

# Analysis report

## related to pesticides found in hair

Kit No. X3-XXXX-xxxxxxx

Report version 1

# OVERVIEW

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# PART 1

## YOUR RESULTS

You have taken a sample of your hair and sent it to Kudzu Science for testing for pesticides (insecticides, herbicides and fungicides) used commonly by individuals and professionals.

The results of this analysis provide information on the nature of the pesticides to which you have been exposed. They reflect an exposure over an average period of 1 to 3 months depending on the length of hair submitted for analysis (from 1 to 3 cm).

The presence of pesticides in your hair may result either from a significant and occasional exposure (known as acute exposure) or from exposure to low and regular doses (known as chronic exposure), or a combination of both.

**We would like to draw your attention to the fact that there is currently no reference scale for linking a certain measured pesticide concentration in hair to a level of risk to health.**

However, taking into account the mechanisms of action at low doses and the effects of pesticide cocktails (increased toxicity from the combination of multiple pesticides) suspected in some scientific studies, it is prudent to consider that any chronic pesticide presence in the organism, whatever the concentration, may have some health effects.

Concentrations of pesticides measured in your hair, in pictogram (pg) of pesticide per milligram (mg) of hair, are given for information purposes. Individual sheets are given in Part 2 of this report for each pesticide detected in your hair sample. These sheets will help you to identify the sources of contamination and to take, if you wish, measures to prevent exposure.

### **Assessment of the pesticides investigated in your hair sample**

The table below presents a summary of the pesticides that were detected (concentration below quantification limit of the analytical method but above detection limit of the instrument) or quantified (concentration higher than or equal to the quantification limit of the analytical method) in your hair sample, out of the pesticides investigated.

Total number of pesticides in your sample (out of 59 investigated) :	10
- Number of detected pesticides :	6
- Number of quantified pesticides :	4
Sum of quantified pesticides concentration :	19.3 pg/mg
- Minimal quantified concentration :	4.3 pg/mg
- Maximum quantified concentration :	5.5 pg/mg

## PART 1 : YOUR RESULTS

### Detail for investigated pesticides in your hair sample (1/3)

Name	CAS no	Category <sup>(1)</sup>	LQ <sup>(2)</sup> (pg/mg)	C measured <sup>(3)</sup> (pg/mg)	Conclusion
2,4-D	94-75-7	H	1000.0	< LQ	NOT DETECTED
4,4'-DDD	72-54-8	I	10.0	< LQ	NOT DETECTED
4,4'-DDE	72-55-9	I	4.0	< LQ	<b>PRESENCE</b>
4,4'-DDT	50-29-3	I	10.0	< LQ	NOT DETECTED
Acephate	30560-19-1	I	100.0	< LQ	NOT DETECTED
Acetamiprid	135410-20-7	I	4.0	< LQ	NOT DETECTED
Acetochlor	34256-82-1	H	40.0	< LQ	NOT DETECTED
Alachlore	15972-60-8	H	20.0	< LQ	NOT DETECTED
Aldrin	309-00-2	I	20.0	< LQ	NOT DETECTED
Allethrin	584-79-2	I	200.0	< LQ	NOT DETECTED
Alpha-HCH	319-84-6	I	20.0	< LQ	NOT DETECTED
Atrazine	1912-24-9	H	4.0	< LQ	NOT DETECTED
Azoxystrobin	131860-33-8	F	4.0	<b>4.3</b>	<b>PRESENCE</b>
Beta-HCH	319-85-7	I	20.0	< LQ	NOT DETECTED
Boscalid	188425-85-6	F	40.0	< LQ	<b>PRESENCE</b>
Chlordane alpha	5103-71-9	I	100.0	< LQ	<b>PRESENCE</b>
Chlordane gamma	5103-74-2	I	100.0	< LQ	<b>PRESENCE</b>
Chlorpyrifos-ethyl	2921-88-2	I	10.0	< LQ	NOT DETECTED
Chlorpyrifos-methyl	5598-13-0	I	20.0	< LQ	NOT DETECTED
Cypermethrin	52315-07-8	I	100.0	< LQ	NOT DETECTED
Cyprodinil	121552-61-2	F	4.0	< LQ	NOT DETECTED
Deltamethrin	52918-63-5	I	200.0	< LQ	NOT DETECTED

<sup>(1)</sup> F = fungicide, H = herbicide, I = insecticide, M = metabolite

<sup>(2)</sup> LQ = Limit of Quantification of the analysis method / LD = Limit of Detection of the analysis method  
Expressed in **ppb**, equivalent to **pg/mg** : picogram (pg) of pesticide per milligram (mg) of hair,  
calculated on the basis of a sample weight of 50 mg.

