CALCULATING DOSAGE FOR SPRAYABLE PESTICIDE PRODUCTS

- Mark Edwardes

I am asked many times by pest control operators (PCO) how to calculate dosage rates of pesticides applied as residual sprays to control crawling pests.

The method of calculation and example used here is an attempt to assist PCOs in working out dosage rates. The example used is of pyrethroid sprays, as these are most commonly used by PCOs, but the principle remains the same when using sprays containing actives from other chemical classes and modes of action (e.g. fipronil – phenyl pyrazole and thiamethoxam – chloronicotinyl). REMEMBER: Always rotate residual sprays between different chemical classes to prevent or delay insecticide resistance from developing.

1) Active ingredient concentration of a pesticide is given in g/l or g/kg.

2) There are 1000 ml or g in a litre or kg.

3) Therefore to find out how much active ingredient is in one ml or g of a formulation divide the concentration by 1000.

4) Identify on the label the dosage rate you wish to spray/apply.

5) Times the answer from 3) with the dosage rate from the label (dosage rate per 10 litres water).

6) When using a 10 litre spray tank and doing residual sprays for cockroaches, ants, flies etc., the 10 litres mixture will cover 200 m2 when applied correctly. Some labels may specify other application rates, but in general 200 m2 is what should be covered in practice. (The application of residual sprays in this way was first worked out by the World Health Organisation for the application of DDT to dwelling walls to control malaria mosquitoes in the Global Malaria Eradication Campaign that ran from 1955-69. The Eradication Campaign failed due to a number of reasons, but among them the development of resistance to DDT. Readers interested in finding out more about residual spray application for malaria mosquito control can search for WHO/CDS/NTD/WHOPES/GCDPP/2007.3).

7) To calculate the dosage rate applied per m2, divide the answer obtained in 5) by 200.

8) There are 1000 mg in a g.

9) Therefore to calculate the mg active ingredient applied per m2, times the answer in 7) with 1000.

Example: Alpha-thrin Pest Kill (alpha-cypermethrin 100 g/l): SC formulation, Reg. No. L 9263

1) Active ingredient concentration 100 g/l.

2) 100/1000 = 0.1 g active per ml formulation.

3) Dosage rate from label: 25 to 50 ml / 10 l water. Higher rate used for severe infestations.

4) Applying the 50 ml rate: 0.1 x 50 = 5 g active ingredient in a 10 litre spray tank.

5) 5 g / 200 m2 = 0.025 g/m2

6) 0.025 g x 1000 = 25 mg active ingredient applied per m2.

The dosage of 25 mg/m2 obtained in the example above is a high rate of application. In general alpha-cyano (type II) and single isomer pyrethroids are active and effective in controlling crawling pests at dosages from 5 mg to 15 mg active ingredient per m2 (e.g. alpha-cypermethrin, lambda-cyhalothrin, deltamethrin etc.). At these dosage rates all these alpha-cyano and single isomer pyrethroids should give up to 2 months residuality in controlling crawling pests, depending on the type of pest, surface type, environmental conditions etc.

Under ideal conditions residual control may extend beyond 2 months. Other pyrethroids, such as permethrin, bifenthrin etc. are applied at much higher dosage rates (typically 50 mg/m2 or higher) because their intrinsic efficacy against crawling pests is much lower than the single isomer and alpha-cyano pyrethroids.

Feel free to contact the writer if you have questions regarding residual spray applications and dosage rates.

Mark Edwardes

Cell: +27 71 384 9213

E-mail: medwardes@villacrop.co.za