

# VigilAnses

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## Informing consumers about the dangers of ornamental plants : a regulatory obligation from 1 July 2021

Ornamental plants sold in shops or on the Internet can cause poisoning due to insufficient knowledge of their toxicity or a lack of precaution. From 1 July 2021, information must be provided to consumers at the point of sale on plants considered to pose a toxic risk to human health. The list of these plants, laid down by ministerial order, was determined according to the type of toxicity and route of exposure: plants that are toxic by ingestion, by mucocutaneous contact, by dermal contact followed by exposure to the Sun, or that can cause respiratory allergy through their pollen. In addition to the information available at the point of sale, fact sheets detailing the toxic risks involved and the means of protection will also be available on the ANSES website and a website specific to the ministerial order.



Poisonings from plants are reported to poison control centres every year. Some are caused by ornamental plants both indoors and in the garden as a result of accidental ingestion of leaves or berries by young children or cognitively impaired individuals, or when touching leaves, flowers or stems. These cases are sometimes serious. Before purchasing a plant, therefore, it is important to be aware of the health risks. Until now, there has been no obligation for sellers to provide any information.

### What will change and when?

In order to prevent the risks of poisoning from ornamental plants, the legislator has now included in the regulations<sup>1</sup> the obligation to provide plant buyers with information on the plants posing a toxic risk to human health, and on the means of protecting themselves.

This obligation is set out in the Ministerial Order of 4 September 2020 issued jointly by the Ministers of Health, Consumer Affairs and Agriculture, which determines *"the prior information that must be provided to buyers of plants likely to be harmful to human health"*<sup>2</sup>.

Once it enters into force on 1 July 2021, professionals in the horticulture, floristry and landscape sectors will be required to provide all their customers, at the time of sale of plants identified as posing a toxic risk to human health, with information on this toxicity and the precautions to be taken to avoid poisoning.

This information will concern plants sold to the general public in physical outlets (shops, markets, etc.) or on the Internet, or to local authorities as part of public procurement (landscaping, events, etc.). The scope of the order covers plants posing a toxic risk to human health that are grown and marketed as indoor or outdoor plants, some of which may also grow in the natural environment.

Plants sold for consumption (lemon trees, parsnips, etc.), cut flowers, cut branches or trees, plant tissue culture, grass seed mixtures and forest reproductive material (tree seeds and seedlings) are not included in the scope of the order.

For each plant listed in the order, information will be available in the form of a label, a poster displayed near the plant, or a guide at the point of sale for the seller or the customer.

1. Article L. 1338-3 of the Public Health Code in the chapter on control of plant and animal species that are harmful to human health  
2. <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000042325453>

### Which plants are concerned?

The Directorate General for Health asked the French Agency for Food and Occupational Health & Safety (ANSES), which is responsible for coordinating the toxicovigilance scheme, to put forward a list of plants corresponding to the scope of the order.

To draw up this list, ANSES called on its "Vigilance for natural toxins" working group, made up of experts in clinical toxicology and botany.

The list of plants to be included was determined on the basis of plant poisoning cases recorded in the Poison control centres' national database (SICAP) from 1999 to 2015, as well as the literature, and expert knowledge on plants with toxic potential.

Four groups of plants were defined according to their type of toxicity to human health and routes of exposure:

- List 1: plants that are toxic if ingested;
- List 2: plants that can cause respiratory allergy through their pollen;
- List 3: plants that can cause mucocutaneous reactions (skin, eyes, nose and mouth);
- List 4: plants posing a risk of phytophotodermatitis, i.e. an abnormal skin reaction in the event of dermal contact followed by exposure to the sun.

The list of plants that can cause respiratory allergy through their pollen (List 2) was drawn up by the National Aerobiological Surveillance Network (RNSA).

For the plants in Lists 1, 3 and 4, the experts assigned a toxicity level for each plant, taking into account the clinical severity of the cases observed in the SICAP.

Three levels of toxicity were defined: low (1), moderate (2) or high (3).

In the end, only the plants with the highest toxicity level (3) were selected for inclusion in the order. They are listed in the Agency's Opinion of 21 March 2019.

The following were selected for the order (see table on page 6):

- 19 plants that are toxic if ingested;
- 10 plants that can cause mucocutaneous reactions;
- 6 plants that can cause phytophotodermatitis.

In addition, the RNSA drew up a list of 23 trees and herbaceous plants that can cause a respiratory allergy through their pollen.

In total, therefore, the order of 4 September 2020 includes 58 plants for which information must be provided to the customer, prior to sale.

### How can poisoning be avoided and what should be done in the event of exposure?

Beyond general prevention considerations, some plants warrant special precautions, which are illustrated below using examples from each list.

ANSES begins by reiterating that in the event of severe disorders or a life-threatening condition (difficulty breathing, etc.) occurring after exposure to a plant, it is vital to call 15 (in France) or 112 (or 114 for people who have difficulty hearing or speaking).

Moreover, plants that are toxic to humans are also usually toxic to domestic animals. It is therefore important to ensure that animals do not approach these plants, and to immediately call a veterinary poison control centre in the event of poisoning (<https://www.veterinaire.fr/annuaires/contacter-un-centre-antipoison.html>).

3. <https://www.anses.fr/fr/system/files/Toxicovigilance2018SA0167.pdf>



**List 1 : Plants that are toxic if ingested, e.g. common yew (*Taxus baccata*)**

This species of non-resinous conifer of the Taxaceae family is grown and used as a hedge shrub because it is highly suitable for pruning (topiary). It also grows in the wild.

All parts of the tree contain alkaloids and are toxic except for the red flesh of the fruit (aril) surrounding the seed. The seed in the fruit is also poisonous if bitten or chewed. Fatal cases of poisoning by intentional ingestion have been reported in the literature.



Photograph : Common yew (*Taxus baccata*)

In the event of ingestion, digestive and neurological signs can be rapidly observed and, in the most serious cases, when large quantities are ingested, can be followed by cardiac disorders including cardiorespiratory arrest.

Children, as well as cognitively impaired individuals who might ingest it due to lack of awareness of the risk, should be kept away from this plant.

In all cases of ingestion, even in the absence of symptoms, it is vital to immediately call a poison control centre (<http://www.centres-antipoison.net/>), which will assess the risks involved and specify the action to be taken.

