



**Ministry of Environment  
and Food of Denmark**

Environmental  
Protection Agency

# Control of Pesticides and Biocides 2015

The Analytical Chemical Control of  
Pesticides and Biocides on the Danish  
Market

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# Preface

33 different types of products, covered by the pesticide and biocide regulation, were included in the Danish authority control in 2015. In this report, pesticides are defined as plant protection products (PPP).

All collected products were examined for content of one or more active substances according to the declared content and the specification of the product given by the authorisation holder. The density of all liquid products was investigated.

One parallel product and the related original product were screened by GC-MS and FTIR to investigate if there were any differences.

For the 2015 programme, 1 tested product (1 pesticide) did not comply with the tolerance limits defined by the Danish Statutory Order on pesticides No. 151 of 18 February 2014 incl. revisions, and in Regulation 1107/2009 concerning marketing of plant protection products.<sup>1,2,3</sup>

# Sammenfatning og konklusion

Denne rapport beskriver den analytisk kemiske kontrol af biocid- og pesticidprodukter på det danske marked, der er udført af Miljøstyrelsens Kemikalieinspektion i 2015.<sup>4,5,6</sup>

33 produkter fra udvalgte typer af bekæmpelsesmidler er blevet indsamlet og analyseret for at verificere, om indholdet af de respektive aktivstoffer er i overensstemmelse med produktspecifikationen og det deklarerede indhold.

33 forskellige produkter er inkluderet i den analytisk kemiske kontrol, der blev udført af myndighederne i 2015:

- 7 insekticider (pesticider) indeholdende indoxacarb, flonicamid, acetamiprid, fenpyroximat, hexythiazox og spinosad.
- 4 insekticider (biocider) indeholdende spinosad
- 2 herbicider indeholdende pendimethalin, picolinafen og eddikesyre
- 4 rodenticider (biocider) indeholdende flocoumafen og alpha chloralose
- 2 rodenticider (pesticider) indeholdende aluminium phosphid
- 14 fungicider (pesticider) indeholdende metrafenon, epoxiconazol, metconazol, pyraclostrobin, boscalid, folpet, mepanipyrim og dodin.

TABLE 1  
OVERSIGT OVER ANTAL ANALYSEREDE PRODUKTER OG KONKLUSION

Aktivstof	Antal analyserede produkter	Antal inden for tolerance	Antal uden for tolerance
Acetamiprid	1	1	0
Eddikesyre	1	1	0
Alpha chloralose	2	2	0
Aluminium phosphid	2	2	0
Boscalid & epoxiconazol	1	1	0
Boscalid, epoxiconazol & pyraclostrobin	1	1	0
Dodin	1	1	0
Epoxiconazol	3	3	0
Epoxiconazol & pyraclostrobin	1	1	0
Epoxiconazol & metconazol	2	2	0
Fenpyroximat	1	1	0

Aktivstof	Antal analyserede produkter	Antal inden for tolerance	Antal uden for tolerance
Flocoumafen	2	2	0
Flonicamid	1	1	0
Folpet	1	1	0
Hexythiazox	1	1	0
Indoxacarb	2	1	1
Mepanipyrim	1	1	0
Metrafenon	2	2	0
Metrafenone & epoxiconazol	1	1	0
Pendimethalin & picolinafen	1	1	0
Spinosad	5	5	0
Total	33	32	1

Grænsen for en accepteret afvigelse i indholdet af et aktivstof i forhold til det deklarerede indhold og produktspecifikationen er fastsat i bekendtgørelsen om bekæmpelsesmidler Nr. 151 af 18. februar 2014 inkl. revisioner og i forordning 1107/2009 om markedsføring af plantebeskyttelsesmidler.<sup>1,2,3</sup>

Det målte indhold af aktivstoffer er ikke i overensstemmelse med det deklarerede indhold i 1 produkt, og overholder således ikke gældende dansk lovgivning, idet der ikke er overlap mellem interval for analyseresultat og tolerance. Det var angivet, at produktet havde en holdbarhed på mindst to år, hvilket var overskredet.

Det målte indhold af aktivstoffer er i overensstemmelse med det deklarerede indhold i 32 produkter, og overholder således gældende dansk lovgivning, idet der er overlap mellem interval for analyseresultat og tolerance.

Densitet blev målt på alle flydende produkter. Der blev foretaget screeninger af et parallel-produkt og det tilhørende originalprodukt for at undersøge, om der var forskel på indhold af urenheder eller andre formuleringsingredienser.

# Summary and Conclusion

This report describes the analytical chemical control of pesticide and biocide products on the Danish market that was carried out by the Danish Environmental Protection Agency (Danish EPA), Chemical Inspection Service, in 2015. <sup>4,5,6</sup>

33 products from selected types of pesticides and biocides were collected and analysed to verify whether or not the content of the active substances in the products in question complies with the product specification and the declared content.

33 different products are covered by the analytical chemical control that was carried out by the authorities in 2015:

- 7 insecticide (Pesticide) containing Indoxacarb, Flonicamid, Acetamiprid, Fenpyroximate, Hexythiazox and Spinosad
- 4 insecticides (Biocides) containing Spinosad
- 2 herbicides containing Pendimethalin, Picolinafen and Acetic acid
- 4 rodenticides (Biocides) containing Flocoumafen and Alpha Chloralose
- 2 rodenticides (Pesticides) containing Aluminium Phosphide
- 14 fungicides (Pesticides) containing Metrafenone, Epoxiconazole, Metconazole, Pyraclostrobin, Boscalid, Folpet, Mepanipyrin and Dodine

**TABLE 1**  
OUTLINE OF TOTAL NUMBER OF ANALYSED PRODUCTS AND CONCLUSION

Active substance	Number of analysed products	Number of products comply	Number of products non-comply
Acetamiprid	1	1	0
Acetic acid	1	1	0
Alpha Chloralose	2	2	0
Aluminium Phosphide	2	2	0
Boscalid & Epoxiconazole	1	1	0
Boscalid, Epoxiconazole & Pyraclostrobin	1	1	0
Dodine	1	1	0
Epoxiconazole	3	3	0
Epoxiconazole & Pyraclostrobin	1	1	0



Active substance	Number of analysed products	Number of products comply	Number of products non-comply
Epoxiconazole & Metconazole	2	2	0
Fenpyoximate	1	1	0
Flocoumafen	2	2	0
Flonicamid	1	1	0
Folpet	1	1	0
Hexythiazox	1	1	0
Indoxacarb	2	1	1
Mepanipyrim	1	1	1
Metrafenone	2	2	0
Metrafenone & Epoxiconazole	1	1	0
Pendimethalin & Picolinafen	1	1	0
Spinosad	5	5	0
Total	33	32	1

The tolerance of an accepted deviation in the content of an active substance compared to the declared content and product specification is determined in the Danish Statutory Order on pesticides No. 151 of 18 February 2014 incl. revisions, and in Regulation 1107/2009 concerning Marketing of Plant Protection Products.<sup>1,2,3</sup>

The measured content of active substance did not comply with the declared content for 1 product and is therefore not in compliance with applicable Danish law, as there is no overlap between the range of analysis results and tolerance. It was indicated that the product had a shelf life of at least two years, and that number of years had been exceeded.