<sup>(3)</sup> C measured = Concentration measured in the sample, expressed in pg of pesticide per mg of hair

For information: 1 g = 1 000 mg et 1 mg = 1 000 000 000 pg

## PART 1 : YOUR RESULTS

### Detail for investigated pesticides in your hair sample (2/3)

Name	CAS no	Category <sup>(1)</sup>	LQ <sup>(2)</sup> (pg/mg)	C measured <sup>(3)</sup> (pg/mg)	Conclusion
Dicamba	1918-00-9	H	1000.0	< LQ	NOT DETECTED
Dieldrin	60-57-1	I	40.0	< LQ	NOT DETECTED
Diflufenican	83164-33-4	H	10.0	< LQ	NOT DETECTED
Dimethomorph	110488-70-5	F	4.0	< LQ	NOT DETECTED
Diuron	330-54-1	H	4.0	< LQ	NOT DETECTED
Endosulfan-alpha	959-98-8	I	20.0	< LQ	NOT DETECTED
Endosulfan-beta	33213-65-9	I	40.0	< LQ	NOT DETECTED
Endosulfan-sulfate	1031-07-8	I	40.0	< LQ	NOT DETECTED
Endrin	72-20-8	I	40.0	< LQ	NOT DETECTED
Epoxiconazole	133855-98-8	F	10.0	< LQ	NOT DETECTED
Fipronil	120068-37-3	I	4.0	<b>4.6</b>	<b>PRESENCE</b>
Fipronil sulfone	120068-36-2	M	4.0	<b>5.0</b>	<b>PRESENCE</b>
HCBD (Hexachlorobutadiene)	87-68-3	-	200.0	< LQ	NOT DETECTED
Heptachlor	76-44-8	I	20.0	< LQ	NOT DETECTED
Heptachlor epoxide cis	1024-57-3	M	20.0	< LQ	NOT DETECTED
Heptachlor epoxide trans	28044-83-9	M	20.0	< LQ	NOT DETECTED
Imidacloprid	138261-41-3	I	10.0	< LQ	NOT DETECTED
Iprovalicarb	140923-17-7	F	4.0	< LQ	NOT DETECTED
Isoxaben	82558-50-7	H	4.0	< LQ	NOT DETECTED
Lindane	58-89-9	I	10.0	< LQ	NOT DETECTED
Malathion	121-75-5	I	20.0	< LQ	NOT DETECTED
Metalaxyl	57837-19-1	F	4.0	< LQ	NOT DETECTED

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calculated on the basis of a sample weight of 50 mg.

<sup>(3)</sup> C measured = Concentration measured in the sample, expressed in pg of pesticide per mg of hair

For information: 1 g = 1 000 mg et 1 mg = 1 000 000 000 pg

## PART 1 : YOUR RESULTS

### 🔍 Detail for investigated pesticides in your hair sample (3/3)

Name	CAS no	Category <sup>(1)</sup>	LQ <sup>(2)</sup> (pg/mg)	C measured <sup>(3)</sup> (pg/mg)	Conclusion
Metolachlor	51218-45-2	H	4.0	< LQ	NOT DETECTED
Mirex	2385-85-5	I	20.0	< LQ	NOT DETECTED
Pendimethaline	40487-42-1	H	40.0	< LQ	NOT DETECTED
Permethrin	52645-53-1	I	100.0	< LQ	<b>PRESENCE</b>
Piperonyl butoxide	51-03-6	I	100.0	< LQ	NOT DETECTED
Propiconazole	60207-90-1	F	20.0	< LQ	NOT DETECTED
Pyraclostrobin	175013-18-0	F	4.0	< LQ	NOT DETECTED
Pyrimethanil	53112-28-0	F	4.0	< LQ	<b>PRESENCE</b>
Simazine	122-34-9	H	4.0	< LQ	NOT DETECTED
Spiroxamine	118134-30-8	F	4.0	< LQ	NOT DETECTED
Tebuconazole	107534-96-3	F	4.0	<b>5.5</b>	<b>PRESENCE</b>
Tetramethrin	7696-12-0	I	40.0	< LQ	NOT DETECTED
Transfluthrin	118712-89-3	I	20.0	< LQ	NOT DETECTED
Trifloxystrobin	141517-21-7	F	4.0	< LQ	NOT DETECTED
Trifluralin	1582-09-8	H	40.0	< LQ	NOT DETECTED

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For information: 1 g = 1 000 mg et 1 mg = 1 000 000 000 pg

## PART 2

# DETAILED PRESENTATION OF DETECTED PESTICIDES

In this part of your report, all pesticides present in your sample are detailed. For each pesticide we present its usual name, chemical family, category, common commercial brand names, major manufacturers, common uses, but also health risks associated with chronic or acute exposure when the toxicological information is available\*.

