHER HEADED CABBAGE VARIETIES	.00 whole product	
2	4	99		OTHER LEAF CABBAGE VARIETIES	.00 whole product	

				43.97		
2	5	1	LEAF VEGETABLES AND FRESH HERBS	GARDENCRESS	.00 whole product	
2	5	2		LAMB-S LETTUCE	.22 whole product	
2	5	3		CABBAGE LETTUCE, COS LETTUCE	8.48 whole product	
2	5	4		ENDIVE	7.42 whole product	
2	5	5		PURSLANE	.24 whole product	
2	5	6		SPINACH	10.24 whole product	
2	5	7		SWISS CHARD/LEAF BEAT	.49 whole product	
2	5	9		WATERCRESS	.10 whole product	consumption in survey is 0
2	5	10		CHICORY	9.17 whole product	
2	5	11		CHERVIL	.10 whole product	consumption in survey is 0
2	5	12		CHIVES	.10 whole product	consumption in survey is 0
2	5	13		PARSLEY	.10 whole product	
2	5	14		CELERY	.27 whole product	
2	5	15		TURNIP TOPS	.08 whole product	
2	5	79		OTHER LETTUCE AND SIMILAR VARI	.01 whole product	
2	5	89		OTHER SPINACH AND SIMILAR VARI	.00 whole product	
2	5	99		OTHER FRESH HERBS	.00 whole product	

				37.03		
2	6	10	LEGUMES	FRENCH BEANS (FRESH)	3.14 whole product	
2	6	11		GREEN BEANS (FRESH)	11.66 whole product	
2	6	12		LEGUME (FRESH)	.50 whole product	
2	6	13		STRING BEAN (FRESH)	.12 whole product	
2	6	20		MARROW FAT PEA (DRY HARVESTED)	.33 whole product	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

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EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
2	6	21	VEGETABLES	LEGUMES	BROAD BEAN (FRESH)	2.50 whole product	
2	6	30			GREEN/(GARDEN) PEAS (FRESH)	14.78 whole product	
2	6	99			OTHER LEGUMES (FRESH)	.00 whole product	

						33.03	
2	7	1		STALK VEGETABLES	ASPARAGUS	1.74 whole product	
2	7	2			CARDOON	.10 whole product	consumption in survey is 0
2	7	3			(BLEACH) CELERY	.56 whole product	
2	7	4			FENNEL	.09 whole product	
2	7	5			ARTICHOKE	.04 whole product	
2	7	6			LEEK	12.86 whole product	
2	7	7			RHUBARB	.71 whole product	
2	7	8			BEAN SPROUTS	1.08 whole product	
2	7	9			BAMBOO SHOOTS	.01 whole product	
2	7	99			OTHER STALK VEGETABLES	.00 whole product	

						17.20	
2	8	2		FUNGUS	MUSHROOM	5.13 whole product	
2	8	3			CHANTARELLE	.00 whole product	

						5.14	
3	1	1	PULSES	BEANS	WHITE BEAN (DRY HARVESTED)	.89 whole product	
3	1	2			BROWN BEAN (DRY HARVESTED)	1.76 whole product	
3	1	4			BEANS	.46 whole product	

						3.11	
3	2	1		LENTILS	LENTILS	.04 whole product	

						.04	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
3	3	1	PULSES	PEAS (DRY HARVESTED)	.76 whole product	

					.76	
3	4	99	OTHER PULSES	OTHER PULSES	.00 whole product	

					.00	
4	1	1	OIL-BEARING SEEDS AND PRODUCTS	LINSEED	.02 whole product	
4	1	2		PEANUTS	7.09 whole product	
4	1	3		POPPY SEED	.10 whole product	consumption in survey is 0
4	1	4		SESAME SEED	.07 whole product	
4	1	5		SUNFLOWER SEEDS	.10 whole product	
4	1	6		COLESEED AND RAPE SEED	.10 whole product	consumption in survey is 0
4	1	7		SOYABEANS	.72 whole product	
4	1	8		MUSTARD SEED	.07 whole product	
4	1	9		COTTON SEED	.10 whole product	consumption in survey is 0
4	1	10		CUMIN(SEED)	.02 whole product	
4	1	99		OTHER OIL-BEARING SEEDS	.00 whole product	

					8.40	
4	1	1		LINSEED	.01 fat part of product	
4	1	2		PEANUTS	3.67 fat part of product	
4	1	3		POPPY SEED	.00 fat part of product	
4	1	4		SESAME SEED	.04 fat part of product	
4	1	5		SUNFLOWER SEEDS	.06 fat part of product	
4	1	6		COLESEED AND RAPE SEED	.00 fat part of product	
4	1	7		SOYABEANS	.14 fat part of product	
4	1	8		MUSTARD SEED	.01 fat part of product	
4	1	9		COTTON SEED	.00 fat part of product	
4	1	10		CUMIN(SEED)	.00 fat part of product	
4	1	99		OTHER OIL-BEARING SEEDS	.00 fat part of product	

					3.93	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
4	2 99	OIL-BEARING SEEDS AND PRODUCTS	VEGETABLE OILS AND FATS	37.28 whole product ----- 37.28	
5	1 99	POTATOES	EARLY POTATOES	.00 whole product ----- .00	see store potatoes
5	2 99		STORE POTATOES	179.68 whole product ----- 179.68	
6	99 99	TEA	TEA, DRIED LEAVES/STALKS, POSS	2.13 whole product ----- 2.13	
7	99 99	HOP	HOPS	.10 whole product ----- .10	consumption in survey is 0
8	1 1	GRAINS AND GRAIN PRODUCTS	GRAINS		
8	1 2		WHEAT	122.83 whole product	
8	1 3		RYE	4.93 whole product	
8	1 4		BARLEY	26.69 whole product	
8	1 5		OAT	1.37 whole product	
8	1 6		MAIZE	3.01 whole product	
8	1 7		RICE	9.90 whole product	
8	1 8		SORGHUM	.10 whole product	consumption in survey is 0
8	1 9		BUCKWHEAT	.71 whole product	
8	1 9		MILLET	.03 whole product	
8	1 99		OTHER GRAINS	.00 whole product ----- 169.58	
8	1 1		WHEAT	1.88 fat part of product	derived from germ part

bl
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Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
8	1	2	GRAINS AND GRAIN PRODUCTS	GRAINS		
8	1	3		RYE	.04 fat part of product	derived from germ part
8	1	4		BARLEY	.53 fat part of product	derived from germ part
8	1	5		OAT	.03 fat part of product	derived from germ part
8	1	6		MAIZE	.01 fat part of product	derived from germ part
8	1	7		RICE	.19 fat part of product	derived from germ part
8	1	8		SORGHUM	.00 fat part of product	derived from germ part
8	1	9		BUCKWHEAT	.01 fat part of product	derived from germ part
8	1	99		MILLET	.00 fat part of product	derived from germ part
				OTHER GRAINS	.00 fat part of product	derived from germ part