The measured content of active substances complies with the declared content for 32 products and is in compliance with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

The density of all liquid products was measured. Screenings were carried out of all parallel products including the original product to investigate if there was a difference in the content of impurities or other formulation ingredients.

# 1. Control campaigns in 2015

## 1.1 Selected active substances

The control campaigns conducted in 2015 covered 20 active substances in pesticides. Overall, pesticides are divided into two types: plant protection products (PPP) and biocides (non-agricultural pesticides).

A summary of the selected active substances is given in following table:

**TABLE 2**  
OUTLINE OF SELECTED ACTIVE SUBSTANCES IN CONTROL CAMPAIGNS IN 2015

Type	Active substance	CAS no.	Area of application
Biocides	Alpha Chloralose	15879-93-3	Rodenticide
	Flocoumafen	90035-08-8	Rodenticide
	Spinosad	168316-95-8	Insecticide
Pesticides	Acetamiprid	135410-20-7	Insecticide
	Acetic acid	64-19-7	Herbicide
	Aluminium phosphide	20859-73-8	Rodenticide
	Boscalid	188425-85-6	Fungicide
	Dodine	2439-10-3	Fungicide
	Epoxiconazole	133855-98-8	Fungicide
	Fenpyoximate	134098-61-6	Insecticide
	Flonicamid	158062-67-0	Insecticide
	Folpet	133-07-3	Fungicide
	Hexythiazox	78587-05-0	Insecticide
	Indoxacarb	144171-61-9	Insecticide
	Mepanipyrim	110235-47-7	Fungicide
	Metconazole	125116-23-6	Fungicide
	Metrafenone	220899-03-6	Fungicide
	Pendimethalin	40487-42-1	Herbicide
	Picolinafen	137641-05-5	Herbicide
	Pyraclostrobin	175013-18-0	Fungicide
Spinosad	131929-60-7, 168316-95-8	Insecticide	

## 1.2 Collecting products

Product samples of the various pesticide and biocide formulations from different manufacturers, covered in the 2015 control campaigns, were collected by the Chemical Inspection Service of the Danish Environmental Protection Agency during the period from March to April 2015. The product samples were collected either from wholesale dealers/importers or at retailer outlets.

The collected product samples were stored at Danish Technological Institute (DTI)<sup>7</sup> in the original packaging until the chemical analyses were initiated. The product samples were stored at ambient temperature and protected from light during the entire storage period.

## 1.3 Tolerance for active substances

The objective of the Danish EPA was to examine the content of active substances in the products, and to compare the result of the chemical analysis with the content according to the specification of the products and the declared content on the label supplied by the authorisation holder.

The Danish Statutory Order on pesticides No. 151 of 18 February 2014 incl. revisions, and the Regulation 1107/2009 concerning Marketing of Plant Protection Products specify the general tolerance of deviation from the declared content.<sup>1,2,3</sup> These tolerances are listed in Table 3.

TABLE 3  
THE TOLERANCE OF DEVIATION FROM THE DECLARED CONTENT OF ACTIVE SUBSTANCES 2015

Content of active substances in g/kg or g/L at 20°C	Tolerance of deviation
Up to 25	± 15% homogeneous formulation ± 25% non-homogeneous formulation
More than 25 up to 100	± 10%
More than 100 up to 250	± 6%
More than 250 up to 500	± 5%
More than 500	± 25 g/kg or ± 25 g/L

## 1.4 Chemical analysis 2015

The analyses of the products for the active substances were performed by Danish Technological Institute, Laboratory for Chemistry and Microbiology. DTI is a self-owned and not-for-profit institute.<sup>7</sup>

The Laboratory for Chemistry and Microbiology is accredited by DANAK (Danish Accreditation and Metrology Fund), registration no. 90, according to DS/EN ISO/IEC 17025.<sup>8</sup> The laboratory is accredited for a flexible scope regarding parameters, performance of the method and test methods within parts of the scope.

### 1.4.1 Analysing active substances

If the sample amount was sufficient, the chemical analyses were as far as possible performed as eight freshly prepared samples of each product. The analyses were distributed over two days (four samples each day), typically within the same week. The mean value of the eight analyses and the SD (standard deviation) were calculated for each day and for all eight results.

Validation of the applied analytical method was carried out. The method was validated with regard to linearity, specificity, accuracy and control tests at two levels spread over 2 days. Recovery was determined by adding a known amount of the relevant active substance to each product.

As far as possible, the expanded uncertainty (k=2) of each product was calculated on the basis of the spread of the results of the analyses and the spread of the three density measurements (only included if the product was liquid). The bias was calculated on the basis of the recovery determination. The expanded analysis uncertainty is used to determine a 95% confidence interval for the analysis result.

The results  $\pm$  the expanded uncertainty were compared with the tolerance of deviation calculated from the declared content of active substances.

#### **1.4.2 Analysing density**

The density of liquid products was determined in triplicate by measuring with a density meter (Densito 30 PX). The mean value and the SD were calculated.

The result in % (w/w) has been converted to g/L by using the measured density:

$$\text{Result (g/L)} = \text{Result (\% (w/w))} \times \text{density (kg/L)} \times 10$$

#### **1.4.3 Screenings**

Screenings were carried out of selected products by gas chromatography with mass spectrometric detection (GC-MS) and Fourier transform infrared spectroscopy (FTIR).

## 2. Biocides

The objective of the active substances, contained in the biocidal products, is to protect humans, animals, materials or articles against harmful organisms such as pests or bacteria.

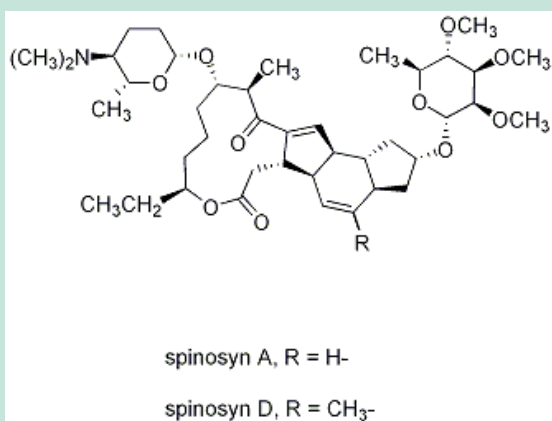
For the Danish 2015 Pesticide Control Campaign, 8 biocides were selected: insecticides and rodenticides. The selected active substances were Spinosad, Flocoumafen and Alpha Chloralose.

### 2.1 Insecticides (Biocides)

Four insecticides containing Spinosad as active substance were selected for the 2015 control campaign.

#### 2.1.1 Spinosad

Spinosad is an insecticide used in Denmark for flies, larvae and ant control. Chemically, it belongs to the spinosyns (macrocyclic lactones) and is a racemic mix of two spinosoids, Spinosyn A and Spinosyn D. Spinosad acts by targeting nicotinic acetylcholine receptors in the insect nervous system, leading to disruption of acetylcholine neurotransmission, and thereby killing the insects via hyperexcitation of the insect nervous system. Spinosad is active by dermal contact and ingestion.<sup>9,10</sup> Products with Spinosad were previously selected in 2011 by the Danish EPA for control of content of active substances.