**We draw your attention to the fact that the presence of pesticide in your hair does not necessarily imply that you will develop the pathologies described here, which are only given for information.**

Appearance of pathologies by exposure to pesticides depends on multiple factors including quantity and duration of exposure as well as a person's sensitivity.

**In general, if you have any health symptoms, we recommend you consult a doctor.**

### **Definitions**

- **Toxicity:** Determined from the Lethal Dose 50 (LD50), for which 50% of the population dies. It allows measuring the toxicity: low, moderate or strong.
- **Carcinogen:** Property of a substance to promote the development of cancer cells.
- **Mutagen:** Property of a substance to induce genetic mutations (DNA modification).
- **Reprotoxic:** Property of a substance to alter reproductive abilities, embryonic and fetal development.
- **Neurotoxic:** Property of a substance to alter the functioning of nerve cells.
- **Endocrine disruptor:** Property of a substance to interact with or modify the hormonal messages of the body.
- **Low doses effect:** The effects of acute intoxication (high dose and short time) are relatively well documented. However, toxicological data on the effects of chronic (repeated) exposure at low doses are rarely available. This is the case of endocrine disruptors for which the low doses effect is greater than for higher doses.

### **Sources of toxicological data presented**

\* Information on toxicology and use of pesticides was obtained with data from:

- Pesticides Action Network (PAN) : [www.pesticideinfo.org/](http://www.pesticideinfo.org/)
- Pesticides Properties DataBase (PPDB) : [www.sitem.herts.ac.uk/aeru/footprint/fr/index.htm](http://www.sitem.herts.ac.uk/aeru/footprint/fr/index.htm)
- Observatoire des résidus de pesticides (ORP) : [www.observatoire-pesticides.gouv.fr/](http://www.observatoire-pesticides.gouv.fr/)
- Agritox : [www.agritox.anses.fr/](http://www.agritox.anses.fr/)
- E-Phy : <http://e-phy.anses.fr/>
- Agence de Protection de l'Environnement des Etats-Unis (US EPA) : [www.epa.gov](http://www.epa.gov)
- Agence Internationale de Recherche sur le Cancer (IARC) : [www.iarc.fr/](http://www.iarc.fr/)
- European Food Safety Authority (EFSA) : [www.efsa.europa.eu](http://www.efsa.europa.eu)
- INERIS : [www.ineris.fr](http://www.ineris.fr)
- Organisation Mondiale de la Santé (OMS) : [www.who.int/fr/](http://www.who.int/fr/)
- The Endocrine Disruption Exchange (TEDX) : [www.endocrinedisruption.org](http://www.endocrinedisruption.org)

### 4,4'-DDE (or p,p'-DDE)

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**Category:** Insecticide

**Chemical family:** Organochloride

**Trade names (non-exhaustive list):** Data not available.

**Manufacturers (non-exhaustive list):** Data not available.

**Use:** The 4,4'-DDE is both a degradation product and a metabolite (compound transformed by the body) of 4,4'-DDT, an insecticide that has been banned in Europe since 1972 .

It is present in small quantities in the preparations of 4,4'-DDT. The latter is a very stable compound which can persist in the environment for several years; it is possible to find some traces of it in the organisms that have been exposed.

**Toxicological data:**

- Acceptable Daily Intake (ADI): Data not available
- Acute Toxicity: Slightly toxic (PAN)
- Symptoms of exposure: Itching, dermal hypersensitivity. Headache, dizziness, nausea, vomiting, incoordination, trembling, mental confusion. In severe cases: convulsions, incontinence, respiratory distress, loss of consciousness.
- Carcinogen: Yes (PAN)
- Mutagen: Data not available (PPDB)
- Neurotoxic: Data not available (PPDB)
- Toxic Effect on Development & Reproduction: Yes (PAN)
- Endocrine disruptor: Yes (TEDX), suspected (PAN).



