PESTICIDES IN DRINKING WATER

HSE NATIONAL DRINKING WATER GROUP
Frequently Asked Questions (FAQs)

What are pesticides?

- Pesticides are chemicals or mixtures of chemicals that are used to control pests.
- A pest can be a small animal (rat), an insect (fly), an unwanted plant (weed) or a micro-organism (bacteria or virus).
- When used to control unwanted plants or weeds, pesticides are called *herbicides*.
- Among pesticides, *herbicides* are the greatest threat to drinking water.
- The word 'pesticides' will be used in this leaflet to mean **all** pesticides and herbicides.
- Pesticides work by preventing (stopping growth), destroying (killing), repelling (keeping away), or reducing (making smaller) a particular pest.

Where are pesticides used?

- They are used in farming and in forestry to control weeds and rodents (e.g. rats).
- They are used in homes on gardens, lawns and drive-ways.
- They are used by transport authorities to keep roadsides and railway verges clear.
- They are used in public parks and golf courses.

How do pesticides get in to drinking water?

- Most public drinking water supplies in Ireland come from surface water e.g. rivers, lakes and streams. Pesticides can get in to surface water in a few different ways:
    - By direct spraying of rushes and other weeds with pesticides close to a river or stream;
    - From pesticide run-off from land into a stream during heavy rain; and

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- Sprayed pesticide can drift in the wind onto a stream, river or lake.

- Pesticides can also seep through soil into groundwater (wells).

- Pesticides can get into drinking water through misuse or careless handling of containers during storage or disposal.

What does it mean when a pesticide has been found in my drinking water?

- In Ireland, when a pesticide is found in drinking water, it usually means that traces have been found during routine water sampling.

- The **European Union (EU) Drinking Water Regulations** aim to keep pesticides out of drinking water.

- Even small traces of pesticides are not allowed.

- Pesticide levels are tested in public water supplies, in large group water schemes and in wells supplying public / commercial buildings.

- Pesticides are not tested in private house wells, unless the owner decides to do so.

- In the EU, most individual pesticides have a legal limit in drinking water of 0.1 micrograms/litre (µg/L).

- If more than one pesticide is found in drinking water, the total (sum) of all pesticides together, has a legal limit of 0.5 µg/L.

- Five pesticides have a stricter legal limit of 0.03 µg/l. These have been banned in Ireland since 1981.

- In general, even a small amount of pesticide in a water source can cause a breach of the legal limit in drinking water:
  - '***A single drop of pesticide in a water body such as a typical stream (1m wide, 0.30m deep), for example, can be enough to breach the legal limit for pesticides in drinking water of 0.1 micrograms /litre along 30 kilometres of its length***.' (**Pesticide Registration & Control Division, Department of Agriculture, Food and the Marine**).

- 0.1 µg/l of the pesticide MCPA is about the same as one drop of pesticide in an Olympic sized swimming pool.

- The EU legal limits for pesticides in drinking water are set in an effort to keep pesticides out of drinking water altogether.

- Health limits for pesticides in drinking water are set by the World Health Organization (**WHO**). Even with large built-in health safety factors, WHO guideline limits are much higher than EU limits.

How do pesticides in drinking water affect my health?

- Pesticides have been found in trace amounts in drinking water in Ireland and **not** at levels which are known to affect health.

- The levels of pesticides found in drinking water in Ireland, have been well below the current WHO health guideline limits.

What happens when a pesticide has been detected in my drinking water?

- When a pesticide has been detected in drinking water:
    - It is investigated by the Water Services Authority and the frequency of testing of the water supply is increased;
    - The Water Services Authority informs the EPA and the HSE about the exceedance; and
    - You will be contacted if there is any cause for concern and advised by the Water Services Authority about what action you should take.

How much of a problem are pesticides in drinking water in Ireland?

- Testing of pesticides in drinking water supplies began in 2007.

- Since then small amounts of pesticides have been found in some drinking water supplies.

- The EPA drinking reports for public water supplies provides further detail of pesticide detections in public water supplies:

https://www.epa.ie/publications/compliance--enforcement/drinking-water/

- In order to prevent contamination of drinking water, pesticides should be used responsibly.

- Responsible use of pesticides is important near private wells and small water supplies as theses supplies may never be tested for pesticide contamination.

- It is best for people and for the environment that the EU legal limit for pesticides is not breached at all. If it is breached it is best that it does not continue.

What is being done nationally about pesticides in drinking water?

- Keeping pesticides out of drinking water is everybody's responsibility.

- Pesticide Registration & Control Division of the Department of Agriculture Food and Marine enforce the European Communities (Sustainable Use of Pesticides) Regulations 2012.