					2.69	
8	2	1	GRAIN PRODUCTS	WHITE FLOUR	.00 whole product	included in grain(s)
8	2	2		BREAD	.00 whole product	included in grain(s)
8	2	3		ROLLED OATS	.00 whole product	included in grain(s)
8	2	4		FLOUR/MEAL	.00 whole product	included in grain(s)
8	2	5		WHOLEMEAL FLOUR	.00 whole product	included in grain(s)

					.00	
9	1	1	TROPICAL SEEDS AND PRODUCTS	TROPICAL SEEDS		
9	1	2		COCOA BEANS	3.82 whole product	
9	1	2		COFFEE BEANS	21.42 whole product	

					25.24	
9	1	1		COCOA BEANS	2.06 fat part of product	

					2.06	
9	2	1	PRODUCTS OF TROPICAL SEEDS	COCOA BUTTER (PRESS)	.00 whole product	included in cacao beans
9	2	2		COCOA MASS	.00 whole product	included in cacao beans
9	2	3		COCOA POWDER	.00 whole product	included in cacao beans
9	2	4		COCOA BUTTER	.00 whole product	included in cacao beans
9	2	5		COFFEE	.00 whole product	included in coffee beans

					.00	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

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EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
9	2	1	TROPICAL SEEDS AND PRODUCTS	PRODUCTS OF TROPICAL SEEDS		
				COCOA BUTTER (PRESS)	.00 fat part of product	included in cacao beans
9	2	2		COCOA MASS	.00 fat part of product	included in cacao beans
9	2	3		COCOA POWDER	.00 fat part of product	included in cacao beans
9	2	4		COCOA BUTTER	.00 fat part of product	included in cacao beans
9	2	5		COFFEE	.00 fat part of product	included in coffee beans

					.00	
10	1	1	VARIOUS VEGETABLE PRODUCTS	SPICES/SEASONINGS		
				GINGER (ROOT)	.07 whole product	
10	1	2		TAMARIND	.02 whole product	

					.09	
10	2	99		SUGAR	64.84 whole product	

					64.84	
11	1	10	MEAT, POULTRY, FAT, EDIBLE OFFALS	MEAT, LIVER, KIDNEY, FAT-COW, PIG, SHEEP, GOAT, HORSE	MEAT OF COW	41.45 whole product
11	1	11		LIVER OF COW	1.64 whole product	
11	1	12		KIDNEY OF COW	.04 whole product	
11	1	13		FAT OF COW	1.16 whole product	
11	1	20		MEAT OF PIG	57.99 whole product	
11	1	21		LIVER OF PIG	2.02 whole product	
11	1	22		KIDNEY OF PIG	.04 whole product	
11	1	23		FAT OF PIG	1.30 whole product	
11	1	30		MEAT OF SHEEP	.98 whole product	
11	1	50		MEAT OF HORSE	1.40 whole product	
11	1	60		MEAT OF CALF	.76 whole product	
11	1	61		LIVER OF CALF	.04 whole product	

					108.83	
11	1	10		MEAT OF COW	3.83 fat part of product	

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

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EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption	
11	1	11	MEAT, POULTRY, FAT, EDIBLE OFFALS	MEAT, LIVER, KIDNEY, FAT-COW, PIG, SHEEP, GOAT, HORSE	LIVER OF COW	.08 fat part of product	
11	1	12		KIDNEY OF COW	.00 fat part of product		
11	1	13		FAT OF COW	1.16 fat part of product	prod = fat	
11	1	20		MEAT OF PIG	6.98 fat part of product		
11	1	21		LIVER OF PIG	.10 fat part of product		
11	1	22		KIDNEY OF PIG	.00 fat part of product		
11	1	23		FAT OF PIG	1.30 fat part of product	prod = fat	
11	1	30		MEAT OF SHEEP	.22 fat part of product		
11	1	50		MEAT OF HORSE	.01 fat part of product		
11	1	60		MEAT OF CALF	.04 fat part of product		
11	1	61		LIVER OF CALF	.00 fat part of product		

					13.73		
11	2	20		MEAT, LIVER-COCK, CHICKEN, DUCK, GOOSE, TURKEY, G. FOWL	MEAT OF CHICKEN	15.64 whole product	
11	2	21			LIVER OF CHICKEN	.20 whole product	
11	2	30			MEAT OF DUCK	.11 whole product	
11	2	50			MEAT OF TURKEY	.60 whole product	

					16.55		
11	2	20			MEAT OF CHICKEN	.82 fat part of product	
11	2	21			LIVER OF CHICKEN	.01 fat part of product	
11	2	30			MEAT OF DUCK	.03 fat part of product	
11	2	50			MEAT OF TURKEY	.05 fat part of product	

					.91		
12	1	1	MILK AND MILK PRODUCTS	MILK	COW MILK	.00 whole product	included in milk
12	1	2			GOAT MILK	.00 whole product	included in milk
12	1	3			SHEEP MILK	.00 whole product	included in milk
12	1	99			MILK	402.00 whole product	

Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
						402.00	
12	1	1	MILK AND MILK PRODUCTS	MILK	COW MILK	.00 fat part of product	included in milk
12	1	2			GOAT MILK	.00 fat part of product	included in milk
12	1	3			SHEEP MILK	.00 fat part of product	included in milk
12	1	99			MILK	19.98 fat part of product	

						19.98	
12	2	1		MILK PRODUCTS	CREAM	.00 whole product	included in milk
12	2	2			BUTTER	.00 whole product	included in milk
12	2	3			CHEESE	.00 whole product	included in milk
12	2	4			CURD	.00 whole product	included in milk

						.00	
12	2	1			CREAM	.00 fat part of product	included in milk
12	2	2			BUTTER	.00 fat part of product	included in milk
12	2	3			CHEESE	.00 fat part of product	included in milk
12	2	4			CURD	.00 fat part of product	included in milk

						.00	
13	1	1	EGGS AND EGG PRODUCTS	EGGS	WHOLE EGG, CHICKEN	22.21 whole product	
13	1	2			DUCK EGGS	.10 whole product	consumption in survey is 0
13	1	3			GOOSE EGGS	.10 whole product	consumption in survey is 0