**FIGURE 1**  
MOLECULAR STRUCTURE OF SPINOSAD<sup>9,10</sup> CAS NO. 131929-60-7 (SPINOSYN A), 131929-63-0 (SPINOSYN D), 168316-95-8 (RACEMIC MIXTURE)<sup>9,10</sup>

#### 2.1.2 Analysis

Spinosad was analysed by reversed high-performance phase liquid chromatography combined with diode array detection (HPLC-DAD). Samples were dissolved in methanol by ultra-sonication before analysis. The method is a modified HPLC method according to CIPAC method no. 636 (CIPAC /4511).<sup>11</sup>

Details concerning the implementation of the analyses and the calculation of the result and expanded analysis uncertainty are described in chapter 1.4. The method is accredited for products in liquid form, but not for canned products.

### 2.1.3 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product.  $U_E$  is the calculated expanded measurement uncertainty described in section 1.4.1.

TABLE 4  
ANALYSIS RESULTS OF INSECTICIDES (BIOCIDES), g/L

DTI sample no.	Active substance	Label claim g/L	Tolerance interval	Analysis result g/L	RSD %	$U_E$ g/L	Analysis interval	Comply/Non-comply
644986-7	Spinosad	0.15	0.13-0.17	0.17	9.6	0.03	0.14-0.20	Comply
644986-8	Spinosad	0.15	0.13-0.17	0.18	9.6	0.01	0.17-0.19	Comply

TABLE 5  
ANALYSIS RESULTS OF INSECTICIDES (BIOCIDES), g/CAN

DTI sample no.	Active substance	Label claim g/can	Tolerance interval	Analysis result g/can	RSD %	$U_E$ g	Analysis interval	Comply/Non-comply
644986-9	Spinosad	0.00168	0.00143-0.00193	0.00148	4.3	0.00015	0.00133-0.00163	Comply
644986-21	Spinosad	0.004	0.0034-0.0044	0.0034	9.6	0.00097	0.0024-0.0044	Comply

### 2.1.4 Conclusion

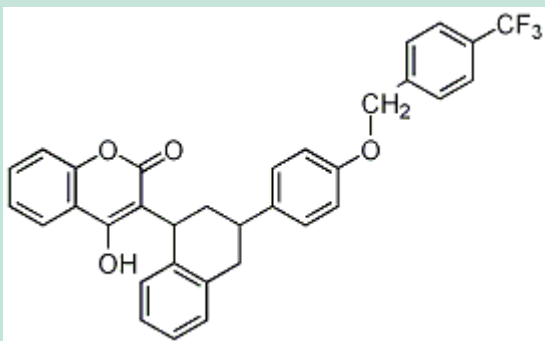
The measured content of Spinosad complies with the declared content for the 4 products and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

## 2.2 Rodenticides (Biocides)

Four rodenticides containing Flocoumafen and Alpha Chloralose as active substances were selected for the 2015 control campaign.

### 2.2.1 Flocoumafen

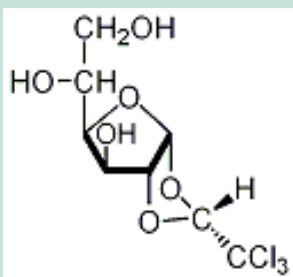
Flocoumafen is a rodenticide used in Denmark for control of rats and mice. Chemically, it belongs to the group of hydroxycoumarines and is a second-generation indirect anticoagulant. Flocoumafen inhibits the metabolism of Vitamin K, and thereby depletes vitamin K-dependent clotting factors in plasma. <sup>9,10</sup> Products with Flocoumafen were previously selected in 1994 and 2013 by the Danish EPA for control of content of active substances.



**FIGURE 2**  
MOLECULAR STRUCTURE OF FLOCOUMAFEN, CAS NO. 90035-08-8<sup>9,10</sup>

### 2.2.2 Alpha Chloralose

Alpha Chloralose is a rodenticide used in Denmark for control of mice. Alpha Chloralose is an anaesthetic compound and acts by retardation of metabolism and lowering of body temperature to a fatal level. The compound is rapidly metabolised and hence non-cumulative.<sup>9,10</sup> Products with Alpha Chloralose have not previously been selected by the Danish EPA for control of content of active substances.



**FIGURE 3**  
MOLECULAR STRUCTURE OF ALPHA CHLORALOSE, CAS NO. 15879-93-3<sup>9,10</sup>

### 2.2.3 Analysis

Flocoumafen and Alpha Chloralose were analysed by reverse phase high-performance liquid chromatography combined with diode array detection (HPLC-DAD). Samples were dissolved in an extraction solution of acetonitrile, water and acetic acid, and they were shaken with heptane. The extraction solution was analysed. The method is a modified HPLC method according to CIPAC-method no. 370.<sup>11</sup>

Details concerning the implementation of the analyses and the calculation of the result and expanded analysis uncertainty are described in chapter 1.4.

The method for analysis of Flocoumafen is accredited.

#### 2.2.4 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product.  $U_E$  is the calculated expanded measurement uncertainty described in section 1.4.1.

TABLE 6  
ANALYSIS RESULTS OF RODENTICIDES (BIOCIDES)

DTI sample no.	Active substance	Label claim g/kg	Tolerance interval	Analysis result g/kg	RSD %	$U_E$ g/kg	Analysis interval	Comply /Non-comply
644986-22	Flocoumafen	0.05	0.038-0.063	0.055	1.8	0.003	0.052-0.058	Comply
644986-30	Flocoumafen	0.05	0.038-0.063	0.045	4.9	0.006	0.039-0.051	Comply
644986-31	Alpha Chloralose	40	36-44	45.3	8	11.7	34-57	Comply
644986-32	Alpha Chloralose	40	36-44	42.7	3.4	14.4	28-57	Comply

#### 2.2.5 Conclusion

The measured content of Flocoumafen and Alpha Chloralose in the 4 products complies with the declared content and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.



# 3. Pesticides

In this report, pesticides are defined as plant protection products (PPP).

In the 2015 Danish Pesticide Control Campaign, 25 pesticide products were selected: herbicides, fungicides, insecticides and rodenticides. The active substances in the selected pesticide products were Aluminium Phosphide, Pendimethalin, Picolinafen, Acetic acid, Metrafenone, Epoxiconazole, Metconazole, Boscalid, Pyraclostrobin, Mepanipyrim, Folpet, Dodine, Indoxacarb, Fonicamid, Acetamidrid, Fenpyroximate, Hexythiazox and Spinosad.

## 3.1 Herbicides (Pesticides)

Two herbicides containing Pendimethalin, Picolinafen and Acetic acid as active substances were selected for the 2015 control campaign.

### 3.1.1 Pendimethalin

Pendimethalin is a herbicide used in Denmark for weed control in cereals, corn, grass, vegetables and bulbs. Chemically, it belongs to the group of dinitroanilines, and acts by inhibiting cell division through microtubule assembly inhibition. Pendimethalin is a selective herbicide, absorbed by the roots and leaves.<sup>9,10</sup> Products with Pendimethalin were previously selected in 2001 and 2013 by the Danish EPA for control of content of active substances.