- A multi-sectoral *National Pesticides in Drinking Water Action Group* has been set up to help stop pesticides getting in to drinking water in the long-term.

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How can I find out if there has been a pesticide exceedance in my water?

For details of pesticides in your drinking water you should contact your water supplier:

- Public Water Supplies – Uisce Éireann (UE) customers can check pesticide levels in their own supply at:
    - **https://www.water.ie/**

- Private Water Supplies – your group water scheme committee or the owner of your private supply (this might be the developer of a private estate, for instance).

Where can I find more information about pesticides in drinking water?

WHO drinking water quality guidelines can be found at:

https://www.who.int/publications/i/item/9789240045064

The following pages provide some information on five of the pesticides which have most commonly been found in drinking water in Ireland:

- MCPA,
- 2,4-D,
- Mecoprop,
- Clopyralid. and
- Glyphosate.

MCPA is the most frequently detected pesticide.

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MCPA IN DRINKING WATER

What is MCPA?

- Its full name is 4-chloro-2-methylphenoxyacetic acid but it is called MCPA.
- It is part of a group of chemicals called the 'chlorophenoxy herbicide' group.
- In Ireland, many weed killer products - which the public can easily buy - contain MCPA.
- It is the most common pesticide found in drinking water in Ireland. About 80% of all pesticide detections in drinking water are of MCPA.
- It is used to control weeds, particularly rushes on grassland.

What are the EU legal limits and the WHO guideline health values for MCPA in drinking water?

- The EU legal limit for MCPA (0.10 microgram/litre) in drinking water is set low to keep pesticides out of drinking water.
- The WHO set two health-based limits for MCPA in 2017. Both WHO limits are set at a higher level than the EU legal drinking water limit:
    1. The value or concentration for MCPA in drinking water that would cause health effects, if exposed to that level over a lifetime, is 700 micrograms/litre. **This is 7000 times the current EU legal limit in drinking water**.
    2. The value or concentration of MCPA in drinking water that would cause immediate health effects if there was a massive contamination or spilling incident, is 20 milligrams/ litre. **This is 200,000 times the current EU legal limit in drinking water**.

How does MCPA in drinking water affect my health?

- MCPA has been found in trace amounts and **not** at levels which are known to affect health.
- Usually, when MCPA is found in drinking water in Ireland it is found at levels which are a small amount above the EU legal limit and well below the WHO guideline value.
- Since testing began in 2007, MCPA has not been found in drinking water at levels above the current WHO guideline value.
- If MCPA was found at levels which might affect health you would be contacted directly. The Water Services Authority would advise you about what action you should take.

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Are there any other health effects of MCPA?

- MCPA is not known to cause cancer. It is classified as 'possibly carcinogenic' by the International Agency for Research on Cancer (**IARC**).

- It causes serious eye damage/ irritation if direct contact is made.

- Animal studies have shown
    - It does not affect pregnancy or the foetus; and
    - At very large doses, thousands of times greater than those found in drinking water, MCPA can affect the kidneys, liver and blood.

2,4-D IN DRINKING WATER

What is 2,4-D?

- Its full name is 2,4-Dichlorophenoxyacetic acid but it is called 2,4-D.
- It is part of a group of chemicals called the 'chlorophenoxy herbicide' group.
- It is the second most common pesticide detected in drinking water in Ireland.
- 2,4-D is used to control of broad-leaf weeds in agriculture and for control of woody plants along roadsides, railways and utilities. It is also used to control broad-leaved water weeds.

What are the EU legal limits and the WHO guideline health values for 2,4-D in drinking water?

- The EU legal limit for 2,4-D in drinking water (0.10 microgram/litre) is set to keep pesticides out of drinking water, so it is set very low.
- The WHO Guideline limit for 2,4-D in drinking water is 30 micrograms/litre. This is 300 times the EU legal limit.

How does 2,4-D in drinking water affect my health?

- Usually, when 2,4-D is found in drinking water in Ireland it is found at levels which are a small amount above the EU legal limit and well below the WHO guideline value.
- Since testing began in 2007, 2,4-D has not been found in drinking water at levels above the current WHO guideline value.
- If 2,4-D was found at levels which might affect health you would be contacted directly. The Water Services Authority would advise you about what action you should take.

Are there any other health effects of 2,4-D?

2,4-D is not known to cause cancer. It is classified as 'possibly carcinogenic' by the International Agency for Research on Cancer (IARC).[i]

- It causes serious eye damage/ irritation if direct contact is made.
- Animal studies have shown:
    - It does not affect pregnancy or the foetus at levels which have been found in drinking water; and
    - At very large doses, but not those found in drinking water, 2,4-D can affect the kidneys and liver.