In practice, the plants selected in List 1 of the order (see box) can be fatal if ingested, with the exception of lupin (*Lupinus sp.*), for which the seeds of certain varieties (bitter lupin) can nevertheless cause serious heart or eye problems.

**List 3 : Plants that can cause mucocutaneous reactions, e.g. Dieffenbachia (*Dieffenbachia sp.*)**

Dieffenbachia (*Dieffenbachia sp.*) is a plant of the Araceae family with broad variegated green and yellow-creamy white foliage, some species of which are commonly grown as houseplants. The plant's sap contains calcium oxalate crystals, which are highly irritating.

Poisoning is most often caused by chewing on the end of a stem or a leaf fragment, which can result in a burning sensation, swelling of the lips, tongue and throat, and possible difficulty breathing.



Photograph: Dieffenbachia (*Dieffenbachia sp.*)

Splashing sap into the eyes or touching the eyes with fingers that have sap on them causes immediate and intense pain, with eye watering and conjunctival oedema. Corneal damage is possible in the most severe cases.

Redness, itching and a burning sensation may occur in the event of dermal contact.

Gloves should be worn when handling the plant, and hands should be washed after handling the plant or the used gloves.

Two of the plants on List 3 of the order are allergenic in addition to being irritating: certain varieties of poison primrose (*Primula obconica*), also called German primrose, and poison ivy (*Toxicodendron radicans*). The effects observed are then increased any time there is further contact with the plant.

In the event of contact with skin, mouth or eyes, exposed areas should be rinsed with plenty of water and contaminated clothing should be washed.

If signs of irritation persist, it is advisable to call a poison control centre or seek medical advice.

**List 4 : Plants posing a risk of phytophotodermatitis, e.g. garden angelica (*Angelica archangelica*)**



Photograph : Garden angelica (*Angelica archangelica*)

Garden angelica (*Angelica archangelica*) is a species of plant in the Apiaceae family, grown as a condiment and medicinal plant.

Contact with its sap or any part of the plant (stems, leaves) may cause damage to exposed parts of the skin if followed by exposure to sunlight or natural light, due to the action of ultraviolet light on the furocoumarins (pigmenting and photosensitising substances) contained in the plant.

These clinical signs sometimes appear after a delay (6 to 48 hours) and manifest as a burning reaction with redness, pain, oedema and in some cases blistering, most often on the exposed areas. After healing, brown spots may persist.

When pruning or handling this plant, direct skin contact should be avoided by wearing gloves and long, loose-fitting clothing should be worn to protect the skin from sunlight.

In the event of contact, the affected area should be rinsed immediately with water and protected from sunlight for several days.

Lastly, if a skin reaction occurs, medical advice can be obtained by calling a poison control centre or consulting a doctor.

**What are the next steps ?**

Fact sheets on the plants listed in the order will be available on the ANSES website from July 2021. For each plant, they will detail the risks involved, the toxic parts of the plant, the possible clinical signs in case of exposure, the means to protect oneself from the risk of poisoning and the measures to take in the event of poisoning. A specific website containing the various information associated with the order will also be launched by the Directorate General for Health.

While the list of plants proposed in the order is exhaustive for metropolitan France, specific local expertise is needed to identify plants posing a toxic risk to human health in the overseas *départements*. An expert appraisal is currently being carried out for Reunion Island and Mayotte; it will be carried out as soon as possible for Guadeloupe, Martinique and French Guiana.

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Table : Lists 1, 3 and 4 of the plants in the Ministerial Order of 4 September 2020.

Common (vernacular) name	Scientific name and family
<b>List 1: Plants that can be toxic if ingested</b>	
Aconite, wolfsbane	<i>Aconitum</i> sp., Ranunculaceae
Deadly nightshade	<i>Atropa belladonna</i> , Solanaceae
Jimsonweed	<i>Datura stramonium</i> , Solanaceae
Sacred datura	<i>Datura wrightii</i> , Solanaceae
Brugmansia	<i>Brugmansia</i> sp., Solanaceae
Poison hemlock	<i>Conium maculatum</i> , Apiaceae
Fool's parsley	<i>Aethusa cynapium</i> , Apiaceae
Cowbane	<i>Cicuta virosa</i> , Apiaceae
Autumn crocus	<i>Colchicum autumnale</i> , Colchicaceae
Wood laurel, spurge laurel	<i>Daphne laureola</i> , Thymelaeaceae
Mezereon, paradise plant	<i>Daphne mezereum</i> , Thymelaeaceae
Delphinium, larkspur	<i>Delphinium</i> sp., Ranunculaceae
Foxglove	<i>Digitalis purpurea</i> , Plantaginaceae
Common yew	<i>Taxus baccata</i> , Taxaceae
Yellow oleander, lucky nut	<i>Thevetia peruviana</i> , Apocyanaceae
Oleander	<i>Nerium oleander</i> , Apocyanaceae
Flame lily	<i>Gloriosa superba</i> , Colchicaceae
Castor-oil plant	<i>Ricinus communis</i> , Euphorbiaceae
Lupin	<i>Lupinus</i> sp. Fabaceae
<b>List 3: Plants that can cause mucocutaneous reactions (skin, eyes, nose, mouth)</b>	
Alocasia	<i>Alocasia</i> sp., Araceae
Caladium	<i>Caladium</i> sp., Araceae
Colocasia, taro	<i>Colocasia esculenta</i> , Araceae
Dieffenbachia, Dumb cane	<i>Dieffenbachia</i> sp., Araceae
Golden pothos	<i>Epipremnum aureum</i> , Araceae
Philodendron	<i>Philodendron</i> sp., Araceae
Spathiphyllum, peace lily	<i>Spathiphyllum</i> sp., Araceae
Poison ivy	<i>Toxicodendron radicans</i> , Anacardiaceae
German primrose, poison primrose	<i>Primula obconica</i> Hance, Primulaceae
All species or varieties of euphorbia (except poinsettia or "Christmas star")	<i>Euphorbia</i> sp., Euphorbiaceae
<b>List 4: Plants that can cause an abnormal skin reaction in the event of skin contact followed by exposure to the sun (phytophotodermatitis)</b>	
Lovage	<i>Levisticum officinale</i> , Apiaceae
Wild angelica	<i>Angelica sylvestris</i> , Apiaceae
Garden angelica	<i>Angelica archangelica</i> , Apiaceae
Burning bush	<i>Dictamnus albus</i> , Rutaceae
Hogweed	<i>Heracleum sphondylium</i> , Apiaceae
Garden rue, common rue	<i>Ruta graveolens</i> , Rutaceae

## 2018 review of calls to poison control centres concerning exposure to plant protection products

Here, ANSES provides its first annual review of calls to poison control centres concerning exposure to plant protection products. These products can cause adverse effects in humans. Most of the symptoms observed are mild, but there have been a few serious cases.