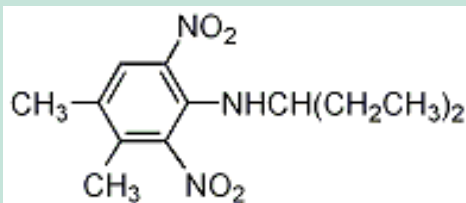


FIGURE 4  
MOLECULAR STRUCTURE OF PENDIMETHALIN, CAS NO. 40487-42-1<sup>9,10</sup>

### 3.1.2 Picolinafen

Picolinafen is a herbicide used in Denmark for weed control in winter cereals. Chemically, it belongs to the pyridine carboxamides, and acts by inhibition of phytoene desaturase, leading to blocking of carotenoid biosynthesis. Picolinafen is a selective herbicide with rapid foliar uptake in susceptible species.<sup>9,10</sup> Products with Picolinafen have not previously been selected by the Danish EPA for control of content of active substances.

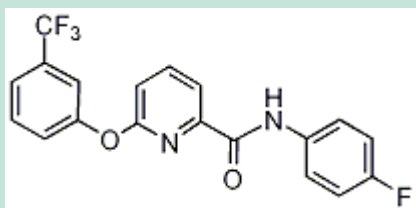


FIGURE 5  
MOLECULAR STRUCTURE OF PICOLINAFEN, CAS NO. 137641-05-5<sup>9,10</sup>

### 3.1.3 Acetic acid

Acetic acid is a herbicide used in Denmark for weed control on parking lots, roads, pavements, patios, etc. Chemically, it belongs to the carboxylic acids. Acetic acid is a non-selective herbicide and acts by dissolution of cell membrane resulting in the desiccation of foliar tissues.<sup>12</sup> Products with acetic acid have not previously been selected by the Danish EPA for control of content of active substances.

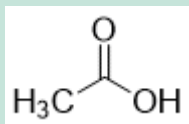


FIGURE 6  
MOLECULAR STRUCTURE OF ACETIC ACID, CAS NO. 64-19-7

### 3.1.4 Analysis

Pendimethalin and Picolinafen were analysed by reversed phase high-performance liquid chromatography combined with diode array detection (HPLC-DAD). All samples were dissolved in acetonitrile by ultra-sonification before the analysis. The method is a modified HPLC method according to AOAC-CIPAC 2007, 357.<sup>11</sup>

Acetic acid was analysed by a potentiometric acid/base-titration with a sodium hydroxide solution according to the Danish Standard DS 235:1978.<sup>13</sup>

Details concerning the implementation of the analyses and calculation of the result and expanded analysis uncertainty are described in chapter 1.4.

The method for determination of Pendimethalin and Picolinafen is accredited.

### 3.1.5 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product. U<sub>E</sub> is the calculated expanded measurement uncertainty described in section 1.4.1.

**TABLE 7**  
ANALYSIS RESULTS OF HERBICIDES (PESTICIDES)

DTI sample no.	Active substance	Label claim g/L	Tolerance interval	Analysis result g/L	RSD %	U <sub>E</sub> g/L	Analysis interval	Comply /Non-comply
644986-10	Pendimethalin	320	304-336	312	0.99	18	294-330	Comply
	Picolinafen	16	13.6-18.4	16.6	2.1	0.8	16-17	Comply
644986-33	Acetic acid	60	54 - 66	58.0	0.24	1.7	56-60	Comply

### 3.1.6 Conclusion

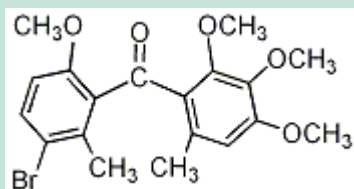
The measured content of Pendimethalin, Picolinafen and acetic acid for 2 products complies with the declared content and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

## 3.2 Fungicides (Pesticides)

Fourteen fungicides containing Metrafenone, Epoxiconazole, Metconazole, Boscalid, Pyraclostrobin, Mepanipyrim, Folpet, and Dodine as active substances were selected for the Danish Pesticide Control Campaign in 2015.

### 3.2.1 Metrafenone

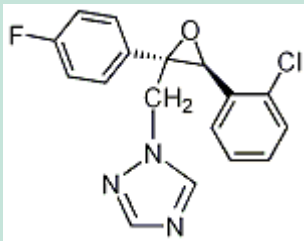
Metrafenone is a fungicide used in Denmark for control of fungal diseases in cereal and grass. Chemically, it belongs to the benzophenones. Metrafenone has preventive, curative and anti-sporulant activity and acts on both germ tubes and hyphal growth.<sup>9,10</sup> Products with Metrafenone have not previously been selected by the Danish EPA for control of content of active substances.



**FIGURE 7**  
MOLECULAR STRUCTURE OF METRAFENONE, CAS NO. 220899-03-6<sup>9,10</sup>

### 3.2.2 Epoxiconazole

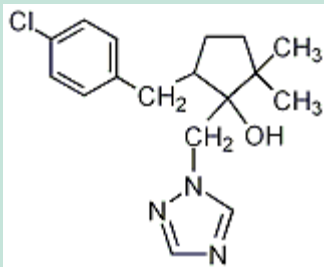
Epoxiconazole is a fungicide used in Denmark for control of fungal diseases in cereals, grass seed, corn and beets. Chemically, it belongs to the triazoles. Epoxiconazole has preventive and curative properties and acts by inhibiting C-14-demethylase in sterol biosynthesis.<sup>9,10</sup> Products with Epoxiconazole were previously selected in 2007 and 2014 by the Danish EPA for control of content of active substances.



**FIGURE 8**  
MOLECULAR STRUCTURE OF EPOXICONAZOLE, CAS NO. 133855-98-8<sup>9,10</sup>

### 3.2.3 Metconazole

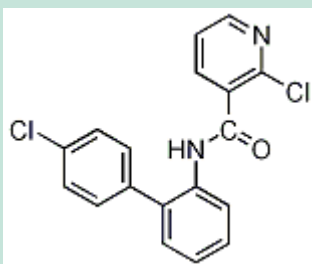
Metconazole is a fungicide used in Denmark to control fungal diseases in crop, e.g., rape, wheat, barley and rye. Chemically, it belongs to the group of triazoles. Metconazole is a systemic fungicide that acts by inhibiting ergosterol biosynthesis. Metconazole is applied post emergence, exhibits penetrant, local and acropetal systemicity and inhibits ergosterol biosynthesis by preventing sterole demethylation.<sup>9,10</sup> Products containing Metconazole were previously selected in 2014 by the Danish EPA for control of content of active substances.



**FIGURE 9**  
MOLECULAR STRUCTURE OF METCONAZOL, CAS NO. 125116-23-6<sup>9,10</sup>

### 3.2.4 Boscalid

Boscalid is a fungicide used in Denmark to control fungal diseases in cereals, rape, berries, vegetables and seed grass. Chemically, it belongs to the group of pyridine carboxamides, and it acts by inhibiting succinate ubiquinone reductase in the mitochondrial electron transport chain. Boscalid has preventive and, in some cases, curative action. It inhibits spore germination, germ tube elongation and is effective on all other stages of fungal development.<sup>9,10</sup> Products containing Boscalid were previously selected in 2007 by the Danish EPA for control of content of active substances.



