

## Pesticide Spraying Technology and its Safe Use

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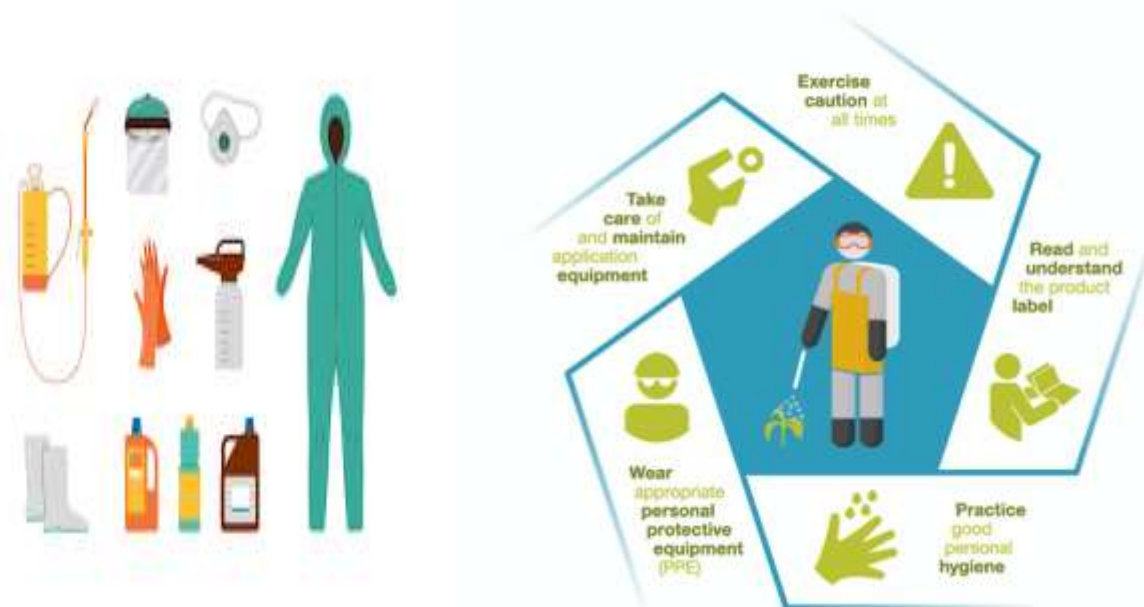
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### SUMMARY

Safety is always an issue when using pesticides. Pesticides can be poisonous to humans, pets, and livestock. They can also harm beneficial organisms and the natural environment. Applicators, bystanders, and the environment can be harmed by exposure to pesticide concentrates or vapour drift. Safe pesticide use reduces risk to applicators, the public, and the environment. The safe use and handling of pesticides is the applicator's responsibility. Those who work with pesticides must know and follow safe practices to reduce risk. Pesticide safety begins with choosing the correct product. Safety is important in pesticide storage, transportation, mixing, and loading. Equipment clean-up and maintenance must be done safely. Unwanted pesticides and empty pesticide containers must be properly disposed. Work responsibly at all times.

### INTRODUCTION

Plant protection activities are most important practices during crop production. The application of fungicides, herbicides and insecticides is one of the most recurrent and significant tasks in agriculture. Conventional agricultural spraying techniques have made the inconsistency between economic growth and environmental protection in agricultural production. Spraying techniques continuously developed in recent decades. The main purpose of pesticide application technique is to cover the target with maximum efficiency and minimum efforts to keep the pest under control as well as minimum contamination of non-targets. All pesticides are poisonous substances and they can cause harm to all living things. Therefore, their use must be very judicious. Applicators, bystanders, and the environment can be harmed by exposure to pesticide concentrates or vapour drift. Those who work with pesticides must know and follow safe practices to reduce risk.



Protective measures for pesticide spraying

### Choosing the right pesticide :

- Central Pesticide Board for Pest-Disease Control, Faridabad recommended pesticides (insecticides, fungicides, bactericides etc.) and herbicide should be selected.
- Type of pest damage, severity of infestation, economic loss level, stage of pest, type and structure of mouth parts of pest and as per recommendation of Central Pesticides Board, Faridabad Pesticide should be selected.
- In general, for the effective management of larvae and insects that feeds on leaves, flowers and fruits stomach poison and contact poison should be selected.