						22.41	
13	1	1			WHOLE EGG, CHICKEN	2.27 fat part of product	
13	1	2			DUCK EGGS	.00 fat part of product	
13	1	3			GOOSE EGGS	.00 fat part of product	

						2.27	
13	2	1		EGG PRODUCTS	EGG YOLK	.84 whole product	

Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
13	2	2	EGGS AND EGG PRODUCTS	EGG PRODUCTS	PROTEIN	.50 whole product	

							1.34
13	2	1			EGG YOLK	.37 fat part of product	
13	2	2			PROTEIN	.00 fat part of product	

							.37
14	1	1	GAME AND POULTRY	GAME AND POULTRY	DOVE	.10 whole product	consumption in survey is 0
14	1	2			PHEASANT	.10 whole product	consumption in survey is 0
14	1	3			HARE	.06 whole product	
14	1	4			DEER	.10 whole product	consumption in survey is 0
14	1	5			RABBIT, INCL. DOMESTIC RABBIT	.23 whole product	
14	1	6			PARTRIDGE	.10 whole product	consumption in survey is 0
14	1	7			ROE-DEER	.03 whole product	
14	1	8			WILD DUCK	.10 whole product	consumption in survey is 0
14	1	9			WILD PIG, BOAR	.10 whole product	consumption in survey is 0

							.91
14	1	1			DOVE	.00 fat part of product	
14	1	2			PHEASANT	.00 fat part of product	
14	1	3			HARE	.00 fat part of product	
14	1	4			DEER	.00 fat part of product	
14	1	5			RABBIT, INCL. DOMESTIC RABBIT	.02 fat part of product	
14	1	6			PARTRIDGE	.00 fat part of product	
14	1	7			ROE-DEER	.00 fat part of product	
14	1	8			WILD DUCK	.00 fat part of product	
14	1	9			WILD PIG, BOAR	.00 fat part of product	

							.03
15	1	1	FISH PRODUCTS	FISH (VARIOUS)	EEL	.40 whole product	
15	1	2			RAY	.05 whole product	

							.45

Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
15	1	1	FISH PRODUCTS	FISH (VARIOUS)	EEL	.08 fat part of product	
15	1	2			RAY	.00 fat part of product	

						.08	
15	2	1		FISH (HERRING-TYPE)	HERRING	1.92 whole product	
15	2	2			ANCHOVY	.00 whole product	
15	2	3			SARDINES	.04 whole product	

						1.96	
15	2	1			HERRING	.22 fat part of product	
15	2	2			ANCHOVY	.00 fat part of product	
15	2	3			SARDINES	.01 fat part of product	

						.23	
15	3	1		FISH (MACKEREL-TYPE)	MACKEREL	.45 whole product	
15	3	2			TUNA	.23 whole product	

						.69	
15	3	1			MACKEREL	.12 fat part of product	
15	3	2			TUNA	.00 fat part of product	

						.13	
15	4	1		FISH (COD-TYPE)	COD	1.16 whole product	
15	4	2			POLLACK, LYTHE	.89 whole product	
15	4	3			HADDOCK	.06 whole product	
15	4	4			GURNARD	.05 whole product	

						2.17	
15	4	1			COD	.02 fat part of product	

Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
15	4	2	FISH PRODUCTS	FISH (COD-TYPE)	POLLACK, LYTHE	.05 fat part of product
15	4	3			HADDOCK	.00 fat part of product
15	4	4			GURNARD	.00 fat part of product

						.07
15	5	1	FISH (FLAT FISH TYPE)	FLOUNDER, FLUKE	.13 whole product	
15	5	2			PLAICE	2.70 whole product
15	5	3			SOLE	.05 whole product
15	5	4			LEMON SOLE, LIMANDE	.05 whole product

						2.93
15	5	1			FLOUNDER, FLUKE	.02 fat part of product
15	5	2			PLAICE	.22 fat part of product
15	5	3			SOLE	.00 fat part of product
15	5	4			LEMON SOLE, LIMANDE	.00 fat part of product

						.24
15	6	1	FISH (SALMON-TYPE)	SALMON	.79 whole product	
15	6	2			TROUT	.02 whole product

						.81
15	6	1			SALMON	.09 fat part of product
15	6	2			TROUT	.00 fat part of product

						.10
15	7	1	FISH (CARP-TYPE)	CARP	.02 whole product	

						.02
15	7	1			CARP	.00 fat part of product

Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
						.00	
15	8	1	FISH PRODUCTS	FISH (PERCH-TYPE)	PERCH	.05 whole product	
15	8	2			BREAM	.02 whole product	

						.07	
15	8	1			PERCH	.00 fat part of product	
15	8	2			BREAM	.00 fat part of product	

						.00	
15	9	1		CRUSTACEANS	CRAB	.02 whole product	
15	9	2			LOBSTER	.01 whole product	
15	9	3			SHRIMPS	.47 whole product	

						.50	
15	9	1			CRAB	.00 fat part of product	
15	9	2			LOBSTER	.00 fat part of product	
15	9	3			SHRIMPS	.01 fat part of product	

						.01	
15	10	1		MOLLUSCS	MUSSEL	.26 whole product	
15	10	2			OYSTERS	.00 whole product	

						.27	
15	10	1			MUSSEL	.01 fat part of product	
15	10	2			OYSTERS	.00 fat part of product	

						.01	
15	11	1		SPAWN	SPAWN	.10 whole product	consumption in survey is 0

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Model TMDI pesticide residues in The Netherlands
Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
						----- .10	
15	11	1	FISH PRODUCTS	SPAWN	SPAWN	.00 fat part of product ----- .00	
15	12	1		FISH LIVER	LIVER OF HADDOCK	.01 whole product ----- .01	
15	12	1			LIVER OF HADDOCK	.00 fat part of product ----- .00	
15	13	1		OCTOPUS/SQUID	OCTOPUS	.01 whole product ----- .01	
15	13	1			OCTOPUS	.00 fat part of product ----- .00	
16	1	1	OTHER ANIMAL PRODUCTS	MEAT OF REPTILES AND AMPHIBIANS	MEAT OF REPTILES AND AMPHIBIAN	.10 whole product	consumption in survey is 0
16	1	2			FROG PARTS	.10 whole product ----- .20	consumption in survey is 0
16	1	1			MEAT OF REPTILES AND AMPHIBIAN	.00 fat part of product	
16	1	2			FROG PARTS	.00 fat part of product ----- .00	
16	2	99		SNAILS	SNAIL	.03 whole product -----	

Model TMDI pesticide residues in The Netherlands

Average Dutch consumption of primary agricultural products derived from Dutch National Food Consumption Survey 1992

EU	Nr	Nr	Group	Subgroup	Primary Agricultural Product	Consumption Component	Remark consumption
						.03	
16	2	99	OTHER ANIMAL PRODUCTS	SNAILS	SNAIL	.00 fat part of product	

						.00	
16	3	1		OTHER ANIMAL OILS AND FATS	COD-LIVER OIL	.10 whole product	consumption in survey is 0
16	3	99			ANIMAL OILS AND FATS	2.67 whole product	

						2.77	
16	3	1			COD-LIVER OIL	.00 fat part of product	prod = fat
16	3	99			ANIMAL OILS AND FATS	2.67 fat part of product	prod = fat

						2.67	
16	4	99		HONEY	HONEY	.82 whole product	

						.82	

377 rows selected.