**FIGURE 10**  
MOLECULAR STRUCTURE OF BOSCALID, CAS NO. 188425-85-6<sup>9,10</sup>

### 3.2.5 Pyraclostrobin

Pyraclostrobin is a fungicide used in Denmark to control fungal diseases in, e.g., vegetables, berries, corn, seed grass, beets and cereals. Chemically, it belongs to the group of methoxycarbamates. Pyraclostrobin is a Quinone outside Inhibitor. It inhibits mitochondrial respiration by blocking electron transfer at the cytochrome bc1 complex. Pyraclostrobin is a fungicide with protectant, curative and translaminar properties.<sup>9,10</sup> Products with Pyraclostrobin were previously selected in 2005 and 2012 by the Danish EPA for control of content of active substances.

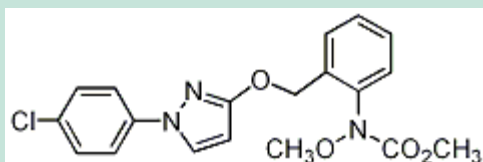


FIGURE 11  
MOLECULAR STRUCTURE OF PYRACLOSTROBIN, CAS NO. 175013-18-0<sup>9,10</sup>

### 3.2.6 Mepanipyrim

Mepanipyrim is a fungicide used in Denmark to control grey mould in strawberry. Chemically, it belongs to the anilinoimidopyrimidines and it may act as an inhibitor of methionine biosynthesis, leading to inhibition of secretion of pathogen proteins such as the cell-wall degrading enzyme pectinase. It also inhibits the pathogens uptake Amino acids and glucose. Mepanipyrim is a non-systemic fungicide with preventive action and inhibits penetration of pathogen into the host plant, germ tube elongation and the formation of appressorium.<sup>9,10</sup> Products with Mepanipyrim have not previously been selected by the Danish EPA for control of content of active substances.

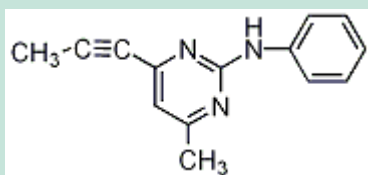
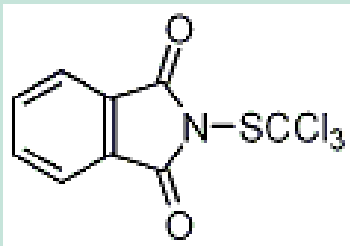


FIGURE 12  
MOLECULAR STRUCTURE OF MEPANIPYRIM, CAS NO. 110235-47-7<sup>9,10</sup>

### 3.2.7 Folpet

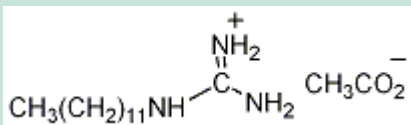
Folpet is a fungicide used in Denmark to control fungal diseases in wheat, triticale and barley. Chemically, it belongs to the phthalimides. Folpet is a non-specific thiol reactant and inhibits respiration.<sup>9,10</sup> Products with Folpet have not previously been selected by the Danish EPA for control of content of active substances.



**FIGURE 13**  
MOLECULAR STRUCTURE OF FOLPET, CAS NO. 133-07-3<sup>9,10</sup>

### 3.2.8 Dodine

Dodine is a fungicide used in Denmark to control fungal diseases in apples, pears and cherries. Chemically, it belongs to the guanidines. Dodine is a local systemic foliar fungicide with protective and some curative action.<sup>9,10</sup> Products with Dodine have not previously been selected by the Danish EPA for control of content of active substances.



**FIGURE 14**  
MOLECULAR STRUCTURE OF DODINE, CAS NO. 2439-10-3<sup>9,10</sup>

### 3.2.9 Analysis

Boscalid, Epoxiconazole, Metconazole, Metrafenone and Pyraclostrobin were analysed by reversed phase high-performance liquid chromatography combined with diode array detection, HPLC-DAD. All samples were dissolved in acetonitrile by ultra-sonication before the analysis. The method is a modified HPLC method according to CIPAC-method Pyraclostrobin 657.<sup>11</sup>

Mepanipyrim was analysed by reversed phase high-performance liquid chromatography combined with diode array detection, HPLC-DAD. All samples were dissolved in a solution of acetonitrile and milliQ water by ultra-sonication before the analysis.

Folpet was analysed by reversed phase high-performance liquid chromatography combined with diode array detection, HPLC-DAD. Samples were dissolved in acetonitrile by ultra-sonication before the analysis. The method is a modified HPLC method according to CIPAC method Pendimethalin 357.<sup>11</sup>

Dodine was analysed according to CIPAC method no. 101, by colorimetric acid-base-titration with perchloric acid and metanil yellow as indicator.<sup>11</sup>

Details concerning the implementation of the analyses, the calculation of the result and expanded analysis uncertainty are described in chapter 1.4.

The methods for Boscalid, Epoxiconazole, Metconazole, Metrafenone, Pyraclostrobin, Mepanipyrim and Folpet are accredited.

### 3.2.10 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product.  $U_E$  is the calculated expanded measurement uncertainty described in section 1.4.1.

**TABLE 8**  
ANALYSIS RESULTS OF FUNGICIDES (PESTICIDES)

DTI sample no.	Active substance	Label claim g/L	Tolerance interval	Analysis result g/L	RSD %	$U_E$ g/L	Analysis interval	Comply/ Non-comply
644986-1	Metrafenone	100	90 - 110	100	1.4	4.2	96 - 104	Comply
	Epoxiconazole	83	74.7 - 91.3	83.9	2.2	4.8	79 - 89	Comply
644986-2	Boscalid	233	219 - 247	239	1.2	7.3	232 - 246	Comply
	Epoxiconazole	67	60.3 - 73.7	67.9	1.3	2.7	65 - 71	Comply
644986-3	Boscalid,	140	132-148	141	0.9	4.2	138 - 146	Comply
	Epoxiconazole	50	45-55	51.9	1.1	2.1	50 - 54	Comply
	Pyraclostrobin	60	54-66	61.4	3.2	8.7	53 - 70	Comply
644986-4	Metrafenone	300	285 - 315	287	1.3	12	275 - 299	Comply
644986-6	Epoxiconazole	125	118 - 133	121	3.5	9.4	111 - 130	Comply
644986-11	Epoxiconazole	125	118 - 133	121	3.5	9.6	112 - 131	Comply
644986-12	Epoxiconazole	50	45 - 55	49.4	1.9	2.6	47 - 52	Comply
	Pyraclostrobin	133	125 - 141	140	2.2	7.4	133 - 148	Comply
644986-19	Metrafenone	300	285 - 315	282	2.1	15	268 - 297	Comply
644986-23	Epoxiconazole	56.3	50.6 - 61.9	58.0	0.7	2.9	55.1 - 60.9	Comply
	Metconazole	41.4	37.2 - 45.5	36.9	1.9	2.1	34.8 - 39.0	Comply
644986-25	Epoxiconazole	37.5	33.8 - 41.3	39.3	0.7	1.8	37.5 - 41.1	Comply
	Metconazole	27.5	24.8 - 30.3	25.2	1.9	1.7	23.5 - 26.9	Comply
644986-26	Folpet	500	475 - 525	493	4.7	23	470 - 516	Comply
644986-27	Epoxiconazole	125	118 - 133	125	3.3	17	108 - 142	Comply

644986-28	Mepanipyrim	440	418-462	457	1.0	48	410-505	Comply
644986-29	Dodine	544	519 - 569	539	1.3	27	512 - 566	Comply

### 3.2.11 Conclusion

The measured content of Metrafenone, Epoxiconazole, Metconazole, Boscalid, Pyraclostrobin, Mepanipyrim, Folpet and Dodine complies with the declared content and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

## 3.3 Insecticides (Pesticides)

Seven insecticides containing Indoxacarb, Flonicamid, Acetamiprid, Fenpyroximate, Hexythiazox, and Spinosad as active substances were selected for the 2015 control campaign.

