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Safe Use of Organophosphates

What are Organophosphates?

Organophosphates (OPs) are a group of insecticides used in chemical sprays to kill bugs and insects in orchards, vineyards, vegetable and cereal crops. They are usually applied from a knapsack sprayer or from spraying equipment pulled by a tractor. Because of their chemical make-up, they can also be hazardous to human health. However, different sprays affect your health in different ways, and the degree of harm they may cause you can also vary.

What Effects Do They Cause?

Organophosphates can enter your body by breathing, eating or skin contact.

The range of possible effects varies depending on such things as the concentration used, the length of time that the OP is used for and individual differences.

Symptoms of OP poisoning include watery mouth, blurred vision, feeling sick, headache, dizziness, vomiting, diarrhoea, muscle tremors, sweating, breathing difficulties, and increasing weakness and urine output. In severe poisoning, you may get increasingly sleepy which could lead to a coma, convulsions, and possibly death. See your doctor immediately if any of these symptoms occur.

OPs reduce the level of an enzyme in your blood called cholinesterase, which controls the nervous system. Repeated small exposures to OPs will progressively reduce cholinesterase levels. Eventually a low level of cholinesterase will produce symptoms. Once OP exposure has stopped, it will still take some weeks to re-establish the cholinesterase levels.

How Can I Avoid Health Problems Working With Organophosphates?

Preventing health problems due to exposure to OPs is a three-pronged approach that involves safe working methods, wearing adequate personal protective equipment and monitoring blood levels for cholinesterase.

Safe Working Methods are Essential!

It is important to obtain a Material Safety Data Sheet (MSDS) for the product you are using. The MSDS should contain information on identification of the product, precautions for use, safe handling, and health hazard information.

Use the correct concentration and type of organophosphate product for the crops that you are spraying. Identify the target for spraying and stand upwind when mixing and spraying. Do not spray if there is a strong wind as this can cause updrift to streams, ponds and neighbours' houses. Learn to reduce overspray, especially onto yourself.

Always wash your hands before eating or smoking. Washing facilities must be provided wherever organophosphates are being handled, mixed, or applied. The employer should provide sufficient water for the crew to wash up at least twice a day. Washing facilities may include a shower if the manufacturer's instructions require one.

Personal Protective Equipment (PPE)

The type of PPE you need depends on the concentration and the type of organophosphate being used.

PPE advice is generally present on the product label. This advice represents the lowest standard required for the applications approved at registration. A higher standard may be required for some (different) applications.

Consult the Material Safety Data Sheet to determine what level of PPE you need, as protective equipment must be properly selected.

PPE could include: an impervious chemical-resistant suit with hood or impermeable apron, chemical resistant gloves, boots and headwear, face and eye protection, and respiratory protection.

Protective Clothing

Start each day with clean protective clothing. Keep bare skin covered with freshly washed clothing. This should preferably be made from a breathable fabric such as cotton, as organophosphates are more readily absorbed through the skin when a person is hot and sweaty.

Gloves should be checked daily to make sure that they are in good condition. Spare gloves should be available on site. Boots should be checked to ensure that they are not letting chemicals through to the skin.

Respiratory Protection

These are the points to consider when selecting the most appropriate respiratory protection:

1. OP type and formulation;
2. Risk of exposure (concentrated or diluted chemical);
3. User comfort/preference;
4. Practicality – worksite conditions; and
5. Possible health effects from contamination.

Respirators need special cleaning care. Read the manufacturer's instructions for advice regarding cleaning and replacement of filters.

If in doubt about which respirator to use, get expert advice from equipment and/or product suppliers, or OSH.

What Health Checks Should I Have?

If you are intending to work with OPs, you need to tell your doctor, who will arrange for you to have a blood test. The purpose of this test is to measure the level of cholinesterase in your blood before you are exposed to OPs. This is called the baseline cholinesterase level. This initial test should be done before you are exposed to OPs and repeated periodically thereafter. The frequency of blood tests will depend on the intensity and frequency of your exposure to OPs.

Your doctor will advise you how often you should have the tests, and will explain the results to you.

What Does My Employer Need to Do?

Under the Health and Safety in Employment Act 1992 (HSE Act) employers must take all practicable steps to identify and manage hazards using the following hierarchy:

Eliminate: Once hazards have been identified, employers must take all possible steps to eliminate significant hazards from the workplace, e.g. eliminating the use of OPs.

Isolate: Sometimes it is not possible to eliminate all significant hazards from the workplace. In this case they must be isolated by your employer. This means separating you from the hazard, e.g. spraying from an air-filtered tractor cab.

Minimise: Sometimes it may not be possible for your employer to eliminate or isolate a hazard. Hazards that can't be eliminated or isolated have to be minimised as much as possible, e.g. ppe, safe working methods, training.

What If I'm Self-Employed?

If you're self-employed and work with OPs you also have duties under the HSE Act. You have responsibilities for your own health and safety at work, and must ensure that your actions (or inactions) do not harm anyone else, e.g. ensure no overspray reaches neighbouring properties and people.

Where Do I Get Further Information?

For further information refer to the *Guidelines for the Safe Use of Organophosphates* or the OSH website at www.osh.dol.govt.nz, or contact your local OSH service centre.