1/2
0/1

ANNEX 2: Attribute definitions Dutch TMDI model.

Entity:	PAP
- Pap_name_nl	<p>Name of primary agricultural product. These are products with established MRLs in Dutch and EG legislation.</p> <p>Properties: Mandatory Basic Text Length: 50 Default none</p>
- Pap_source_number	<p>Reference to literature where primary agricultural product is mentioned.</p> <p>Properties: Optional Basic Integer Length: 1 Default none</p>
- Pap_name_uk	<p>English name of primary agricultural product. These are products with established MRLs in Dutch and EG legislation.</p> <p>Properties: Optional Basic Text Length: 50 Default none</p>
- Eu_productgroup_number	<p>Unique number for a product group of primary agricultural products according to the EU plant classification.</p> <p>Properties: Optional Basic Integer Length: 2 Default none</p>
- Eu_productsubgroup_number	<p>Unique number for a product subgroup (in combination with eu_productgroup_number) of primary agricultural products according to the EU plant classification.</p> <p>Properties: Optional Basic Integer Length: 2 Default none</p>
- Eu_product_number	<p>Unique number for an individual primary agricultural product (in combination with eu_productgroup_number, eu_productsubgroup_number) according to the EU plant classification.</p> <p>Properties: Optional Basic Integer Length: 2 Default none</p>

Entity:	COMPONENT
- Component_code	Code for the consumed component of a primary agricultural product. Properties: Mandatory Basic Text Length: 12 Default none
- Component_desc_nl	Dutch description of the component_code. Properties: Mandatory Basic Text Length: 60 Default none
- Component_desc_uk	English description of the component_code Properties: Optional Basic Text Length: 60 Default none

Entity:	EU_PPRODUCTGROUP
- Eu_productgroup_number	Unique number for a productgroup according to the EU plant classification (Directive 90/642/EEC). Properties: Mandatory Basic Integer Length: 2 Default none
- Eu_productgroup_name_nl	Dutch name of productgroup. Properties: Mandatory Basic Text Length: 50 Default none
- Eu_productgroup_name_uk	English name of productgroup. Properties: Optional Basic Text Length: 50 Default none

Entity:	EU_PRODUCTSUBGROUP
- Eu_productgroup_number	Unique number for a productgroup according to the EU plant classification (Directive 90/642/EEC). Properties: Mandatory Basic Integer Length: 2 Default none
- Eu_productsubgroup_number	Unique number for a productsubgroup according to EU plant classification (Directive 90/642/EEC).

	<p>Properties: Mandatory Basic Integer Length: 2 Default none</p>
- Eu_productsubgroup_name_nl	<p>Dutch name of productsubgroup.</p> <p>Properties: Mandatory Basic Text Length: 50 Default none</p>
- Eu_productsubgroup_name_uk	<p>English name of productsubgroup.</p> <p>Properties: Optional Basic Text Length: 50 Default none</p>
Entity:	CONSUMPTION_PAP
- Eu_productgroup_number	<p>Unique number for productgroup according to EU plant classification (Directive 90/642/EEC).</p> <p>Properties: Mandatory Basic Integer Length: 2 Default none</p>
- Eu_productsubgroup_number	<p>Unique number for a productsubgroup according to EU plant classification (Directive 90/642/EEC).</p> <p>Properties: Mandatory Basic Integer Length: 2 Default none</p>
- Eu_product_number	<p>Unique number for a product (in combination with eu_productgroup_number,eu_productsubgroup_number) according to EU plant classification.</p> <p>Properties: Optional Basic Integer Length: 2 Default none</p>
- Avg_cons_pap_tmdi	<p>Average consumption of primary agricultural products derived from the DNFCs-1992 population n=6,218 (corrected for sex-age). Consumption values are updated when consumption = 0 according to WHO procedures. These consumption figures are applied for a TMDI calculation.</p> <p>Properties: Optional Basic Integer Length: 10,4 Default none</p>
- Component_code	<p>Code for the consumed component of a primary</p>

agricultural product.

Properties: Mandatory Basic Text
Length: 12
Default none

- Consumption_reference

Remarks to consumption data.

Properties: Optional Basic Text
Length: 80
Default none

Entity:

COMPOUND_PAP_MRL

- Compound_name

Entered name of compound for calculating TMDI.

Properties: Mandatory Basic Text
Length: 50
Default none

- Eu_productgroup_number

Unique number for productgroup according to EU plant classification (Directive 90/642/EEC).

Properties: Mandatory Basic Integer
Length: 2
Default none

- Eu_productsubgroup_number

Unique number for a productsubgroup according to EU plant classification (Directive 90/642/EEC).

Properties: Mandatory Basic Integer
Length: 2
Default none

- Eu_product_number

Unique number for a product (in combination with eu_productgroup_number,eu_productsubgroup_number) according to EU plant classification.

Properties: Mandatory Basic Integer
Length: 2
Default none

- Value

MRL value to be entered of compound for concerning product.

Properties: Optional Basic Integer
Length: 9,5
Default none

- Component_code

Code for the consumed component of a primary agricultural product.

Properties: Mandatory Basic Text
Length: 12

Default none

Entity:

COMPOUND_ADI

- Compound_name

Entered name of compound for calculating TMDI.

Properties: Mandatory Basic Text

Length: 50

Default none

- ADI_value

Acceptable Daily Intake.

Properties: Mandatory Basic Integer

Length: 9,5

Default none

- LOD

Limit of Determination.

Properties: Optional Basic Integer

Length: 9,5

Default none

- Component_code

Code for the consumed component of a primary agricultural product.

Properties: Mandatory Basic Text

Length: 12

Default none

- Body_weight

Average body weight. The user can enter a standard body weight of 60 kg or the average body weight of the DNFCS-1992 population of 65 kg.

