
INDUSTRY TASK FORCE II ON 2,4-D RESEARCH DATA

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2,4-D Web Page www.24d.org

QUESTIONS AND ANSWERS ABOUT 2,4-D*

2,4-D, in addition to being the most widely used agricultural herbicide worldwide, is also the most widely used lawn care herbicide in Canada, where it was introduced in 1947.

Since 1986, 2,4-D has been reviewed by more than a dozen government and independent expert panels, including the Canadian Centre for Toxicology review conducted for the Ontario Ministry of the Environment, and a more recent review by the National Cancer Institute of Canada. All expert panels concluded that the continued use of the herbicide 2,4-D poses no unreasonable risk to humans or the environment.

Canadians are understandably concerned about pesticide use. There are many contradictory statements in the news media about the potential effects of pesticides on human and animal health. The following information addresses the most common concerns raised by the public.

1. "2,4-D is a human carcinogen"

Those opposed to pesticide use cite only the few case-control studies suggesting an association between 2,4-D and cancer and disregard the many studies that do not support the alleged association. Case-control studies are short-term studies based mainly on questionnaires and telephone interviews. Exposure to the studied chemical is assumed based on the type of work done by the people who make up the cases and controls in the study, and no actual exposure measurements are made.

In contrast, the more powerful cohort studies do not suggest an association between 2,4-D exposure and cancer. Cohort studies are long-term studies (20 years or more) where the participants' actual medical records are followed and, in many cases, exposure studies are actually conducted. This is why the most recent Environmental Protection Agency (EPA) review of the 2,4-D toxicology and epidemiology databases has concluded (for the fourth time) that 2,4-D should remain a class D compound.¹

Under EPA's classification of carcinogenicity, class A compounds are "known carcinogens," class B compounds are "probable carcinogens" and class C compounds are "possible carcinogens." A "D" classification means that there is insufficient evidence of carcinogenicity in the data package to place the compound in any of the three higher classifications. The recent World Health Organization, Food and Agriculture Organization (WHO/FAO) review of 2,4-D reaches the same conclusion.²

* 2,4-Dichlorophenoxyacetic acid

2. "2,4-D causes cancer in family pets and animals"

The toxicology database now demonstrates conclusively that 2,4-D does not cause cancer in laboratory animals. Canadian government officials have been provided with an EPA review of several Good Laboratory Practices (GLP) lifetime mouse and rat feeding studies and a re-review of a multi-generational reproductive study in rats. In a study done by the U.S. Food and Drug Administration, dogs were fed massive doses of 2,4-D daily for two years, and these dogs did not develop cancer or any other serious disease. The current EPA toxicology evaluation and profile sheet on 2,4-D describes 2,4-D as both non-carcinogenic and non-mutagenic and states "2,4-D acid was not carcinogenic in male or female rats or mice."³ The WHO/FAO review² states, "There was no evidence of carcinogenicity."

3. "Bystanders to turf applications are exposed to 2,4-D"

Several Canadian researchers at the University of Guelph have completed studies on human exposure to applications of 2,4-D. These studies show the highest observed exposures for homeowners and commercial applicators were well below the lifetime ADI (acceptable daily intake) as established by the WHO. The most recent research demonstrates that there were no detectable exposures for the bystanders who resided in homes of homeowner or commercially treated lawns or for barefoot, barelegged bystanders who actively walked or sat on turfgrass for one hour on the day of spraying.⁴

4. "Pesticides are inadequately researched"

2,4-D, in addition to being the most widely used agricultural herbicide worldwide, was the first selective herbicide developed (a selective herbicide controls weeds in a crop without harming the crop), something that stimulated an enormous amount of research on 2,4-D all over the world. The toxicology database alone exceeds 4,000 peer-reviewed, published studies, plus hundreds of unpublished studies that the manufacturers must fund for the various regulatory agencies throughout the world. Additionally, there are now more than 100 peer-reviewed, published epidemiologic (human) studies pertinent to 2,4-D. The federal government acknowledged this research in its response to report of the House of Commons Standing Committee on Environment and Sustainable Development.

5. "Regulators do not take into account the effects of pesticides on children"

The Pest Management Regulatory Agency (PMRA) and other government bodies tasked with the responsibility of assessing the risks associated with pesticides do take into account the exposure to vulnerable groups, such as children. To quote from the federal government's response to the House of Commons Standing Committee on Environment and Sustainable Development⁵:

“The hazard, exposure and risk assessments specifically include consideration of the potential effects of a pesticide on fetuses, infants, children, pregnant women, seniors, applicators or agricultural workers. The toxicology studies are conducted to assess potential effects during preconception, through the reproductive and developmental life cycle, the post-natal period, weaning and through to adulthood. Assessment of children’s potential exposure includes direct and indirect skin contact with surfaces treated with pesticides, ingestion through the transfer of residues from the hands to the mouth, soil ingestion and inhalation. Children’s unique play and activity patterns, including higher contact with surfaces and increased teething and mouthing activity, and children’s unique physiology, are factored into these exposure estimates. The unique food consumption patterns of infants and children are considered, including their consumption of maternal milk, packaged milk and fruit juice.”

6. “Exposure to the odour of 2,4-D is hazardous”

Pure 2,4-D is odourless. Odour associated with the application of lawn care products comes from a small amount of the primary breakdown product, 2,4-dichlorophenol (DCP). Another odour may come from a small amount of dimethylamine, a neutralizing agent of the 2,4-D formulation. Both of these compounds are considered extremely low toxicity as a vapour, although low levels are quite odorous. Government agencies have indicated low toxicological concern for inhalation of 2,4-D. In fact, the EPA has stated in their Toxicological Endpoint Selection Document⁶, “Exposure via inhalation is not a concern ... This risk assessment is not required.” meaning inhalation will be a non-factor in exposure risk assessment. Dietary ingestion or skin contact are considered to be the primary routes of exposure. Thus any odour exposure is not of toxicological concern.