### 3.3.1 Indoxacarb

Indoxacarb is an insecticide used in Denmark for pest control in fruit, vegetable and rapeseed. Chemically, it belongs to the oxadiazines, and it acts as a sodium channel blocker in insect nerve cells. Indoxacarb is active by contact and ingestion.<sup>9,10</sup> Products with Indoxacarb have not previously been selected by the Danish EPA for control of content of active substances.

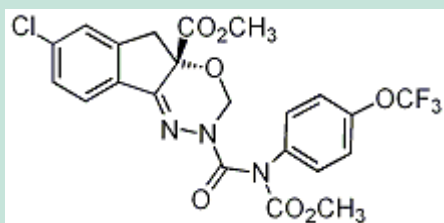


FIGURE 15  
MOLECULAR STRUCTURE OF INDOXACARB, CAS NO. 144171-61-9<sup>9,10</sup>

### 3.3.2 Flonicamid

Flonicamid is an insecticide used in Denmark to control insects in wheat, potatoes, apples and pears. Chemically, it is a pyridine carboxamide. The mode of action is not known, but Flonicamid has systemic and translaminar activity and inhibits feeding.<sup>9,10</sup> Products with Flonicamid have not previously been selected by the Danish EPA for control of content of active substances.

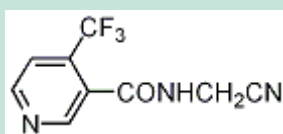


FIGURE 16  
MOLECULAR STRUCTURE OF FLONICAMID, CAS NO. 158062-67-0<sup>9,10</sup>

### 3.3.3 Acetamiprid

Acetamiprid is an insecticide used in Denmark for control of pests in, e.g., ornamental plants, apples, cherries, potatoes and lettuce. Chemically it belongs to the neonicotinoids and it acts as an agonist of the nicotinic acetylcholine receptor. Acetamiprid is a systemic insecticide with translaminar activity and with contact and stomach action. It effects the synapses in the insect central nervous system.<sup>9,10</sup> Products with Acetamiprid have not previously been selected by the Danish EPA for control of content of active substances.



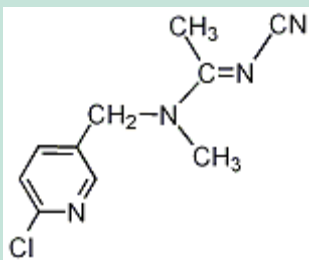


FIGURE 17  
MOLECULAR STRUCTURE OF ACETAMIPRID, CAS NO. 135410-20-7<sup>9,10</sup>

### 3.3.4 Fenpyroximate

Fenpyroximate is an insecticide used in Denmark for control of spider mites in strawberry plants and ornamental plants. Chemically, it belongs to the pyrazoles and acts as an inhibitor of mitochondrial electron transport at Complex I. Fenpyroximate is an acaricide and has activity against larvae, nymphs and adults, mainly by contact and ingestion. The compound also has some moulting inhibitory activity on nymphs.<sup>9,10</sup> Products with Fenpyroximate have not previously been selected by the Danish EPA for control of content of active substances.

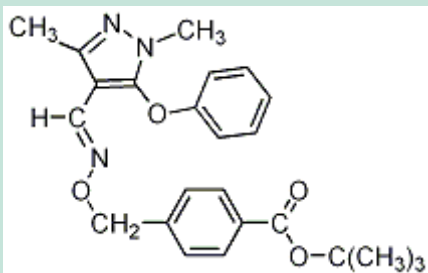


FIGURE 18  
MOLECULAR STRUCTURE OF FENPYROXIMATE, CAS NO. 134098-61-6<sup>9,10</sup>

### 3.3.5 Hexythiazox

Hexythiazox is an insecticide used in Denmark to control spider mites in, e.g., apples, berries and grapes. Chemically, it belongs to thiazolidines and acts non-systemically with contact and stomach action. Hexythiazox is an acaricide with ovicidal, larvicidal and nymphicidal activity.<sup>9,10</sup> Products with Hexythiazox have not previously been selected by the Danish EPA for control of content of active substances.

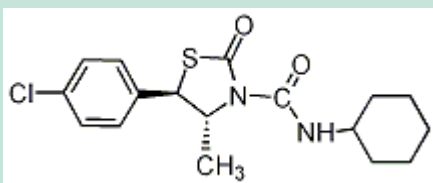


FIGURE 19  
MOLECULAR STRUCTURE OF HEXYTHIASOX, CAS NO. 78587-05-0<sup>9,10</sup>

### 3.3.6 Spinosad

Spinosad is an insecticide used in Denmark for thrips and leaf miner control in ornamentals, cucumber and tomato. Chemically, it belongs to the spinosyns (macrocyclic lactones) and is a racemic mix of two spinosoids, Spinosyn A and Spinosyn D. Spinosad acts by targeting nicotinic acetylcholine receptors in the insect nervous system, leading to disruption of acetylcholine neurotransmission, thereby killing the insects via hyperexcitation of the insect nervous system. Spinosad is active by dermal contact and ingestion.<sup>9,10</sup> Products with Spinosad were previously selected in 2011 by the Danish EPA for control of content of active substances.

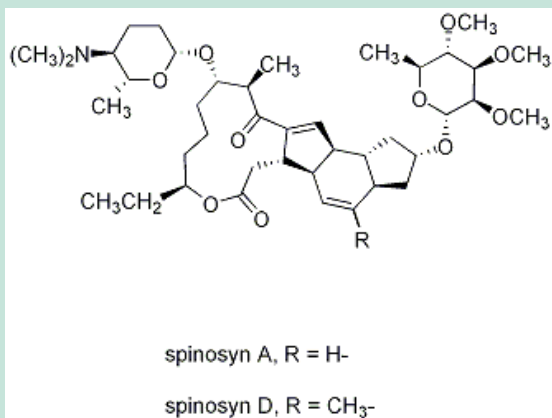


FIGURE 20  
MOLECULAR STRUCTURE OF SPINOSAD, CAS NO. 131929-60-7, 168316-95-8<sup>9,10</sup>

### 3.3.7 Analysis

Indoxacarb, Flonicamid and Hexythiazox were analysed by reversed phase high-performance liquid chromatography combined with diode array detection, HPLC-DAD. All samples were dissolved in acetonitrile by ultra-sonication before the analysis. The extraction was conducted in accordance with CIPAC-method pendimethalin 357.

Acetamiprid and Fenpyroximate were analysed by reversed phase high-performance liquid chromatography combined with diode array detection, HPLC-DAD. The samples were dissolved in a solution of acetonitrile and MilliQ water by ultra-sonication before the analysis.

Spinosad was analysed by reverse phase high-performance liquid chromatography combined with diode array detection (HPLC-DAD). Samples were dissolved in methanol by ultra-sonication before analysis. The method is a modified HPLC method according to CIPAC method no. 636 (CIPAC /4511).