# AZOXYSTROBIN

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**Category:** Fungicide

**Chemical family:** Strobilurin

**Trade names (non-exhaustive list):** Amistar, Azerty, Azimut, Azoami, Azoxygold, Eurostrob, Gabriac, Headway, Heritage, Hortosan, Menuet, Ortiva, Priori, Proteo+, Quadris max, Strobane, Teramis, Universalis, Xtraline, Zoxis

**Manufacturers (non-exhaustive list):** Syngenta Agro, Nufarm, Rivale, Phyto-sem, Landgold & Co, Phyto service, Agriphar

**Use:** The use of this substance is allowed in the European Union and in the United States.

Azoxystrobin is a broad-spectrum fungicide effective against different families of pathogenic fungi. It blocks the growth of molds. This substance is used in viticultural areas but also for larger crops such as cereals and vegetable crops.

### **Toxicological data:**

- Acceptable Daily Intake (ADI): 0,2 mg/kg of body weight/day (PPDB).
- Acute Toxicity: Low for oral and skin exposure, average by inhalation.
- Symptoms of exposure: Eye and skin irritation. Maybe toxic for liver.
- Carcinogen: No (PPDB), Unlikely (PAN)
- Neurotoxic: No (PPDB), Data not available (PAN)
- Toxic Effect on Development & Reproduction: Possible (PPDB), Data not available (PAN)
- Endocrine disruptor: Data not available (PPDB and PAN)

# BOSCALID

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**Category:** Fungicide

**Chemical family:** Carboxamide

**Trade names (non-exhaustive list):** Arolle, Bell, Bosca, Boscapyr, Cantus, Cazocoli, Collis, Granovo, Gringo, Hexagon, Jetset, Maitre, Pictor Pro, Rubis, Signum, Sophisme, Tolara, Venture, Viverda, Zumba

**Manufacturers (non-exhaustive list):** Leu + Gygax, BASF, Syngenta Agro, Agri Chem, Saga

**Use:** Boscalid is authorized in European Union. Boscalid is a fungicide with a broad spectrum of activity against pathogenic fungi and in particular against botrytis cinerea, a fungus responsible for gray mold. It prevents the reproduction of fungi and their growth.

**Toxicological data:**

- Acceptable Daily Intake (ADI): 0.04 mg/kg of body weight /day
- Acute Toxicity: Low for oral and dermal exposure and by inhalation.
- Symptoms of exposure: Eye irritation. Maybe toxic to the liver and thyroid.
- Carcinogen: Possible (PPDB and PAN).
- Neurotoxic: No (PPDB), Data not available (PAN)
- Toxic Effect on Development & Reproduction: Possible (PPDB), Data not available (PAN)
- Endocrine disruptor: No (PPDB), Data not available (PAN)

### CHLORDANE (Alpha & Gamma)

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**Category:** Insecticide

**Chemical family:** Organochloride

**Trade names (non-exhaustive list):** Toxichlor, Kypchlor, Dowchlor, Octachlor, Belt...

**Manufacturers (non-exhaustive list):** Velsicol, Dow ...

**Use:** Chlordane has been used as a non-systemic insecticide especially against termites, and in agriculture. It has been banned from use in the European Union since 1981 and in the United States since 1983. Chlordane is classified as Persistent Organic Pollutants (POPs) and has been on the Stockholm list of 12 POPs since 2001. Due to its persistence in Soils (half-life of 1 year), it remains present in the soil for several years and may contaminate water resources.

**Toxicological data:**

- Acceptable Daily Intake (ADI): 0.0005 mg/kg of body weight/day (PPDB).
- Acute Toxicity: Moderate (PPDB).
- Symptoms of exposure: Confusion, convulsions, nausea and vomiting. Irritating to eyes and skin. It is lipophilic and accumulates in adipose tissues. As a result, it accumulates in the food chain.
- Carcinogen: Yes (PAN and CIRC, Groupe 2B), Possible (PPDB)
- Neurotoxic: Yes (PPDB)
- Mutagen: No (PPDB)
- Toxic Effect on Development & Reproduction: Possible (PPDB and PAN).
- Endocrine disruptor: Yes (PPDB and DTEDX), suspected (PAN).

# FIPRONIL & FIPRONIL-SULFONE

**Note:** *Fipronil-Sulfone is a metabolite of Fipronil.*

**Category:** Insecticide

**Chemical family:** Organochloride and Phenylpyrazole

**Trade names (non-exhaustive list):** Frontline\*, Fiprosport\*, Tick-Puss\*, Flevox\*, Goliath Gel, Regent 500FS, Standak 250 FS, Cosmos 250 FS, Cosmos 500 FS, Mundial, Sofion, Diffuseur Fipro Habitat\* ...

