

Safe and Effective Use of Pesticides

Pesticides continue to be a growing component of modern rice technology even if there are already alternatives to chemical pest control. Guidelines on the effective use of pesticides must be observed to safeguard the user's health and the environment.



I. Pesticide and its Different Formulations

- a. A pesticide is any chemical used to control pests. The pesticides used to control pests for rice are: insecticides, herbicides, rodenticides, molluscicide and fungicides.
- b. A pesticide is not usually applied in pure form. It must be diluted with water, oil or an active solid so it is less toxic to humans and can be spread evenly over a large area. The final product is called a pesticide formulation.

These formulations include:

1. **Dusts.** These require no mixing and can be applied directly to the plant. However, dusts may drift from where they are applied and contaminate areas where humans and livestock live.
2. **Granules.** These can be applied as bought with simple equipment and require no additional mixing. Granules do not easily drift to other areas.
3. **Liquid Formulations (LFs).** These are also called *Emulsifiable*. **Samples of LFs are:**
 - a. **Concentrates (ECs)** are mixed with water and sprayed. They contain a high concentration of pesticides and are easy to transport and store. They are effective for treating foliage and require little agitation in the tank to have them mixed.
 - b. **Flowables (LFs).** These are special kinds of LFs in which finely ground solid particles of pesticides

are suspended in a liquid. They are applied and used in the same way as other LFs.

- c. **Wettable Powders (WPs).** These have the same kind of materials as ECs except that the insecticide is in small, dry, powder like particles. WPs are mixed with water to form suspensions and has to be agitated during application.
- d. **Soluble Powders (SP s).** These have the same materials as the WPs but are dissolved in water to form solutions. Thus, they do not settle down like the WPs.
- e. **Poisonous Baits (PBs).** A poisonous bait is food or other substances with which pesticides are mixed. Pests eat the bait and die.

II. Pesticides use for rice in the Philippines

- a. In 1991, rice production accounts for about 50% of the total insecticide usage. Over 80% of the herbicides and 4% of the fungicides are sold in the Philippines (APIP,1991).
- b. Molluscicides have also been used in small quantities since 1987 to control GAS (Warburton and Pingali, 1993).
- c. The total quantities of pesticides used in the Philippines are small compared to South Korea and Japan. Rice agrochemicals in the country accounted for only 2% of the world market value in 1988 (Woodburn, 1990).
- d. Rice farmers have been applying pesticides for over three decades. They make two to three applications of insecticides and one application of herbicides.
- e. With the advent of rice varieties that are resistant to a wide variety of insects and diseases, the importance of insecticides for rice production has declined.
- f. The release of resistant varieties, however, was not accompanied by supporting information campaign on the reduced need for insecticides.
- g. Compared to other crops, insecticide use in rice is low. Insecticide use in rice neither enhances grain quality nor improves yield in the absence of pest pressures.
- h. If IPM technology leads to the reduction of pesticide use, any associated improvements on health and environmental quality should be counted as benefits from the adoption of IPM.

III. Effects of indiscriminate use of pesticides

- a. Health impairment due to direct or indirect exposure to hazardous chemicals.
- b. Contamination of ground and surface water through run-off, seepage and percolation.
- c. Pesticide residue through the food chain to the farm family and urban consumers.
- d. An increase in the resistance of pest populations to pesticides.
- e. Reduction of beneficial organisms.
- f. Pesticides are useful component of IPM in rice but these must be used only when necessary and be applied properly. Improper use may cause the following side effects:

1. **Environment pollution.** Some pesticides may be taken in from the environment and accumulated in animals and plants. Wildlife and people who eat meat contaminated with pesticides may be poisoned even without direct contact with a pesticide and causes long-lasting damage.
2. **Phytotoxicity.** The active ingredient (ai) or materials in pesticide formulations may damage crop plant. Phytotoxicity or toxicity to plant may be caused by:
 - a. Using the wrong pesticide.
 - b. Applying an inappropriate pesticide mixture.
 - c. Wrong timing of application
 - d. Using too much pesticide
 - e. Selecting the wrong pesticide formulation.
3. **Damage to non-target organism.** If pesticides are carried by wind, water or other means from the area where they are applied, they may be harmful to friendly insects and microorganisms, humans, livestock, wildlife and crops.

IV. Steps to consider before choosing and applying any pesticides

- a. Identify the pest. Carefully check the field to determine both symptoms or sign of damage and species of pests.
- b. Consider other control methods. After you have identified the pest, determine if control is necessary, and considering other control measures, decide on the most appropriate one to implement.
- c. Choose a pesticide that is effective against the target pest, has directions on the label, will not

cause injury to the crop, and is least harmful to beneficials (parasitoids and predators).

- d. If possible, choose pesticides with color bands; blue (moderately toxic) and green (slightly toxic) in the label rather than yellow (highly toxic) and red (extremely toxic) bands.

