CIPAC wash method for LN

Draft method: MT XXX RETENTION OR RELEASE INDEX OF LN
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SCOPE

The method is suitable for determination of the retention or release index of long-lasting insecticidal mosquito nets (LN) and to measure the wash resistance of LN.

OUTLINE OF METHOD

Suitable pieces of the net are subjected to successive wash-rinsing-drying cycles and the total active ingredient content is determined in washed samples representing different wash points. The retention or release index is determined by the decrease of the total content of the insecticide after selected (4) wash points using the appropriate analytical method.

APPARATUS AND GLASSWARE

Reciprocal (horizontal) shaker in a water bath thermostated at 30°C ± 2°C capable of holding typically 6 to 10 bottles of 1 L and providing a movement of 155 beats / min with an amplitude of 15 mm. If no thermostated shaker is available and the room temperature differs from 30°C by just a few degrees, the use of deionised water at 30 to 32°C should ensure the range of temperature to be between 28 to 32°C for the time needed to carry out the washing and rinsing steps (10 min each). In this case, the temperature at start and end of the wash cycle must be determined and noted.

Oven at 40°C ± 2°C

Scissors

Tweezers

Stopwatch

1 L screw capped glass bottles (ISO 4796, external diameter 101 mm, height 230 mm)

100 ml glass beakers (external diameter 50 mm, height 70 mm)

REAGENTS

IEC-A* reference detergent 60456 without phosphate

Deionised water

PROCEDURE

Cut sufficient number of suitable pieces of 25 x 25 cm from the net or netting. If desired, label the pieces using a suitable ink for easier identification. Perform up to 4 wash-rinsing-drying cycles on 3 pieces of the net.

Step 1: Washing

Dissolve 2.5 ± 0.1 g IEC-A* detergent in 500 ml of deionised water at 30°C ± 2°C in a 1 L glass bottle (Note 1). Insert a net sample, size 25 x 25 cm, and cap the bottle. Wash each sample individually for 10 min by the agitation of the reciprocal shaker. After 10 min, remove the sample using tweezers, remove adherent drops of wash solution by gentle shaking.

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Step 2: Rinsing

Insert the net sample in a 1 L glass bottle containing 500 ml of deionised water at 30°C ± 2°C, cap and shake the sample for 10 min by the agitation of the reciprocal shaker. Repeat the rinsing step to carry out a total of two rinsing steps.

Step 3: Drying

Using tweezers remove the net sample from the rinsing solution and carefully remove adherent water drops by shaking. Line dry the net sample on a line, protected from direct sunlight at room temperature for 30 min.

Step 4: Replenishing

After 30 min, fold the net sample carefully one time in each direction, place it loosely rolled and upward in a 100 ml beaker and store in an oven at 40 ± 2 °C for 22 hours ± 2 hours until next washing step (Note 2).

When longer storage times are necessary, store the sample folded and loosely rolled in a 100 ml beaker at room temperature, protected from direct sunlight. Net samples having finished their scheduled wash cycles can also be stored in aluminium foil at 4°C in the dark awaiting analysis.

ANALYSIS

Analyse each sample using the appropriate CIPAC method for determination of total active ingredient content. Express results as g active ingredient per kg net or netting material.

CALCULATION

Calculate the retention index after 4 washes using the following equation (free migration stage behaviour).

Average a.s. retention index = $\sqrt[n]{(t_n/t_0)}$

where t_n = active substance total content after wash n, g/kg
t_0 = active substance total content at wash 0 (pre-washing), g/kg
n = number of washes.

Note 1 The detergent is phosphate free and contains zeolithe to control water hardness. Zeolithe is a mineral and forms suspensions upon addition of water. Therefore, the detergent cannot be prepared as a concentrated stock solution for further dilution and individual weightings for preparation of the wash solution need to be used. If a weighting is prepared for more than 500 ml deionised water, the solution has to be agitated using a magnetic stirrer.

Note 2 The storage under defined temperature is intended to re-establish equilibrium of the insecticide at the surface. For practical reasons, the storage in glass beakers of defined dimension is chosen. The average storage time until the next washing step is approximately 22 hours. If the storage is over weekend, the storage should be either at room temperature protected from sunlight or for longer time wrapped in aluminium foil in a refrigerator. Deviations from the recommended temperature are possible for certain nets if necessary and justified.

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