*\* Formulations authorized for domestic use (indoor or in gardens).*

**Manufacturers (non-exhaustive list):** Bayer, BASF, Beaphar, Biocanina, Ceva, Certis, Kingtai, Chemicals, Merial, Vetoquinol ...

**Use:** Use of Fipronil is authorized in some European Union countries such as France, Belgium, Bulgaria, Cyprus, Czech Republic, Spain, Hungary, Romania and Slovakia. This active substance is found in flea and tick treatment preparations in dogs and cats for veterinary and domestic use. It is also used against cockroaches and grasshoppers.

### Toxicological data:

- **Acceptable Daily Intake (ADI):** 0.0002 mg/kg of body weight /day (PAN)
- **Acute Toxicity:** Medium for oral, dermal and respiratory routes (AgriTox). Specific toxicity for some targeted organ.
- **Symptoms of exposure:** Irritating to the eyes.
- **Carcinogen:** Possible (PPDB and PAN).
- **Mutagen:** Data not available (PPDB)
- **Neurotoxic :** Yes (PPDB)
- **Toxic Effect on Development & Reproduction:** Possible (PPDB), Data not available (PAN)
- **Endocrine disruptor:** Possible (PPDB), suspected (PAN).

# PERMETHRIN

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**Category:** Insecticide

**Chemical family:** Pyrethroid

**Trade names (non-exhaustive list):** Adventix dog\*, Raid against bedbugs\*, Diffuser Pucid'habitat\*, Pulvex\*, Ecologis Spray\*...

*\* Formulations authorized for domestic use (E-Phy)*

**Manufacturers (non-exhaustive list):** S.C.Johson, Bayer, Biocanina, MSD, Virbac, Ceva, Vetoquinol, Beaphar...

**Use:** Permethrin has been used against a large number of insects, including insect parasites (cockroaches, horseflies, fleas, etc.) in nut/fruit trees, vegetables, cotton and mushroom crops. Since 2000, the agricultural use of permethrin is no longer authorized in Europe. On the other hand, this substance is found in repellent insecticidal formulations for domestic and veterinary use.

**Toxicological data:**

- **Acceptable Daily Intake (ADI):** 0.05 mg/kg of body weight /day (PPDB)
- **Acute Toxicity:** Moderately toxic (PPDB).
- **Symptoms of exposure:** Irritation for the skin (redness, burning sensation), eyes and respiratory tracts (cough). Risk of diarrhea and vomiting if swallowed.
- **Carcinogen:** Likely (PPDB).
- **Mutagen:** No (PPDB)
- **Neurotoxic:** Yes (PPDB)
- **Toxic Effect on Development & Reproduction:** Yes (PPDB)
- **Endocrine disruptor:** Yes (PPDB).

# PYRIMETHANIL

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**Category:** Fungicide

**Chemical family:** Pyrimidine

**Trade names (non-exhaustive list):** Babel, Fleurus, Lasca, Papyrus, Pascalou, Pyrimetop, Pyrus 400, Scala jardin, Tagara, Toucan, Verdi, Vision, Walabi

**Manufacturers (non-exhaustive list):** Leu + Gyax, Agriphar, Omya

**Use:** The use of this compound is authorized in the European Union.

Pyrimethanil is a fungicide used either for preventive action (against gray mold in viticulture) or curative (against scab, which mainly affects apple and pear trees). Pyrimethanil is very effective against fungi like Botrytis, Sclerotinia, Monilia, and Venturia. Indirectly, it inhibits the growth of the fungus.

### Toxicological data

- **Acceptable Daily Intake (ADI):** 0.17 mg/kg of body weight /day (PAN)
- **Acute Toxicity:** Low for oral and dermal exposure and by inhalation (PPDB, Pesticide Action Network et Agritox).
- **Symptoms of exposure:** Possible reaching of the liver, kidneys, adrenal glands of the bladder and may be toxic to the thyroid.
- **Carcinogen:** No (PPDB), Possible (PAN).
- **Neurotoxic :** No (PPDB), Data not available (PAN)
- **Toxic Effect on Development & Reproduction:** No (PPDB), Data not available (PAN)
- **Endocrine disruptor:** Possible (PPDB and PAN).

# TEBUCONAZOLE

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**Category:** Fungicide

**Chemical family:** Triazole

**Trade names (non-exhaustive list):** Abilis, Abnakis, Axima, Balmora, Baltazar, Bony, uster, Cabestor, Cezix, Cogito, Corail, Cosinus, Curzol, Diapazon, Divinus, Duolys, Eveil, Fazol, Formose, Galactica, Gladio, Helocur, Illiade, Kadima, Kestrel, Kisaro, Ludik, Magnello, Milord, Muza, Pepito, Prosaro, Rancho, Sonara, Tabou, Tepro...