- For the effective management of sap-sucking insects (aphids, jassids, thrips, whitefly, mealybugs etc.) systemic poison should be selected.
- For the effective management of insects that lives in the soil a fumigant or a granular insecticide should be selected that can be applied through soil.
- For pesticide spraying, less toxic insecticide (green or blue triangle) should be selected first and then, if necessary, highly toxic (yellow and red triangle) insecticides should be selected. 7. Instead of repeatedly spraying pesticides of the same group or the same type, as per Central Pesticides Board, Faridabad recommendations, the suitable pesticide should be rotated and sprayed as per the label claim in the recommended quantity.
- Insecticides, acaricides, fungicides, herbicides, growth inhibitors and any other chemicals should not be mixed and sprayed unless recommended. Mixing of two chemicals should be avoided if possible.
- There are mainly two types of pesticides. The first type is water insoluble forms EC, SC, WP, WSC and another type is water soluble (SP, WSL, SL, SG).
- Water insoluble pesticides are mixed with water but not dissolved, so the solution of such pesticide should be constantly stirred.
- Since water-soluble pesticides are completely soluble in water, they are quickly absorbed into the plant and are effective for pest control.

### Effect of toxicity of pesticides on the human body and the environment :

Pesticides have adverse effects on the human body and the environment and according to the toxicity, the pesticides are classified into four categories as extremely toxic, highly toxic, moderately toxic and slightly or low toxic.

- Extremely toxic (class 1) pesticide has a red triangle in the shape of a kite with the hazard symbol on the top of the triangle and the word "Poison" in red letters.
- As well as on the box of pesticides that fall into the highly toxic category, there is a yellow triangle in the shape of a kite and the word "Poison" on the top of the triangle, and these pesticides (extremely toxic and highly toxic) fall into the toxic group.
- The pesticide in the moderately toxic category has a blue triangle in the shape of kite and the letter "Danger" on top of the triangle indicated.
- Slightly toxic category pesticides are marked with a green triangle in the shape of a kite and the letter "Caution" on the top of the triangle and these pesticides (moderately toxic and slightly toxic) fall into the mild category.



### Care to be taken while buying pesticides:

- Pesticides should be purchased only from registered pesticide dealers having valid license. Obtain a firm bill from the seller of the pesticide purchased.
- Buy only the quantity required for spraying the pesticide with the label claim and recommendation.
- Before buying pesticides, ask for a label (leaflet) or an information sheet from the seller, read or listen to the information sheet properly and follow the complete instructions exactly.

- While buying pesticides, buy only by looking at the required chemical ingredient.
- Check the production date and expiry date of the pesticide, do not buy pesticides with expired or damaged packaging, as well as those with leaky containers and pockets.

**Care to be taken while preparing pesticide solutions and mixtures:**

- While preparing the pesticide solution, it is necessary to wear gloves, mouth mask and eye protection glasses.
- Pay close attention to the toxicity label and directions on the pesticide container.
- Prepare the solution by taking the right amount of pesticide as recommended.
- Care should be taken while opening the box, pocket or bottle of pesticide so that the pesticide does not fly on the body.
- Mixing different chemicals (insecticides-acaricides-fungicides-herbicides-plant growth promoters) should be avoided for spraying.
- Stir the pesticide solution with a stick without stirring it by hand.
- While filling the pesticide solution into the spray pump, use a funnel or bucket and take care that the pesticide solution does not fall on the ground.
- If the pesticide solution is spilled on the ground, it should be absorbed with a dry cloth or soil mud without letting it fall. Then bury it in the ground.
- Eating or smoking tobacco and other edibles should be strictly avoided while mixing pesticide solutions or chemicals or during spraying.

**Care to be taken while spraying pesticides:**

- Keep first aid kit with you before going to spray pesticide in the field.
- Pesticides should be sprayed in the recommended amount according to the pest-disease. The pesticide should be selected and used as per the recommendation by keeping in mind the colour of the triangle and the symbol on triangle on the pesticide container.
- Read the label and information sheet carefully before using pesticides. Follow all precautionary instructions.
- A hand pump should be used during the early stage of crop growth as air is circulating in the crop. Battery or power pump should be used if the crop is dense.
- Requirements for ensuring that the sprayer is efficient and fault free, if necessary, repair work should be done before spraying. Pump nozzle Make sure it's good.
- Herbicide sprayers or pumps should not be used for spraying pesticides.
- Prepare the solution by taking the right amount of pesticide as recommended.
- For spraying the pesticide PH of water content for spraying should be 6 to 7.
- Hollow cone nozzle should be used for pesticide spraying and flat fan nozzle or flood jet nozzle should be used for fungicide and herbicide spraying.
- If the crop is dense and the space between the two rows is completely covered, a power pump should be used, so that the speed of spraying the solution can be controlled according to the circumference of the crop and the size of the leaf while spraying.
- Hold the pump nozzle half a foot away from the crop while spraying.
- Avoid spraying if there is a chance of rain on the day of spraying.
- Spraying should be done in the morning or evening. Avoid spraying after 12 noon in full sun.
- Do not use leaky spray pump or machine for spraying.
- Breakfast should be taken at least 1 hour before spraying. Avoid spraying on an empty stomach.
- The persons should not be selected for spraying with wounds on limbs, sick or cold, fever, cough.
- The work of spraying should not be done by one person continuously and should be done alternately by another person.
- Before starting the spraying work, personal protective equipment and clothing such as gloves, mouth mask, eye glasses, hat on the head, spray coat, gum boots on the feet should be used.
- Care should be taken to keep children, pets and animals away from the spraying area during spraying.
- While spraying, the pump nozzle should be kept away from the body so that spray of pesticides does not fly on the body.

