Formulations and Concentrations

The common types of insecticide formulations are wettable powders, emulsifiable concentrates, dusts, solutions, aerosols, baits, granules, flowables, and soluble powders.

Wettable powders (WP) are dry forms of insecticides in which the toxicant is absorbed or adsorbed on inert materials that can be mixed readily with water because a wetting agent has been added. These form a suspension-type spray which must be kept agitated in a sprayer tank.

Emulsifiable concentrates (EC) contain an insecticide and an emulsifying agent in a suitable solvent. These are diluted with water to form an emulsion and applied as sprays.

Dusts (D) usually are made by diluting the toxicant with finely ground, dried plant materials or minerals. These include wheat, soybean, walnut shells, talc, clay, or sulfur.

Solutions are liquid forms of insecticides which are dissolved in suitable solvents such as petroleum distillates or liquid gas. Oilbase cattle sprays, household sprays, and gas-propelled aerosols are examples of insecticide solutions.

Aerosols are air suspensions of solid or liquid particles of ultramicroscopic size which remain suspended for long periods.

Baits consist of a poison or poisons plus some substances which will attract the insect.

Granules (G) are formed by impregnating the insecticide upon an inert carrier of 30 to 60 mesh particle size.

Soluble powder (SP)—a powder formulation that dissolves in water.

Flowable (Fl)—a liquid or viscous concentrate of suspendible pesticide in water.

Fumigant—a substance or mixture of substances which produce gas, vapor, fume, or smoke intended to destroy insects, bacteria, rodents, or other organisms.

Computing insecticide concentrations

To determine the percent active ingredient in a spray mixture:

$$\frac{\text{lb of formulation used} \times \text{\% of active ingredient}}{\text{gallons of spray mixture x 8 (lb per gal water)}}$$

Example: 4 pounds of 25% malathion wettable powder were mixed with 100 gallons of water. What percent malathion is in the spray?

$$\frac{4 \times 25}{100 \times 8} = 0.125\%$$

To determine the pounds of wettable powder needed to mix a spray containing a given percentage of active ingredient:

$$\frac{\text{gal of spray wanted} \times \text{\% of active ingredient wanted} \times 8 \text{ (lb per gal water)}}{\text{\% of active ingredient in formulation used}}$$
(pounds of wettable powder)

Example: How many pounds of 12% gamma isomer BHC wettable powder are needed to make 100 gallons of spray containing 0.03% gamma isomer BHC?

$$\frac{100 \times 0.03 \times 8}{12} = 2 \text{ pounds}$$

To determine the gallons of emulsifiable concentrate needed to mix a spray containing a given percentage of active ingredient:

$$\frac{\text{gal of spray wanted} \times \text{\% of active ingredient wanted} \times 8 \text{ (lb per gal water)}}{\text{lb active ingredient per gal in formulation used} \times 100}$$
(gallons of concentrate)

Example: What volume of 4 lb/gal parathion emulsifiable concentrate is needed to make 50 gallons of spray containing 0.25% parathion?

$$\frac{50 \times 0.25 \times 8}{4 \times 100} = 0.25 \text{ gal}$$

To determine the pounds of dust needed to mix a dust containing a given percentage of active ingredient:

$$\frac{\text{\% of active ingredient} \times \text{lb of mixed dust wanted}}{\text{\% active ingredient in formulation used}}$$

Example: 5 pounds of 3% diazinon dust is wanted. How much talc should be added to 50% diazinon powder to make the dust?

$$\frac{3 \times 5}{50} = 0.3 \text{ lb of 50\% diazinon}$$

Answer: 4.7 lb of talc to make the 5 lb of 3% diazinon dust.