Properties: Mandatory Basic Integer

Length: 2

Default none

ANNEX 3: Output Dutch TMDI model pesticide chlorfenvinphos.

Model TMDI pesticides in The Netherlands
 Calculation of Theoretical Maximum Daily Intake

ADI : Acceptable Daily Intake (mg/kg body weight)
 Consumption : Average consumption (g/person/day) of primary agricultural products derived from Dutch National Food Consumption Survey 1992
 MRL : Maximum Residu Limit (mg/kg)
 TMDI : Theoretical Maximum Daily Intake (ug/person/day)
 ADI% : Percentage (%) of ADI
 * : Calculation including MRLs at Level Of Determination (MRL*)

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
FRUIT, NUTS	CITRUS FRUIT	GRAPEFRUIT	PROD	5.28	1.000	1.000	5.28	5.28	16.23	16.23
		LEMON	PROD	2.13			2.13	2.13	6.55	6.55
		LIME	PROD	.10			.10	.10	.31	.31
		MANDARIN ORANGE, CLEMENTINE AND OTHERS	PROD	10.18			10.18	10.18	31.33	31.33
		ORANGE	PROD	77.41			77.41	77.41	238.18	238.18
		POMELO	PROD	.10			.10	.10	.31	.31
		OTHER CITRUS FRUIT	PROD	.00			.00	.00	.00	.00
	NUTS	ALMOND	PROD	.81	.000	.050	.00	.04	.00	.12
		PARANUTS (BRAZILNUT)	PROD	.05			.00	.00	.00	.01
		CASHEW	PROD	.42			.00	.02	.00	.07
		SWEET (EDIBLE) CHESTNUTS	PROD	.02			.00	.00	.00	.00
		COCONUT	PROD	.62			.00	.03	.00	.09
		HAZELNUT	PROD	.77			.00	.04	.00	.12
		MACADAMIA NUT	PROD	.10			.00	.01	.00	.02
		PECAN	PROD	.10			.00	.01	.00	.02
		PINE CONE	PROD	.10			.00	.01	.00	.02
		PISTACHIO NUTS	PROD	.10			.00	.01	.00	.02
		WALNUTS	PROD	.26			.00	.01	.00	.04
		OTHER NUTS	PROD	.00			.00	.00	.00	.00
		MALACEOUS FRUIT	APPLE	PROD	81.05	.000	.050	.00	4.05	.00
	PEAR		PROD	9.49			.00	.47	.00	1.46
	QUINCE		PROD	.11			.00	.01	.00	.02
	OTHER MALACEOUS FRUIT		PROD	.00			.00	.00	.00	.00
	STONE FRUIT	APRICOT	PROD	2.23	.000	.050	.00	.11	.00	.34
		SWEET CHERRIES	PROD	2.17			.00	.11	.00	.33
		PEACH, NECTARINE	PROD	2.79			.00	.14	.00	.43
		PLUM	PROD	1.94			.00	.10	.00	.30

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Model TMDI pesticides in The Netherlands
 Calculation of Theoretical Maximum Daily Intake

ADI : Acceptable Daily Intake (mg/kg body weight)
 Consumption : Average consumption (g/person/day) of primary agricultural products derived from Dutch National Food Consumption Survey 1992
 MRL : Maximum Residu Limit (mg/kg)
 TMDI : Theoretical Maximum Daily Intake (ug/person/day)
 ADI% : Percentage (%) of ADI
 * : Calculation including MRLs at Level Of Determination (MRL*)

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
FRUIT, NUTS	STONE FRUIT	OTHER STONE FRUIT	PROD	.00	.000	.050	.00	.00	.00	.00
	BERRIES AND SMALL FRUIT	TABLE GRAPES	PROD	15.20	.000	.050	.00	.76	.00	2.34
		WINE GRAPES	PROD	34.82			.00	1.74	.00	5.36
		STRAWBERRY	PROD	4.33			.00	.22	.00	.67
		BLACKBERRY	PROD	.32			.00	.02	.00	.05
		DEWBERRY	PROD	.10			.00	.01	.00	.02
		LOGANBERRY	PROD	.10			.00	.01	.00	.02
		RASPBERRY	PROD	.81			.00	.04	.00	.12
		BLUE BILBERRIES	PROD	.25			.00	.01	.00	.04
		CRANBERRIES	PROD	.00			.00	.00	.00	.00
		CURRANT (RED, WHITE, BLACK)	PROD	1.38			.00	.07	.00	.21
		GOOSEBERRIES	PROD	.05			.00	.00	.00	.01
		COWBERRY	PROD	.00			.00	.00	.00	.00
		ELDERBERRY	PROD	.26			.00	.01	.00	.04
		ROSE HIP	PROD	.40			.00	.02	.00	.06
		OTHER RUBUS VARIETIES	PROD	.00			.00	.00	.00	.00
		OTHER SMALL FRUIT AND BERRY FRUIT (NOT W	PROD	.00			.00	.00	.00	.00
		WILD BERRY FRUITS AND WILD FRUITS	PROD	.00			.00	.00	.00	.00
	VARIOUS FRUITS	AVOCADO	PROD	.02	.000	.050	.00	.00	.00	.00
		BANANA	PROD	21.59			.00	1.08	.00	3.32
		DATE	PROD	.03			.00	.00	.00	.00
		FIGS	PROD	.02			.00	.00	.00	.00
		KIWI FRUIT	PROD	3.05			.00	.15	.00	.47
		KUMQUAT	PROD	.10			.00	.01	.00	.02
		LYCHEE	PROD	.03			.00	.00	.00	.00
		MANGO	PROD	.84			.00	.04	.00	.13
		OLIVES (TABLE OLIVES)	PROD	.25			.00	.01	.00	.04
		OLIVES (FOR OIL-EXTRACTION)	PROD	.00			.00	.00	.00	.00

Model TMDI pesticides in The Netherlands
 Calculation of Theoretical Maximum Daily Intake

ADI : Acceptable Daily Intake (mg/kg body weight)
 Consumption : Average consumption (g/person/day) of primary agricultural products derived from Dutch National Food Consumption Survey 1992
 MRL : Maximum Residu Limit (mg/kg)
 TMDI : Theoretical Maximum Daily Intake (ug/person/day)
 ADI% : Percentage (%) of ADI
 * : Calculation including MRLs at Level Of Determination (MRL*)