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- It is classified by the EC as a ‘potential endocrine disrupter’. These are chemicals that can interfere with hormone systems at certain doses.

Mecoprop in Drinking Water

What is Mecoprop?

- It is part of a group of chemicals called the 'chlorophenoxy herbicide' group.
- It is found in many household weed killers and "weed-and-feed" type lawn fertilisers.
- It is often used to control weeds among cereal crops (wheat, barley, rye, oats) and fruit trees.
- Mecoprop is rarely found in Irish drinking water supplies.

What are the EU legal limits and the WHO guideline health values for Mecoprop in drinking water?

- As with all individual pesticides the EU legal limit for Mecoprop is 0.10 micrograms/litre in drinking water.
- The WHO Guideline limit for Mecoprop in drinking water is 10 micrograms/litre (0.01 milligrams/litre). **This is 100 times the EU drinking water regulations limit**.

How does Mecoprop in drinking water affect my health?

- When it is found in drinking water it is usually a small amount above the EU legal limit and well below the WHO guideline value.
- Since testing began in 2007, Mecoprop has **not** been found in drinking water at levels above the current WHO guideline value.
- If Mecoprop was found at levels which might affect health you would be contacted directly. The Water Services Authority would advise you about what action you should take.

Are there any other health effects of Mecoprop?

- Like the other pesticides in the chlorophenoxy herbicide group, such as 2,4-D above, Mecoprop is not known to cause cancer. It is classified as 'possibly carcinogenic' by the IARC.
- It is irritant to eyes if direct contact is made.
- Animal studies have shown:
    - It does not affect pregnancy or the foetus; and
    - At very large doses, but not those found in drinking water, Mecoprop can affect the kidneys and liver.

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CLOPYRALID IN DRINKING WATER

What is Clopyralid?

- Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid) is a herbicide used for control of broadleaf weeds, especially thistles and clovers. It is also used to control weeds among cereal crops (wheat, barley, rye, and oats).

- It lasts longer in the environment in comparison to other pesticides.

- Clopyralid is rarely found in Irish drinking water supplies. When it is found in drinking water it is usually a small amount above the EU legal drinking water limit.

What are the EU legal limits and the WHO guideline health values for Clopyralid in drinking water?

- As with all individual pesticides the EU legal limit for Clopyralid is 0.10 micrograms/litre in drinking water.

- When it is found in drinking water it is usually a small amount above the EU legal limit.

- There is no WHO health-based guideline values set for Clopyralid in drinking water.

- There are European Food Safety Authority (**EFSA**) guideline values for Clopyralid in food.

- The guideline values for food, when applied to drinking water, are several thousand times the EU drinking water regulations limit for pesticides. This allows for a very large safety margin.

How does Clopyralid in drinking water affect my health?

- If Clopyralid was found at levels which might affect health you would be contacted directly. The Water Services Authority would advise you about what action you should take.

Are there any other health effects of Clopyralid?

- Clopyralid is not known to cause cancer.

- It is an irritant to the lungs, when breathed in.

- It is also an irritant to the skin and eyes, so care is needed when handling.

- No adverse health effects in people who work with Clopyralid have been found.

- Animal studies have shown:
    - It does not affect pregnancy or the foetus; and

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- It is possibly toxic to the liver and kidneys, but only at extremely high doses.

GLYPHOSATE IN DRINKING WATER

What is Glyphosate?

- Glyphosate (CAS No. 1071-83-6) is the active ingredient in a wide range of broad-spectrum herbicide products. These products are largely used in agriculture to kill broadleaved weeds and grasses that compete with crops and negatively impact on yields.

- Other uses include weed control in forestry, horticulture, amenity areas and gardens, and maintenance of hard-surface areas and railway tracks.

- Glyphosate is the most frequently used herbicide both worldwide and in the EU and it has been used for several decades.

- Microbial degradation of glyphosate occurs in soil, aquatic sediment and water, the major metabolite being aminomethylphosphonic acid (AMPA, CAS No. 1066-51-9), which is susceptible to degradation.

- Glyphosate is not readily broken down by sunlight or water.

- The low mobility of glyphosate in soil indicates minimal potential for the contamination of groundwater. Glyphosate can, however, enter surface waters after direct use near aquatic environments via spray drift or by runoff from terrestrial applications through erosion, as it binds to soil particles suspended in runoff. Buffer strips (no-use areas bordering the aquatic environment) and spray drift-reducing technology are used to protect waterbodies from potential inputs arising from terrestrial applications.