For amateur gardeners, the ban since 1 January 2019 on products other than those authorised for biocontrol is expected to lead to a reduction in the number of serious cases.

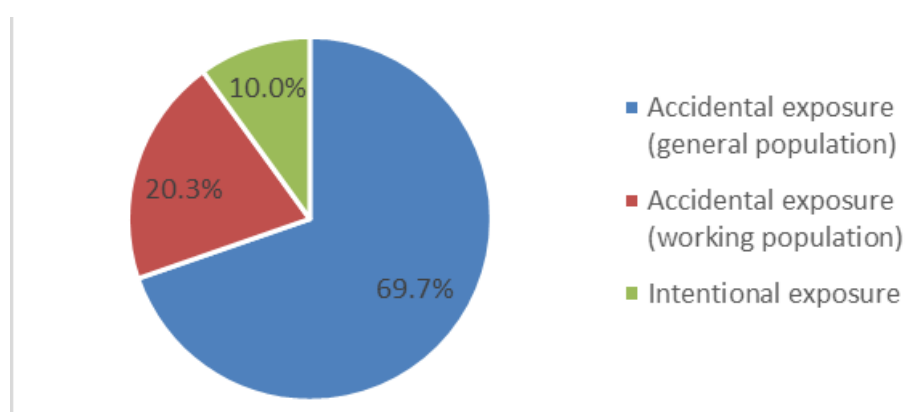


Plant protection products are designed to protect plants and crops from insects, fungi, weeds, etc. but can pose risks to human health. In 2018, out of around 190,000 calls recorded by poison control centres (PCCs), 0.9% involved at least one plant protection product.

Studies on certain plant protection products have already been carried out in the past using PCC data, for example on products that are not authorised but are still used in France [1][2]. Now for the first time, a review has focused on telephone calls received over one year concerning exposure to all plant protection products, whether authorised or not authorised for sale in France.

This review was also an opportunity to examine biocontrol products, which are becoming more and more widespread.

A total of 1244 people called a PCC for this reason in 2018, of whom 65.8% had symptoms. The vast majority of exposures were accidental and involved the general population (69.7%, n=867). This was followed by accidental occupational exposure (20.3%, n=252) and then intentional exposure (10%, n=125), including suicide attempts (Figure 1). Intentional poisoning will not be detailed in this article. To find out more, read the full report [3].



**Figure 1** : Percentage of people exposed to plant protection products recorded by the PCCs in 2018, according to the exposure situation [n=1244] (source SICAP).

### General population: watch out for banned products at the back of the cupboard

In the general population (867 cases), most exposure occurred in the spring, related to gardeners' typical activities at this time of year (Figure 2).

The plant protection products involved were most often herbicides (42.1%), followed by insecticides (25%). Molluscicides (12.6%), which are mainly active against slugs or snails and are widely used by amateur gardeners, were on an equal level with fungicides (13.9%) (Figure 3).

A third of exposed people were children under 10 years of age. This age group usually accounts for half of the calls to PCCs for all types of exposure, suggesting that plant protection products are kept away from young children.

The most frequently reported exposure circumstance concerned cognitively impaired individuals or young children who do not see the risk associated with the product (risk perception failure), (27.3%, n= 237). The second most frequent situation was gardening accidents (26.5%, n=230). Note that 8.2% of accidents were related to decanting (n=71). This involves transferring a product from its original container into another one, such as a water or soda bottle, often for ease of handling. This practice leads to numerous poisonings due to confusion and is strongly discouraged.

Exposure occurred primarily by the oral route, which is consistent with the "risk perception failure", mainly in young children.

The respiratory and dermal routes were also frequent routes of exposure, reflecting gardening activities. Splashing into the eyes was far less common.

In the general population, 57.1% (n=495) of people experienced symptoms, the vast majority of which were minor.

The most commonly observed symptoms were digestive (38.2%), consistent with the frequently reported oral route of exposure. These mainly involved irritation of the mucous membranes: oropharyngeal pain, nausea, vomiting, abdominal pain, diarrhoea. In the case of dermal exposure, the signs observed were redness, oedema and even blisters, accounting for 19.4% of symptoms. With splashing into the eyes, conjunctivitis was the most common sign (43% of cases) although several cases of corneal damage were found; with inhalation exposure, cough, dyspnoea and respiratory discomfort were the most frequently reported respiratory signs. Neurological, cardiovascular and general symptoms that might indicate that the product had penetrated the body were reported with a much lower frequency (17%).

The review identified five cases of moderate severity and one case of high severity. The products involved, the route of exposure, the symptoms observed and the severity are detailed in Table 1.