Details concerning the implementation of the analyses, the calculation of the result and expanded analysis uncertainty are described in chapter 1.4.

The methods for Indoxacarb, Hexythiazox, Acetamiprid, Fenpyroximate and Spinosad are accredited.

### 3.3.8 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product. U<sub>E</sub> is the calculated expanded measurement uncertainty described in section 1.4.1.

**TABLE 9**  
ANALYSIS RESULTS OF INSECTICIDES (PESTICIDES), g/L

DTI sample no.	Active substance	Label claim g/L	Tolerance interval	Analysis result g/L	RSD %	U <sub>E</sub> g/L	Analysis interval g/L	Comply /Non-comply
644986-5	Indoxacarb	150	141-159	153	1.3	13	140-166	Comply
644986-13	Indoxacarb	300	285-315	373	1.6	31	342-404	Non-comply
644986-16	Fenpyroximate	53	47.7-58.3	53.8	5.6	7.8	46.0-61.6	Comply
644986-17	Hexythiazox	250	235-265	248	0.98	9.3	238-257	Comply
644986-24	Spinosad	120	102-138	119	9.6	17	102-136	Comply

**TABLE 10**  
ANALYSIS RESULTS OF INSECTICIDES (PESTICIDES), g/kg

DTI sample no.	Active substance	Label claim g/kg	Tolerance interval	Analysis result g/kg	RSD %	U <sub>E</sub> g/kg	Analysis interval	Comply /Non-comply
644986-14	Flonicamid	500	475-525	515	2.1	53	463-568	Comply
644986-15	Acetamiprid	200	188-212	209	1.5	11	198-220	Comply

### 3.3.9 Conclusion

The measured content of Indoxacarb in one product does not comply with the declared content and with applicable Danish law, as there is no overlap between the range of analysis results and tolerance. The product had expired before the collection of samples and analysis.

In the remaining products, the measured content of Indoxacarb, Flonicamid, Acetamiprid, Fenpyroximate, Hexythiazox and Spinosad complies with the declared content and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

### 3.4 Rodenticides (Pesticides)

Two rodenticides containing Aluminium Phosphate as the active substance were selected for the 2015 control campaign.

#### 3.4.1 Aluminium Phosphide

Aluminium Phosphide is a rodenticide used in Denmark to control moles and water voles. Chemically, it is an inorganic salt and acts as a mitochondrial Complex IV electron transport inhibitor.<sup>9,10</sup> Aluminium Phosphide evolves a non-flammable mixture of phosphine (the toxicant), ammonia and carbon dioxide and is a respiratory, metabolic and nerve poison. Products with Aluminium Phosphide have not previously been selected by the Danish EPA for control of content of active substances.

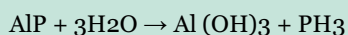


FIGURE 21

MOLECULAR STRUCTURE OF ALIUMINIUM PHOSPHIDE AND REACTION WITH WATER, CAS NO. 20859-73-8<sup>14</sup>

#### 3.4.2 Analysis

Aluminium Phosphide was analysed by titration. In short, Aluminium Phosphide reacts with sulphuric acid to form phosphine, which then reacts with potassium permanganate. The consumed amount of potassium permanganate is determined by titration.

Details concerning the implementation of the analyses, the calculation of the result and expanded analysis uncertainty are described in chapter 1.4.

#### 3.4.3 Results

The results from the performed measurements and the corresponding tolerance intervals are listed in the following tables. % RSD is the percentage relative reproducibility of the determinations of the product.  $U_E$  is the calculated expanded measurement uncertainty described in section 1.4.1.

TABLE 11  
ANALYSIS RESULTS OF RODENTICIDES (PESTICIDES)

DTI sample no.	Active substance	Label claim g/kg	Tolerance interval	Analysis result g/kg	RSD %	$U_E$ g/kg	Analysis interval	Comply /Non-comply
644986-20	Aluminium Phosphide	560	535 - 585	586	1.4	18	568-604	Comply
644986-34	Aluminium Phosphide	560	535 - 585	543	1.1	11	532-554	Comply

#### 3.4.4 Conclusion

The measured content of Aluminium Phosphide complies with the declared content and with applicable Danish law, as there is an overlap between the range of analysis results and tolerance.

# 4. Screenings

Products under a parallel trade permit were compared by gas chromatography with mass spectrometric detection (GC-MS) and Fourier transform infrared spectroscopy (FTIR), to investigate if they contain the same solvents and additives as the original product.

## 4.1 Regulations in Denmark

The requirements for parallel trade permits are described in detail in Article 52 of Regulation No. 1107/2009.<sup>15</sup>

### 4.1.1 Parallel trade permits

A parallel trade permit is an authorisation for the import of a plant protection product that is identical to a product already authorised in Denmark. A parallel trade permit is valid only for Denmark. It is not valid in the rest of the North zone. For each country, an application must be made to obtain the permit.

A plant protection product under a parallel trade permit may only be placed on the market and used in accordance with the authorisation of the original product. The parallel trade permit will expire at the same time as the authorisation of the original product. If the authorisation of the original product is withdrawn for reasons other than safety reasons, the parallel trade permit will be similarly affected.

### 4.1.2 Identical products

A plant protection product is identical with a product already authorised in Denmark only if:

- a) It is produced by the same company or an associated company or under licence according to the same method of manufacture as that of the authorised product.
- b) It has the same specification, that is, contains the same active substance, safeners and synergists. The plant protection product is of the same formulation type; and the contents of the co-formulants and the packaging are the same or equivalent.

The packaging and co-formulants may not have more negative effects on health or the environment than the original product.

## 4.2 Analysed products

The analysed product appears in the following table.

TABLE 12  
COMPARISON OF ORIGINAL PRODUCT WITH PARALLEL PRODUCT CONTAINING METRAFENONE

Parallel product DTI sample no.	Product name	Reg. no.	Original product DTI sample no.	Product name	Reg. no.
644986-19	LFS Metrafenone svampemiddel	318-164	644986-4	Flexity	19-166

#### 4.2.1 Analysis

##### 4.2.1.1 GC-MS

A subsample (app. 5 g) was weighed in a 50 ml calibrated flask and acetone was added up to the label. Another subsample was added methanol. Then 1 ml was drawn and 1 ml dichloromethane was added. The analysis was carried out by gas chromatography with mass spectrometric detection (GC-MS), scan m/z 40 - 450.

##### 4.2.1.2 FTIR

A drop of the product was placed on an ARO object glass. The drop dried up at room temperature before the measurement by FTIR. Fourier transform infrared spectroscopy (FTIR) was carried out on a Renishaw InVia Streamline microscope attached to FTIR, IlluminatIR II, from Smiths Detection. The spectra were taken with ARO (All Reflective Objective) with 64 repetitions and a resolution of 8 cm<sup>-1</sup>.

#### 4.2.2 Results and conclusion

The difference between the determined concentrations and densities is within the analysis uncertainties of the methods; please refer to the following table.

TABLE 13  
QUANTITATIVE DETERMINATION OF THE CONCENTRATION OF METRAFENONE AND DENSITY DETERMINATION

DTI sample no.	Product name	Analysis result g/L	RSD %	Density kg/L
644986-4	Flexity	287	1.3	1.172
644986-19	LFS Metrafenone svampemiddel	282	2.1	1.174

The comparison of FTIR spectra demonstrated differences in intensity, but all peaks appear in both spectra.

