

PREPARATION OF PESTICIDE SOLUTIONS AND THEIR SAFE SPRAYING IN ORCHARD

Exercise

Preparation of pesticide solutions and their safe spraying in orchard.

Objectives

- To know how to prepare pesticide solutions and their safe spraying in orchard

Delivery schedule: 01 period

Student expectations / learning objectives

- To know about different types of pesticides
- To learn about preparation of pesticide solutions
- To learn about safe application of pesticides in fruit orchards

Handouts / material / equipment's & tools required: Paper sheet and pen to note down the different types of pesticides and to note few specimens from farm / pesticide shops. Important instructions can also be noted on a sheet.

Pre-learning required: Pre-requisite knowledge of some of the pesticide commonly used in fruit crops and their Do's and Don't

Introduction

A pesticide is a substance or a mixture of substances intended for preventing, destroying, repelling, or lessening the damage of any pest / insects. Fruit growers adopt different ways to control insects and pests in their fruit orchards. Traditional eco friendly pesticides like plant extracts such as neem seed extracts, neem leaf extracts, chrysanthemums, rotenone derivatives or common chemicals such as sulfur in the form of sulphur dust etc. and animal derivatives like cows urine etc. Similarly, various chemical pesticides are available and extensively used by the fruit growers in current time. These chemical pesticides are poisonous to human being. The indiscriminate use of these chemical pesticides may cause hazard to humans and can also pollute soil and water. Since most of the pesticides are poisonous and causes health hazards to human being, we should know the safe method of use of these pesticides. For example, how to prepare pesticide solutions, how to mixing it with different chemicals and what precautions one should take during spray of these pesticides?

Students should know

- Different types of pesticides available in the market
- Knowledge about active ingredients in different formulations
- How to prepare pesticide solutions?

For teachers...

- Demonstrate the safe application of insecticides to the students.
- Show different type of insecticides available in local

- How to mix pesticides with other chemicals?
- Precautions during preparation and spray of pesticides in fruit orchards.

Contact pesticides: Based on the mode of action some pesticides are categorized as contact pesticides. In order to have maximum efficiency these chemicals are need to be absorbed through the external body surface of the insects or the exposed plant tissues, where the pests cause damage. Contact pesticides when applied should reach their target directly to have effective control.

Systemic pesticide: This category of pesticides are absorbed by the plant or insects and moved (translocated) from the site of application to another site within the plant or insects where they become more effective. When insects feed on plants tissues, they are killed by systemic insecticide already present the plant tissues.

Insecticide formulations: Different types of pesticide are available in different formulations like, wettable or soluble powders, liquid concentrates or emulsion concentrates (EC). These chemicals must be diluted, usually with water, before use. Other diluents, such as deodorized kerosene, may be used for special applications.

Spray volume and active ingredient: While preparing the pesticide solution one should take into consideration the quantity of spray volume required for spraying a specific area. Students may also like to know that in some cases the spray volume is also calculated based upon the number of tree planted in an unit area and the volume required to cover each tree canopy. Dusts and granules are applied without dilution by the farmers. Therefore, in this case the recommended dose to be applied based on the recommendation by the scientist to specific crop. The amount of active ingredient in liquid concentrates is expressed in percent EC for examples” in chlorpyrifos 20% EC. In case of granules, dusts, wettable or soluble powders it is expressed as percent by weight (Fipronil 0.3% GR, Ridomil Gold i.e., Metalaxyl M 4.0% and Mancozeb 64.0% WP). Application rates are usually expressed as ml / litre or mg / litre in case of powder.

How to prepare insecticide solution for spray

1. Quantity of insecticide required

The required of quantity of commercial formulation of the insecticide can be calculated by the formulae.

$$= \frac{\text{Volume of spray liquid} \times \text{Strength of the spray solution desired (\%)}}{\text{Quantity of finished spray solution required}}$$

2. Strength of the finished spray solution

To calculate the strength of a finished spray solution when a known quantity of chemical is added to known quantity of water, the following formulae may be adopted.

$$= \frac{\text{Quantity of the insecticide used} \times \text{Strength of the insecticide (\%)}}{\text{Quantity of finished spray solution required}}$$

3. In case of granules

$$\text{Quantity of chemical needed} = \frac{\text{Recommended dose a.i. / ha} \times 100}{\% \text{ a.i. of insecticide}} \times \text{Area}$$

Key points to be remembered

While purchasing

- Purchase a pesticides / biopesticides only from a registered pesticide dealers having valid licence.
- Purchase only required quantity of pesticides for current use.
- Check approved labels on the containers / packets of pesticides.
- Check Batch No., Registration Number, Date of Manufacture / Expiry on packet.
- Purchase the pesticide which are in packed containers.

Storage of pesticide

- Store the pesticides away from house premises.
- Keep pesticides in original containers.
- Pesticides / weedicides must be stored separately.
- Pesticides be stored away from the reach of the children and livestock.
- Keep pesticides in a separate container during transportation.
- Bulk pesticides should be carried tactfully to the site of application.

Preparation of insecticide solution

- Always use clean water or fresh water for mixing of chemicals or pesticides
- Always use protective clothing when handling pesticides viz., handgloves, face masks, cap, apron, full trouser, etc. to cover whole body.
- Take care to protect your nose, eyes, ears, hands, etc. from spill of spray solution.
- Read the instructions on pesticide container label carefully before use.
- Avoid spilling of pesticides solutions while filling the spray tank.
- Always use recommended dosage of pesticide.
- Do not eat or drink during handling of pesticides.

Selection of equipment

- Select right kind of equipment. Select right sized nozzles. Use separate sprayer for insecticides and weedicides.

Spraying of insecticide

- Apply only recommended dose and dilution.
- Spray operation should be conducted on cool and calm day.
- Spray operation should be conducted on sunny day in general.
- After every spray operations, sprayer, buckets should be washed with clean water using detergent / soap.
- Avoid the entry of workers /domestic animals in the field immediately after spray.

After spray operation

- Left over solutions should be disposed off at safer place.
- The used / empty containers should be crushed and buried deep in soil.
- Wash hands and face with clean water and soap before eating.
- On observing poisoning symptoms give the first aid immediately and take the patient to a doctor. Also show the empty container to doctor.

Students Activities

- Visit to nearby orchards and try to note down different pesticide and their formulations used. Make a list of pesticides available in the local market with their active ingredient.
- An orchard of mango (100 plants) has severe infestation of mango hopper. Mango expert has suggested spray of 0.06% dimethoate to control the insect. Calculate the amount of Rogar insecticide (35% EC dimethoate) required for spray assuming that 10 litre solution per plant is sufficient.
- Practice preparation and spray of insecticide in fruit orchard with all precautions.

Study Material

- Bal, J. S. (2007). Fruit growing. Kalyani Publishers, Ludhiana, India.
- Bose, T. K., Mitra, S.K. and Sanyal, D. (2001). Fruits:Tropical and Subtropical (Vol. 1). NoyaUdyog, Kolkatta-6.
- Chadha, K.L. (2001). Handbook of Horticulture. ICAR, New Delhi.
- Chattopadhyay, T.K. (2008). A textbook on Pomology, Vol. 1-4 (Fruits), Kalyani publishers, Ludhiana, India.