**Manufacturers (non-exhaustive list):** Bayer, Nufarm, Syngenta Agro, Rotam Agrochemical, Makhteshim Agan France, Helm ...

**Use:** Tebuconazole is a systemic fungicide, that is, spreads in the plant, with preventive and curative actions, that acts on the pathogen's membrane and makes it vulnerable. It is widely used in viticulture against powdery mildew.

### Toxicological data

- Acceptable Daily Intake (ADI): 0.03 mg/kg of body weight /day
- Acute Toxicity: Low for oral and dermal exposure and by inhalation.
- Symptoms of exposure: Irritation of eyes, headache, dizziness, weakness and nausea. Targets: liver and blood system.
- Carcinogen: Possible (PPDB and PAN).
- Neurotoxic : No (PPDB), Data not available (PAN)
- Toxic Effect on Development & Reproduction: Yes (PPDB), Data not available (PAN)
- Endocrine disruptor: Data not available (PPDB), suspected (PAN).

## **PART 3**

# **INFORMATION ABOUT YOUR SAMPLE**

### **Sampling material**

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A cardboard sampler for hair of more than 3 cm in length and a cardboard scale for hair less than 3 cm in length, produced by Kudzu Science.

### **Sample**

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- Sample type: Hair
- Sampling date: 15/DEC/2017
- Laboratory receipt date: 03/JAN/2018
- Sample analysis date: 19/JAN/2018
- Sample weight analysed: 50.35 mg
- Length of hair segment analyzed (from the scalp): 3 cm
- Exposure period investigated: about 3 months (01/SEP/2017 to 01/DEC/2017)

### **Laboratory**

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Institut de Recherche et d'Expertise Scientifique (IRES)

2 rue de la Durance, Europarc Meinau, 67100 STRASBOURG - France

### **Method of analysis**

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Hair sample has been analyzed using internal method with GC-MS/MS (Gas Chromatography coupled with Mass Spectrometry detection) and LC-MS (Liquid Chromatography coupled with Mass Spectrometry Detection).

### **Report validation**

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This report has been validated on 24/JAN/2018 by :

Célia BURG, M. Sc.  
Laboratory Manager



## **PART 4**

# **INFORMATION AND ADVICE**

The term pesticide refers to substances or preparations used for the prevention, control or elimination of organisms considered to be undesirable, whether they are plants, animals, fungi or bacteria. According to their target, pesticides are divided into different categories: herbicides (against vegetation like weeds), insecticides (against insects), fungicides (against fungi and mould)...

The health impact of pesticides is now established by numerous scientific studies. To date, there is no reference scale between the concentration measured in the hair and the level of possible risk to health.

The presence of pesticides in hair reflects a presence in the body, as a result of exposure at a significant level.

Given the suspected low-dose mechanisms of action, this presence may have health effects.

In order to limit your exposure, it is important to know their sources and know how to use them safely.

### **Sources of pesticides exposure**

Pesticides are present in our daily lives. They are mainly found:

- In food,
- In water,
- In products used in gardens and house plants,
- In products used on pets for the treatment of pests,
- In products used for the treatment of wood,
- In products used against mosquitoes, ants, cockroaches and flies inside and outside houses,
- In products used against pests such as lice

Some compounds, such as DDT, have been banned for several years, yet they are sufficiently persistent in the environment for populations to remain exposed to them.

### **The exposure of crops neighbors**

The application of pesticides by spraying exposes the neighbors to the products used in the plots bordering the dwellings. Residents do not benefit from the personal protection systems needed to protect themselves from pesticides. It is therefore important to find actions to limit the exposure of local residents, as for example:

- The installation of fabric net able to hold pesticides and prevent their spread,
- Communication between farmers and neighbors, to know the most "at risk" periods to allow the local residents to organize themselves.

### How to limit occupational exposure to pesticides?

Farmers are highly exposed to plant protection products used to treat crops and orchards. It is important to consider that all operations are dangerous. Exposure occurs mainly during the following operations: mixing and filling, application by spraying, transport and storage of plant protection products, maintenance of equipment, accidental spillage and elimination of phytosanitary products.

Pesticides can enter the body by ingestion, inhalation (respiratory tract) and skin contact (through the skin).

Often the effect of intoxication is delayed and it is not noticed immediately. In addition, plant protection products can remain toxic long after application. If you think you have had a significant exposure, it is essential to stop working and contact your doctor or the Poison Control Center.