7. “2,4-D soil dissipation is not well known, and can move into ground water”

On the contrary, soil dissipation of 2,4-D in Canada is very well understood^{7 8}. The recent data from 30 soil dissipation studies on various soil types around North America illustrate the average half life of 2,4-D in soil is a short 4.5 - 10 days⁹. The rapid breakdown of 2,4-D and metabolites minimizes the potential for movement in soil, and greater than 90 - 95% of 2,4-D dissipates in the top six inches of soil. Eventually 2,4-D breaks down to CO₂ and is integrated into other carbon compounds in the soil. Any findings of 2,4-D in ground water have been extremely rare. These have been attributed to spot contamination or spills near water wells or very unique soil conditions with high rainfall or irrigation shortly following application. Over 50 years of 2,4-D use in Canada on cereal and turf has shown 2,4-D and metabolite residues are not persistent in the soil, water or vegetation.

8. *"The bulk of the research has been done by industry and is therefore biased and should not be taken seriously"*

As described below, this task force was formed to fund more than 270 new research studies requested by the PMRA and the EPA. All these studies were completed by outside independent contract laboratories and conducted in accordance to GLP regulations, as specified by law. These are laboratories that meet stringent PMRA and EPA specifications and are routinely audited by those agencies. This research, which applies to pesticides registered before November 1984, has a cost in excess of \$45 million for 2,4-D alone.

The EPA carefully reviews all studies for GLP compliance; any intentional GLP violation (such as the understating of toxicity) is a violation of federal law, a felony. These laws are enforced, so both the industry responsible and the laboratory doing the work take GLPs very seriously. This task force has contracted the required 2,4-D research studies in more than 30 EPA/GLP qualified laboratories. The last of these studies was submitted to EPA in December 1995, although additional work is ongoing. The Canadian PMRA has either received copies of the complete studies, some of which run 5,000 pages or more, or they have received copies of U.S. EPA's critique (Data Evaluation Reports) of the study in place of the entire study, at PMRA's option.

9. *"2,4-D is an endocrine disruptor"*

The major focus around endocrine disruptors has been on synthetic chemicals including pesticide active ingredients (e.g. 2,4-D) or pesticide formulants. However, recently published scientific studies demonstrate that synthetic chemicals tested are only weak estrogen mimics, while other sources of natural estrogens (resulting from human waste treatment plants or animal manure use) are orders of magnitude more active and have been shown to have environmental impacts. There is currently no scientific consensus regarding endocrine modulators or their impact on human health or the environment. Preliminary evidence suggests synthetic chemicals are not the problem.

Unlike alleged endocrine disruptors, 2,4-D is not persistent in the environment, having a half-life of about seven days. It eventually breaks down to carbon, carbon dioxide and a trace amount of chlorine – all of no toxicological significance. 2,4-D does not accumulate in the body, does not metabolize and is excreted in the urine unchanged. In EPA's classification of potential endocrine disruptors, 2,4-D is a Category 3 compound, chemicals "known to have no endocrine effect".

10. *"2,4-D has been banned in a number of countries, including Sweden, for decades"*

2,4-D has not been banned in Sweden or any other country.

About the Industry Task Force II on 2,4-D Research Data

The Industry Task Force II on 2,4-D Research Data is organized under U.S. pesticide law to provide funding for some 270 new research studies required to respond to the Canadian and U.S. pesticide re-registration programs. The 2,4-D Task Force is made up of those companies owning the technical Canadian and U.S. registrations on the active ingredient in 2,4-D herbicides. They are BASF (Germany), Nufarm, Ltd. (Australia), Atanor, S.A. (Argentina), PBI-Gordon Corp. (U.S.A.) and Dow AgroSciences (USA).

In the continuing public debate on this important matter of public policy, it remains important that the principle of scientific evidence is not discarded. For those who wish to receive copies of any of the studies referenced, please do not hesitate to call the Task Force at 1-800-345-5109.

¹ Health Effects Division Carcinogenicity Peer Review (4th) of 2,4- Dichlorophenoxyacetic acid, United States Environmental Protection Agency, (1997).

² Pesticide residues in Food Review of 2,4-D Toxicological Effects, World Health Organization, (1996).

³ Review of Chronic Toxicity/Carcinogenicity Study in Rats and Mice, United States Environmental Protection Agency, (1996).

⁴ Stephenson, G.R., et al. 1992. Exposure of Homeowners and Bystanders to 2,4-D. *Journal of Environmental Science Health* vol B27(1).

⁵ Government Response to the Report of the House of Commons Standing Committee on Environment and Sustainable Development, *Pesticides: Making the Right Choice for the Protection of Health and the Environment*, (October 2000).

⁶ Health Effects Division Toxicology Endpoint Selection Committee on 2,4-D, United States Environmental Protection Agency, (1996).

⁷ Smith, A.E., et al. 1989. Effects of Long-term 2,4-D and MCPA Field Applications on Soil Residues and Their Rates of Breakdown. *Journal of Environmental Quality* vol 18:299-302.

⁸ Smith, A.E., et al. 1989. Degradation, fate, and persistence of phenoxyalkanoic acid herbicides in soil. *Review of Weed Science* vol 4:1-24.

⁹ Wilson, R.D., et al. 1997. 2,4-D Dissipation in Field Soils After Applications of 2,4-D Dimethylamine Salt and 2,4-D 2-Ethylhexyl Ester. *Environmental Toxicology and Chemistry*, vol. 16, No 6:1239-1246.