

**CONFIDENTIAL**

**Tables of results**

BioGenius GmbH, Biology  
 TechnologiePark, Building 56  
 Friedrich-Ebert-Straße  
 51429 Bergisch Gladbach, Germany

Study no. : Mo4070  
 Report no : BIO102b-10  
 Date : 2011-01-06  
 Study Director : R. Jung

Figure 1

**Mosquito repellent effect / Protection time of two formulations against *Aedes aegypti*, strain BioGenius 04, on the forearm of volunteers (summarized results).**

study: Mo4070  
 method: BioG B 406-02

temp.: 25-26°C  
 rel. hum.: 69-72%

test insects	product	protection time in hours (3 volunteers):		
		A	B	C
<i>Aedes aegypti</i>  strain BioGenius 04 susceptible	<b>ARIES</b>	6.0	7.0	>8.0
	<b>Mückenschutzlotion pmd</b>	<b>Ø hours 7.0</b>		
	<b>Citriodiol</b>			
	<b>MRM 03.11.10</b>			
	<b>Anti Brumm Naturel</b>	6.0	>8.0	>8.0
	<b>Lot: 102 704</b> <b>Exp: 07/2013</b>	<b>Ø hours 7.3</b>		

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**Final Report  
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Table 1


**Mosquito repellent effect of two formulations against *Aedes aegypti*, strain BioGenius 04, on the forearm of volunteers (raw data).**

study: Mo4070  
method: BioG B 406-02 (modified)

temp.: 25-26°C  
rel. hum.: 69-72%

product	volunteer	number of <b>bites</b> on human arms after							
		1h	2h	3h	4h	5h	6h	7h	8h
<b>ARIES Mückenschutzlotion pmd Citriodiol MRM 03.11.10</b>	A	0	0	0	0	0	0	III	n.t.
	B	0	0	0	0	0	0	0	III
	C	0	0	0	0	0	0	0	0
<b>Anti Brumm Naturel Lot: 102 704 Exp: 07/2013</b>	A	0	0	0	0	0	0	III	n.t.
	B	0	0	0	0	0	0	0	I
	C	0	0	0	0	0	0	0	0

n.t. = not tested

 = protection

note: end of protection = three bites within one test interval or within two subsequent test intervals

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Figure 2

**Mosquito repellent effect / Protection time of two formulations against  
*Anopheles gambiae*, strain BioGenius 07,  
 on the forearm of volunteers (summarized results).**

study: Mo4070  
 method: BioG B 406-02

temp.: 24-25°C  
 rel. hum.: 63-65%

test insects	product	protection time in hours (3 volunteers):		
		A	B	C
<i>Anopheles gambiae</i>  strain BioGenius 07 susceptible	ARIES Mückenschutzlotion pmd Citriodiol MRM 03.11.10	>8.0	>8.0	7.0
		Ø hours 7.3		
	Anti Brumm Naturel Lot: 102 704 Exp: 07/2013	>8.0	>8.0	>8.0
		Ø hours >8.0		

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Table 2

**Mosquito repellent effect of two formulations against *Anopheles gambiae*, strain BioGenius 07, on the forearm of volunteers (raw data).**

study: Mo4070  
 method: BioG B 406-02

temp.: 24-25°C  
 rel. hum.: 63-65%

product	volunteer	number of <b>bites</b> on human arms after							
		1h	2h	3h	4h	5h	6h	7h	8h
<b>ARIES</b> <b>Mückenschutzlotion pmd</b> <b>Citriodiol</b> <b>MRM 03.11.10</b>	A	0	0	0	0	I	0	0	0
	B	0	0	0	0	0	II	0	I
	C	0	0	0	0	I	0	0	III
<b>Anti Brumm Naturel</b> <b>Lot: 102 704</b> <b>Exp: 07/2013</b>	A	0	0	0	I	0	I	0	I
	B	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	I	0

 = protection

note: end of protection = three bites within one test interval or within two subsequent test intervals

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Figure 3

**Mosquito repellent effect / Protection time of two formulations against *Aedes albopictus*, strain BioGenius 08, on the forearm of volunteers (summarized results).**

study: Mo4070  
 method: BioG B 406-02

temp.: 24-25°C  
 rel. hum.: 63-65%

test insects	product	protection time in hours (3 volunteers):		
		A	B	C
<i>Aedes albopictus</i>  strain BioGenius 08 susceptible	ARIES Mückenschutzlotion pmd Citriodiol MRM 03.11.10	>8.0	>8.0	>8.0
		Ø hours >8.0		
	Anti Brumm Naturel Lot: 102 704 Exp: 07/2013	>8.0	>8.0	>8.0
		Ø hours >8.0		