What are the EU legal limits and the WHO guideline health values for Glyphosate in drinking water?

- The EU legal limit for glyphosate is 0.10 µg/L in drinking water.[ii] This is a statutory quality standard that applies to nearly all individual pesticides, and is not a health-based value. It is based on an EU objective to minimise the presence of pesticides in drinking water as much as possible.

- The WHO has established health-based guideline values for drinking water quality for various chemicals. The WHO has not established a formal guideline value for glyphosate in water, since it was considered that glyphosate and its by-product AMPA both exhibit low toxicity and that, if present in drinking water, they would normally occur at concentrations well below those of health concern.

- However, the WHO has derived a health-based limit in drinking water of 0.9 mg/L for AMPA alone or in combination with glyphosate of up to 0.3mg/kg body weight, based upon a NOAEL (No-observed-adverse-effect-level) of 32 milligrams per kilogram of body weight per day.[2]

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How does Glyphosate in drinking water affect my health?

- WHO guidance on drinking water quality states that glyphosate and its by-product AMPA are both considered to exhibit low-toxicity. This assessment is in agreement with the findings from the latest EU review of glyphosate, which concluded in December 2023 and is the most detailed evaluation ever performed for a pesticide in the EU. The EU review showed that potential levels of human exposure to glyphosate and AMPA via various exposure routes are far below the level that would be required to have a harmful impact on human health.

- The EU review also included a comprehensive assessment by the European Chemicals Agency, which concluded that the available scientific information does not meet the criteria to classify glyphosate as a carcinogenic substance.

- Under usual conditions, therefore, the presence of glyphosate and AMPA in drinking-water does not represent a hazard to human health.[iii]

- If glyphosate were to be found at levels above the aforementioned health-based threshold, the water supplier or supervisory authority would provide timely advice as to what action should be taken.

Are there any other health effects of Glyphosate?

- Studies on the effect of glyphosate on animals have shown some evidence for oxidative stress, changes in intestinal microbiome, hormonal imbalances and neurological disorders.

- Can cause eye or skin irritation.

- These effects were carefully considered as part of the recent EU review procedure, which resulted in a decision in December 2023 to renew the status of glyphosate as an EU-approved active substance for use in plant protection products for a period of 10 years.

- This decision was based on exceptionally detailed scientific assessments completed by the European Food Safety Authority and the European Chemicals Agency, which did not identify any critical areas of concern that would have precluded renewal of approval in accordance with the strict requirements specified in EU legislation.

How can I find out more on Glyphosate:

Uisce Éireann
Environmental Protection Agency
European Commission (food.ec.europa.eu/plants/pesticides/approval-active-substances/renewal-approval/glyphosate_en)
European Food Safety Authority (www.efsa.europa.eu/en/topics/topic/glyphosate)
European Chemicals Agency (echa.europa.eu/hot-topics/glyphosate)

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DRINKING WATER AND SPECIFIC PESTICIDES

	MCPA	2,4-D	Mecoprop	Clopyralid	Glyphosate
EU drinking water legal limit	0.10 µg/L	0.10 µg/L	0.10 µg/L	0.10 µg/L	0.10 µg/L
WHO Drinking Water Guideline value	700 µg/L (0.7 mg/L)	30 µg/L	10 µg/L (0.01 mg/L)	No drinking water guideline	No drinking water guideline
	X 7,000 times above EU legal limit	**X 300 times above EU legal limit**	**X 100 times above EU legal limit**	**X 15,000 times EFSA recommendation**	

ABBREVIATIONS:

EU: European Union; WHO: World Health Organization; EFSA: European Food Safety Authority

[i] *The possibility of an association between 2,4-D and two types of cancer has been studied at length. The cancers studied are a blood cancer called non-Hodgins Lymphoma and a soft tissue cancer called a sarcoma. Most of these studies show no association between 2,4-D and these cancers. Where associations have been found they are weak or are from poor quality studies. When a health issue like this is uncertain, a precautionary approach is taken. That is one of the reasons why the EU legal limit for pesticides in drinking water is set so low.*

[ii] Irish Statute Book (**ISB**) 2023. S.I. No. 99 of 2023. **European Union (Drinking Water) Regulations 2023**. Available URL: https://www.irishstatutebook.ie/eli/2023/si/99/made/en/pdf (Accessed: 25th April 2024).

[iii] World Health Organization (**WHO**) 2023. **Guidelines for drinking water quality: Fourth edition incorporating the first and second addenda**. Available URL: https://www.who.int/publications/i/item/9789240045064(Accessed: 25th April 2024).

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