



Certificate of Physical and Chemical Analysis

Product name:

Pherobank *Helicoverpa armigera*

Type of formulation: Active compounds impregnated in natural rubber sleeve stopper
Name of producer: Pherobank BV
Country of origin: The Netherlands
Fabrication lot number: representative sample
Production date: March, 2015

Content:

Pheromone 0.72% p/p
Inert material 99.28% p/p

Physical description of the pheromone dispenser:

Red Natural rubber sleeves. Dimensions: 9.1 mm outside diameter, 18.8 mm total height.
Weight: 0.7 gram.

Packaging description:

Suitable

ID active compound(s):

- 1) (Z)-11-hexadecenal [53939-28-9]
- 2) (Z)-9-hexadecenal [56219-04-6]
- 3) (Z)-7-hexadecenal [56797-40-1]

Concentration of active ingredient found per pheromone dispenser:

SAMPLE	TEST	SPECIFICATIONS	TEST RESULTS
<i>Helicoverpa armigera</i> lure	pheromone content	5.1 mg MIN	5.1 mg

Signature Quality Assurance


pherobank
wageningen
Wijk bij Duurstede, 12 March 2015



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Addendum: Protocol for the chemical analysis of pheromone evaporators.

Choice of solvent

Dichloromethane; because this solvent is able to extract chemical compounds absorbed into the rubber. The gc-ms response factor of unsaturated linear acetates compared to the internal standard tridecyl acetate was measured.

Part 1, equipment

All glassware and tools were cleaned by water and soap and subsequently flushed with distilled acetone and dried in an oven at 60 Celsius for 4 hours. Oven dried items were allowed to return to room temperature before use.

GC-analyses were performed on a Hewlett Packard GC-MS.

GC part: Agilent 7890A Gas Chromatograph
Column: AT-5 (5% Phenyl, 95% Methyl Silicone), 30 m, 0.25 mm id, 0.25 µm film thickness
Carrier gas: Helium, constant flow mode at 2.00 ml/min
Detector: MSD 5975C
Injector: split/splitless injector operating in splitless mode, temperature: 230 °C
Oven temperature: 50 °C for 2 minutes, then with 20 °C/minute to 280 °C, at 280 °C isotherm for 6.5 minutes. Total runtime 20 minutes.

Part 2, chemicals

Dichloromethane was distilled prior to use.

For dichloromethane a specific gravity of 1.325 gram/ml at 25 Celsius was applied.

A 0.1 mg/ml internal standard of tridecyl acetate in dichloromethane was prepared by weighing exactly 100 mg tridecyl acetate into a bottle of 1 litre. To this bottle 1.325 kilogram (1.00 litre) of dichloromethane was added.

Part 3, Quantification of pheromones in rubber evaporators, general method.

One pheromone lure was put into a 25 ml Erlenmeyer with a stirring magnet.

To this Erlenmeyer 5 ml of internal standard solution (0.5 mg tridecyl acetate) was added by weighing (6.625 grams). To this Erlenmeyer 10 ml (graduated cylinder) of dichloromethane was added.

The Erlenmeyer was closed with a glass stop and stirred for 2-3 hours.

After this period of stirring an aliquot was taken and analysed by gc-ms.