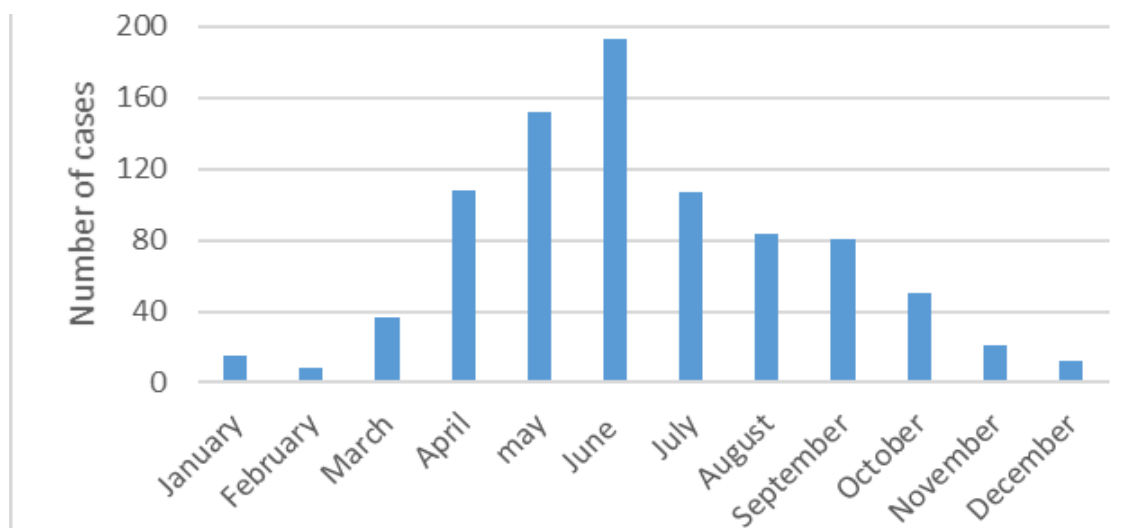
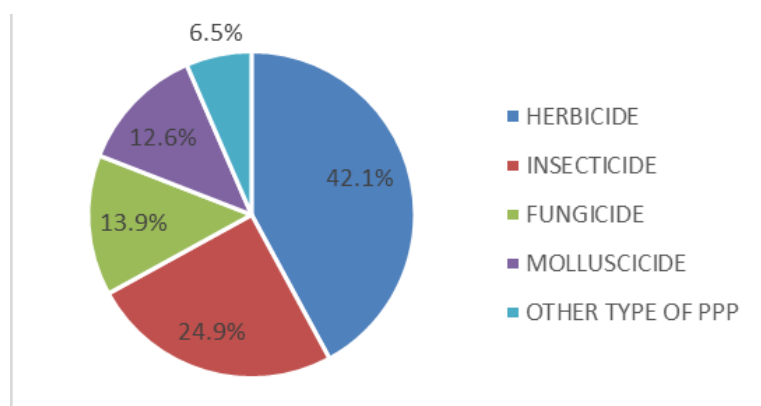


Figure 2: Number of people accidentally exposed to plant protection products in the general population recorded by the PCCs in 2018, according to the month of exposure [n=867] (source SICAP).





**Figure 3 :** Categories of plant protection products involved in cases of accidental exposure in the general population [n=867], in percentage of occurrences (Source SICAP).

**Table I :** Description of exposure cases in the general population of moderate or high severity and the agents involved (source SICAP).

Case	Plant protection product (active substance)	Route and symptoms	Severity
G1	ROUNDUP READY-TO-USE GARDEN WEED CONTROL ( <i>glyphosate</i> )	Dermal (gardening: leakage from a backpack sprayer): second-degree burns	Moderate
G2	KB POLYSECT INSECTICIDE ( <i>bifenthrin</i> ) ALGOFLASH ORCHID INSECTICIDE AEROSOL [REGISTERED NAME: FAZILO] ( <i>pyrethrins + abamectin</i> )	Dermal (gardening: prolonged contact without immediate decontamination): second-degree burns	Moderate
G3	KB LONG-LASTING ANTI-APHID SPRAY ( <i>dimethoate</i> )	Dermal (gardening: spraying without protection): second-degree burns	Moderate
G4	ROUNDUP ( <i>glyphosate</i> )	Oral (decanting): persistent vomiting	Moderate
G5	GLYPHOSATE ISOPROPYLAMINE SALT	Respiratory (gardening: unprotected use): delayed lung damage leading to acute respiratory distress syndrome	High
G6	STAR JARDIN ( <i>glyphosate + incorporated surfactant</i> ) HOUSEHOLD BLEACH	Dermal, ocular and respiratory (gardening: release of gas from the mixture): eye, skin and lung damage	Moderate

These active substances have been banned for amateur gardeners since 1 January 2019, with the exception of abamectin in combination with pyrethroids, which is authorised for biocontrol.

#### Professionals: contact a poison control centre in the event of poisoning with a plant protection product

With regard to accidental occupational exposure (252 cases), two seasonal peaks were observed: one in spring and the second in autumn, which corresponds to the crop treatment periods. These cases mainly concerned men (78.6%), which is in line with the predominantly male occupational agricultural population.

The groups of agents most often involved were herbicides (37.4%) and insecticides (22.3%). As in the general population, harmful weeds and insects are the main concern (Figure 4).

Fungicides (25.5%) were found in the working population at almost the same frequency as that of insecticides, which was not the case in the general population.

The main route of exposure was respiratory, followed by dermal: these are common accidental exposure routes for workers when handling plant protection products. Some contact with the eyes also occurred.

For the working population, nearly 89% of calls to poison control centres concerned symptomatic exposure, even though the vast majority were of low severity (96.6%). In comparison, accidents in the general population were less often symptomatic (57.1%).

Digestive symptoms were clearly predominant with nausea, vomiting, oropharyngeal irritation and pain, diarrhoea and abdominal pain. Ocular symptoms (conjunctivitis, pain, eye watering) were also very common. Neurological signs such as headaches and dizziness were often reported and could indicate systemic penetration of plant protection products. Signs of skin irritation (redness, pain, burning) were also observed. Cough was the main respiratory symptom, sometimes combined with respiratory discomfort or even respiratory distress.

Five cases of moderate severity occurred in workers but none of high severity. The products involved, the route of exposure and the symptoms observed are detailed in Table 2 below.

In the event of poisoning with plant protection products, farmers are encouraged to report their symptoms to the Phyt'attitude scheme set up by the French Central Fund for the Agricultural Mutual Insurance Scheme (CCMSA) [4]. This contributes to a greater understanding of the risks associated with the use of these products and improves the health and safety of the farming community.

**Table II:** Description of cases of occupational exposure of moderate severity and the agents involved (source SICAP).

Case	Plant protection product (active substance)	Route and symptoms
P1	CURATIO ( <i>calcium polysulphide</i> )	Dermal (leakage from a backpack sprayer): second-degree burns
P2	CRUISER 350 ( <i>thiamethoxam, withdrawn in 2015</i> ); MAXIM ( <i>triclopyr</i> ); INFLUX QUATTRO ( <i>fludioxonil + metalaxyl-M + thiabendazole + azoxystrobin</i> )	Ocular: keratitis
P3	GUILD ( <i>glyphosate + pyraflufen-ethyl</i> )	Dermal (leakage from a backpack sprayer): second-degree burns
P4	HYDROGEN PEROXIDE; SODIUM HYDROXIDE; NORDOX 50 ( <i>Bordeaux mixture</i> )	Respiratory: respiratory burns, dysphonia and transient bradycardia
P5	LAMBDASTAR ( <i>lambda cyhalothrin</i> ); KRUGA ( <i>fenbuconazole</i> )	Dermal, ocular and respiratory: skin burns and irritation of the mucous membranes (conjunctivitis, inflamed oral mucosa, cough with dyspnoea on exertion)

### No severe poisoning from biocontrol products

Biocontrol products<sup>1</sup> are plant protection products that use natural mechanisms to protect plants as part of integrated control of crop pests. In particular, they include:

macro-organisms (invertebrates, insects, mites or nematodes);

plant protection products containing micro-organisms (fungi, bacteria, viruses), chemical mediators such as sex pheromones (chemical substances produced by insects that play a role in sexual attraction) and natural substances of vegetable, animal or mineral origin.