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
FRUIT, NUTS	VARIOUS FRUITS	PASSIONFRUIT	PROD	.54	.000	.050	.00	.03	.00	.08
		PINEAPPLE	PROD	4.51			.00	.23	.00	.69
		POMEGRANATE	PROD	.10			.00	.01	.00	.02
		GUAVA	PROD	.00			.00	.00	.00	.00
		PAPAYA	PROD	.10			.00	.01	.00	.02
		KAKI	PROD	.02			.00	.00	.00	.00
		OTHER MISCELLANEOUS FRUIT	PROD	.00			.00	.00	.00	.00
VEGETABLES	ROOTS AND TUBERS	BEETROOT	PROD	5.15	.500	.500	2.58	2.58	7.92	7.92
		CARROT	PROD	13.43			6.71	6.71	20.66	20.66
		CELERIAC	PROD	.78			.39	.39	1.21	1.21
		HORSERADISH	PROD	.10			.05	.05	.15	.15
		TOPINAMBUR	PROD	.10			.05	.05	.15	.15
		PARSNIP	PROD	.10			.05	.05	.15	.15
		ROOTED PASLEY	PROD	.10			.05	.05	.15	.15
		RADISH	PROD	.43			.21	.21	.66	.66
		SALSIFY	PROD	.06			.03	.03	.09	.09
		SWEET POTATO	PROD	.04			.02	.02	.06	.06
		SWEDISH TURNIP, SWEDE	PROD	.81			.40	.40	1.24	1.24
		TURNIP SHOOTS	PROD	.10			.05	.05	.15	.15
		YAM	PROD	.10			.05	.05	.15	.15
		WINTER CARROT	PROD	.16			.08	.08	.24	.24
		CASSAVA	PROD	.02			.01	.01	.03	.03
		BLACK RADISH	PROD	.03			.01	.01	.04	.04
		OTHER ROOT AND TUBER VARIETIES	PROD	.02			.01	.01	.03	.03
	BULBOUS PLANT	GARLIC	PROD	.01	.500	.500	.00	.00	.01	.01
		ONION	PROD	16.81			8.41	8.41	25.87	25.87
		SHALLOT	PROD	.10			.05	.05	.15	.15

Model TMDI pesticides in The Netherlands
Calculation of Theoretical Maximum Daily Intake

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*		
VEGETABLES	BULBOUS PLANT	ONION (SMALL)	PROD	.10	.500	.500	.05	.05	.15	.15		
		OTHER BULBOUS PLANTS	PROD	.00			.00	.00	.00	.00		
VEGETABLES	FRUITING VEGETABLES	TOMATO	PROD	26.07	.100	.100	2.61	2.61	8.02	8.02		
		SWEET PEPPER	PROD	3.97			.40	.40	1.22	1.22		
		AUBERGINE/EGG PLANT	PROD	.26			.03	.03	.08	.08		
		CUCUMBER	PROD	8.03			.80	.80	2.47	2.47		
		GHERKIN/PICKLE	PROD	1.54			.15	.15	.47	.47		
		COURGETTE	PROD	.54			.05	.05	.17	.17		
		MELON	PROD	2.23			.22	.22	.69	.69		
		PUMPKIN	PROD	.02			.00	.00	.01	.01		
		WATERMELON	PROD	.48			.05	.05	.15	.15		
		SWEET CORN	PROD	1.41			.14	.14	.43	.43		
		OTHER SOLANACEAE	PROD	.00			.00	.00	.00	.00		
		OTHER CUCURBITACEAE WITH EDIBLE SKIN	PROD	.00			.00	.00	.00	.00		
		OTHER CUCURBITACEAE WITH NOT EDIBLE SKIN	PROD	.00			.00	.00	.00	.00		
		VEGETABLES	CABBAGES	BROCCOLI	PROD	1.98	.100	.100	.20	.20	.61	.61
				CAULIFLOWER	PROD	16.00			1.60	1.60	4.92	4.92
				BRUSSEL SPROUTS	PROD	4.66			.47	.47	1.44	1.44
RED CABBAGE	PROD			5.13			.51	.51	1.58	1.58		
OXHEART/CONICAL CABBAGE	PROD			2.03			.20	.20	.62	.62		
WHITE CABBAGE	PROD			6.98			.70	.70	2.15	2.15		
SAVOY CABBAGE	PROD			1.20			.12	.12	.37	.37		
CHINESE CABBAGE	PROD			.92			.09	.09	.28	.28		
CURLY KALE	PROD			4.93			.49	.49	1.52	1.52		
KOHLRABI	PROD			.15			.01	.01	.05	.05		
OTHER CAULIFLOWER VARIETIES	PROD	.00			.00	.00	.00	.00				
OTHER HEADED CABBAGE VARIETIES	PROD	.00			.00	.00	.00	.00				
OTHER LEAF CABBAGE VARIETIES	PROD	.00			.00	.00	.00	.00				

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
VEGETABLES	LEAF VEGETABLES AND FRESH HERB	GARDENCRESS	PROD	.00	.100	.100	.00	.00	.00	.00
		LAMB-S LETTUCE	PROD	.22			.02	.02	.07	.07
		CABBAGE LETTUCE, COS LETTUCE	PROD	8.48			.85	.85	2.61	2.61
		ENDIVE	PROD	7.42			.74	.74	2.28	2.28
		PURSLANE	PROD	.24			.02	.02	.07	.07
		SPINACH	PROD	10.24			1.02	1.02	3.15	3.15
		SWISS CHARD/LEAF BEAT	PROD	.49			.05	.05	.15	.15
		WATERCRESS	PROD	.10			.01	.01	.03	.03
		CHICORY	PROD	9.17			.92	.92	2.82	2.82
		CHERVIL	PROD	.10			.01	.01	.03	.03
		CHIVES	PROD	.10			.01	.01	.03	.03
		PARSLEY	PROD	.10	.500	.500	.05	.05	.16	.16
		CELERY	PROD	.27			.13	.13	.41	.41
		TURNIP TOPS	PROD	.08	.100	.100	.01	.01	.02	.02
		OTHER LETTUCE AND SIMILAR VARIETIES	PROD	.01			.00	.00	.00	.00
	OTHER SPINACH AND SIMILAR VARIETIES	PROD	.00			.00	.00	.00	.00	
	OTHER FRESH HERBS	PROD	.00			.00	.00	.00	.00	
	LEGUMES	FRENCH BEANS (FRESH)	PROD	3.14	.100	.100	.31	.31	.97	.97
		GREEN BEANS (FRESH)	PROD	11.66			1.17	1.17	3.59	3.59
		LEGUME (FRESH)	PROD	.50			.05	.05	.15	.15
STRING BEAN (FRESH)		PROD	.12			.01	.01	.04	.04	
MARROW FAT PEA (DRY HARVESTED)		PROD	.33			.03	.03	.10	.10	
BROAD BEAN (FRESH)		PROD	2.50			.25	.25	.77	.77	
GREEN/(GARDEN) PEAS (FRESH)		PROD	14.78			1.48	1.48	4.55	4.55	
OTHER LEGUMES (FRESH)	PROD	.00			.00	.00	.00	.00		
STALK VEGETABLES	ASPARAGUS	PROD	1.74	.100	.100	.17	.17	.54	.54	
	CARDOON	PROD	.10			.01	.01	.03	.03	