Otherwise, repeated treatments combined with the use of multiple pesticides may increase the toxicity of pesticides (cocktail effects). There are few "antidotes" against pesticides.

The storage places are sometimes closed and in the absence of air renewal, the concentration of pesticide in the air increases and presents a health risk for the people frequenting the place of storage. It is therefore advisable to store the products in an airy place.

To limit the risks related to ingestion, it is strongly discouraged to eat or drink at the workplace. After using phytosanitary products, it is important to change clothes and wash your hands and face before moving on to other activities.

Cutaneous absorption intoxication is most common in agricultural occupations. This is mainly done on uncovered or unprotected areas of the body such as the face and hands. However, it can also occur through clothing if these are not suitable.

In the event of spraying on clothing, it is essential to immediately remove all contaminated clothing and wash the skin with water, avoiding the use of alcoholic solutions as these promote the dermal absorption of pesticides.

To limit one's exposure, individual protection systems should be worn:

- A mask and goggles for face and respiratory tract protection. The mask used must be able to effectively filter the pesticides and the filter cartridges must be changed regularly.
- Cuffed gloves and boots to protect hands and feet. These should be washed thoroughly before removal to avoid contamination.
- A suit to protect the body, which must be in good condition and well adjusted. If it is washable, it should be cleaned separately from other clothes.

All these personal protection systems must be stored in a clean, dry and well ventilated room, and separated from the place of residence as well as the place of storage of the pesticides.

### **🔗 How to limit the presence of pesticides in food**

In order to limit the presence of pesticides in foods, fruits and vegetables should be washed well with water and, if appropriate, water and white vinegar and, ideally, peeled.

We advise you to monitor the origin of food, as some producer countries often do not have the same regulations concerning the use of pesticides, especially with regard to the quantities used. Several compounds are banned from use in some countries and authorized in others (e.g. Alachlor, diazinon and permethrin are banned from use in the European Community but they may end up on imported fruits and vegetables from outside the EC).

Finally, it is also useful to favour the consumption of fruits and vegetables from organic farming.

### **🔗 How to limit the use of pesticides in gardening activities**

To grow and to be more resistant to outside attacks, plants need fertilizers. There are several natural fertilizers such as compost, manure, guano etc. Some of these fertilizers can be produced by yourself as compost, whose production also enables you to reduce your household waste volumes.

Several techniques can be used to eliminate or limit the presence of "weeds". Mulching consists of putting straw on the ground to prevent light from passing through to the soil and to prevent weed growth. It is also advisable to regularly sprinkle or spray cooking water (from potatoes, pasta, rice etc.) or hot water on the plants you want to eliminate.

It is advisable to leave a small area in your vegetable garden fallow so that pollinating insects and birds participate in the healthy ecosystem that is your garden. In addition, the land will rest and create better quality crops in following years.

There are plant combinations that allow you to get rid of the insect pests in your garden: carnations next to tomato plants, parsley or marigolds against the proliferation of the aphids. Possible combinations are presented in organic gardening books.

Against aphids, ladybirds are effective because they feed on them. Finally, against slugs and snails, you can use wood ash or fine sand around the plants or sink a cup with beer in to the soil.

### **🔗 How to use pesticides safely**

In agriculture, the application of pesticides by spraying enables to limit the quantities of phytosanitary products used but poses a risk related to the dispersion of the products in the atmosphere. Thus, the pesticides used can be transported by the winds and found at a great distance from the point of application.

It is recommended not to treat by spraying when the wind speed is too high, in order to avoid as much as possible the dispersal of the pesticides beyond the application zones.

Before handling pesticides, it is important to read the instructions for use carefully and observe the manufacturer's instructions for the use of the product, in particular with regard to the doses to be used. The preparation to be used must not be excessive in relation to the quantity necessary to be applied.

## **PART 4 : INFORMATION AND ADVICE**

It is very important to avoid inhalation, ingestion, and dermal or eye contact with these substances. Handling pesticides involves taking the following precautions:

- Wear personal protection systems (clothing, gloves, goggles, boots and mask),
- Remove personal protection systems after completing the application of pesticides and before starting another activity,
- Wash hands thoroughly after use,
- Keep children and sensitive people (pregnant women and elderly) away from the treated areas for a few days after use

### **🔗 How to store pesticides**

Pesticides are hazardous to the entire family and should be stored in a dry, well-ventilated area out of the reach of children and in their original packaging.

Once used, the container must be returned for recycling at the distributor's or at a specialized shop. It is very important not to use the container for any other purpose.

