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Pest Control Products Sales Report for 2012

Canada



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Foreword

In November 2006, the Pest Control Products Sales Information Reporting Regulations came into force. This made the reporting of sales information by registrants to Health Canada's Pest Management Regulatory Agency (PMRA) mandatory under the *Pest Control Products Act*.

These regulations require registrants to submit annually to the PMRA the total volume of all their products registered with the PMRA and made available for sale to users (referred to as "sold" in the remainder of this report).¹ These data are reported by calendar year (January 1 to December 31) and must be submitted by June 1 of the following year. The purpose of the sales information reporting program is to collect sales data that are used by the PMRA in order to better understand potential pesticide use in Canada. The information is taken into consideration in risk assessments of pesticides, in policy decisions, in identifying trends in pesticide use and in providing guidance for risk-reduction strategies.

Introduction

The fifth *Pest Control Product Sales Report* provides an overview of pesticides sold in Canada for the 2012 calendar year, and briefly discusses changes in pesticide sales since the regulations were implemented. Delays were encountered in producing this report related to data submission and anomalies. This report is intended to represent only the best information provided to the PMRA through the reporting program. Data are considered confidential business information and are presented in various combined ways to ensure confidentiality. As there are limited data presented in this report, readers should be careful in drawing conclusions about pesticide sales in Canada.

Overall Canadian Pesticide Sales Data

Overview

Registrants have reported the sales quantities for 97% of all products (6382 in total) registered in Canada in the 2012 calendar year. Data can be submitted in different units depending on the product (for example, kilograms or litres). To standardize varying products, the data have been converted into kilograms of active ingredient (kg a.i.).

All technical grade active ingredient and manufacturing concentrate product information was excluded from calculation as the quantity is reported in the end-use products. Also, products where the data could not be converted to kg a.i., due to the reported units of measure, were excluded from calculation. This includes products where units were reported incorrectly and could not be corrected.

¹ Not all products that the registrants distribute are bought by users in a given year. The regulations allow the registrants to account for the amount of product distributed and made available for sale, but not necessarily bought by users.



It also includes products that had unusual units, such as colony forming units and devices, which were counted in units. In total, 124 out of the 2674 end-use products reported as sold were excluded from the kg a.i. calculations. The majority of these products are biopesticides and are discussed separately in this document. Only four conventional products with sales were excluded from the kg a.i. calculations due to issues with units.

Of the remaining 2550 products, the overall pesticide sales in Canada in 2012 were 92 917 691 kg a.i., which is just under a 3% increase from the 90 324 969 kg a.i. sold in 2011 (Figure 1). This is only a slightly larger increase in sales than was seen between 2010 and 2011 (2%) and shows a steady but small overall increase in sales since 2009.

Quantity of Pesticides Sold in Canada (2008-2012)

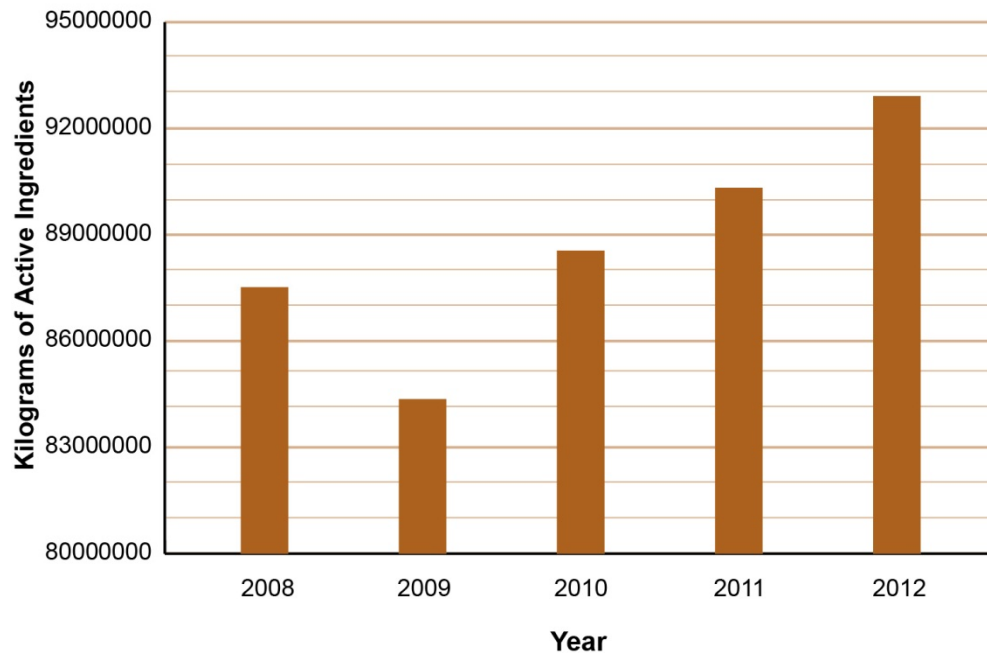


Figure 1: Quantity of Pesticides Sold in Canada Between 2008 and 2012

In the analysis of the overall quantity for 2012, it should be noted that the sum of the top 50 products from the total number of products for which sales reports were submitted made up 68.1% of the total kg a.i. sold in Canada in 2012 (63 293 586 kg a.i.). This was a slight increase from 2011, where the top 50 products sold 61 141 047 kg a.i (69%). The top 10 active ingredients sold, presented in decreasing order in Table 1, made up 63 074 469 kg a.i. or 67.9% of the total. A comprehensive list with the rankings for all active ingredients sold in Canada in 2012 is provided in Appendix I. Five active ingredients have remained on the top 10 list since the first report in 2008: glyphosate; available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports); 2,4-D; MCPA; and mineral oil.



Table 1: Top 10 Active Ingredients Sold in Canada in 2012

Active Ingredient	Product Type
Glyphosate	Herbicide
Available chlorine, present as sodium hypochlorite	Antimicrobial
2,4-D	Herbicide
Glufosinate ammonium	Herbicide
MCPA	Herbicide
Mineral oil	Insecticide/Fungicide/Other
Surfactant blend	Other
Corn gluten meal	Herbicide
Mancozeb	Fungicide
Available chlorine, present as calcium hypochlorite	Antimicrobial

Sales Information by Sector

All products were grouped according to their areas of use into three sectors: Agricultural, Non-agricultural, and Domestic. (Data from each of the sectors is discussed in more detail in the following sections.)

The groups were designed so there would be no overlap between the groupings. A product was placed into the Domestic sector if its classification was Domestic on its label. For the Non-domestic products, a product with any agricultural use on the label was grouped with the Agricultural sector, even if there were non-agricultural uses listed on the label. All remaining products were grouped as Non-agricultural. In some cases, if it was determined a product in the Agricultural sector had its main usage in the Non-agricultural sector, the product was moved to the Non-agricultural sector group.

Overall, 78.1% of pesticide sales in Canada were of Agricultural sector products (see Figure 2), whereas 17.1% of pesticide sales were of Non-agricultural sector products and 4.8% were of Domestic sector products. Since 2008, Agricultural sector products have constituted the largest amount of pesticides sold in Canada, followed by Non-agricultural sector products and Domestic sector products. The relative sales of products in the Agricultural sector increased between 2011 and 2012 (increasing from 69% of overall sales to 78%), while the Non-agriculture sector decreased from 27% to 17% and the Domestic sector remained fairly consistent at 5% (from 6% in 2011) (see Figure 3). Absolute Agricultural sector products sales increased by 17% from 2011 to 2012. Non-agricultural sector products sales decreased by a third from 2011 to 2012. Domestic sector products sales increased 7% from 2011 to 2012.



Quantity of Pesticides Sold in Canada in 2012 by Sector

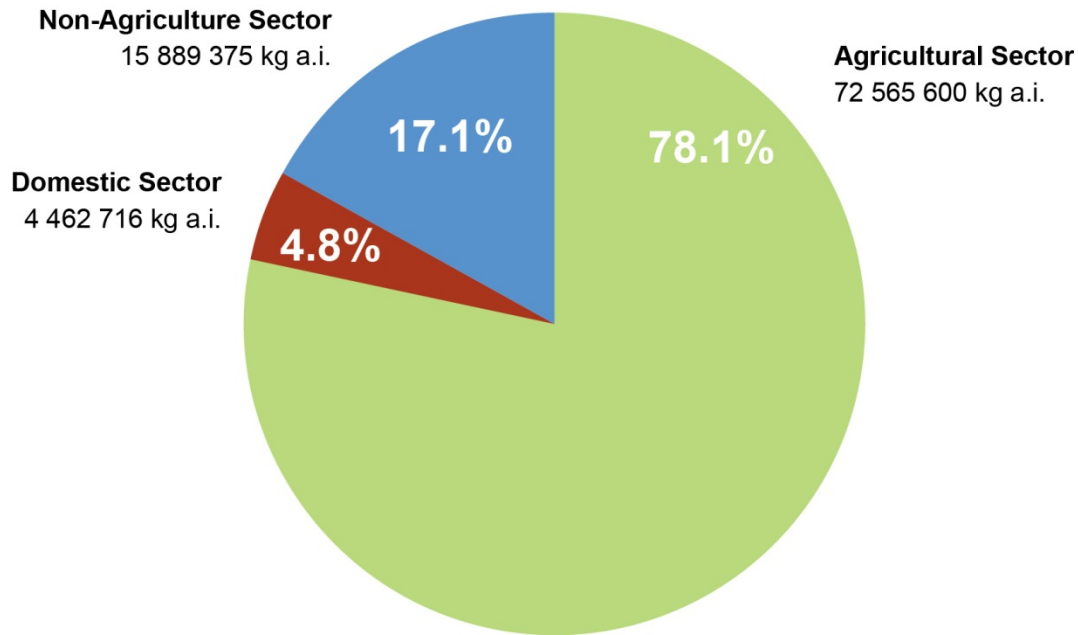


Figure 2: Quantity of Pesticides Sold in Canada in 2012 by Sector

Quantity of Pesticides Sold in Canada by Sector (2008-2012)