Model TMDI pesticides in The Netherlands
Calculation of Theoretical Maximum Daily Intake

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
VEGETABLES	STALK VEGETABLES	(BLEACH) CELERY	PROD	.56	.500	.500	.28	.28	.86	.86
		FENNEL	PROD	.09	.100	.100	.01	.01	.03	.03
		ARTICHOKE	PROD	.04			.00	.00	.01	.01
		LEEK	PROD	12.86			1.29	1.29	3.96	3.96
		RHUBARB	PROD	.71			.07	.07	.22	.22
		BEAN SPROUTS	PROD	1.08			.11	.11	.33	.33
		BAMBOO SHOOTS	PROD	.01			.00	.00	.00	.00
		OTHER STALK VEGETABLES	PROD	.00			.00	.00	.00	.00
	FUNGUS	MUSHROOM	PROD	5.13	.100	.100	.51	.51	1.58	1.58
		CHANTARELLE	PROD	.00			.00	.00	.00	.00
PULSES	BEANS	WHITE BEAN (DRY HARVESTED)	PROD	.89	.000	.050	.00	.04	.00	.14
		BROWN BEAN (DRY HARVESTED)	PROD	1.76			.00	.09	.00	.27
		BEANS	PROD	.46			.00	.02	.00	.07
	LENTILS	LENTILS	PROD	.04	.000	.050	.00	.00	.00	.01
	PEAS	PEAS (DRY HARVESTED)	PROD	.76	.000	.050	.00	.04	.00	.12
	OTHER PULSES	OTHER PULSES	PROD	.00	.000	.050	.00	.00	.00	.00
	OIL-BEARING SEEDS AN OIL-BEARING SEEDS	LINSEED	PROD	.02	.000	.050	.00	.00	.00	.00
PEANUTS		PROD	7.09			.00	.35	.00	1.09	
POPPY SEED		PROD	.10			.00	.01	.00	.02	
SESAME SEED		PROD	.07			.00	.00	.00	.01	
SUNFLOWER SEEDS		PROD	.10			.00	.01	.00	.02	
COLESEED AND RAPE SEED		PROD	.10			.00	.01	.00	.02	

Model TMDI pesticides in The Netherlands
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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
OIL-BEARING SEEDS AN OIL-BEARING SEEDS		SOYABEANS	PROD	.72	.000	.050	.00	.04	.00	.11
		MUSTARD SEED	PROD	.07			.00	.00	.00	.01
		COTTON SEED	PROD	.10			.00	.01	.00	.02
		CUMIN (SEED)	PROD	.02			.00	.00	.00	.00
		OTHER OIL-BEARING SEEDS	PROD	.00			.00	.00	.00	.00
	VEGETABLE OILS AND FATS	VEGETABLE OILS AND FATS	PROD	37.28	.000	.050	.00	1.86	.00	5.74
POTATOES	EARLY POTATOES	EARLY POTATOES	PROD	.00	.000	.050	.00	.00	.00	.00
	STORE POTATOES	STORE POTATOES	PROD	179.68	.000	.050	.00	8.98	.00	27.64
TEA	TEA	TEA, DRIED LEAVES/STALKS, POSSIBLY FERME	PROD	2.13	.200	.200	.43	.43	1.31	1.31
HOP	HOP	HOPS	PROD	.10	.000	.050	.00	.01	.00	.02
GRAINS AND GRAIN PRO GRAINS		WHEAT	PROD	122.83	.000	.050	.00	6.14	.00	18.90
		RYE	PROD	4.93			.00	.25	.00	.76
		BARLEY	PROD	26.69			.00	1.33	.00	4.11
		OAT	PROD	1.37			.00	.07	.00	.21
		MAIZE	PROD	3.01			.00	.15	.00	.46
		RICE	PROD	9.90			.00	.50	.00	1.52
		SORGHUM	PROD	.10			.00	.01	.00	.02
		BUCKWHEAT	PROD	.71			.00	.04	.00	.11
		MILLET	PROD	.03			.00	.00	.00	.00
OTHER GRAINS	PROD	.00			.00	.00	.00	.00		

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
GRAINS AND GRAIN PRO	GRAIN PRODUCTS	WHITE FLOUR	PROD	.00	.000	.050	.00	.00	.00	.00
		BREAD	PROD	.00			.00	.00	.00	.00
		ROLLED OATS	PROD	.00			.00	.00	.00	.00
		FLOUR/MEAL	PROD	.00			.00	.00	.00	.00
		WHOLEMEAL FLOUR	PROD	.00			.00	.00	.00	.00
TROPICAL SEEDS AND P	TROPICAL SEEDS	COCOA BEANS	PROD	3.82	.000	.050	.00	.19	.00	.59
		COFFEE BEANS	PROD	21.42			.00	1.07	.00	3.30
	PRODUCTS OF TROPICAL SEEDS	COCOA BUTTER (PRESS)	PROD	.00	.000	.050	.00	.00	.00	.00
		COCOA MASS	PROD	.00			.00	.00	.00	.00
		COCOA POWDER	PROD	.00			.00	.00	.00	.00
		COCOA BUTTER	PROD	.00			.00	.00	.00	.00
		COFFEE	PROD	.00			.00	.00	.00	.00
VARIOUS VEGETABLE PR	SPICES/SEASONINGS	GINGER (ROOT)	PROD	.07	.000	.050	.00	.00	.00	.01
		TAMARIND	PROD	.02			.00	.00	.00	.00
	SUGAR	SUGAR	PROD	64.84	.000	.050	.00	3.24	.00	9.97
MEAT, POULTRY, FAT, MEAT, LIVER, KIDNEY, FAT-COW, PIG,		MEAT OF COW	FAT	3.83	.200	.200	.77	.77	2.35	2.35
		LIVER OF COW	FAT	.08			.02	.02	.05	.05
		KIDNEY OF COW	FAT	.00			.00	.00	.00	.00
		FAT OF COW	FAT	1.16			.23	.23	.71	.71
		MEAT OF PIG	FAT	6.98			1.40	1.40	4.29	4.29
		LIVER OF PIG	FAT	.10			.02	.02	.06	.06

