

PESTICIDES : WHEN PERCEPTION OUTFRONS REALITY

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The use of pesticides has become an issue hotly disputed particularly in urban areas. Some people believe they are very damaging and cause significant adverse effects both on human health and the environment. They do not feel safe any longer and thus raise new issues.

Pesticides are now among the substances that are being most investigated across the world, even more than drug products. It is not any pesticide that can be launched on the market nowadays. The long and tedious certification process requires over 200 studies, tests, experiments and analyses of all kinds. Manufacturers must conduct a complete series of tests and studies in compliance with GLP (Good Laboratory Practice) international standards set by the OECD (Organisation for Economic Co-operation and Development). The development of one single ingredient can cost between 50 and 100 millions of dollars and extend over a 7 to 10 year period. Worldwide, an average of one single molecule among 20 000 is licensed for sale.

Regulation in Canada

Pesticide regulations in Canada are considered to be extremely severe. A national scientific organization called Pest Management Regulatory Agency (PMRA) must conduct a comprehensive assessment of the impacts of each product on human health and the environment and evaluate its efficiency before authorizing its market launching. Only those products not posing unacceptable risks to humans and the environment can be marketed. Moreover, pesticides are regulated under provincial laws in order to control their certification, sale and transport, and to monitor their use and users.

Assessment of existing risks

One of the principles of modern toxicology comes from the Middle Ages with the statement made by Paracelse, a Swiss physician and alchemist (1493-1541): every substance has a toxic potential, it's the rate of application that makes it poisonous, not the substance itself.

An overdose of any substance can be damaging: table salt, vitamins, caffeine, alcohol, aspirin, medications... Risks associated with the use of a substance are not only determined by its inherent toxicity but also by its exposure level. They are represented by the following equation:

$$\text{RISK} = \text{TOXICITY} \times \text{EXPOSURE}$$

Risks are directly related to quantity. PMRA certifies each product through a thorough and comprehensive analysis of existing risks, such as:

- potential short and long term effects on humans, i.e. adults, teenagers, children, infants and embryos through the animal model;
- effects on nervous and hormonal systems;
- mutagenic, carcinogenic and reproductive effects;
- potential effects on wild species, such as birds, fish, insects;
- effects on non-target organisms;
- environmental effects;
- studies on measurable residues;
- exposure studies.

Exposure

In order to evaluate the rate of exposure, the World Health Organization (WHO) determines the no-effect level on animals, then extrapolates it on humans by dividing it by safety factors of at least 100 (10 x 10). Such safety factors take into account extra-species variations (animal to man, factor of 10) and intra-species variations (man to man, factor of 10). Other safety factors can also be used. Such information ensures PMRA that the exposure to the product, even under the maximum allowable dosage shown on labels, never exceeds accepted standards.

With risks being related to exposure, it is determined that application rates prescribed on labels for pest control are considerably lower than pesticide application rates considered to be harmful to mammals, including humans and domestic animals. According to PMRA, when complying with label instructions, the public, users and even professional applicators are not exposed to harmful dosage.

The no-pesticide position

Opponents to pesticides simply deny the soundness and rigour of the Canadian certification process, the world scientific expertise, the evolution and improvement of chemistry since the introduction of pesticides, and even the numerous benefits associated with pesticides. Indeed, these people prefer to concentrate on potential effects associated with products no longer available (arsenic, mercury, organochlorine...) or marginal since the introduction of new and more acceptable products. 2,4-D is the exception: created some 50 years ago, this product is still widely used and approved after some 4 000 studies (www.24d.org).

People often tend to generalize beyond measure by considering all pesticides as a whole, while in fact there is a wide variety of chemical products with various properties, very different toxicological profiles and different impacts.

Pesticide detractors are often limited to the inherent toxicity of the products. A core study requires a comprehensive risk analysis based not only on the inherent toxicity of a substance but also on its exposure level. As mentioned earlier, even with a high toxicity value, the risk will be marginal if the exposure is also marginal. All certified products have gone through a comprehensive risk analysis based on exposure and are considered to be safe when label instructions are complied with.

Despite years of research, most studies do not establish any causal relationship between pesticides (including products used in urban areas) and the incidence of chronic diseases, such as human cancer, but for those who prefer to believe the contrary, the rare and so well mediated studies suggesting the least connection, even if barely detectable, represent conclusive evidence. The non-permissive scientific world will not jump to conclusions on the basis of a single probative study. It is only when the overall studies will bring consistent and similar results that we will be able to draw inferences with regards to causality.

The « Doomsday Syndrome » about pesticides leads to intrusive measures intended to limit the availability of approved and legal products. Thus, some people although well-intentioned feel they must protect the human race and decide to make the existing regulation even tougher. As mentioned by Dr Keith Salomon, Director of the Ontario Toxicology Centre, in his article «Pesticides are safe – Proving the unprovable», some municipalities, again well-intentioned but with no scientific expertise to determine the effects of pesticides on health and environment, decide to regulate these products for perception, belief or political purposes, but unfortunately not on a scientific basis.

As a result of all these misleading allegations about pesticides, more and more toxicology experts have decided to make their voices heard, not to defend pesticides but rather to make the issue more objective and more scientifically sound (see Sources below) : «Pesticides: weeding out the myths» - Dr. Joe Schwarcz», «Pesticides are safe: proving the unprovable – Dr. Keith Solomon», «Peu de liens entre le cancer et l'utilisation des pesticides – Dr.Len Ritter», «Use as directed, pest control products are safe – PMRA», «Rachel Revisited ; Mark L. Winston».

Modern pesticides

Nowadays, certified pesticides are much less residual, more specific, less toxic, more efficient and used at rates 100 to 1000 times lower than former products. They have nothing in common with pesticides used at the time of Rachel Carson when she wrote her book *Silent Spring* : this book had led to an angry outcry against pesticides in 1966, and unfortunately it still attracts some people.

In Canada, the non-farming market represents only 4% of pesticide sales : 3.2% for occupational use in urban areas (golf, railways, electrical transmission lines, forestry, open space maintenance) and 0.8% for the domestic market. It is certainly not an overstatement to consider these markets as marginal. Québec represents only 5% of the overall pesticide market in Canada.

The industry supports a sound and sophisticated regulatory system intended to protect human health and the environment. However, any over-regulation on pesticides, with no scientific merit, could give totally reverse effects and produce a new and dangerous generation of so-called chemists. The non-availability to approved and certified products could bring along all kinds of mixtures and quack powders not certified by any tests.

It is through education and awareness that the public will be best protected. Pesticides are only a tool among many others for pest control in urban areas and open space protection. Whenever you use a pesticide while complying entirely with label instructions, you can be assured that each product has been thoroughly tested with respect to its impacts on health, its efficiency and its safety.

Sources :

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- Rachel Revisited - Mark L. Winston, www.croplife.ca , ground swell –vol 36, March/April 2002

WEB SITES:

www.croplife.ca

www.healthylawns.net

www.hc-sc.gc.ca/pmra-arla www.lawnfacts.ca