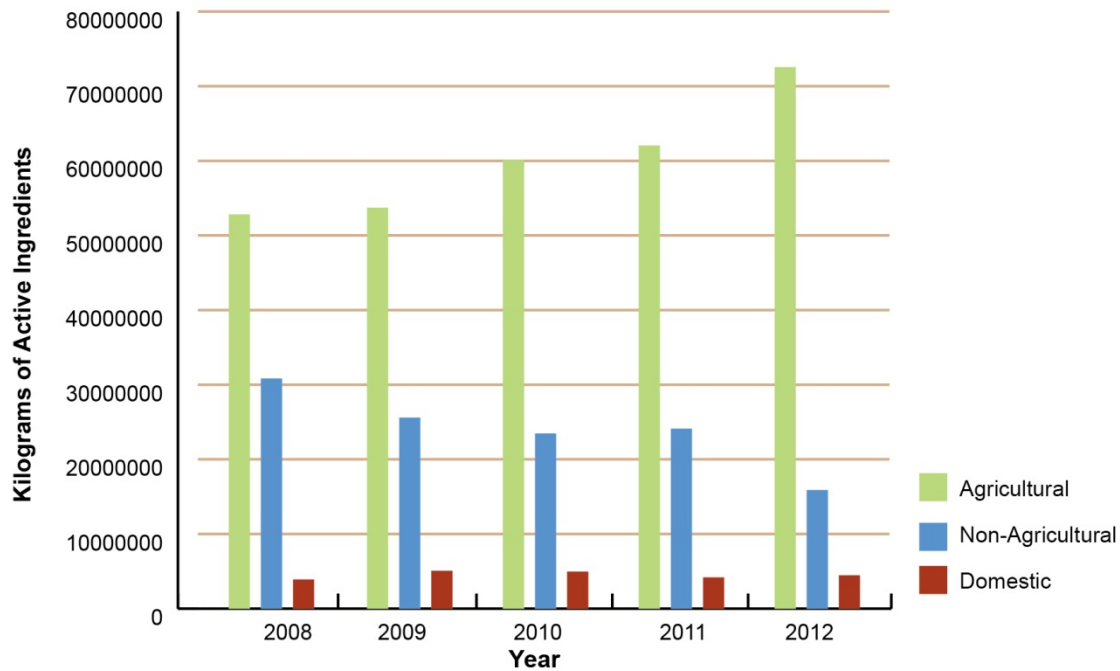


Figure 3: Quantity of Pesticides Sold in Canada by Sector Between 2008 and 2012



Within each sector, data were further broken down into product type groupings. These include herbicides, insecticides, fungicides, antimicrobials, vertebrate controls and others (for the remaining products). A product may have a number of different uses on the label. As the sales reporting does not collect data on the relative amount of a product used for a specific label use, the data may not necessarily be separated into only one product type. This means that there may be overlap between the product type groupings and these numbers should not be summed to obtain total quantities sold in Canada in 2012, as an over-reporting would occur.

Agricultural Sector

Products with agricultural uses accounted for the largest amount of pesticide sales in Canada in 2012 at 78.1%. There was a 17% increase in Agricultural sector pesticide sales from 62 045 226 kg a.i. in 2011 to 72 565 600 kg a.i. in 2012. Combined with decreases in Non-agricultural sector sales, this resulted in an increase in the prominence of the Agricultural sector in overall sales by 9% (from 69% in 2011 to 78% in 2012).

Of the quantity of pesticides sold having Agricultural sector uses, herbicides accounted for 80.2% of the pesticide sales, followed by fungicides at 10.4%, and insecticides at 5.0% (Figure 4). Antimicrobials (0.4%) and vertebrate control (0.02%) accounted for very small quantities of agricultural pesticides sold in 2012 and have been included in the “others” category (5.1%), to account for 5.5% of agricultural sales. Within the Agricultural sector, sales by product type have been consistent, with only very small changes seen in the percentage of sales in each type throughout the years reported.

Agricultural Sector

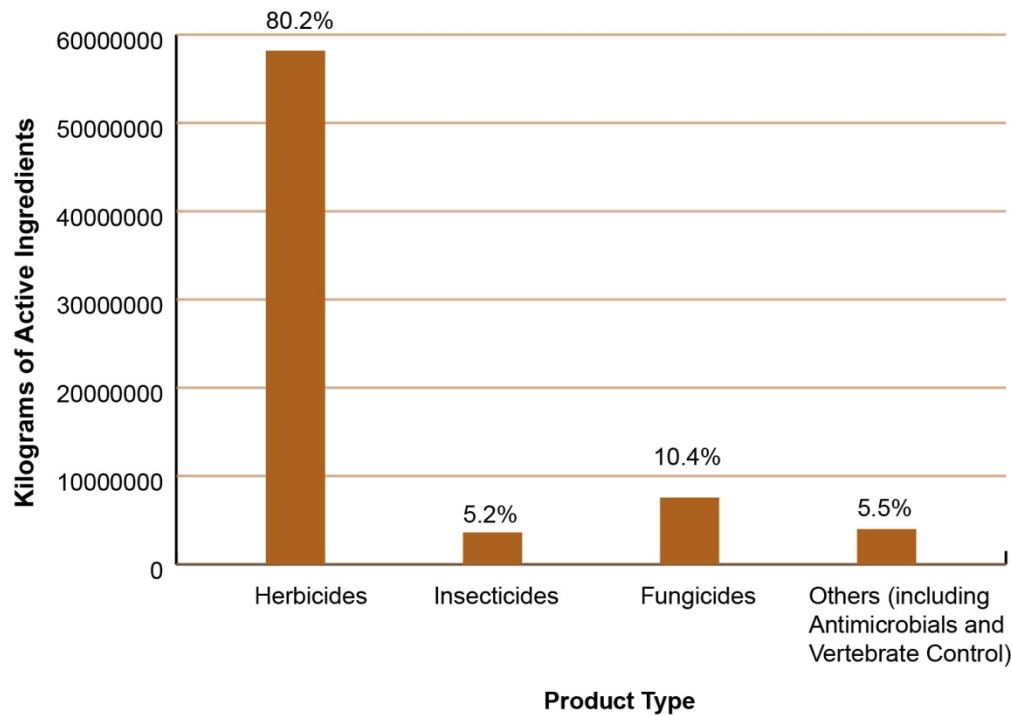


Figure 4: Kilograms of Active Ingredients Sold in Canada in 2012 in the Agricultural Sector



The top 10 active ingredients sold with agricultural uses are shown in Table 2 in decreasing order. Eight of the top 10 agricultural products were herbicides and adjuvants that are used in conjunction with herbicides. These top 10 active ingredients accounted for 78% of the Agricultural sector pesticides sold. Of the top 10, eight have remained consistent through all years of reporting: glyphosate, 2,4-D, MCPA, mineral oil, surfactant blend, mancozeb, chlorothalonil, and bromoxynil.

Table 2: Top 10 Active Ingredients Sold in Canada in 2012 in the Agricultural Sector

Active Ingredient	Product Type
Glyphosate	Herbicide
2,4-D	Herbicide
Glufosinate ammonium	Herbicide
MCPA	Herbicide
Mineral oil	Insecticide/Other
Surfactant blend	Other
Mancozeb	Fungicide
Corn gluten meal	Herbicide
Chlorothalonil	Fungicide
Bromoxynil	Herbicide

Non-Agricultural Sector

Commercial products with non-agricultural uses accounted for the second-largest amount of all pesticides sold in Canada in 2012 at 17.1% (compared to 26.7% in 2011). Non-agricultural sector pesticide sales decreased by a third from 2011 to 2012 (from 24 110 857 kg a.i. to 15 889 375 kg a.i.).

Of the total pesticides sold with Non-agricultural sector uses, antimicrobials accounted for 93.4%, followed by herbicides with 4.3%. Fungicides (1.2%), insecticides (1.1%), vertebrate control (0.9%) and other product types (0.1%) were combined due to the low quantities of pesticides sold (Figure 5). Fluctuations within the product type groupings have been evident since the start of pesticide sales reporting. However, antimicrobials consistently account for the majority of Non-agricultural sector pesticide sales (with a low of 86% to a high of 96.3%).



Agricultural Sector

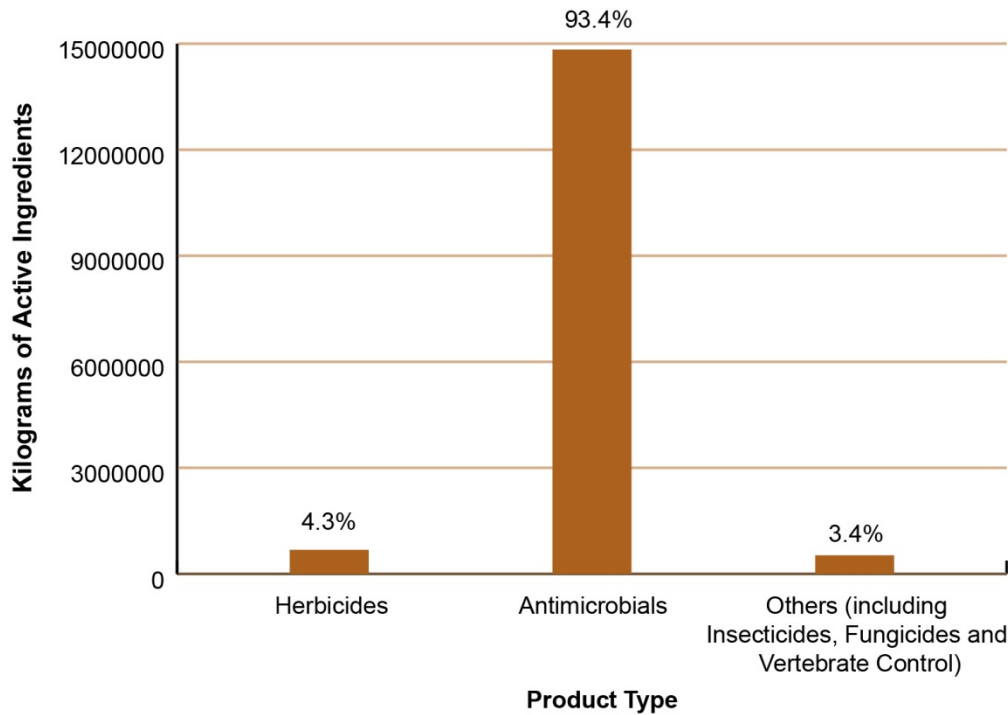


Figure 5: Kilograms of Active Ingredients Sold in Canada in 2012 in the Non-Agricultural Sector

The top 10 active ingredients sold with Non-agricultural sector uses were antimicrobials. These are presented in Table 3 in decreasing order. Some of the active ingredients also have product types in addition to the antimicrobial type. Non-agricultural sector products would be used predominantly in the wood preservation industry and for water treatment. The top 10 active ingredients accounted for 76% of the Non-agricultural sector pesticides sold. Five active ingredients have remained on the top 10 list for Non-agricultural sector pesticides throughout the reporting years: available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports); chromic acid; glutaraldehyde; arsenic pentoxide; and cupric oxide.