In a context advocating reduced use of plant protection products, biocontrol is one solution that has been identified for achieving the goals of the Ecophyto 2+ plan [5].

This section details calls to PCCs concerning exposure to biocontrol products, both in the general and working populations.

Of the 1244 cases identified in this 2018 review, 203 involved exposure to biocontrol products. The vast majority of these cases corresponded to accidental exposure in the general population (90%) (see Figure 5).

1. The list of biocontrol products is defined in Article L. 253-6 of the Rural and Maritime Fishing Code : <https://info.agriculture.gouv.fr/gedei/site/bo-agri/instruction-2021-277>

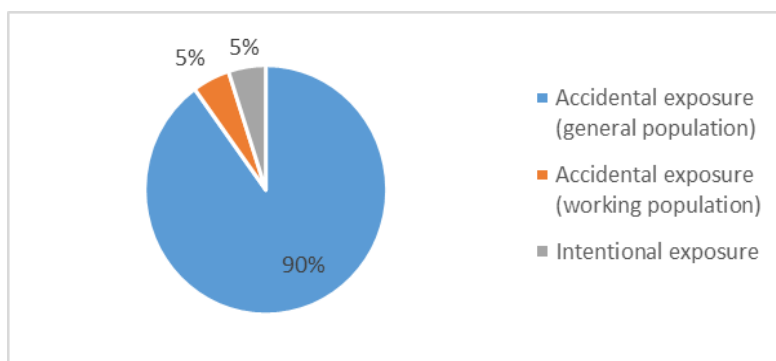


Figure 5 : Percentage of people exposed to biocontrol plant protection products recorded by the PCCs in 2018 according to the exposure situation [n=203] (source SICAP).

The exposure situations of the 182 individuals in the general population were broadly similar to those already described above.

Slug biocontrol products containing ferric phosphate caused more than one third of accidents. This was followed by weed control products containing pelargonic or acetic acid. Next came biocontrol products containing *Bacillus thuringiensis* and insecticides and products against scale insects based on natural pyrethrins or vegetable oil. Lastly, various biocontrol products such as moss killer and rooting hormone were much more rarely involved.

However, only 40% of the cases involved symptomatic exposure. This percentage is well below that observed with other plant protection products (61.6%). Similarly, there were no cases of moderate or high severity.

Symptoms reported were most frequently signs of digestive irritation (n=31), dermal signs (n=24), eye irritation (n=12) and, much more rarely, respiratory symptoms (n=3). Neurological symptoms were also found (dizziness, feeling unwell, headaches, anxiety, agitation) in 10 people.

Only 11 cases of occupational exposure were reported, accounting for fewer than 5% of cases. Nine of these workers had symptoms, all of which were minor. The main symptoms were itching and skin irritation in the case of skin splashes, eye pain in the case of eye contact and, with inhalation and oral contact, common digestive disorders (nausea, vomiting, abdominal pain), headache and transient respiratory discomfort.

The products involved contained pelargonic acid, natural pyrethrins, rapeseed oil, abamectin, *Bacillus thuringiensis* or rooting hormone.

### Conclusion

It should be remembered that calls to poison control centres account for only a proportion of poisonings, as some people directly consult a doctor or pharmacist, who will not then call a PCC.

Similarly, the breakdown of the various products in this study should be compared with the sales data, as the products most represented in this review may be the best selling and not the most toxic.

Concerning the exposure of individuals in the general population, the share of children under 10 years of age was lower than for exposure to other agents, which seems to indicate that plant protection products are more rarely left within the reach of young children.

While there have been a few cases of moderate to high severity since 2018, the range of products available on the market has changed. Since 1 January 2019, only authorised biocontrol products are available to amateur gardeners. The ban on the sale, use and possession of unauthorised biocontrol plant protection products (e.g. glyphosate products) is expected to limit the number of potentially serious cases of poisoning among the general public. Products that are prohibited for amateur gardeners but are still kept at home must be taken to a waste disposal centre.

The practice of decanting should be discouraged, both in the general population and among professionals, as it is responsible for a considerable number of poisonings.

Whether for the general or working populations, in the event of exposure to a plant protection product, it is important to call a PCC for guidance on treatment and the action to be taken, and to call 15 (in France) or 112 in the event of a life-threatening condition.

Gaëlle CREUSAT (Nancy Poison Control Centre)  
and Rachel PAGES (Anses)

The study on banned plant protection products [1][2], carried out over the period 2012-2016, revealed fraudulent uses of these products. They resulted from either the storage of old products or illegal imports from border countries where they may still be on the market (introduction into French Guiana of products from Surinam). Four hundred and eight cases of exposure (symptomatic or not) were reported to the PCC network during the study period. The substances most often incriminated were dichlorvos, paraquat and aldicarb.

It is important to reiterate that the use of banned plant protection products poses risks to humans, animals and the environment and is subject to heavy penalties.

