What are the five active substances that groups are calling for to be banned from use in medicines for dogs and cats?

Active Substance *(All five are insecticides)*	**Approved in UK for use on agricultural crops?**	**Environmental impacts**	**Human health impacts**	**Used in which type of veterinary medicines and on which animals?**	**Number of parasiticide products for cats and dogs containing active substance**
Dinotefuran (neonicotinoid)	Never approved	• Highly toxic to bees		Ectoparaciticide Dogs, cats	12
Fipronil	No products ever approved	• Highly toxic to bees • Ground water contaminant	• Carcinogen • Endocrine disruptor	Ectoparaciticide and endectocide Dogs, cats	483
Imidacloprid (neonicotinoid)	Banned in 2018	• Highly toxic to bees • Ground water contaminant		Ectoparaciticide and endectocide Dogs, cats	176
Nitenpyram (neonicotinoid)	Never approved	• Highly toxic to bees		Ectoparaciticide Dogs, cats	9
Permethrin	Banned in 2002	• Highly toxic to bees	• Carcinogen • Endocrine disruptor	Ectoparaciticide Dogs, cats	90

Guide to terms used in the table

What are 'ectoparaciticides'?

An ectoparaciticide is an antiparasitic drug (usually a 'spot-on' treatment) used to kill parasites that live on the body's surface (such as ticks and fleas). In the UK, there are 676 ectoparaciticide products approved for use in veterinary medicines for dogs and cats. Of this total, 523 products (77%) contain one or more of the five active substances listed above.

What are 'endectocides'?

An endectocide is an antiparasitic drug (usually in tablet form) used to kill parasites that live both inside the body (such as worms) and on the body's surface (such as fleas). In the UK, there are 218 endectocide products approved for use in veterinary medicines for dogs and cats. Of this total, 58 products (26.6%) contain the neonicotinoid imidacloprid and/or fipronil, which are two of the active substances listed in the table above. None of the other three active substance listed above are included in any endectocides approved for use as a medicine on dogs and cats in the UK.

What do the negative impacts listed in the table mean?

- 'Highly toxic to bees' – This classification is assigned **i**f the LD_{50} (lethal dose 50%) for acute and dermal absorption by honey bees is lower than 2 micrograms per bee (µg/bee). The value of LD_{50} for a substance is the dose required to kill half the members of a tested population after a specified test duration. A lower LD_{50} is indicative of increased toxicity as it shows that it takes less of a substance to kill half the population.

- ‘Groundwater contaminant’ – Strict limits are set for pesticides in groundwater due to the potential for them to negatively impact drinking water quality and aquatic ecosystems. In order to maintain the integrity of groundwater sources, a precautionary limit of 0.1µg/L is set for pesticides. Some pesticides regularly exceed this limit and are therefore classified as groundwater contaminants.
- ‘Endocrine disruptor’ – Interferes with hormone systems and can cause birth defects, developmental disorders and reproductive problems such as infertility.
- ‘Carcinogen’ – Capable of causing different types of cancer, including Leukaemia and Non-Hodgkin’s Lymphoma.

It is important to note that if a substance is classified as a ‘carcinogen’ (for example) it does not mean that exposure to it will definitely result in the development of cancer. The classification simply means that in tests for toxicity the substance can cause a particular effect.

How do we know that particular pesticide active substances have specific negative impacts on human health or the environment?

Companies that manufacture pesticides are required by national regulators (such as the European Food Safety Authority, US Environmental Protection Agency and UK Health and Safety Executive) to conduct toxicity testing as a key part of the process through which an active substance is approved. The data generated by this toxicity testing is fed into risk assessments which are then used to determine the extent and nature of the potential harm an active substance poses to human health and the environment. When we say an active substance is a ‘water contaminant’ or ‘carcinogenic’, it is based on the results of these national risk assessments.

There are a number of databases that collate this toxicity data and regulatory decisions from around the world. To ascertain the impacts of the five active substances listed above, PAN UK used the following two sources:

- University of Hertfordshire Pesticide Properties DataBase – https://sitem.herts.ac.uk/aeru/ppdb/en/
- PesticideInfo database (managed by PAN North America) – https://www.pesticideinfo.org/search-chemicals-or-products

What’s the difference between an active substance being banned vs. ‘never approved’ vs. ‘no products ever approved’?

Pesticides are approved in two distinct stages. Firstly, the active substance – the chemically active part of a manufactured pesticide product – is authorised. For the second stage, pesticide products containing that active substance (usually alongside many other ingredients known as ‘co-formulants’) are authorised. For example, the active substance glyphosate had to be approved before it could be allowed to be sold in the pesticide product ‘Roundup’. With that in mind, this is what the classifications in the table above mean:

- Banned – Many pesticide active substances and products are approved but then subsequently found to be negatively impacting human health or the environment once in use, leading to approval being rescinded. There are numerous examples of this happening, perhaps most famously with DDT.
- Never approved – Not all pesticide active substances are submitted for approval in every country. This can be for any number of reasons including; unsuitability for the specific conditions in that country such as landscape, crops or weather, marketing issues or because the pesticide will not meet the regulatory requirements for the administrative region, including the accepted level of threshold for harm.
- No products ever approved – Even when a pesticide active substance is approved for use, a country may choose not to approve any products that contain it due to concerns about its suitability for that particular area or the harms it causes.