Table 3: Top 10 Active Ingredients Sold in Canada in 2012 in the Non-Agricultural Sector

Active Ingredient	Product Type
Available chlorine, present as sodium hypochlorite	Antimicrobial
Chromic acid	Antimicrobial
Copper as elemental	Antimicrobial /Herbicide/Fungicide
Arsenic pentoxide	Antimicrobial
Glutaraldehyde	Antimicrobial
Cupric oxide	Antimicrobial
Sodium bromide	Antimicrobial
Tetrakis(hydroxymethyl) phosphonium sulphate	Antimicrobial
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial/Fungicide
Ammonium bromide	Antimicrobial

Domestic Sector

The Domestic Class products accounted for 4.8% of overall pesticide sales in Canada for 2012. There was a 7% increase from 2011 (4 168 886 kg a.i.) to 2012 (4 462 716 kg a.i.) in Domestic sector pesticide sales.

Antimicrobial products accounted for 72.8% of domestic pesticides sold in Canada (Figure 6) mainly due to the sale of swimming pool and spa products. Insecticides accounted for 21.4% of the Domestic sector sales. Herbicides accounted for 4.9% of the Domestic sector sales. Fungicides (0.9%), vertebrate controls (0.7%) and “other” products (0.1%) accounted for a small portion of sales and were combined. The Domestic sector has seen fluctuation from year to year in the product type groupings, especially in the herbicide, insecticide and antimicrobial groupings.



Domestic Sector

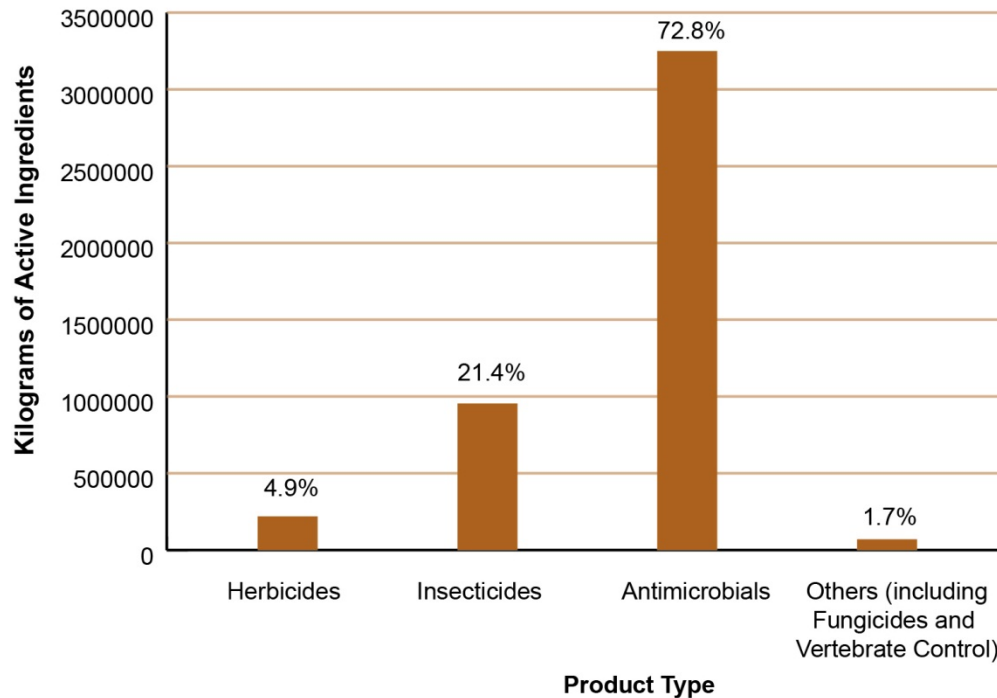


Figure 6: Kilograms of Active Ingredients Sold in Canada in 2012 in the Domestic Sector

The top 10 active ingredients sold for use in the Domestic sector are from three product type groups: antimicrobials, herbicides and insecticides. They are presented in Table 4 in decreasing order. Of the top 10 products, seven are used for swimming pools and spas and accounted for 82% of the amount sold of the top 10 Domestic sector list. The top 10 active ingredients accounted for 85.4% of the Domestic sector pesticides sold. Seven active ingredients remained in the top 10 in each year of reporting: available chlorine, present as calcium hypochlorite (as calcium hypochlorite in previous reports); available chlorine, present as trichloro-s-triazinetriene (as trichloro-s-triazinetriene in previous reports); n-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride; Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]; naphthalene; available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins (as halobrom in previous reports); and chlorine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins (as halobrom in previous reports).



Table 4: Top 10 Active Ingredients Sold in Canada in 2012 in the Domestic Sector

Active Ingredient	Product Type
Available chlorine, present as calcium hypochlorite	Antimicrobial
Available chlorine, present as trichloro-s-triazinetrione	Antimicrobial
Available bromine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	Antimicrobial
Poly[oxyethylene(dimethyliminio)ethylene (dimethyliminio)ethylene dichloride]	Antimicrobial
DEET*	Insecticide
Naphthalene	Insecticide
Available chlorine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	Antimicrobial
Available chlorine, present as sodium dichloro-s-triazinetrione	Antimicrobial
Acetic acid	Herbicide

*Because DEET is an insect repellent, it has been grouped with the insecticides.

Sales Information by Product Type

In the following sections, all pesticides are discussed according to their product type (including herbicides, insecticides, fungicides, antimicrobials, vertebrate controls and other product types). As previously discussed, a product may have a number of different uses on the label. As the sales reporting does not collect data on the relative amount of a product used for a specific label use, the data may not necessarily be separated into only one product type. This means that there may be overlap between the product type groupings. These numbers should not be added together to obtain total quantities sold in Canada in 2012, as an over-reporting would occur.

Herbicides

Herbicides accounted for 63.6% (59 087 185 kg a.i.) of all pesticides sold in Canada in 2012. This is an increase from 2011 when herbicides accounted for 59% of all pesticides sold. There was an overall increase of 11% in the quantities of herbicides sold in 2011 (53 359 859 kg a.i.) to 2012 (59 087 185 kg a.i.).

The top 10 herbicides sold in 2012, as listed in Table 5 in decreasing order, accounted for 90.7% of all herbicide sales in Canada and 57.7% of pesticide sales overall. Seven of the top 10 active ingredients have remained in the top 10 during all years of reporting: glyphosate, 2,4-D, MCPA, bromoxynil, S-metolachlor and R-enantiomer, atrazine, and ethalfluralin.



Table 5: Top 10 Herbicide Active Ingredients Sold in Canada in 2012

Active Ingredient
Glyphosate
2,4-D
Glufosinate ammonium
MCPA
Corn gluten meal
Bromoxynil
S-metolachlor and R-enantiomer
Atrazine (plus related active triazines)
Ethalfuralin
Diquat

Insecticides

Insecticides accounted for 5.1% (4 742 608 kg a.i.) of all pesticides sold in Canada in 2012. Insecticide sales have remained relatively low during the years of reporting, with the highest quantities sold in 2012 and the lowest in 2010 (3 796 725 kg a.i.). Many of the insecticides are used in agricultural settings, though the fourth- and fifth-most sold insecticides (naphthalene and DEET) are used only in the Domestic sector.

The top 10 insecticides sold in 2012, as listed in Table 6 in decreasing order, accounted for 84% of all insecticides sales in Canada and 4.3% of pesticide sales overall. Six of the top 10 insecticides have remained on the top 10 list during all years of reporting: mineral oil, chlorpyrifos, naphthalene, DEET, sulphur, and carbon dioxide gas.

Table 6: Top 10 Insecticide Active Ingredients Sold in Canada in 2012

Active Ingredient
Mineral oil
Hydrogen peroxide
Chlorpyrifos
DEET*
Naphthalene
Sulphur
Thiamethoxam
Carbon dioxide gas
Clothianidin
Dimethoate

*Since DEET is an insect repellent, it has been grouped with the insecticides.



Fungicides

Fungicides accounted for 8.4% (7 782 593 kg a.i.) of all pesticides sold in Canada in 2012. Fungicide sales have remained relatively low throughout the reporting years, with a high in 2012 and a low in 2010 (5 784 829 kg a.i.). The vast majority of fungicides are used in the Agricultural sector (97%).

The top 10 fungicides sold in Canada in 2012, as listed in Table 7 in decreasing order, accounted for 74.9% of fungicide sales and 6.3% of pesticide sales overall. Four of the top 10 active ingredients have remained consistent in all years of reporting: chlorothalonil, mancozeb, metam-sodium, and sulphur.

Table 7: Top 10 Fungicide Active Ingredients Sold in Canada in 2012

Active Ingredient
Mancozeb
Chlorothalonil
Chloropicrin
Metam-sodium
Mono- and dipotassium phosphite
Propiconazole
Prothioconazole
Sulphur
Tebuconazole
Pyraclostrobin

Antimicrobials

Antimicrobials accounted for 19.7% (18 341 475 kg a.i.) of all pesticides sold in Canada in 2012. This was a 24% decrease from 2011 (24 066 501 kg a.i.). While most of the antimicrobial active ingredients are used in the Non-agricultural sector, there are a number where the majority of the active ingredient is sold in the Domestic sector. This is true of some of the active ingredients containing available chlorine and available bromine. The high volumes are due to large quantities used in swimming pools and spas, which are mostly for Domestic use.

The top 10 antimicrobial active ingredients sold in 2012, as listed in Table 8 in decreasing order, accounted for 76.2% of all antimicrobial sales in Canada and 15% of pesticide sales overall. Five of the top 10 active ingredients have remained consistent during the reporting years: available chlorine, present as sodium hypochlorite (appears as sodium hypochlorite in previous reports), chromic acid, glutaraldehyde, arsenic pentoxide, and cupric oxide.



Table 8: Top 10 Antimicrobial Active Ingredients Sold in Canada in 2012

Active Ingredient
Available chlorine, present as sodium hypochlorite
Available chlorine, present as calcium hypochlorite
Chromic acid
Copper as elemental
Available bromine, present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins
Arsenic pentoxide
Glutaraldehyde
Available chlorine, present as trichloro-s-triazinetrione
Cupric oxide
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride

Vertebrate Control

Vertebrate controls accounted for 0.2% (194 597 kg a.i.) of all pesticides sold in Canada in 2012. Since sales data have been collected in Canada, products for vertebrate control have always accounted for a very small and consistent amount of overall pesticide sales. Non-agricultural uses accounted for 76.3% of the vertebrate controls in 2012.

