

SOP for Spray Calculations for experimental hut studies

Purpose: This SOP outlines the procedures to be followed for calculating insecticide solutions required for the application of insecticides as an indoor residual spray using manually operated compression sprayers for the generation of study data.

Appendix: FORM AVECNET EH 007.01

Definitions

IRS	Indoor residual spray
CFV	Constant Flow Valve
SOP	Standard operating procedure

Scope

For accurate application of an IRS treatment, insecticide solutions need to be calculated correctly. This SOP can be used to calculate the volume of insecticide solution required for an IRS application.

Supplemental SOPs are to be followed (not detailed in this SOP) to ensure accuracy of application, these include:

- Sprayer Calibration
- Sprayer Cleaning and Decontamination
- Sprayer Maintenance and Repair
- Safe Handling of Pesticides

Responsibilities

1. It is the responsibility of the Study Director and those preparing insecticides for application in experimental hut studies to follow this SOP AVECNET EH 008.01 and record results using the corresponding record sheet

Instructions

1. Equipment

- 1.1. Measuring tape (metric)
- 1.2. Calculator

2. Calculation of surface area of the hut

- 2.1. Measure the width and the height of the interior walls of the huts to calculate the area of the hut.
- 2.2. Measure the height and width of each wall in at least 2 places to account for point differences during construction.

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SOP for Spray Calculations for experimental hut studies

2.3. Internal Surface Area (i.e. total surface area to be sprayed) = area of 4 walls + area of ceiling (if ceiling is also sprayed).

3. Calculation of amount of insecticide solution (water + insecticide) required per hut

3.1. The amount of formulated insecticide required for the preparation of an insecticide spray is based on the average discharge rate of the sprayer and the speed of application. When the compression sprayer is fitted with a CFV, the output of the nozzle remains the same although the pressure inside the tank decreases as it empties. The amount of insecticide solution needed can be calculated as follows:

Volume to be sprayed per m² x surface area of hut

3.2. For example if the surface area of 1 hut is 30 m² and the target application rate is 40ml/m² then 30 × 40 = 1200 ml of insecticide solution is required to treat the hut.

4. Calculation of volume insecticide required for each hut

4.1. The amount of insecticide required for each hut to attain a target rate of application should be calculated as follows:

$$V_{i(ml)} = \frac{S_{(m^2)} \times TD_{(mg/m^2)}}{Di_{(mg/ml)}}$$

Where;

$V_{i(ml)}$ = Volume of insecticide required in ml

$S_{(m^2)}$ = Internal Surface area of hut

$TD_{(mg/m^2)}$ = Target dose in mg/m² (as stated in Study Protocol or on Product Label)

$Di_{(mg/ml)}$ = Insecticide concentration in mg/ml

NB: where the concentration of the insecticide comes in a different format or as a percentage, be careful to convert this to mg/ml before applying the formula

After determining how much insecticide is required per hut add an excess of at least 30% to account for loss of insecticide during application.

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5. References Calculation of volume of water per hut required for preparing insecticide solution:

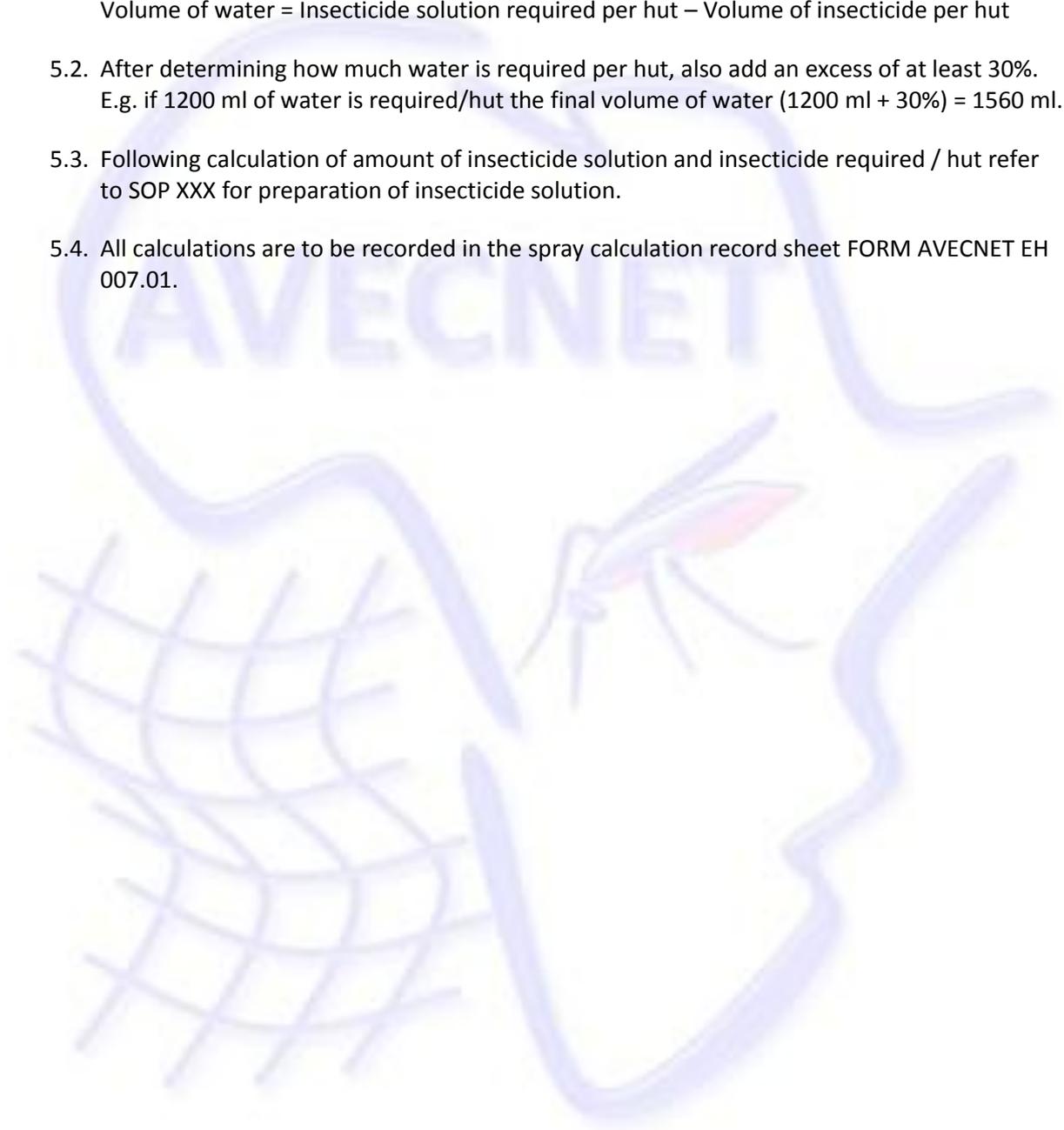
5.1. The volume of water required per hut can be calculated as follows:

Volume of water = Insecticide solution required per hut – Volume of insecticide per hut

5.2. After determining how much water is required per hut, also add an excess of at least 30%.
E.g. if 1200 ml of water is required/hut the final volume of water (1200 ml + 30%) = 1560 ml.

5.3. Following calculation of amount of insecticide solution and insecticide required / hut refer to SOP XXX for preparation of insecticide solution.

5.4. All calculations are to be recorded in the spray calculation record sheet FORM AVECNET EH 007.01.



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