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Table 3

**Mosquito repellent effect of two formulations against *Aedes albopictus*, strain BioGenius 08, on the forearm of volunteers (raw data).**

study: Mo4070  
 method: BioG B 406-02

temp.: 24-25°C  
 rel. hum.: 63-65%

product	volunteer	number of <b>bites</b> on human arms after							
		1h	2h	3h	4h	5h	6h	7h	8h
<b>ARIES</b> <b>Mückenschutzlotion pmd</b> <b>Citriodiol</b> <b>MRM 03.11.10</b>	A	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0
<b>Anti Brumm Naturel</b> <b>Lot: 102 704</b> <b>Exp: 07/2013</b>	A	0	0	0	0	0	0	0	0
	B	0	0	0	0	0	0	0	0
	C	0	0	0	0	0	0	0	0

 = protection

note: end of protection = three bites within one test interval or within two subsequent test intervals

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Figure 4

**Mosquito repellent effect / Protection time of two formulations against  
*Culex quinquefasciatus*, strain BioGenius 05, on the forearm of volunteers  
 (summarized results).**

study: Mo4070  
 method: BioG B 406-02

temp.: 25-26°C  
 rel. hum.: 54-56%

test insects	product	protection time in hours (3 volunteers):		
		A	B	C
<b><i>Culex quinquefasciatus</i></b>  strain BioGenius 05 susceptible	<b>ARIES</b> <b>Mückenschutzlotion pmd</b> <b>Citriodiol</b> <b>MRM 03.11.10</b>	>8.0	>8.0	>8.0
		<b>Ø hours &gt;8.0</b>		
	<b>Anti Brumm Naturel</b> <b>Lot: 102 704</b> <b>Exp: 07/2013</b>	>8.0	>8.0	>8.0
		<b>Ø hours &gt;8.0</b>		

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Table 4


**Mosquito repellent effect of two formulations against *Culex quinquefasciatus*, strain BioGenius 05, on the forearm of volunteers (raw data).**

study: Mo4070  
 method: BioG B 406-02

temp.: 25-26°C  
 rel. hum.: 54-56%

product	volunteer	number of <b>bites</b> on human arms after							
		1h	2h	3h	4h	5h	6h	7h	8h
<b>ARIES Mückenschutzlotion pmd Citriodiol MRM 03.11.10</b>	A	n.t.	n.t.	n.t.	n.t.	0	0	0	0
	B	n.t.	n.t.	n.t.	n.t.	0	0	0	0
	C	n.t.	n.t.	n.t.	n.t.	0	0	0	0
<b>Anti Brumm Naturel Lot: 102 704 Exp: 07/2013</b>	A	n.t.	n.t.	n.t.	n.t.	0	0	0	0
	B	n.t.	n.t.	n.t.	n.t.	0	0	0	0
	C	n.t.	n.t.	n.t.	n.t.	0	0	0	0

n.t. = not tested

 = protection

note: end of protection = three bites within one test interval or within two subsequent test intervals

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#### **Execution of Method BioG B 406-02 (modified)**

##### Repellent efficacy of formulations against mosquitoes on human arms.

Insects are kept as biting active populations (about 1000 mosquitoes, mixed sex) in cages (90 cm long, 30 cm wide, 40 cm high, side walls made of gauze) equipped with two light cloth sluices at the front side. The insects are fed on sugar water only (10 % Dextropur). The age of the insects is 7 days minimum; the number of insects is replenished with three days old adults twice a week.

The biting activity is verified continuously by exposure untreated arms to the insects during the test period for every hour.

Weak day light is given as illumination. The temperature is 25 - 26 °C, the relative humidity 69 - 72 %.

The volunteers shall avoid alcohol, caffeine and fragrance products (e.g. perfume, cologne, hair spray, lotion etc.) for 12 hours before and during the test. Volunteers (test subjects) forearms washed with unscented (fragrance free) soap, rinsed with water, then with a solution consisting of 70 % ethanol and 30 % water and dried with a towel. 90 cm<sup>2</sup> of each forearm of a volunteer is treated evenly with 150 mg of the test products. Beginning one hour after treatment a sleeve with an opening of 3.1 x 8 cm (approx. 25 cm<sup>2</sup>) is fastened around the arm in such a way that the opening is positioned completely over the treated area. The edges of the opening of the sleeve have been also treated with the test material (200 mg) in a width of 1 cm to prevent bites from the edge. The areas above the sleeves are protected by cloth a proboscis cannot penetrate; hands are protected by latex gloves. Volunteers shall avoid exertion which might increase perspiration, or abrasion, rubbing, touching or wetting the treated area.

Both arms are introduced into the cage through the cloth sluices and the number of bites per arm in a three minutes test period is registered. The test is repeated every hour up to eight hours, or finished before, if efficacy has ended (three or more bites within three minutes or within 2 subsequent testing's). Each test consists of three volunteers.