The top 10 vertebrate controls, as listed in Table 9 in decreasing order, accounted for 97.8% of all vertebrate control sales in 2012 and 0.2% of pesticide sales overall. Only two of the top 10 active ingredients have remained consistent during the years of reporting: carbon dioxide gas and zinc phosphide.

Table 9: Top 10 Vertebrate Control Active Ingredients Sold in Canada in 2012

Active Ingredient
Carbon dioxide gas
4-nitro-3-(trifluoromethyl)phenol sodium salt
Cellulose (from powdered corn cobs)
Aluminum phosphide
Dried blood
Sulphur
Castor oil
Zinc phosphide
Thiram
Fish meal mixture



Others

Products fall into the “others” category when they include uses that are not classified in any of the groups above and include adjuvants, nematicides, and molluscicides. These “others” products accounted for 4% (3 741 957 kg a.i) of pesticide sales in Canada in 2012. Sales in this category have fluctuated slightly over the years of reporting, but have remained fairly low, with a high in 2012 and a low in 2008 (2 033 691 kg a.i.). The majority of the label uses of these other active ingredients are in the Agricultural sector (99.3%).

The top 10 active ingredients sold in Canada in 2012 that fall into this type are listed in Table 10 in decreasing order and accounted for 98.1% of “others” type sales and 3.9% of pesticide sales overall. Six of the top 10 active ingredients have remained consistent during the years of reporting: surfactant blend, mineral oil, nonylphenoxypolyethoxyethanol, paraffin-based petroleum oil, octylphenoxypolyethoxyethanol, and polyoxyalkylated alkyl phosphate ester.

Table 10: Top 10 Other Active Ingredients Sold in Canada in 2012

Active Ingredient
Surfactant blend
Polyoxyalkylated alkyl phosphate ester
Mineral oil
Paraffin based petroleum oil
Triglyceride ethoxylate
Alcohols, C9-11, ethoxylated
Nonylphenoxypolyethoxyethanol
Octadec-9-enoic acid, ethyl ester
Octadec-9-enoic acid, methyl ester
Octylphenoxypolyethoxyethanol

Biopesticides

Biopesticides include microbial pesticides (which contain a bacterium, fungus, virus, protozoan, or alga as the active ingredient), pheromones and other semiochemical pesticides, and other non-conventional (formerly biochemical) pesticides.

In 2012, there were 151 active ingredients identified as biopesticides, which accounted for 775 registered products. Reporting compliance for biopesticides was consistent with compliance levels seen for all pesticides (96.3%).

A total of 55 products out of the 332 products reported as sold could not be converted into kg a.i. Due to the use of unconventional units, such as colony forming units and international units or errors in reporting of the products, biopesticide sales have been broken into two groups: products that could be converted into kg a.i., and microbial products that could not be converted into kg a.i. Note that biopesticide sales are represented in this subsection in addition to being included in each individual product type section (such as herbicides and insecticides).



The 277 products that could be converted to kg a.i. accounted for 5 919 276 kg a.i. sold in 2012, which represents 6.4 % of pesticide sales overall. There was a slight decrease in biopesticide sales from 2011 (6 159 077 kg a.i.) to 2012. Insecticides accounted for more than 46.3% of the biopesticide sales in 2012 (Figure 7). Herbicides accounted for the next largest portion of biopesticide sales in 2012 at 33.0%, followed by fungicides with 18.1% of sales and vertebrate control with 2.6%. Antimicrobials accounted for 0.006% of the biopesticides sold in 2012 and were added to the “others” product type (5.6%).

Biopesticides

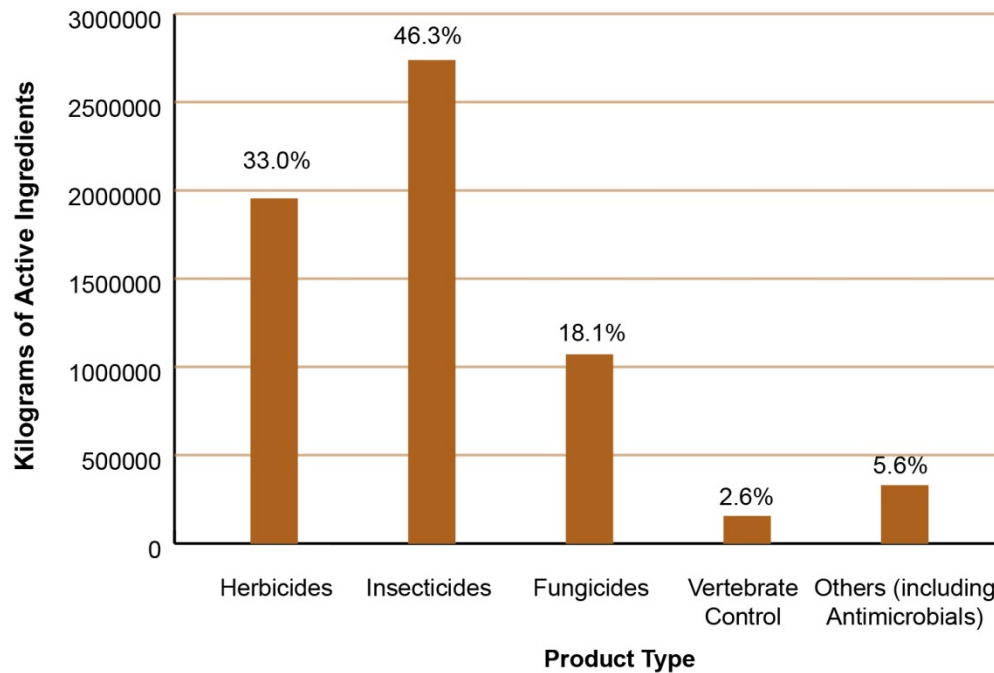


Figure 7: Kilograms of Active Ingredients of Biopesticides Sold in Canada in 2012

The top 10 biopesticide active ingredients sold in Canada are listed in Table 11 in decreasing order. The top 10 active ingredients accounted for 95.1% of sales of biopesticides that could be converted to kg a.i. and 6.1% of pesticide sales overall. Six of the top 10 active ingredients remained consistent during reporting years: corn gluten meal, mineral oil, sulphur, n-decanol, silicon dioxide and acetic acid.



Table 11: Top 10 Biopesticide Active Ingredients Sold in Canada in 2012

Active Ingredient	Product Type
Mineral oil	Fungicide, Insecticide, Other
Corn gluten meal	Herbicide
Hydrogen peroxide	Herbicide, Insecticide, Fungicide, Antimicrobial
Mono- and dipotassium phosphite	Fungicide
N-decanol	Herbicide
Sulphur	Fungicide, Insecticide, Vertebrate Control
Mono- and dibasic sodium, potassium, and ammonium phosphites	Fungicide
Carbon dioxide gas	Insecticide, Vertebrate Control
Acetic acid	Herbicide
Silicon dioxide	Insecticide

The remaining 55 products could not be converted into kg a.i. due to unconventional units of measure. Many of these products are of interest as they are dispensers for pheromones and microbial agents. The amount of these products sold in 2012 is listed in Table 12.

Table 12: Quantity of Pheromone Dispensers and Microbials Sold in Canada in 2012

Units of Product Sold	Total
Dispensers (pheromones)	20 025
Litres (microbials)	1 202 060
Kilograms (microbials)	444 192

Sales Information by Chemical Group

Active ingredients have been grouped into chemical groups to present an alternate way of viewing Canadian pesticide sales information (Table 13). The chemical groups were aligned with the listings from the Quebec Ministry of Sustainable Development, Environment and Parks (Dion 2007) and are outlined in Appendix II.

In 2012, the chemical group with the largest proportion of sales was the “Phosphonic and phosphinic acids” group at 47%, followed by the “Inorganic, others” group at 14%. The next group was the “Phenoxy acids” at 6%. The remaining chemical groups were all under 4%, and 36 out of 52 chemical groups were under 1% of total sales. Eight chemical families remained in the top 10 from 2011 to 2012.



Table 13: Summary of Pesticide Sales by Chemical Group (All Sectors) in 2012

Chemical Grouping	Kilograms of Active Ingredients	Ranking
Phosphonic acids, phosphinic acids	43 268 596	1
Inorganic, others	12 957 344	2
Phenoxy acids	5 827 830	3
Fatty acids & surfactants	37 27 821	4
Benzonitriles	21 25 395	5
Triazines, tetrazines	18 92 199	6
Oils, mineral and vegetable	1 850 753	7
Others	1 846 539	8
Biscarbamates	1 699 273	9
Inorganic coppers	1 550 603	10
Urea derivatives	1 427 828	11
Ammoniums, quaternary	1 340 363	12
Triazoles	1 227 217	13
Anilides/anilines	1 171 999	14
Alcohols	1 120 169	15
Dinitrobenzenes	1 050 450	16
Dithiocarbamates	887 392.9	17
Aldehydes	826 130.6	18
Organochlorines	725 802.6	19
Carbamates	567 062.8	20
Halogenated organic acids	553 183.6	21
Thiophosphates	492 999.7	22
Acylureas	441 570.2	23
Cyclohexanedione oximes	398 260.6	24
Guanidines	362 893.4	25
Benzamides	355 418.6	26
Methoxyacrylates	333 273.3	27
Aryloxyphenoxy acids	328 952.3	28
Hydrocarbons	327 384.5	29
Azoles, oxazoles, thiazoles	316 540.5	30
Dithiophosphates	XXX	31
Phenols/chlorophenols	264 720.6	32
Benzoic acid and derivatives	256 563.8	33
Phtalic acids	233 190.4	34
Amides	209112.1	35
Organic acids	121 910	36
Imidazolinones	107 027.2	37
Sulfonylureas	82 749.52	38
Morpholines and oxathiines	XXX	39
Nitrobenzenes	78 166.67	40
Pyrethroids, pyrethrins	59 347.39	41
Pyridines	53 544.84	42
Diazines	33 766.79	43
Phosphates	17 128.29	44
Organohalogens	16 873.77	45
Phosphoramidothioates	XXX	46



Chemical Grouping	Kilograms of Active Ingredients	Ranking
Inorganic zincs	XXX	47
Organometallics	4637.181	48
Pheromones	1456.214	49
Chromenones	447.3712	50
Indanediones	XXX	51
Microbials	0	52

XXX indicates confidential business information. The chemical group did not contain a minimum of four registrants in the calculation of the total.

Future Years

The PMRA is analyzing the sales data for the 2013 calendar and will publish the 2013 data after the analysis is complete.