### **References**

[1] Vigil'Anses article: When unauthorised plant protection products remain in circulation

[https://vigilances.anses.fr/sites/default/files/VigilancesN7\\_PPPinterdits\\_0.pdf](https://vigilances.anses.fr/sites/default/files/VigilancesN7_PPPinterdits_0.pdf)

[2] Study report: Exposure to plant protection products containing unauthorised active substances in metropolitan France and the overseas territories <https://www.anses.fr/fr/system/files/Toxicovigilance2019SA0027Ra.pdf>

[3] Study report: Exposure to plant protection products in the general and working population: focus on biocontrol products

<https://www.anses.fr/fr/system/files/Toxicovigilance2020VIG0185Ra.pdf>

[4] Vigil'Anses article: Toxicovigilance in agriculture: the Phyt'attitude network

[https://vigilances.anses.fr/sites/default/files/VigilancesN4\\_Phytattitude\\_0.pdf](https://vigilances.anses.fr/sites/default/files/VigilancesN4_Phytattitude_0.pdf)

5 ] Web page dedicated to the Ecophyto plan on the website of the French Ministry of Agriculture and Food <https://agriculture.gouv.fr/le-plan-ecophyto-quest-ce-que-cest>



## Antiparasitics containing fipronil intended for dogs and cats must not be used on rabbits

Cases of fipronil poisoning in pet rabbits are regularly reported to the French Agency for Veterinary Medicinal Products (ANSES-ANMV). The vast majority of these cases are due to the deliberate use of drugs containing fipronil intended for dogs or cats. Between 2013 and 2020, ANSES-ANMV received 137 such reports of adverse effects. Sixty-six cases were considered serious; a total of 33 rabbits died following the use of one of these antiparasitic drugs. The annual number of reports has generally remained stable, with an average of 17 cases per year. In this context, ANSES-ANMV reminds rabbit owners not to treat their pets with veterinary drugs intended for dogs or cats, especially if they contain fipronil. In the event of accidental exposure, the rabbit should be washed and veterinary advice sought promptly, even if no adverse effects have yet occurred. Measures should also be taken to avoid accidental exposure of rabbits in households where other treated animals are present.



### Specific toxicity in rabbits

A retrospective review of pharmacovigilance reports received by ANSES-ANMV between 2013 and 2018 showed that topical antiparasitics were responsible for 26.8% of reports concerning pet rabbits. This therapeutic class is second only to vaccines in all reports for this species. The same study showed that drugs containing fipronil were involved in 93% of reports of adverse effects associated with antiparasitics in rabbits, despite the fact that no drugs containing fipronil are authorised for this species [1].

Fipronil is particularly toxic to this species. Its use can lead to potentially fatal disorders, whether systemic (anorexia, lethargy), digestive or neurological (convulsions). Symptoms may not appear until several days after exposure (up to 20 days in some cases). The animal usually dies within a few days of the onset of symptoms [2]. The origin of this specific toxicity in rabbits is not fully understood. Young rabbits appear to be particularly sensitive, probably due to the immaturity of their enzyme system [3]. There is no specific antidote for this poisoning. Supportive therapy should be initiated as soon as symptoms appear (rehydration, assisted feeding, treatment of hypothermia, use of benzodiazepines in the event of seizures). The prognosis remains cautious despite treatment, especially if there are neurological symptoms [2].

### Context

After cats and dogs, rabbits are the most popular pet mammals in French households. Fipronil is a synthetic insecticide belonging to the phenylpyrazole class. It is found in 57 veterinary medicines authorised for the prevention and treatment of flea and tick infestations in dogs and cats<sup>1</sup>. No drugs containing fipronil are currently authorised for use in rabbits.

With the arrival of spring, many pet owners treat their animals with topical antiparasitics containing fipronil. These products, which are available from pharmacies, veterinary surgeries, supermarkets, garden centres and pet stores, must not be used on rabbits.

Nevertheless, despite the fact that the packaging inserts state that these drugs are absolutely contraindicated in rabbits, accidents are regularly reported. In recent years, through the veterinary pharmacovigilance scheme operated by the French Agency for Veterinary Medicinal Products (ANMV), ANSES has recorded a number of serious or even fatal cases of poisoning in rabbits intentionally treated with topical antiparasitics containing fipronil intended for dogs or cats.

1. Source : [SPC index \(anses.fr\)](https://anses.fr)

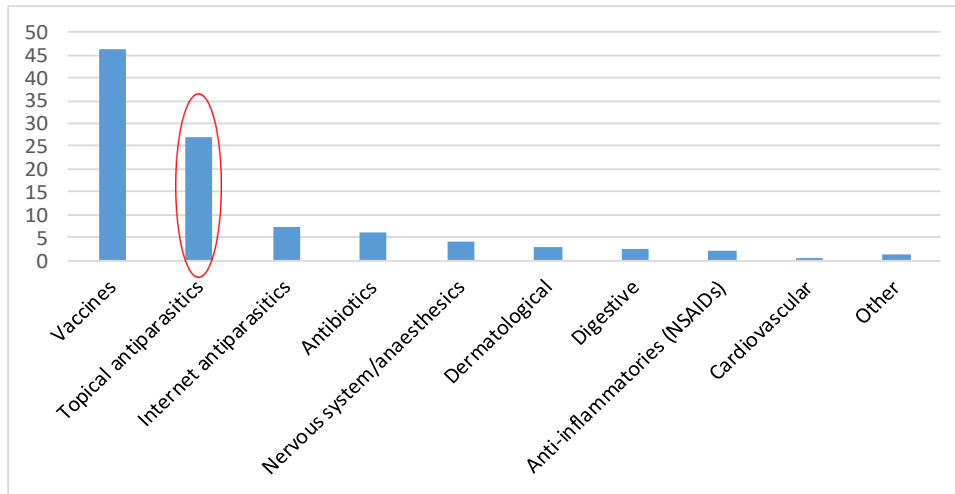


Figure 1 : Breakdown of drugs involved in pharmacovigilance reports concerning pet rabbits by therapeutic class (several therapeutic classes are possible for the same case). Source: ANSES-ANMV 2013-2018.

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#### Fatal cases regularly reported

Between 2013 and 2020, the Agency recorded 137 cases of adverse effects in rabbits following administration of a treatment containing fipronil. Of these 137 reports, 66 were deemed serious and 33 rabbits died following the use of one of these antiparasitic drugs authorised for dogs or cats. The annual number of reports received has generally remained stable, with an average of 17 cases per year. A decline was seen in 2019 with 10 reports received, but this was followed by a new increase in the number of cases in 2020 (16 cases). The number of rabbits dying from this type of reaction is stable (generally less than 5 per year), with the exception of 2015 when 14 rabbit deaths were reported. That year, the application of a drug containing fipronil to 12 young rabbits in one household killed 10 of them.