V. Precautions in handling pesticides

A. Before application

1. Read the label to determine:
 - a. Target organism;
 - b. Rate and time of application;
 - c. Need for protective clothing and equipment;
 - d. Antidotes and other safety measures;
 - e. Field re-entry intervals after treatment
2. Check the sprayer
 - a. Fill the tank with plain water and test the sprayer to be sure that there are no leaks or loose connections and the equipment is working properly.
 - b. Repair or replace any worn-out or faulty part.
3. Mixing and filling. Extra precaution is necessary when mixing and filling sprayers because pesticides are concentrated.
 - a. Wear protective clothing.
 - b. Open pesticide container carefully to avoid splashes, spills, or drift.
 - c. Stand upwind when adding materials to the sprayer to avoid drift of pesticides fumes or particles.
 - d. Keep your head away from the opening of the sprayer.
 - e. Wash and change clothes immediately if pesticide is spilled on clothing.
 - f. Do not use bare hands in mixing pesticides, nor allow concentrated materials to touch bare skin.

B. During application

1. Wear protective clothing.
2. Do not eat, drink, smoke or blow clogged nose, cover, with your mouth while applying the pesticides.
3. Do not apply when it is windy to avoid pesticide drift.
4. Do not spray near or in ponds, lakes or streams.

5. Spray areas near homes in early mornings or evenings when humans, pets and lives-tocks are less likely to be exposed.

C. After application

1. Make sure the sprayer is empty. Clean and rinse the sprayer inside and out and return it to storage area. Dispose empty pesticide containers properly.
2. Store remaining pesticides properly.
3. Bathe and change clothing.
4. Stay away from treated field for 1-2 days. This prevents poisoning through contact with treated plants, or inhalation of pesticide fumes.

VI. Types of pesticide poisoning and their symptoms

A. There are two different kinds of poisoning. These are acute and chronic.

1. **Acute poisoning** occurs after exposure to just a single dose of pesticide. Symptoms may occur immediately or be slightly delayed.
2. **Chronic poisoning** occurs after repeated exposures over a long period of time. Symptoms include nervousness, slowed reflexes, irritability, and a general decline of health.

B. The general symptoms of poisoning include:

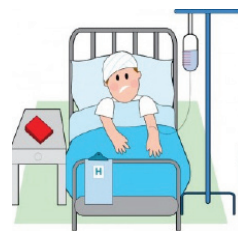
1. Mild poisoning or early symptom of acute poisoning:
 - a. Irritation of eyes, nose, or throat;
 - b. Headache and/or dizziness;
 - c. Fatigue and/or diarrhea
2. Moderate poisoning or early symptoms of acute poisoning:
 - a. Upset stomach, blurred vision;
 - b. Extreme weakness, excessive perspiration;
 - c. Muscle twitches, rapid heartbeat.
3. Severe or acute poisoning:
 - a. Vomiting and convulsions, pinpoint pupils;
 - b. Difficulty in breathing, unconsciousness.

VII. First aid measures for pesticide poisoning.

- a. Call a doctor or bring the patient to the hospital. Show the pesticide and/or label to the doctor.

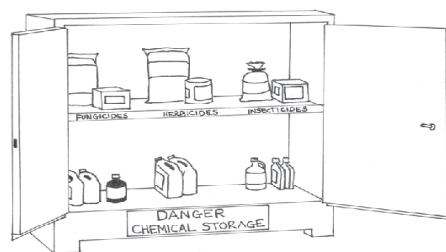
- b. While waiting for medical help or while transporting the victim to the hospital, apply the following first aid measures:

1. If the patient has pesticide on the skin, wash it off quickly to lessen the degree of injury.
 - a. Remove the patient's clothing.
 - b. Drench his/her skin and body with water.
 - c. Dry the patient and wrap him/her in a clean blanket.
2. If the patient has poison in the eye, wash the eye immediately and as gently as possible.
 - a. Hold the eyelids open and wash the eyes with a gentle stream of running water for 15 minutes or more.
 - b. Do not use chemicals in the wash water.
3. If the patient has inhaled poison, immediately move him/her to fresh air.
4. Loosen all his/her tight clothing, prevent chilling.
5. Apply artificial respiration if breathing stops or is irregular.
6. Do not give him/her alcohol in any form.



VIII. The proper storage and disposal of pesticides.

- a. Store pesticides in their original containers and keep them in safe, dry, locked, and well ventilated area.
- b. They must be sealed, labeled correctly, and kept out of reach of children and animals.



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Rice Technology Bulletin
 Philippine Rice Research Institute (PhilRice)
 Science City of Muñoz, 3119 Nueva Ecija
 Tel: (044) 456-0113, -0258, -0277
 Tel/Fax: (044) 456-0112; -0651 local 512;
 -0652 local 515
 E-mail: prri@philrice.gov.ph
 Website: <http://www.philrice.gov.ph>

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 DEPARTMENT OF AGRICULTURE
 Regional Field Unit IX
 E-mail: rfu9da@yahoo.com
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