References

Dion, S. 2007. Guide de classement des ingrédients actifs par groupes chimiques. Ministère du développement durable, de l'environnement et des parcs. Québec. 35 pp.



Appendix I Ranking of All Active Ingredients Sold in Canada in 2012

Active Ingredient Name	Kilograms of Active Ingredients
Glyphosate	> 25 000 000
Available chlorine, present as sodium hypochlorite	> 5 000 000
2,4-D	> 1 000 000
Glufosinate ammonium	
MCPA	
Mineral oil	
Surfactant blend/mixture	
Corn gluten meal	
Mancozeb	
Available chlorine, present as calcium hypochlorite	
Chlorothalonil	
Copper as elemental	
Chromic acid	> 500 000
Bromoxynil	
Hydrogen peroxide	
Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
Arsenic pentoxide	
Glutaraldehyde	
S-metolachlor and R-enantiomer	
Chloropicrin	
Metam-sodium	
Atrazine (plus related active triazines)	
Ethalfuralin	
Available chlorine, present as trichloro-s-triazinetrione	
Polyoxyalkylated alkyl phosphate ester	
Diquat	
Cupric oxide	
Mono- and dipotassium phosphite	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride	> 100 000
Sodium bromide	
Chlorpyrifos	
Fluroxypyr (present as 1-methylheptyl ester)	
Tetrakis(hydroxymethyl) phosphonium sulphate	
Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride]	
Propiconazole	
Triallate	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins	
DEET	
Prothioconazole	
Bentazon (present as sodium salt)	
Paraffin base petroleum oil	
N-decanol	
Tebuconazole	
Ammonium bromide	



Active Ingredient Name	Kilograms of Active Ingredients
Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine	
Clethodim	
Naphthalene	
Sulphur	
Trifluralin	
Triglyceride ethoxylate	
Dicamba (present as acid, amine salt, ester, or sodium salt)	
Borates	
Pentachlorophenol plus related active chlorophenols	
Acrolein	
Pyraclostrobin	
Metribuzin	
Metiram	
Captan	
Alcohols, C9-11, ethoxylated	
Boscalid	
Bronopol	
1-alkyl (C8-C18)-1,3-propanediamine acetate	
Linuron	
Thiamethoxam	
2,2-dibromo-3-nitrilopropionamide	
Nonylphenoxypolyethoxyethanol	
Clodinafop-propargyl	
Mecoprop-P	
Mono- and dibasic sodium, potassium, and ammonium phosphites	
Carbon dioxide gas	
Fenoxaprop-P-ethyl	
Pendimethalin	
Clothianidin	
Dimethoate	
Dimethenamid-P	
Clopyralid	> 50 000
1,2-benzisothiazolin-3-one	
Sodium chlorite	
Acetic acid	
Thiram	
Silicon dioxide	
N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethyl benzyl ammonium chloride	
Carbathiin	
Potassium dimethyldithiocarbamate	
Available chlorine, present as sodium dichloro-s-triazinetrione	
Azoxystrobin	
Metam-potassium	
Metconazole	
2,4-DB	
Phorate	
Chlorpropham	



Active Ingredient Name	Kilograms of Active Ingredients
Malathion	
Didecyldimethylammonium present as carbonate and bicarbonate salts	
Tralkoxydim	
Penthiopyrad	
Quizalofop P-ethyl	
Dazomet	
Hexazinone	
Pyrasulfotole	
Diazinon	
1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	
Propamocarb hydrochloride	
Lime sulphur	< 50 000
N-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride	
Sodium omadine	
Dichlorprop-P	
Sodium chloride	
Saflufenacil	
Soap	
Tribenuron-methyl	
Iprodione	
Iron (present as FeHEDTA)	
Cyprodinil	
Triclopyr-butotyl	
Difenoconazole	
Amitrole	
Fosetyl-Al	
Sodium fluoride	
Imazethapyr	
Diuron	
Octadec-9-enoic acid, methyl ester	
Octadec-9-enoic acid, ethyl ester	
Tepraloxydim	
Octylphenoxyethoxyethanol	
Fludioxonil	
Imazamox	
Didecyl dimethyl ammonium chloride	
Imidacloprid	
Mesotrione	
5-chloro-2-methyl-4-isothiazolin-3-one	
N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride	
Fomesafen	
Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dichloro-5-ethyl-5-methylhydantoin and related hydantoins	
Maleic hydrazide	
Metalaxyl	
Paradichlorobenzene	



Active Ingredient Name	Kilograms of Active Ingredients
3-iodo-2-propynyl n-butylcarbamate	
EPTC	
Pinoxaden	
Picoxystrobin	
Simazine plus related active triazines	
Fluazinam	
Folpet	
Formic acid	
Florasulam	
Aluminum phosphide	
Paraquat	
Pyroxsulam	
Picloram	
Phosmet	
Petroleum hydrocarbon blend	
Sulfuryl fluoride	
Nabam	
Sodium dimethyldithiocarbamate	
Lambda-cyhalothrin	
Flucarbazone (present as flucarbazone-sodium)	
Sulfentrazone	
5,5-dimethylhydantoin	
Siloxylated polyether	
Amitraz	
Thiophanate-methyl	
Isoxaflutole	
4-nitro-3-(trifluoromethyl) phenol sodium salt	
Piperonyl butoxide	
Imazamethabenz-methyl	
Kaolin	
Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin	
Permethrin	
Aminopyralid	
Acephate	
Cellulose (from powdered corn cobs)	
Thiabendazole	
Carbaryl	
Pyrimethanil	
N-coco-alkyltrimethylene diamines present as monobenzoate salt	
Ethephon	
Dichlobenil	
Fluazifop-P-butyl	
Ethyl alcohol	
Formaldehyde	
Oxydiethylene bis(alkyl dimethyl ammonium chloride)	
2-methyl-4-isothiazolin-3-one	
Thifensulfuron-methyl	



Active Ingredient Name	Kilograms of Active Ingredients
Methylene bis(thiocyanate)	
Napropamide	
Prometryne plus related active triazines	
Difenzoquat metilsulfate	
Mineral spirits	
Oxirane derivatives (50% minimum)	
Propyzamide	
2-(thiocyanomethylthio)benzothiazole	
Ferrous sulfate	
MCPB	
Deltamethrin	
Mandipropamid	
Imazapyr	
Naled	
Sethoxydim	
2-phenylphenol	
Terbacil	
Diflufenzopyr	
Dichlorvos plus related compounds	
Dodecylguanidine hydrochloride	
Octhilinone	
Fenamidone	
Triticonazole	
1,2-dibromo-2,4-dicyanobutane	
Chlorantraniliprole	
Dried blood	
Creosote	
Barium metaborate monohydrate	
Extract of <i>Reynoutria sachalinensis</i>	
Chlormequat chloride	
Flumioxazin	
Trifloxystrobin	
1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin	
Ferbam	
Potassium bicarbonate	
Carfentrazone-ethyl	
Methyl bromide	
4-chloro-3-methylphenol (sodium salt)	
Flumetsulam	
10,10'-oxybis(phenoxarsine)	
Cymoxanil	
Fenhexamid	
Diodofon	
Tembotrione	
Methomyl	
Metsulfuron-methyl	
N-octyl bicycloheptene dicarboximide	
Myclobutanil	



Active Ingredient Name	Kilograms of Active Ingredients
Ferric sodium EDTA	
Castor oil	
Thiencarbazone-methyl	
Liquid corn gluten	
Bromacil (present in free form, as dimethylamine salt, or as lithium salt)	
Zinc as elemental (present as zinc naphthenate)	
Oxamyl	
Methylated seed oil of soybean	
Cypermethrin	
Pyrethrins	
Cyfluthrin	
Zinc phosphide	
Metallic copper	
Chlorimuron-ethyl	
Daminozide	
Chlorthal-dimethyl	
Copper, present as basic copper carbonate	
Spirotetramat	
Thiacloprid	
Nicosulfuron	
Clomazone	
Tetrachlorvinphos	
Oxyfluorfen	
Formetanate hydrochloride	
Acetamiprid	
P-menthane-3,8-diol	
Metrafenone	
Silica aerogel	
Propoxur	
2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane)	
D-cis, trans allethrin	
Spinetoram	
Acifluorfen (present as sodium salt)	
Flonicamid	
Icaridin	
Tetramethrin	
Sedaxane	
Fish meal mixture	
Spinosad	
Octyl decyl dimethyl ammonium chloride	
Dodine	
Butoxypolypropylene glycol	
Disodium cyanodithioimidocarbonate	
Novaluron	
4,5-dichloro-2-n-octyl-3(2H)isothiazolone	
1- or 3-monomethylol-5,5-dimethylhydantoin	
Ethofumesate	
Metaldehyde	



Active Ingredient Name	Kilograms of Active Ingredients
Cyazofamid	
D-trans allethrin	
Methoxyfenozide	
Garlic	
Triforine	
3-methyl-4-chlorophenol (or: p-chloro-m-cresol)	
Trinexapac-ethyl	
Phenmedipham	
Desmedipham	
Diphenylamine	
Rimsulfuron	
Famoxadone	
Lactic acid	
Spiromesifen	
Bifenazate	
2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)	
Ferric phosphate	
Bis(trichloromethyl)sulfone	
Diocetyl dimethyl ammonium chloride	
Strychnine	
Kresoxim-methyl	
D-phenothrin	
Tefluthrin	
Magnesium phosphide	
Streptomycin	
Cloransulam-methyl	
Quinoxifen	
Fluopicolide	
Penflufen	
1,4-bis(bromoacetoxy)-2-butene	
Spirodiclofen	
Foramsulfuron	
Pyridaben	
Phosphine	
Sodium 2-phenylphenate	
Quinclorac	
Dried eggs	
<i>Brassica hirta</i> White mustard seed powder	
Etridiazole	
Polybutene	
Fenbutatin oxide	
Acequinocyl	
Prohexadione calcium	
Octenol	
Citric acid	
Dodemorph-acetate	
Rotenone	
Diallyl disulfide and related sulfides	



