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To Prof. Marc Coosemans

## CERTIFICATE OF ANALYSIS ITM / FO 23458 / Ch.5774 / 2013 / A

**Samples of :** Repellent spray

Declared active substance content : icaridin 20% w/w  
Manufacturer : SC Johnson  
Batch number : MANF 250113 65 - A2 094478

**Supplier :** Institute of Tropical Medicine Antwerp.

**Arrived on :** October 14, 2013.

**Type of package :** plastic flask of 100 mL.

**Reference :** Request of October 01, 2013 from Prof. Marc Coosemans (Institute of Tropical Medicine Antwerp).

### **RESULTS :**

#### 1. **Icaridin content**

[CIPAC method 740/TC/(M)/3, CIPAC Handbook K, p. 65, Gas Chromatography with Flame Ionization Detection (GC-FID)].

**Dates of analysis :** November 20, 2013.

**Repellent spray - Batch MANF 250113 65 - A2 094478**

WHO general specification limit : 20% w/w  $\pm$  6% [18.8 – 21.2 % w/w]

Determination	Icaridin content (% w/w)
1	20.02
2	20.02
3	19.98
<b>Mean</b>	<b>20.01</b>
Standard deviation	0.02
Relative standard deviation (RSD) *	0.10 %
Confidence interval of the mean (Student T-test with a probability of 95 %)	<b>20.01 <math>\pm</math> 0.05</b>

\* RSD < RSD Horwitz x 0.67 (1.71 %).

## 2. Impurity sec-butyl chlorformate content

[Method developed by the test facility and based on CIPAC method 740/TC/(M)/3, CIPAC Handbook K, p. 65, and Gas Chromatography with Mass Spectrometry Detection (GC-MS)].

Dates of analysis : from December 02 until December 03, 2013.

Repellent spray - Batch MANF 250113 65 - A2 094478

Determination	sec-butyl chlorformate content	
	g/kg	g/kg of the icaridin content
1	ND	ND
2	ND	ND
3	ND	ND
<b>Mean</b>	<b>ND</b>	<b>ND</b>
Standard deviation	-	-
Relative standard deviation (RSD)	-	-
Confidence interval of the mean (Student T-test with a probability of 95 %)	-	-

ND = not detected (limit of quantification = 0.005 g/kg or 0.025 g/kg of the icaridin content).

## 3. Impurity sec-butyl carbonic anhydride content

[Method developed by the test facility and based on CIPAC method 740/TC/(M)/3, CIPAC Handbook K, p. 65, and Gas Chromatography with Mass Spectrometry Detection (GC-MS)].

Dates of analysis : from December 02 until December 03, 2013.

Repellent spray - Batch MANF 250113 65 - A2 094478

Determination	sec-butyl carbonic anhydride content	
	g/kg	g/kg of the icaridin content **
1	0.173	0.864
2	0.175	0.873
3	0.179	0.894
<b>Mean</b>	<b>0.176</b>	<b>0.877</b>
Standard deviation	0.003	0.015
Relative standard deviation (RSD) *	1.74 %	1.76 %
Confidence interval of the mean (Student T-test with a probability of 95 %)	<b>0.176 ± 0.008</b>	<b>0.877 ± 0.038</b>

\* RSD < RSD Horwitz x 0.67 (3.48 %).

\*\* Using the result obtained for icaridin content.



December 10, 2013

Dr ir Olivier PIGEON  
Scientific Unit Coordinator