The colour and appearance of the two sample extracts are assessed to be identical.

When comparing the GC-MS chromatograms, differences appear in the intensity of some of the peaks. It has not been possible to identify the peaks through the NIST MS library.

# References

1. Statutory Order on Pesticides. Statutory Order from the Ministry of the Environment, No. 151 of 18 February 2014 incl. revisions, Statutory Order is in Danish.
2. REGULATION (EC) No. 1107/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC.
3. The regulation of the European Commission (EU) No. 546/2011 of 10 June 2011 concerning the implementation of the regulation of the European Parliament and the European Council (EF) No. 1107/2009 concerning uniform principles for evaluation and approval of crop protection agents.
4. Danish Ministry of the Environment, Environmental Protection Agency (Danish EPA) site; <http://www.mst.dk/English/Pesticides/>.
5. Danish EPA, 2009. List of approved Pesticides 2009, the Danish Environmental Protection Agency. The list is in Danish: [http://www.mst.dk/Virksomhed\\_og\\_myndighed/Bekaempelsesmidler/Find+godkendt+beke%C3%A6mpelsesmiddel/](http://www.mst.dk/Virksomhed_og_myndighed/Bekaempelsesmidler/Find+godkendt+beke%C3%A6mpelsesmiddel/).
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7. Danish Technological Institute, <http://www.dti.dk/>
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9. Tomlin, C.D.S (2009): The Pesticide Manual, fifteenth Edition. British Crop Protection Council, United Kingdom.
10. The e-Pesticide Manual, fifteenth Edition, version online, 2014. British Crop Protection Council, United Kingdom.
11. CIPAC method no. 101, 370, 357, 636, 657, <http://www.cipac.org/>
12. <http://www.weeds.iastate.edu/weednews/vinegar.htm>
13. Danish Standard DS 235:1978
14. <http://www.fao.org/docrep/x5042e/x5042e0a.htm>
15. The requirements for parallel trade permits, Article 52 of Regulation No 1107/2009, <http://mst.dk/82449>

## Appendix 1 Pesticide and biocide samples collected on the Danish market for the authority control 2015

TABLE 14  
COLLECTED INSECTICIDES (BIOCIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-7	Spinosad	364-38	ECOStyle Loxiran MyreFri Lokkemiddel til myrelokkedåser	W. Neudorff GmbH KG
644986-8	Spinosad	364-28	ECOStyle Loxiran MyreFri Genopfyldelige myrelokkedåser	W. Neudorff GmbH KG
644986-9	Spinosad	364-37	ECOStyle Loxiran MyreFri lokkedåser	W. Neudorff GmbH KG
644986-21	Spinosad	416-8	SpinoWay	Detia Degesch GmbH

TABLE 15  
COLLECTED RODENTICIDES (BIOCIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-22	Flocoumafen	19-128	Storm Rotteblok 20G	BASF A/S
644986-30	Flocoumafen	19-164	Musegift pellets 100g Gnavermiddel	TANACO A/S
644986-31	Alfa Chloralose	669-9	Trinol Korn MOD MUS	LODI S.A.S
644986-32	Alfa Chloralose	669-6	Trinol Paste MOD MUS	LODI S.A.S



**TABLE 16**  
COLLECTED HERBICIDES (PESTICIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-10	Pendimethalin & Picolinafen	19-172	Flight Xtra	BASF
644986-33	Acetic acid	18-858	Natria mod ukrudt	Bayer A/S, Bayer CropScience

**TABLE 17**  
COLLECTED FUNGICIDES (PESTICIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-1	Metrafenone & Epoxiconazole	19-177	Ceando	BASF
644986-2	Boscalid & Epoxiconazole	19-173	Bell	BASF
644986-3	Boscalid, Epoxiconazole & Pyraclostrobin	19-204	Viverda	BASF
644986-4	Metrafenone	19-166	Flexity	BASF
644986-6	Epoxiconazole	11-29	Rubric	Cheminova A/S
644986-11	Epoxiconazole	19-87	Opus	BASF
644986-12	Epoxiconazole & Pyraclostrobin	19-144	Opera	BASF
644986-19	Metrafenone	318-164	LFS Metrafenone svampemiddel	LFS Kemi
644986-23	Epoxiconazole & Metconazole	19-209	Osiris Star	BASF
644986-25	Epoxiconazole & Metconazole	19-182	Osiris	BASF
644986-26	Folpet	396-48	Folpan 500 SC	Markhteshim-Agan Holland B.V.
644986-27	Epoxiconazole	396-35	Maredo 125 SC	Markhteshim-Agan Holland B.V.

644986-28	Mepanipyrim	509-4	Frupica SC	Nordisk Alkali AB
644986-29	Dodine	361-29	Syllit 544 SC	Agriphar S.A.

**TABLE 18**  
COLLECTED INSECTICIDES (PESTICIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-5	Indoxacarb	3-179	Avaunt insektmiddel	DuPont Danmark ApS
644986-13	Indoxacarb	3-173	Steward Insektmiddel	DuPont Danmark ApS
644986-14	Flonicamid	352-5	Teppeki	ISK Biosciences Europe S.A.
644986-15	Acetamiprid	561-3	Mospilan SG	Nisso Chemical Europe GmbH
644986-16	Fenpyoximate	509-5	Danitron 5 SC	Nordisk Alkali AB
644986-17	Hexythiazox	561-6	Nissorun 250 SC	Nisso Chemical Europe GmbH
644986-24	Spinosad	64-51	Conserve	Dow AgroSciences Danmark A/S

**TABLE 19**  
COLLECTED RODENTICIDES (PESTICIDES)

DTI sample no.	Active substances	Reg. no.	Name of product	Authorisation holder
644986-20	Aluminium phosphide	668-2	TANAPHOS muldvarpe- og mosegrisegas	Delicia Freyberg GmbH
644986-34	Aluminium phosphide	730-23	Mortalin Muldvarpegas ny	Trinol A/S (Vilofarm A/S)

## Control of Pesticides and Biocides 2015

### English

The analytical chemical authority control of pesticide and biocide products on the Danish market that was carried out in 2015 by the Danish Environmental Protection Agency (Danish EPA), Chemical Inspection Service, is described in this report. Samples of selected types of pesticides and biocides were collected on the Danish market and analysed to verify whether or not the content of the active substances in the products in question complies with the product specification and the labelled content. A total of 33 different pesticide products were analysed. The content of active substance in 1 of the analysed products was not within the accepted tolerance that is determined in the Danish Statutory Order on pesticides.

### Danish

Den analytisk kemiske kontrol af biocid- og pesticidprodukter på det danske marked, der er udført i 2015 af den danske Miljøstyrelses Kemikalieinspektion, er beskrevet i denne rapport. Prøver fra udvalgte typer af bekæmpelsesmidler er blevet indsamlet og analyseret for at verificere, om indholdet af de respektive aktivstoffer er i overensstemmelse med det deklarerede indhold. Der blev undersøgt i alt 33 bekæmpelsesmidler. Indholdet af aktivstoffet i 1 af de analyserede produkter var ikke inden for den accepterede tolerance, der er fastsat i bekendtgørelsen om bekæmpelsesmidler