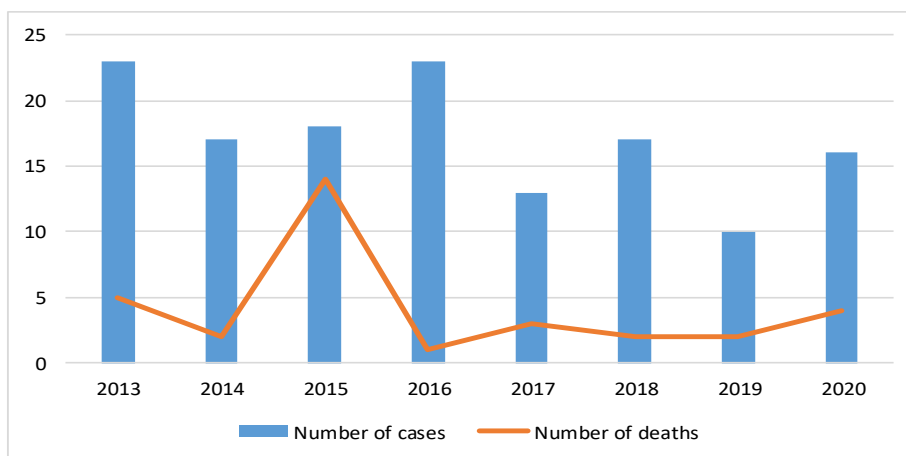


Figure 2 : Change in cases of adverse effects due to fipronil reported in rabbits between 2013 and 2020 (Source ANSES-ANMV).

### Precautions need to be taken to avoid these accidents

In this context, the Agency reminded rabbit owners, via an article on its website in May 2021, not to treat their pets with veterinary drugs intended for dogs and/or cats, especially those that contain fipronil [4].

In the event of accidental exposure, the rabbit should be washed with warm water and soap or washing-up liquid and prompt advice should be sought from a veterinarian or a veterinary poison control centre. As the prognosis is generally poor in rabbits already showing clinical symptoms, these measures should be taken as soon as possible, even if adverse effects have not yet occurred.

To prevent rabbits from being accidentally exposed to these products in homes with more than one type of animal, owners should keep treated dogs and cats away from their rabbits until the site where the antiparasitic was applied is dry, in order to prevent the rabbits licking or otherwise coming into contact with the application site of a treated animal.

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### Conclusion: comply with the instructions in the summaries of product characteristics (SPCs)

It is essential to comply with the SPC and any contraindications in order to limit the risk of any adverse effect from a veterinary drug. Rabbits are not the only species affected by cases of poisoning due to the misuse of topically administered veterinary antiparasitics. In cats, cases of poisoning with topical antiparasitics containing permethrin intended for dogs are also regularly reported and are related to the cat's particular sensitivity to this compound [5]. The Agency reiterates that marketing authorisations are issued for one or more given animal species, and that it is important to comply with the target species for each of these veterinary drugs.

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#### Where should reports be sent ?

To report an adverse effect in an animal following the use of a veterinary drug:

<https://pharmacovigilance-anmv.anses.fr/>

To report an adverse effect in a human following the use of a veterinary drug:

[https://signalement.social-sante.gouv.fr/psig\\_ihm\\_utilisateurs/index.html#/accueil](https://signalement.social-sante.gouv.fr/psig_ihm_utilisateurs/index.html#/accueil)

2. <https://www.veterinaire.fr/annuaires/contacter-un-centre-antipoison.html>

## What are the adverse effects of *Melaleuca* essential oils (tea-tree, niaouli and cajeput) taken orally?

Although *Melaleuca* leaves have not traditionally been used for food purposes in France, they have given rise to tea-tree, niaouli and cajeput essential oils found in multiple food supplements. Some consumers misuse them as auxiliary therapies to treat certain infections. This is despite the fact that these essential oils are discouraged or even banned in some European countries due to their potential neurotoxic effects. ANSES studied the risks associated with their ingestion, and confirms that on the basis of current knowledge, the oral absorption of certain compounds in *Melaleuca* essential oils poses neurological risks (niaouli and cajeput). To avoid these risks, the Agency is making some recommendations and advises against their consumption, in particular by children and pregnant or breastfeeding women.



Several *Melaleuca* essential oils are available on the French food supplement market: tea-tree (*Melaleuca alternifolia*), niaouli (*Melaleuca quinquenervia* (Cav.)) and cajeput (*Melaleuca cajuputi*). They are taken for their claimed antimicrobial properties. However, in some countries such as Belgium, oral consumption is strictly prohibited. The European Medicines Agency (EMA) monograph also contraindicates oral use of these essential oils. This ban appears to be based on cases of neurological damage in young children following ingestion of high doses of these essential oils. The article below summarises the adverse effects reported in the literature and by the various vigilance schemes following oral consumption of these essential oils.

The composition of these essential oils, together with the toxicological data and a risk assessment, are detailed in the ANSES Opinion (see "Find out more").

### Risks to young children reported in the scientific literature

- Accidental exposure to tea-tree essential oils and neurological damage

Three cases of accidental ingestion by children of tea-tree essential oils, leading to neurological disorders, have been reported in the literature.

The first case concerned a 17-month-old boy who had ingested no more than 15 mL of tea-tree oil (non-childproof bottle). After about ten minutes, the child became drowsy, staggering and unable to sit or walk. On admission to the hospital emergency department, the child was ataxic<sup>1</sup> and agitated, but alert. His blood oxygen saturation was normal. Nearly five hours after ingestion, his condition had returned to normal [1].

The second case involved a four-year-old boy who was found prostrate after ingesting two teaspoons (about 10 mL) of tea-tree oil in a glass of water. This was apparently administered following confusion with a bottle of *Aloe vera*. The child had behaved normally for 30 minutes, except for a slight ataxia. Fifteen minutes later, he was found crying. He responded incoherently and seemed apathetic to his parents. His mother made him vomit and then he fell asleep. On admission to hospital, the child was unconscious with respiratory distress that required artificial ventilation. Toxicological tests (blood and urine) found no trace of any substances. The remaining tests were normal (in particular those concerning liver function), as was the chest X-ray. There followed alternating phases of drowsiness and agitation. His condition then improved, allowing him to return home twenty-four hours after his admission, without any sequelae [2].