Active Ingredient Name	Kilograms of Active Ingredients
Propetamphos	
Methyl nonyl ketone	
Methoprene	
5-chloro-2(2,4-dichlorophenoxy)phenol	
Citronella oil	
Azamethiphos	
Tebufenozide	
Ethametsulfuron-methyl	
Azadirachtin	
Sodium alpha-olefin sulfonate	
Zoxamide	
Capsaicin	
Garlic powder	
(E,E)-8,10-dodecadien-1-ol	
Thymol	
Topramezone	
Aminoethoxyvinylglycine	
(Z)-11-tetradecenyl acetate	
Meat meal mixture	
Verbenone	
Fenbuconazole	
Ethylene oxide	
1,4-dimethylnaphthalene	
Resmethrin	
Citronella terpene	
(Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate	
Clofentezine	
Wintergreen oil	
Copper, present as copper 8-quinolinolate	
Chlorsulfuron	
Ipconazole	
Abamectin	
Peracetic acid	
Di-n-propyl isocinchomeronate	
6-benzylaminopurine (or: 6-benzyladenine)	
Pyriproxyfen	
Fish oil mixture	
1-alkyl(C6-C18)-1,3-propanediamine	
Bispyribac-sodium (KIH-2023)	
Oxadiazon	
Warfarin	
Naphthylacetic acid	
S-kinoprene	
Dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methyl benzyl ammonium chloride	
Copper (present as micro cupric ammonium formate and tannate complex)	
Gibberellic acid	
1-dodecanol	
Bromadiolone	



Active Ingredient Name	Kilograms of Active Ingredients
(Z)-8-dodecen-1-yl acetate	
Metofluthrin	
Methyl anthranilate	
Muscalure	
(Z)-9-tetradecen-1-yl acetate	
Tau-fluvalinate	
Saponins of chenopodium quinoa	
Coumaphos	
Chlorophacinone	
(Z,Z)-3,13-octadecadienyl acetate	
1-tetradecanol	
Triflurosulfuron-methyl	
3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride	
Diphacinone (present in free form or as sodium salt)	
Paclobutrazol	
Denatonium benzoate	
(Z)-11-tetradecen-1-ol	
(E,Z)-3,13-octadecadienyl acetate	
Difethialone	
(Z)-11-tetradecenal	
Pine needle oil	
Lemon oil	
Oil of geranium	
Eucalyptus oil	
Related capsaicinoids	
Natamycin	
Oriental mustard seed meal	
Brodifacoum	
(E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol	
4-aminopyridine	
(E)-8-dodecen-1-yl acetate	
Camphor oil	
1-methylcyclopropene	
Tributyltin oxide	
Putrescent whole egg solids	
Pymetrozine	
Uniconazole-p	
Prosulfuron	
3-methyl-2-cyclohexen-1-one	
(Z)-8-dodecen-1-ol	
Ancymidol	
Bromethalin	
Oil of black pepper	
4-CPA	
Acibenzolar-s-methyl	
Piperine	
Sodium monofluoroacetate	
Sodium cyanide	



Active Ingredient Name	Kilograms of Active Ingredients
Decyl isononyl dimethyl ammonium chloride	
N-alkyl (25% C12, 60% C14, 15% C16) dimethyl benzyl ammonium chloride	
<i>Ophiostoma piliferum</i> fungus	
Picolinafen	
Irgarol 1051	
<i>Trichoderma asperellum</i> , strain T34	
Naphthaleneacetamide	
Tri-n-butyltin maleate	
Quintozene	
Nucleopolyhedrovirus for gypsy moth larvae	
(Z)-4-tridecenyl acetate	
Oxalic acid	
<i>Nosema locustae</i> canning, (spore of)	
<i>Trichoderma virens</i> strain G-41	
2-(hydroxymethyl)-2-nitro-1,3-propanediol	
N-alkyl (50% C12, 30% C14, 17% C16, 3% C18) dimethyl ethylbenzyl ammonium chloride	
Available chlorine, present as lithium hypochlorite	
<i>Pantoea agglomerans</i>	
<i>Verticillium albo-atrum</i> , isolate WCS850	
N-alkyl (3% C12, 95% C14, 2% C16) dimethyl benzyl ammonium chloride (or: myristyl dimethyl benzyl ammonium chloride dihydrate)	
<i>Streptomyces griseoviridis</i> strain K61	
[[[1-methyl-2-(5-methyl-3-oxazolidinyl)ethoxy]methoxy]methoxy]methanol	
<i>Lactobacillus rhamnosus</i> strain LPT-21	
Propylene glycol	
Prallethrin	
Primisulfuron-methyl	
(E,Z)-11-tetradecenal	
Soybean oil	
(E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate	
Methyl salicylate	
Nucleopolyhedrovirus for Douglas fir tussock moth	
N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium saccharinate	
Fosamine ammonium	
<i>Lactococcus lactis</i>	
<i>Typhyla phacorrhiza</i> (strain 94671)	
Pyrazon	
<i>Clavibacter michiganensis</i> (spp <i>michiganensis</i>) bacteriophage	
Sulfometuron methyl	
Oxalic acid dihydrate	
Oxycarboxin	
<i>Lactobacillus casei</i> strain LPT-111	
<i>Phoma macrostoma</i>	
P-tert amyl phenol	
<i>Metarhizium anisopliae</i> (strain F52)	
D-limonene	
Pyroxasulfone	



Active Ingredient Name	Kilograms of Active Ingredients
Triclopyr triethylamine salt	
Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride	
<i>Paecilomyces fumosoroseus</i> strain FE 9901	
(E)-11-tetradecenyl acetate	
<i>Neodiprion abietis</i> nucleopolyhedrovirus	
<i>Streptomyces lydicus</i> strain WYEC108	
Ziram	
Triethylene glycol	
Sodium chlorate	
Nuclear polyhedrosis virus of red-headed pine sawfly	
(Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol	
(Z,Z)-3,13-octadecadien-1-ol	
N-alkyl (5% C5-18, 61% C12, 23% C14, 11% C16) dimethyl benzyl ammonium chloride	
Potassium peroxymonosulfate, present as potassium peroxymonosulfate sulfate	
R-(-)-1-octen-3-ol	
Paraformaldehyde	
Endothal	
German cockroach extract	
Cyromazine	
Ammonia (present as ammonium sulfate)	
Borax pentahydrate	
Hydramethylnon	
Anhydrous ammonia	
<i>Agrobacterium radiobacter</i>	
<i>Aureobasidium pullulans</i>	
<i>Bacillus thuringiensis</i>	
Flusilazole	
Isopropyl alcohol	
Fenpropimorph	
Etofenprox	
Cyphenothrin	
<i>Chondrostereum purpureum</i> (strain: North American; pathovar: PFC2139)	
<i>Pseudomonas fluorescens</i> A506	
Cloquintocet-mexyl	
Niclosamide	
Fungus: <i>Gliocladium catenulatum</i>	
Bensulide	
Diflubenzuron	
2-bromo-4'-hydroxyacetophenone	
<i>Pseudomonas syringae</i> - strain ESC-10	
N-octanol	
1-(alkyl-amino)-3-aminopropane hydrochloride (component of Ampho 443-31)	
Mesosulfuron-methyl	
<i>Coniothyrium minitans</i> strain CON/M/91-08	
<i>Bacillus subtilis</i>	
Liquid carbon dioxide	
Cornmint oil	



Active Ingredient Name	Kilograms of Active Ingredients
Benzyl benzoate	
Dichloran	
Aromatics	
Dinocap (plus related active compounds)	
<i>Bacillus sphaericus</i>	
Imiprothrin	
(E,Z)-2,13-octadecadien-1-ol	
<i>Bacillus firmus</i> I-1582	
Dithiopyr	
Garlic oil	
<i>Cydia pomonella</i> granulovirus	
<i>Beauveria bassiana</i>	
Iodosulfuron-methyl-sodium	
Indaziflam	
Ametoctradin	
Bifenthrin	
Carbendazim	
Fluopyram	
(E)-4-tridecenyl acetate	
Dimethomorph	
Cyprosulfamide	
Dimethoxane	
(E,Z)-2,13-octadecadien-1-yl acetate	
<i>Sclerotinia minor</i> IMI 3144141	
Isoxaben	
Endosulfan	
<i>Trichoderma harzianum</i> strain KRL-AG2	
Ethylene	
Fluoxastrobin	
1-(alkyl-amino)-3-carboxymethylaminopropane (component of Ampho 443-31)	
Fluxapyroxad	
Flufenacet	

**Appendix II Chemical Groups and Active Ingredients for 2012**

Chemical Group	Active Ingredient Name
Acylureas	Bromacil (present in free form as dimethylamine salt or as lithium salt) Bentazon (present as sodium salt) Cymoxanil Diflubenzuron Iprodione Novaluron Terbacil Hexazinone
Alcohols	Alcohols, C9-11, ethoxylated Aminoethoxyvinylglycine Bronopol Butoxypolypropylene glycol Ethyl alcohol Ethylene oxide N-decanol N-octanol Tetrakis(hydroxymethyl) phosphonium sulphate Isopropyl alcohol P-menthane-3,8-diol Propylene glycol Siloxylated polyether Triethylene glycol 2-(hydroxymethyl)-2-nitro-1,3-propanediol
Aldehydes	Formaldehyde Glutaraldehyde Metaldehyde Paraformaldehyde
Amides	2,2-dibromo-3-nitrilopropionamide Capsaicin Piperine Daminozide Mandipropamid Naphthaleneacetamide Napropamide Related capsaicinoids Saflufenacil
Ammoniums, Quaternary	Difenzoquat metilsulfate Chlormequat chloride 1-(3-chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride Denatonium benzoate Diquat Paraquat N-alkyl (25% C12, 60% C14, 15% C16) dimethyl benzyl ammonium chloride N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium chloride NaAlkyl (50% C12, 30% C14, 17% C16, 3% C18) dimethyl ethylbenzyl ammonium chloride N-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride didecyl dimethyl ammonium chloride N-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride N-alkyl (67% C12, 25% C14, 7% C16, 1% C18) dimethyl benzyl ammonium chloride