- Avoid spraying during cloudy weather, hot temperatures and windy conditions. Avoid spraying in rainy weather or immediately after rain.
- If the wind is blowing slowly, spray in the direction of the wind instead of against the wind directions.
- If the nozzle gets clogged or blocked while spraying, it can be dangerous to clean it by blowing air through the mouth or by inhaling air through the mouth. For cleaning of nozzle pin or rod should be used.
- During spraying, depending on the type of pump and the specific pressure of the pump, misty droplets or particles of the spray come out. Therefore, the spraying person should control the walking speed and make sure that the plants get wet from all sides and the sprayed frost does not fall down in the form of drops.
- After finishing spraying, hands and feet should be washed immediately with soap and the sprayed clothing should be washed and kept separate and should not be used for other work. Wipe the body with a clean towel and put on other clothes. Avoid eating and drinking immediately after spraying.
- Avoid going to sprayed fields for some time after spraying.
- One person should not spray insecticide for more than 6 hours in a day.
- After a certain period of time by a regular sprayer get yourself medically examined.
- Cattle should not be allowed to graze near the pesticide sprayed area for at least 2 weeks.



**Pesticide spraying kit**

#### **Precautions to be taken after spraying :**

- Immediately after spraying the insecticides, take a quick bath and wash the sprayed clothes and keep them separate.
- Wash thoroughly all tools, materials used for spraying with water.
- Pesticides should be kept in a locked place out of reach of children.
- Empty pesticide containers or left over pesticide solution should be buried in a deep pit in a safe place without buried in or near any water source (well, river, lake, farm).
- Empty pesticide containers should not be used for other purposes.

#### **Symptoms of pesticide poisoning and care to be taken and remedies :**

- Weakness, dizziness.
- Skin and eye irritation, inflammation, excessive sweating, watery eyes, blurred vision.
- Drooling from the mouth, burning of the mouth, face, emesis and vomiting nausea, vomiting, abdominal pain.
- Headache, feeling unwell, muscle pain, tongue twisting, fainting, Shortness of breath, chest pain, a persistent cough.

#### **Immediate first aid and care after poisoning :**

- As soon as the symptoms of poisoning appear, the affected person should be taken from the accident site to a shaded place without wasting time and first aid should be given immediately. Take the affected person to the hospital as soon as possible.
- If pesticide splashes in the eyes, immediately flush the eyes with clean water for 5 minutes.
- If the pesticide has splashed on the body, immediately wash the body with soap and clean water and wipe it with a dry towel.
- If the poisoned person is sweating profusely, keep wiping the sweat with a dry towel. If the poisoned person is feeling cold, cover the body.



- If the pesticide enters the mouth and stomach, the affected person should be induced to vomit immediately.
- Milk, other food should not be given to the poisoned person to drink.
- Check if the poisoned person is breathing properly. If breathing becomes irregular or stops, try to resuscitate the affected person immediately by giving artificial respiration.
- If a poisoned person has convulsions, a soft cloth should be placed between his teeth.
- If the poisoned person is unconscious, try to revive him but do not try to feed him anything.
- The poisoned person should be immediately admitted to the hospital with the information about the pesticide involved and all the records should be told to the doctor.
- After the poisoned person recovers, a complete medical examination should be done and the person should be taken home only after complete recovery.
- For more information, contact the scientists of the University of Agriculture, the officers of the Department of Agriculture and the medical officers and doctors.

**CONCLUSION:**

Pesticide application plays an important role in pest management. Proper technique of application of pesticide and the equipment used for applying pesticide are vital to the success of pest control operations. The main purpose of pesticide application technique is to cover the target with maximum efficiency and minimum efforts to keep the pest under control as well as minimum contamination of non-targets. All pesticides are poisonous substances and they can cause harm to all living things. Therefore, their use must be very judicious. Safety is always an issue when using pesticides. Pesticide safety begins with choosing the correct product. The mode of action of pesticide, its relative toxicity and other physicochemical properties, help to decide the handling precautions, agitation requirement etc. Safety is important in pesticide storage, transportation, mixing, and loading. Equipment cleanup and maintenance must be done safely. Unwanted pesticides and empty pesticide containers must be properly disposed. Pesticides can be poisonous to humans, pets, and livestock. They can also harm beneficial organisms and the natural environment. Safe pesticide use reduces risk to applicators, the public and the environment.

**REFERENCES**

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