For a professional warehousing, it is important:

- Not to store large amount of pesticides (limit to the required amounts)
- To respect the storage instructions showed on the information labels
- To make sure the shelves are strong enough to support the mass of stored products
- Store pesticides in a dry, cool, dark place (away from direct sunlight) and protected from extreme temperatures

### **🔗 We are unequal before pesticide exposure**

Children and pregnant women are more sensitive than the rest of the population to the health effects of pesticides. Several scientific studies have shown that the exposure of the pregnant woman also results in an exposure of the fetus, which can lead to major malformations, especially in the genitalia of children. Exposure of children causes developmental problems.

### **🔗 What to do in case of acute exposure to pesticides by ingestion or inhalation**

Pesticide ingestion is accidental. It usually occurs through the mouthing of an object, fruit, vegetable or clothing soiled by pesticides. Therefore, before handling, it is very important to take maximum care when wearing personal protection systems and to respect the instructions for use of pesticides (see section How to use pesticides safely?).

In case of direct ingestion, you should:

- Not induce the person to vomit,
- Contact your local poison control centre immediately,
- Seek medical attention

Inhalation of pesticide may occur during the preparation of the diluted solution or when spraying the pesticide.

In case of inhalation, you should:

- Stop any activity to decrease your breathing rate,
- Contact your local poison control centre immediately,
- Seek medical attention

When contacting a doctor or hospital, take the packaging of the pesticide as it contains important information that can be used in order to provide you with the most suitable and effective treatment.

### **🔗 What to do in case of acute exposure to pesticides by dermal contact**

Dermal exposure may occur during pesticide preparation or application. For this specific reason, it is very important to take the maximum precautions when handling, including personal protection systems (see section How to use pesticides safely).

Immediately after observing the exposure, you must:

- Quickly remove any contaminated clothing,
- Wash the exposed parts very thoroughly with mild soap.

It is very important not to use organic solvents (alcohol, acetone, etc.) to remove traces of pesticides. Indeed, these solvents easily traverse the skin and therefore allow the absorption of pesticides by the body.

After this washing step, you should contact your poison control centre and consult a doctor.

When making these contacts, take the packaging of the pesticide as it contains important information that can be used in order to provide you with the most suitable and effective treatment.

### **🔗 How to apply pest control products to pets safely**

For sanitary reasons, pets should be regularly treated against ticks and fleas. Products used are purchased in pharmacies or at veterinarians and are generally offered as a single dose.

Before using these products, it is important to read the instructions for use indicated on the leaflet.

For the application of the product to the animal, it is important to protect yourself with individual protection systems - at least a pair of gloves. After the application, it is necessary to thoroughly wash your hands.

Finally, the applied product is present on the hair of animals and it is therefore advisable not to stroke them for several days after treatment.

### **🔗 Products against mosquitoes and alternative solutions**

In spring and summer, we often use diffusers or sprays to limit the discomfort caused by mosquitoes. These products contain some insecticides and repellents, mainly chemical compounds of the pyrethroids family, which are found in the air we breathe and are inhaled directly.

Avoid their use as much as possible and make sure to air the room during and after their use. If you use this type of product, use natural pyrethrum, because the synthetic products are more harmful.

We suggest the use of natural products such as lemongrass essence. This product not only acts as a repellent but also reduces the itching associated with insect bites.

Some plants also have insect repellent properties (thyme, lemon thyme, lemon basil, lemon verbena, geranium, lavender, peppermint etc.) and can be used indoors or outdoors. To increase their effectiveness, it is preferable to water them in the evening and to slightly ruffle their foliage.

Finally, you could use a lemon slice in a saucer resting on your bedside table and/or a mosquito net.

### **🔗 Alternative solutions against lice**

Lice are recurrent in schools where their presence is regularly reported. There are some alternatives to the use of pesticides to treat your children's hair, such as lavender oil that has proven repellent effects with respect to lice. It can be used either as a preventive or curative shampoo.

## PART 5

# USEFUL CONTACTS & LINKS

### 🔗 Contacts

For any query, please contact our customer service by email [info@kudzuscience.com](mailto:info@kudzuscience.com)

or by phone : **+33 (0)3 69 61 46 00.**

### 🔗 Useful Links

- The website of Pesticide Action Network contains information about pesticides toxicity <http://www.pesticideinfo.org>
- The website of World Health Organisation (WHO) <http://www.who.int>
- The website of EFSA (European Food Safety Authority) <http://www.efsa.europa.eu>

Kudzu Science thanks you for your trust.