1. Ataxia is a disorder affecting balance and motor coordination, mimicking acute drunkenness.



The third article described the case of a 23-month-old boy who was found with an empty 10 mL bottle of tea-tree oil. Thirty minutes later, the child had become dazed and disoriented, unable to keep his balance and constantly stumbling. Once hospitalised, all further investigations (chest X-ray and blood tests) as well as the clinical examination were normal, apart from persistent disorientation and a strong eucalyptus smell on the breath. His neurological condition finally returned to normal after about five hours [3].

Accidents in young children involving essential oils are common and can have serious consequences. As with all household products and medicines, parents should ensure that bottles of essential oils are kept out of their children's reach.

- Exposure to niaouli and cajepout essential oils and neurological damage

1,8-cineole, belonging to the terpenoid family, is the major constituent of niaouli (up to 65%) and cajepout (up to 70%) essential oils. In France, the French Health Products Safety Agency (ANSM) has reported cases of convulsions in infants and children following the use, under normal conditions, of medicines (suppositories) and cosmetics (products intended to be rubbed onto the chest and/or back) containing 1,8-cineole. These cases led the ANSM to issue recommendations to manufacturers and marketers of cosmetic products containing terpenoids such as 1,8-cineole, and to contraindicate suppositories containing terpenic derivatives in children under 30 months and children with a history of epilepsy or febrile convulsion. This contraindication was then adopted by the EMA.

Oral consumption of niaouli and cajepout essential oils in the form of food supplements, by children under 30 months and children with a history of epilepsy or febrile convulsions, should therefore be prohibited. Despite this, they are currently available over the counter.

#### Poisonings recorded by French vigilance schemes

When they concern food supplements, cases of poisoning with these essential oils can be reported by consumers and healthcare professionals to ANSES's nutrivigilance scheme ([www.nutrivigilance-anses.fr/](http://www.nutrivigilance-anses.fr/)). Poison control centres also receive calls from poisoned individuals concerning all types of agents or products (domestic or industrial products, human or veterinary medicines, food supplements, plants, mushrooms, etc.), and record all their data in SICAP, the poison control centres' common information system.

2. Hepatic cytolysis is a process of destruction of liver cells.

ANSES has drawn up an inventory of all the adverse effects occurring after ingestion of *Melaleuca* essential oils (tea-tree, niaouli or cajepout) and reported to the various vigilance schemes.

- Nutrivigilance scheme

Between the establishment of the nutrivigilance scheme in 2009 and the month of October 2019, there were 15 reports of adverse effects likely to be associated with the consumption of food supplements containing *Melaleuca* essential oils. Of these 15 reports, all of which concerned adults, ten were sufficiently documented to be analysed for their causality. For these analysable cases, the most commonly reported adverse effects were mainly general (headache, dizziness) and digestive symptoms (abdominal pain). Reports where causality could not be analysed included one case of hepatic cytolysis<sup>2</sup>, one case of dry mouth, one case of reversible cerebral vasoconstriction manifested by sudden headaches, one case of itching and one case of faintness with headache.

- Poison control centre data

Between December 2006 and December 2019, 496 cases of adverse effects likely to be due to the consumption of food supplements containing *Melaleuca* essential oils were registered in SICAP. The exposed individuals ranged in age from ten days to 85 years. About 35% of the reported symptoms were digestive disorders such as abdominal pain, vomiting and nausea. In 28% of cases, the symptoms concerned oropharyngeal disorders, the vast majority of which were oropharyngeal pain or irritation. Twelve per cent of cases concerned general symptoms such as headaches, dizziness or fatigue. Other symptoms, such as cough, drowsiness, skin damage or tachycardia, were reported more sporadically.

- Data from regional pharmacovigilance centres

From 1986 to February 2019, 15 reports concerning adults were registered for Terpone<sup>®</sup> and Euphonyll<sup>®</sup>, both orally administered medicinal products containing niaouli essential oil. The most frequently reported adverse effects were general symptoms (dizziness, drowsiness) or dermatological and allergic effects (skin rash, Stevens-Johnson syndrome). For the product Euvanol<sup>®</sup>, which is a nasal spray also containing niaouli essential oil, 35 reports were registered. The most frequently reported adverse effects were neurological (convulsions), dermatological and allergic (angioedema, skin rash), and ENT symptoms (epistaxis, burning in the throat). Marketing of this product was discontinued in 2019.

The adverse effects recorded by the different vigilance schemes are consistent, with the majority being headaches, dizziness and effects on the digestive and oropharyngeal areas.

Oral consumption of *Melaleuca* essential oils is becoming increasingly popular and is based on antimicrobial properties published in various aromatherapy books. However, this practice is not without risk. Adverse effects have been reported in the literature – mainly accidents in young children – and by the various vigilance schemes. Oral consumption of these essential oils in the form of food supplements should be prohibited in children aged under 30 months or with a history of epilepsy, and the products should be kept out of their reach. In the absence of sufficient data to more effectively manage safe use, ANSES advises against their consumption by children

and pregnant or breastfeeding women. All other members of the population are encouraged to talk to a healthcare professional about the suitability of these products.

Furthermore, during its expert appraisal, the Agency identified some confusion between the different *Melaleuca* species from which these essential oils are produced. ANSES therefore stresses the importance of confirming the full scientific name of the species for each product marketed and mentioning it on the label. Lastly, poor storage of tea-tree essential oils can lead to the formation of ascaridole, whose toxicity is still subject to uncertainty. The Agency recommends clearly info

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### TO FIND OUT MORE :

[ANSES Opinion on "the use of \*Melaleuca\* essential oils in food supplements"](#)

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ANSES is in charge of several health vigilance systems: pharmacovigilance for veterinary medicinal products, nutrivi-gilance, phytopharmacovigilance, toxicovigilance and vigilance for occupational diseases. Our vigilance activities make little noise and are therefore poorly known to public health actors, health professionals, marketers and users in general. And so, in order to make our work more visible we have decided to create a dedicated newsletter entitled Vigil'Anses.

As news on each of our vigilance topics crops up, this quarterly newsletter presents the main results of the work carried out by ANSES within the framework of its vigilance missions, in conjunction with its partners, professional networks and expert groups, as well as the actions we have undertaken.

The articles are deliberately short, and are intended for all those involved in the occupational and environmental health and safety field: public authorities, health agencies, institutes and expert bodies that are partners of ANSES, prevention policy managers, the scientific community, professionals, associations and users. Vigil'Anses also invites the interested reader to delve deeper and discover publications, opinions and reports available online that will further their knowledge.



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