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*	
MEAT, POULTRY, FAT,	MEAT,LIVER,KIDNEY,FAT-COW,PIG,	KIDNEY OF PIG	FAT	.00	.200	.200	.00	.00	.00	.00	
		FAT OF PIG	FAT	1.30			.26	.26	.80	.80	
		MEAT OF SHEEP	FAT	.22			.04	.04	.14	.14	
		MEAT OF HORSE	FAT	.01			.00	.00	.01	.01	
		MEAT OF CALF	FAT	.04			.01	.01	.02	.02	
		LIVER OF CALF	FAT	.00			.00	.00	.00	.00	
	MEAT,LIVER-COCK,CHICKEN,DUCK,G	MEAT OF CHICKEN	FAT	.82	.200	.200	.16	.16	.51	.51	
		LIVER OF CHICKEN	FAT	.01			.00	.00	.01	.01	
		MEAT OF DUCK	FAT	.03			.01	.01	.02	.02	
		MEAT OF TURKEY	FAT	.05			.01	.01	.03	.03	
	MILK AND MILK PRODUC MILK	MILK	COW MILK	PROD	.00	.008	.008	.00	.00	.00	.00
			GOAT MILK	PROD	.00			.00	.00	.00	.00
			SHEEP MILK	PROD	.00			.00	.00	.00	.00
			MILK	PROD	402.00			3.22	3.22	9.90	9.90
MILK PRODUCTS		CREAM	PROD	.00	.008	.008	.00	.00	.00	.00	
		BUTTER	PROD	.00			.00	.00	.00	.00	
		CHEESE	PROD	.00			.00	.00	.00	.00	
		CURD	PROD	.00			.00	.00	.00	.00	
EGGS AND EGG PRODUCT EGGS		WHOLE EGG, CHICKEN	WHOLE EGG, CHICKEN	PROD	22.21	.000	.050	.00	1.11	.00	3.42
			DUCK EGGS	PROD	.10			.00	.01	.00	.02
	GOOSE EGGS		PROD	.10			.00	.01	.00	.02	
	EGG PRODUCTS	EGG YOLK	PROD	.84	.000	.050	.00	.04	.00	.13	
		PROTEIN	PROD	.50			.00	.03	.00	.08	

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
GAME AND POULTRY	GAME AND POULTRY	DOVE	PROD	.10	.000	.050	.00	.01	.00	.02
		PHEASANT	PROD	.10			.00	.01	.00	.02
		HARE	PROD	.06			.00	.00	.00	.01
		DEER	PROD	.10			.00	.01	.00	.02
		RABBIT, INCL. DOMESTIC RABBIT	PROD	.23			.00	.01	.00	.03
		PARTRIDGE	PROD	.10			.00	.01	.00	.02
		ROE-DEER	PROD	.03			.00	.00	.00	.00
		WILD DUCK	PROD	.10			.00	.01	.00	.02
		WILD PIG, BOAR	PROD	.10			.00	.01	.00	.02
FISH PRODUCTS	FISH (VARIOUS)	EEL	PROD	.40	.000	.050	.00	.02	.00	.06
		RAY	PROD	.05			.00	.00	.00	.01
	FISH (HERRING-TYPE)	HERRING	PROD	1.92	.000	.050	.00	.10	.00	.30
		ANCHOVY	PROD	.00			.00	.00	.00	.00
		SARDINES	PROD	.04			.00	.00	.00	.01
	FISH (MACKEREL-TYPE)	MACKEREL	PROD	.45	.000	.050	.00	.02	.00	.07
		TUNA	PROD	.23			.00	.01	.00	.04
	FISH (COD-TYPE)	COD	PROD	1.16	.000	.050	.00	.06	.00	.18
		POLLACK, LYTHE	PROD	.89			.00	.04	.00	.14
		HADDOCK	PROD	.06			.00	.00	.00	.01
		GURNARD	PROD	.05			.00	.00	.00	.01
	FISH (FLAT FISH TYPE)	FLOUNDER, FLUKE	PROD	.13	.000	.050	.00	.01	.00	.02
		PLAICE	PROD	2.70			.00	.13	.00	.42

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
FISH PRODUCTS	FISH (FLAT FISH TYPE)	SOLE	PROD	.05	.000	.050	.00	.00	.00	.01
		LEMON SOLE, LIMANDE	PROD	.05			.00	.00	.00	.01
	FISH (SALMON-TYPE)	SALMON	PROD	.79	.000	.050	.00	.04	.00	.12
		TROUT	PROD	.02			.00	.00	.00	.00
	FISH (CARP-TYPE)	CARP	PROD	.02	.000	.050	.00	.00	.00	.00
	FISH (PERCH-TYPE)	PERCH	PROD	.05	.000	.050	.00	.00	.00	.01
		BREAM	PROD	.02			.00	.00	.00	.00
	CRUSTACEANS	CRAB	PROD	.02	.000	.050	.00	.00	.00	.00
		LOBSTER	PROD	.01			.00	.00	.00	.00
		SHRIMPS	PROD	.47			.00	.02	.00	.07
	MOLLUSCS	MUSSEL	PROD	.26	.000	.050	.00	.01	.00	.04
		OYSTERS	PROD	.00			.00	.00	.00	.00
	SPAWN	SPAWN	PROD	.10	.000	.050	.00	.01	.00	.02
	FISH LIVER	LIVER OF HADDOCK	PROD	.01	.000	.050	.00	.00	.00	.00
	OCTOPUS/SQUID	OCTOPUS	PROD	.01	.000	.050	.00	.00	.00	.00
OTHER ANIMAL PRODUCT MEAT OF REPTILES AND AMPHIBIAN MEAT OF REPTILES AND AMPHIBIANS		PROD	.10	.000	.050	.00	.01	.00	.02	
	FROG PARTS	PROD	.10			.00	.01	.00	.02	
	SNAILS	SNAIL	PROD	.03	.000	.050	.00	.00	.00	.00

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COMPOUND : CHLORFENVINPHOS - ADI-waarde : .0005

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Productgroup	Productsubgroup	Product	Component	Consumption	MRL	MRL*	TMDI	TMDI*	ADI %	ADI %*
OTHER ANIMAL PRODUCT	OTHER ANIMAL OILS AND FATS	COD-LIVER OIL	PROD	.10	.000	.050	.00	.01	.00	.02
		ANIMAL OILS AND FATS	PROD	2.67			.00	.13	.00	.41
	HONEY	HONEY	PROD	.82	.000	.050	.00	.04	.00	.13
							139.49	175.49	429.21	539.98

266 rows selected.

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