Chemical Group	Active Ingredient Name
	<p>Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride N-alkyl (5% C5-C18, 61% C12, 23% C14, 11% C16) dimethyl benzyl ammonium chloride N-alkyl (40% C12, 50% C14, 10% C16) dimethyl benzyl ammonium saccharinate Didecyldimethylammonium present as carbonate and bicarbonate salts Decyl isononyl dimethyl ammonium chloride Dioctyl dimethyl ammonium chloride Octyl decyl dimethyl ammonium chloride Dialkyl (5% C12, 60% C14, 30% C16, 5% C18) methyl benzyl ammonium chloride Oxydiethylene bis(alkyl dimethyl ammonium chloride) N-alkyl (3% C12, 95% C14, 2% C16) dimethyl benzyl ammonium chloride (or: myristyl dimethyl benzyl ammonium chloride dihydrate) 3-(trimethoxysilyl)-propyldimethyloctadecyl ammonium chloride</p>
Anilides/Anilines	<p>S-metolachlor and R-enantiomer Amitraz Niclosamide Boscalid Dimethenamid-P Diphenylamine Fenhexamid Flufenacet Flumioxazin Fluxapyroxad Methyl Anthranilate Metalaxyl-M and S-isomer Metalaxyl Picolinafen Penflufen Penthiopyrad Sedaxane</p>
Aryloxyphenoxy Acids	<p>Clodinafop-propargyl Fenoxaprop-P-ethyl Fluazifop-P-butyl Quizalofop P-ethyl</p>
Azoles, Oxazoles, Thiazoles	<p>1,2-benzisothiazolin-3-one Carbendazim Clomazone Fludioxonil 2-methyl-4-isothiazolin-3-one 5-chloro-2-methyl-4-isothiazolin-3-one 4,5-dichloro-2-n-octyl-3(2H)isothiazolone Isoxaflutole Topramezone Othilinone Pinoxaden Pyrasulfotole Pyroxasulfone Spirotetramat Strychnine 2-(thiocyanomethylthio)benzothiazole Etridiazole Thiabendazole</p>



Chemical Group	Active Ingredient Name
Benzamides	Cyprosulfamide DEET Fluopicolide Fluopyram Isoxaben Chlorantraniliprole Propyzamide Methoxyfenozide Tebufenozide Zoxamide
Benzoic Acid and Derivatives	Acibenzolar-s-methyl Benzyl benzoate Bispyribac-sodium (KIH-2023) Dicamba (present as acid, amine salt, ester, or sodium salt) Methyl salicylate Quinclorac
Benzonitriles	Bromoxynil Dichlobenil Chlorothalonil
Biscarbamates	Desmedipham Ferbam Mancozeb Metiram Nabam Phenmedipham Thiram Thiophanate-methyl
Carbamates	Propoxur Bifenazate Carbaryl Chlorpropham EPTC Famoxadone Formetanate hydrochloride (FOM) 3-Iodo-2-propynyl n-butylcarbamate Methomyl Oxadiazon Oxamyl Propamocarb hydrochloride Icaridin Triallate
Chromenones	Brodifacoum Bromadiolone Difethialone Rotenone Warfarin
Cyclohexanedione Oximes	Clethodim Sethoxydim Tepaloxym Tralkoxydim



Chemical Group	Active Ingredient Name
Diazines	Ancymidol 6-benzylaminopurine (or 6-benzyladenine) Maleic hydrazide Pyridaben Pyrazon Triforine
Dinitrobenzenes	Bromethalin Dinocap (plus related active compounds) Ethalfuralin Fluazinam Pendimethalin Trifluralin
Dithiocarbamates	Dazomet Disodium cyanodithioimidocarbonate Potassium dimethyldithiocarbamate Metam-potassium Metam-sodium Sodium dimethyldithiocarbamate Ziram
Dithiophosphates	Bensulide Dimethoate Malathion Phorate Phosmet
Fatty Acids and Surfactants	N-coco-alkyltrimethylene diamines present as monobenzoate salt 1-alkyl (C8-C18)-1,3-propanediamine acetate 1-alkyl C6-C18 1,3-propanediamine Alkanolamine salts of fatty acids Ammonium salt of fatty acid Ammonium salts of higher fatty acids Fatty acids Nonylphenoxypolyethoxyethanol Octadec-9-enoic acid, methyl ester Octadec-9-enoic acid, ethyl ester Octylphenoxypolyethoxyethanol Paraffin based petroleum oil Polyoxyalkylated alkyl phosphate ester Poly[oxyethylene(dimethyliminio)ethylene(dimethyliminio)ethylene dichloride] Potassium salts of fatty acids Soap (non-specific) Herbicide soap Triethanolamine salts of fatty acids Triglyceride ethoxylate 10 POE Triglyceride ethoxylate Surfactant blend



Chemical Group	Active Ingredient Name
Guanidines	Hydramethylnon Clothianidin Cyprodinil Dodine Dodecylguanidine hydrochloride Imidacloprid Pirimethanil Streptomycin Thiamethoxam
Halogenated Organic Acids	Aminopyralid 1,4-bis(bromoacetoxy)-2-butene Clopyralid Fluroxypyr (present as 1-methylheptyl ester) Picloram (present as potassium salts) Picloram (present as acid) Picloram (present as amine salts) Spirodiclofen Triclopyr triethylamine salt
Hydrocarbons	Citronella terpene Creosote 1,4-dimethylnaphthalene Ethylene Mineral spirits Naphthalene Petroleum hydrocarbon blend Polybutene
Imidazolinones	Imazapyr Imazamethabenz-methyl Fenamidone Imazethapyr Imazamox
Indanediones	Chlorophacinone Diphacinone (present in free form or as sodium salt)
Inorganic Coppers	Copper as elemental (present as tribasic copper sulphate) Copper as elemental (present as copper thiocyanate) Metallic copper Copper as elemental (present as copper naphthenate) Cupric oxide Copper as elemental (present as cuprous oxide) Copper, present as copper 8-quinolinolate Copper as elemental (present as mixed copper ethanolamine complexes) Copper as elemental (present as copper sulphate) Copper, present as basic copper carbonate Copper (present as picro cupric ammonium formate and tannate complex) Copper as elemental (present as copper oxychloride) Copper as elemental (present as copper hydroxide)
Inorganic Zincs	Zinc as elemental (present as zinc naphthenate) Zinc as elemental (present as zinc oxide) Zinc phosphide



Chemical Group	Active Ingredient Name
Inorganic, Others	Anhydrous ammonia Aluminum phosphide Ammonium bromide Arsenic pentoxide Ammonia (present as ammonium sulfate) Barium metaborate monohydrate Borax pentahydrate Borax Boric acid Disodium octaborate tetrahydrate Borax or sodium borate Available chlorine, present as calcium hypochlorite Liquid carbon dioxide Chromic acid Fosetyl-Al Ferrous sulfate Ferric phosphate Hydrogen peroxide Iron (present as FeHEDTA) Kaolin Potassium peroxymonosulfate present as potassium peroxymonosulfate sulfate Available chlorine, present as lithium hypochlorite Mono- and dipotassium phosphite Magnesium phosphide Sodium chloride Phosphine Potassium bicarbonate Sodium bromide Sodium chlorite Sodium chlorate Sodium cyanide Sodium fluoride Sulfuryl fluoride Available chlorine, present as sodium hypochlorite Silicon dioxide (present as 100% diatomaceous earth) – fresh water fossils Silica aerogel Silicon dioxide (present as 100% diatomaceous earth) – salt water fossils Sulphur Lime sulphur Zinc borate
Methoxyacrylates	Azoxystrobin Fluoxastrobin Kresoxim-methyl Pyraclostrobin Picoxystrobin Trifloxystrobin



Chemical Group	Active Ingredient Name
Microbials	<p> <i>Aureobasidium pullulans</i> DSM 14940 <i>Aureobasidium pullulans</i> DSM 14941 <i>Aureobasidium pullulans</i> DSM 14940 and DSM 14941 <i>Agrobacterium radiobacter</i> <i>Bacillus firmus</i> I-1582 <i>Beauveria bassiana</i> strain GHA <i>Beauveria bassiana</i> strain HF23 <i>Pseudomonas fluorescens</i> A506 <i>Pseudomonas syringae</i> – strain ESC-10 <i>Pseudomonas fluorescens</i> CL145A <i>Bacillus subtilis</i> QST 713 <i>Bacillus subtilis</i> MB1600 <i>Bacillus thuringiensis</i> Berliner spp. <i>kurstaki</i> <i>Bacillus thuringiensis</i> serotype H-14 <i>Bacillus sphaericus</i> <i>Bacillus thuringiensis</i> sp. <i>tenebrionis</i> <i>Coniothyrium minitans</i> strain CON/M/91-08 <i>Cydia pomonella</i> granulovirus (strain M) <i>Cydia pomonella</i> granulosis virus (strain CMGV4) <i>Chondrostereum purpureum</i> (strain: North American; pathovar: PFC2139) Fungus: <i>Gliocladium catenulatum</i> <i>Sclerotinia minor</i> IMI 3144141 <i>Trichoderma harzianum</i> strain KRL-AG2 <i>Lactobacillus casei</i> strain LPT-111 <i>Lactobacillus rhamnosus</i> strain LPT-21 <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain LL64/CSL <i>Lactococcus lactis</i> ssp. <i>cremoris</i> strain M11/CSL <i>Lactococcus lactis</i> ssp. <i>lactis</i> strain LL102/CSL <i>Metarhizium anisopliae</i> (strain F52) <i>Phoma macrostoma</i> <i>Neodiprion abietis</i> nucleopolyhedrovirus <i>Nosema locustae</i> canning (spore of) Nucleopolyhedrovirus for gypsy moth larvae Nuclear polyhedrosis virus of red-headed pine sawfly Nucleopolyhedrovirus for Douglas fir tussock moth <i>Ophiostoma piliferum</i> fungus <i>Pantoea agglomerans</i> C9-1 <i>Pantoea agglomerans</i> strain E325 (NRRL B-21856) <i>Paecilomyces fumosoroseus</i> strain FE 9901 <i>Streptomyces griseoviridis</i> strain K61 <i>Streptomyces lydicus</i> strain WYEC 108 <i>Trichoderma asperellum</i> strain T34 <i>Trichoderma virens</i> strain G-41 <i>Clavibacter michiganensis</i> (spp <i>michiganensis</i>) bacteriophage <i>Typhyla phacorhiza</i> strain 94671 <i>Verticillium albo-atrum</i> isolate WCS850 </p>
Morpholines & Oxathiines	<p> Dimethomorph Dodemorph-acetate Fenpropimorph Oxycarboxin Carbathiin </p>



Chemical Group	Active Ingredient Name
Nitrobenzenes	Acifluorfen (present as sodium salt) Dichloran Fomesafen Tembotrione Mesotrione Oxyfluorfen Quintozene
Oils, mineral and vegetable	Oil of black pepper Citronella oil Castor oil Oil of geranium Garlic oil D-limonene Lemon oil Mineral oil – paraffin base (adjuvants) Mineral oil (insecticidal) Methylated seed oil of soybean Verbenone Pine oil Thymol Soybean oil Wintergreen oil
Organic Acids	Abamectin Acetic acid Acequinocyl Azadirachtin Citric acid Formic acid Gibberellic acid Gibberellins A4A7 Lactic acid Naphthylacetic acid Oxalic acid dihydrate Oxalic acid Peracetic acid Prohexadione calcium Natamycin Spinosad Spiromesifen Spinetoram Sodium monofluoroacetate Trinexapac-ethyl Ferric sodium EDTA
Organochlorines	5-chloro-2(2,4-dichlorophenoxy)phenol Chloropicrin Endosulfan Paradichlorobenzene
Organohalogens	1,2-dibromo-2,4-dicyanobutane Diodofon Methyl bromide Metrafenone



