Pesticides

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Experiment No. 7: Study of pesticides, their formulation, applicators (sprayers and dusters).

A substance used for destroying insects or other organisms harmful to cultivated plants or to animals

FORMS AND FORMULATIONS

Formulations of pesticides are marketed in three forms viz. Solid, Liquid and Gaseous.

(a) Solid formulations

(i) Dusts (D): The dust formulations are mixture of toxicants and inert diluent to form a dry, free flowing powder. The concentration of toxicant mostly ranges from 0.1 to 50 per cent.

(ii) Wettable powders (WP) or water dispersible powders (WDP): These are essentially finely divided concentrated dusts containing a wetting agent i.e. surface active agent to facilitate the mixing of the powder with water to prepare the solution of a desirable strength before spraying. Water dispersible powder in addition contains a dispersing agent for uniform dispersion of the solute in the suspension. Such powders usually contain 50 percent to 75 per cent inert diluents.

(iii) Water soluble powder (SP): It is a finely ground water soluble solid and contains nothing else to assist its solution in water. It is merely added to the proper amount of water in the spray tank where it dissolves immediately.

(iv) Granulars (G): These formulations consist of inert material with the toxicants absorbed on to them. Granular formulations are classified as extruded (impregnated) and non extruded (surface coated). The former readily disintegrates in water whereas the latter resist disintegration in water.

(v) Capsules, baits and pellets: Capsules are the pesticide formulations which have essentially a very small mass of toxicant enveloped in a thick coating material from which the toxicant diffuse slowly. Baits are formulations which consist of small quantities of toxicants combined with food material attractive to the pests. As regards pellets, the toxicant is mixed with polyvinyl chloride and a plasticizer which release the toxicant over a period of time.

(b) Liquid formulations

These formulations are applied as sprays in the form of solutions, suspensions and emulsions.

(i) Solutions: They are homogenous mixture of two or more substances and usually are not soluble in water. However, most of them are soluble in organic solvents like xylene, carbon tetrachloride, kerosene etc.

(ii) Suspensions: They are also referred as flowable or sprayable suspensions (F or S). They consist of finely divided solid particles dispersed in a liquid medium by means of a wetting agent.

Therefore, they mix well with water as a suspension and can be sprayed, but with the same tank-settling characteristics as mentioned in case of WP.

(iii) Emulsions: There are two types of emulsion; the first is the oil in water (O/W) type. In this, oil is dispersed in water. The second type is invert emulsion. This is a change from oil in water emulsion to water in oil (W/O).

(iv) Water miscible liquids: They readily mix with water. They do not become milky when diluted in water.

(v) Concentrate insecticide liquids: They are applied in a concentrate form without diluting in water at ultra low volume (ULV) rates.

(c) Gaseous Formulations: These include the formulation which may be available in liquid or solid state but act in gaseous or vapour state.

(i) Aerosols: These contain the toxicant dissolved in an inert liquid which is gaseous at ordinary temperatures but liquifiable under pressure. When the pressure is released the solution is discharged through a fine nozzle, the solvent evaporates and the toxicant is dispersed in a very finely divided state.

(ii) Fumigants: Pesticides in gaseous forms are known as fumigants and are most often formulated as liquids. These are generally useful in completely closed spaces.

PESTICIDE SPRAYERS

Sprayers are the equipments used to apply the insecticide. Very simple to sophisticated instruments are available in the market. Three different models are shown in the picture.

1. Hand operated useful for very small area of the mulberry garden.
2. Manual operated useful to moderate area of mulberry garden.
3. Machine operated useful for very large area like forests *etc.*,

REFERENCES

1. Anonymous, 1990, Hand book on pest and disease control of mulberry and silkworm, United Nations, Thailand.
2. Anonymous, Diseases and Pests of Mulberry and their Control, Central Silk Board, India.
