

Ex No. 5

Date:

CALCULATION OF DOSES / CONCENTRATIONS OF DIFFERENT INSECTICIDE FORMULATIONS

Objectives:

To calculate the dosages of given insecticides for field application To calculate the strength of the spray solution and To calculate the amount or quantity of insecticide required to apply in a given cropped area.

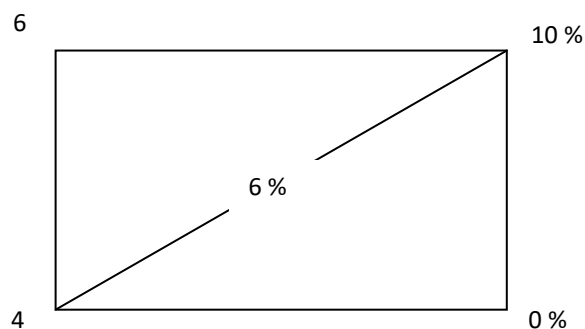
All insecticides are toxic not only to insects but also to warm blooded animals including man. Active ingredients of pesticides are generally available in concentrated forms with primary producers. They have to be diluted and formulated as per recommended concentration or strength and it varies with the nature of pest and the type of crop to be treated. The preparation of recommended spray or dust in the field should be known to a plant protection worker and should get acquainted with the calculation of quantities of diluents and formulated insecticides required to prepare the same.

Dilution of dusts:

The dilution of dusts requires a certain quantity of talc to be mixed with to reduce the concentration of the dust and for dilution, rectangular method is generally used, where in the centre of the rectangle, the percentage of required concentration of dust is given and on the right hand side top corner, highest concentration of the dust available and on the right side corner bottom, lower concentration to be given. The values are diagonally subtracted and represented on left hand side top and bottom corners.

Example:

A chickpea farmer has advised to dust 6% Malathion dust for control of gram pod borer in his 3 acres of field at the rate of 10kg/acre. Calculate the quantity of talc he has to purchase from the market for diluting the 10% malathion dust available with him.



1. 6kg of 10% dust has to be mixed with 4 kg of talc to get 10kg of 6% dust.
2. For getting 10kg of 6% malathion dust, the requirement of talc is 4kg and for getting 30kg (for 3 acres) of 6% dust, the requirement of talc is $4/10 \times 30 = 12\text{kg}$.
3. For getting 10kg of 6% dust, the requirement of malathion is 6kg and for getting 30kg (for 3 acres) of 6% dust, the requirement is $6/10 \times 30 = 18\text{kg}$.

Dilution of spray formulation:

The liquid formulations have to be diluted to ensure the minimum outreach of the active ingredient that is sufficient to act against insect pest.

To find out the quantity of insecticide required for treating an area at a required strength, the following formula may be adopted:

$$\text{Quantity of Insecticide} = \frac{\text{Total quantity of spray solution required} \times \text{Concentration of the spray solution required}}{\text{Strength of the formulation}}$$

Example:

A paddy farmer was advised to spray 0.05% chlorpyrifos (20% EC) for the control of rice leaf roller in his 4 acres of cropped area. Calculate the cost of the chemical when the spray fluid required is 300lt/acre and the cost of the chemical is Rs. 500/lt.

$$\text{Quantity of chemicals required per acre} = \frac{300 \times 0.05}{20}$$

$$\text{For 4 acres} = 0.75 \times 4 = 3 \text{ ltr}$$

$$\text{Cost of the chemical} = 3 \times 500 = 1500/-$$

To obtain the strength/concentration of a finished spray solution, when a known quantity of chemical is added to a known quantity of water, the following formula may be adopted:

$$\text{Concentration of spray fluid} = \frac{\text{Quantity of formulation used} \times \text{Strength in percentage of the formulation}}{\text{Quantity of finished spray solution required}}$$

Example:

For the control of groundnut leafminer, farmer has mixed 300ml of chlorpyrifos 20 EC in 300lt of water and sprayed in his field. Find out the concentration of spray fluid he has applied in his field.

Three hundred (300) ml of chlorpyrifos 20% EC is added to 300l of water. The strength/concentration of chlorpyrifos in the spray liquid is

$$\frac{0.3 \times 20}{300} = 0.02\%$$

Calculation of Granular formulations:

Example:

Carbofuran 3G at the rate of 1kg a.i./ha was recommended for the control of root grub in groundnut. Calculate the cost of the granules for applying in 4 ha of cropped area, when cost of the chemical is Rs.30/kg.

For getting 3kg a.i. of carbofuran 3G, the requirement of formulation is 100kg

For getting 1 kg a.i., the requirement is

$$\frac{1 \times 100}{3} = 33.33 \text{ kg/ha}$$

For 4 ha the chemical requirement is $33.33 \times 4 = 133.32 \text{ Kg}$

The cost of chemical is $133.32 \times 30 = \text{Rs. } 3999.60$

Record Work:

1. Calculate the dosage of insecticides with given strength and recommendations.
2. Calculate the amount of insecticide required to apply in given cropped area