Chemical Group	Active Ingredient Name
Organometallics	Tributyltin oxide Fenbutatin oxide 10,10'-oxybis(phenoxarsine) Tri-n-butyltin maleate
Others	Acrolein 1-(alkyl-amino)-3-aminopropane hydrochloride (Component Of Ampho 443-31) 1-(alkyl-amino)-3-carboxymethylaminopropane (Component Of Ampho 443-31) Aromatics 2,2-oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane) Dried blood <i>Brassica hirta</i> white mustard seed powder Bis(trichloromethyl)sulfone Cellulose (from powdered corn cobs) Corn gluten meal Carbon dioxide gas Camphor oil Cornmint oil 3-methyl-2-cyclohexen-1-one Diallyl disulfide and related sulfides Dimethoxane Putrescent whole egg solids Dried eggs Endothal Ethofumesate Eucalyptus oil Fish meal mixture Fish oil mixture Garlic powder Garlic Oxirane derivatives (50% minimum) Liquid corn gluten Methylene bis(thiocyanate) 1-methylcyclopropene 2,2'-(1-methyltrimethylenedioxy)bis-(4-methyl-1,3,2-dioxaborinane) Methyl nonyl ketone Oriental mustard seed meal Meat meal mixture [[[1-methyl-2-(5-methyl-3-oxazolidinyl)ethoxy]methoxy]methoxy]methanol Piperonyl butoxide Extract of <i>Reynoutria sachalinensis</i> Sodium alpha-olefin sulfonate Saponins of <i>Chenopodium quinoa</i>
Phenols/Chlorophenols	2-bromo-4'-hydroxyacetophenone 2-phenylphenol 2-phenylphenol (present as sodium salt) Pentachlorophenol plus related active chlorophenols 3-methyl-4-chlorophenol (or: p-chloro-m-cresol) 4-chloro-3-methylphenol (sodium salt) Sodium 2-phenylphenate 4-nitro-3-(trifluoromethyl)phenol sodium salt P-tert amyl phenol



Chemical Group	Active Ingredient Name
Phenoxy Acids	<p>4-CPA Cloquintocet-mexyl Dichlorprop 2,4-DB Dichlorprop-P (present as dimethylamine salt) Dichlorprop-P Dichlorprop P-isomer (present as 2-ethyhexyl ester) 2,4-D (present as acid) 2,4-D (present as amine salts) 2,4-D (present as low volatile esters) MCPA (present as acid) MCPA (present as amine salts: diethanolamine, dimethylamine or mixed amines) MCPA (present as esters) MCPA (present as potassium salt or sodium salt) MCPB (present as sodium salt) MCPB (present as isomer specific) Mecoprop P-isomer (present as acid) Mecoprop-P (present as dimethylamine salt) Mecoprop-P (present as potassium salt) Mecoprop-P (present as amine salt) Triclopyr-butotyl</p>
Pheromones	<p>(E)-8-dodecen-1-yl acetate (E)-4-tridecenyl-acetate (E,Z)-2,13-octadecadien-1-yl acetate (E,Z)-2,13-octadecadien-1-ol German cockroach extract S-kinoprene Methoprene Octenol (Z)-8-dodecenyl acetate + (E)-8-dodecenyl acetate + (Z)-8-dodecen-1-ol (E,E)-8,10-dodecadien-1-ol + 1-dodecanol + 1-tetradecanol (Z)-9-dodecenyl acetate + (Z)-11-tetradecenyl acetate (E,Z)-3,13-octadecadienyl acetate (Z,Z)-3,13-octadecanienyl acetate R-(-)-1-octen-3-ol (E)-11-tetradecenyl acetate Muscalure (Z)-11-tetradecenal (Z)-11-tetradecen-1-ol (Z)-9-tetradecen-1-yl acetate 1-tetradecanol 1-dodecanol (E,E)-8,10-dodecadien-1-ol (Z)-8-dodecen-1-ol (Z)-8-dodecen-1-yl acetate (Z)-4-tridecenyl acetate (Z)-11-tetradecenyl acetate (Z,Z)-3,13-octadecadien-1-ol (E,Z)-11-tetradecenal (E)-4-tridecenyl acetate + (Z)-4-tridecenyl acetate</p>
Phosphates	<p>Dichlorvos plus related compounds Tetrachlorvinphos Naled</p>



Chemical Group	Active Ingredient Name
Phosphonic Acids, Phosphinic Acids	Ethephon Glufosinate ammonium Glyphosate present as isopropylamine and ethanolamine salt Glyphosate present as monoammonium or diammonium salt Glyphosate present as isopropylamine and potassium salt Glyphosate present as potassium salt Glyphosate Glyphosate present as trimethylsulfonium salt Glyphosate present as dimethylamine salt Fosamine ammonium Mono- and dibasic sodium, potassium, and ammonium phosphites
Phosphoramidothioates	Acephate Propetamphos
Phtalic Acids	Captan Chlorthal-dimethyl Folpet N-octyl bicycloheptene dicarboximide
Pyrethroids, Pyrethrins	D-cis, trans allethrin D-trans allethrin Bifenthrin Cyfluthrin Lambda-cyhalothrin Cypermethrin Cyphenothrin Deltamethrin Imiprothrin Etofenprox Tau-fluvalinate Tetramethrin Metofluthrin Prallethrin Permethrin D-phenothrin Pyrethrins Resmethrin Tefluthrin
Pyridines	4-aminopyridine Dithiopyr Di-n-propyl isocinchomeronate Acetamiprid Sodium omadine Pyriproxyfen Quinoxifen Thiacloprid Flonicamid



Chemical Group	Active Ingredient Name
Sulfonylureas	Chlorimuron-ethyl Chlorsulfuron Rimsulfuron Ethametsulfuron-methyl Flucarbazone (present as flucarbazone sodium) Foramsulfuron Iodosulfuron-methyl-sodium Mesosulfuron-methyl Metsulfuron-methyl Tribenuron-methyl Thifensulfuron-methyl Nicosulfuron Primisulfuron-methyl Prosulfuron Sulfometuron methyl Triflurosulfuron-methyl
Thiophosphates	Azamethiphos Coumaphos Diazinon Chlorpyrifos
Triazines, Tetrazines	Atrazine (plus related active triazines) Metribuzin Clofentezine Cyromazine Hexahydro-1,3,5-tris(2-hydroxyethyl)-s-triazine Indaziflam Prometryne plus related active triazines Pymetrozine Thiencarbazone-methyl Available chlorine, present as sodium dichloro-s-triazinetrione Simazine plus related active triazines Irgarol 1051 Available chlorine, present as trichloro-s-triazinetrione
Triazoles	Amitrole Ametoctradin Flusilazole Carfentrazone-ethyl Cloransulam-methyl Difenoconazole Fenbuconazole Flumetsulam Florasulam Metconazole Ipconazole Pyroxsulam Myclobutanil Paclobutrazol Propiconazole Prothioconazole Sulfentrazone Tebuconazole Triticonazole Uniconazole-P



Chemical Group	Active Ingredient Name
Urea Derivatives	Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins Available bromine present as 1-bromo-3-chloro-5,5-dimethylhydantoin and related hydantoins Cyazofamid Available chlorine present as 1-bromo-3-chloro-5,5-dimethylhydantoin, 1,3-dichloro-5,5-dimethylhydantoin, 1,3-dichloro-5-ethyl-5-methylhydantoin and related hydantoins Available chlorine present as 1,3-dichloro-5,5-dimethylhydantoin and 1,3-dichloro-5-ethyl-5-methylhydantoin 1,3-dichloro-5-ethyl-5-methylhydantoin Diflufenzopyr Diflufenzopyr (present as sodium salt) 5,5-dimethylhydantoin 1,3-bis(hydroxymethyl)-5,5-dimethylhydantoin Diuron Linuron 1- or 3-monomethylol-5,5-dimethylhydantoin



Appendix III Glossary

Active ingredient:	The ingredient of a pesticide that actually controls the targeted pest.
Adjuvant:	Any substance that is added to a spray tank (separate from the pesticide formulation) that will improve the performance of the pesticide.
Agricultural sector:	Commercial pesticides applied to farms involved in the production of raw agricultural commodities, such as food, fibre and tobacco, excluding non-crop and post-harvest applications.
Antimicrobial:	A pest control product that intends to control microorganisms and fouling organisms on/in inanimate objects, industrial processes and systems, surfaces, water and air.
Biopesticide:	Microbial pesticides (contain a bacterium, fungus, virus, protozoan, or alga as the active ingredient), pheromones and other semiochemical pesticides, and other non-conventional (formerly biochemical) pesticides.
Colony forming unit:	A measure of viable bacterial or fungal numbers.
Commercial product:	A product that is used in commercial activities, such as farming and other industrial processes.
Device:	An instrument or apparatus that generates or applies a pest control product.
Domestic product:	A product that is used in or around the house by the public.
End-use product:	A product containing active ingredient(s) and usually formulant(s) that is labelled with instructions for direct pest control use or application.
Fungicide:	Pesticides used to kill or inhibit fungi or fungal spores.
Herbicide:	Pesticides used to kill or inhibit weeds.
Insecticide:	Pesticides used to kill or inhibit insects.
Insect repellent:	Pesticides used to repel insects.
Manufacturing concentrate:	A product containing a registered technical grade of active ingredient(s) and formulant(s) intended for further reformulating and/or repackaging into end-use products.
Non-agricultural sector:	Commercial pesticides that are not applied to farms involved in the production of raw agricultural commodities.
Pest control product or Pesticide:	Any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest.
Product type:	Pesticide products can be grouped by their main target pest, into herbicide, insecticide, fungicide, antimicrobial, vertebrate control and "other".
Registrant:	A company that holds the registration of a pesticide with the PMRA.
Technical grade active ingredient:	Contains the active ingredient and normally contains impurities that are by-products of the manufacturing process.
Vertebrate control:	A product used to control vertebrates.
Water treatment:	Products to control microorganisms in swimming pools and industrial process waters (such as paper mill whitewater, wastewater systems and cooling water).
Wood preservative:	Antimicrobials applied to wood to control wood-destroying organisms and increase the service life of wood.