



Tick-off

Odorless Solution based on IR3535[®]

WHAT IS IR3535[®]?

INSECT REPELLANT

Definition: "Substance or formulation that causes insects to make oriented movements away from its source."

IR3535[®] IS:

- a topical repellent.
Application: to chosen parts of surface.

- a synthetic repellent.

Synthetic repellents are developed for long lasting protection in comparison to natural repellents. However, IR3535[®] is close to nature (similar structure like β -alanin)



MODE OF ACTION:

Scientific explanation:

Repellents are detected from the insect by contact or simply in the air. Years of experience and several in vivo and in vitro efficacy tests performed with IR3535[®], indicate that IR3535[®] mainly acts via the vapour phase. The mode of action of IR3535[®] is not a passive masking of an attracting odour of a victim, but an active repellent effect as insects avoid to enter regions with IR3535[®] vapours. The exact biochemical mode of action of insect repellents is not yet known.

HISTORY OF REPELLANTS:

First repellents were derived from nature. This repellents show high evaporation. Therefore the long time protection of surfaces was not possible.

Examples are:

- Citronella
- Lemon Eucalyptus derived actives (PMD)
- Geraniol

Modern synthetic repellents are optimized for long lasting protection.

Examples are:

- DEET
- IR3535[®]
- Icaridin



(Comparison between Citronella, DEET and IR3535 tested as personal repellent on skin surfaces:

US EPA states that effectiveness of Citronella last 1-2 hours. DEET and IR3535 provide 2-14 hours depending on concentration and target organism).



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MARKETING INFORMATION:

■ PROS of IR3535[®]

- ✓ Marketed since more than 30 years in Europe
- ✓ Broad spectrum of efficacy
- ✓ US-CDA recommendation for “long lasting protection”
- ✓ **Close to nature**: structural similarity with natural occurring β -alanine
- ✓ Excellent toxicological profile (classification as **Bio-Pesticide** in USA)
- ✓ Gentle to the environment (**biodegradable**)

■ BROAD SPECTRUM OF EFFICACY:

CLAIMS WITH IR3535[®]:



ANTS
COCKROACHES
(TIGER) MOSQUITOES
TICKS
LICE
STABLE FLIES
BLACK FLIES
SAND FLIES
DEER FLIES
BITING MIDGES
HOUSE FLIES
WASPS
BEES





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MARKETING INFORMATION:

BROAD SPECTRUM OF EFFICACY:

Year	Author / Institute	Type	Target organism
1996	Buczek A. Silesian Medical Academy, Katowice, Poland	in-vivo labtest	Tick Ixodes ricinus
1996	Benzon G.L. Benzon Research, Carlisle, PA, USA	in-vitro labtest	Tick (Nymphs) Ixodes scapularis
1996	Broce A.B. Department of Entomology, KS, USA	in-vitro labtest	Stable fly Stomoxys calcitrans Fly Musca autumnalis Cat flea Ctenocephalides felis
1996	Cilek J.E. Mulrennan Research Laboratory A&M, FL, USA	Lab test	Ticks Ixodes scapularis Stable fly Stomoxys calcitrans
1996	Hunter F. Department of Biological Sciences, St. Catharines	in-vitro labtest	Black fly Simulium venustum Deer fly Chrysops ssp Stable fly Stomoxys calcitrans
1998	Shashina N.I. Russian Academy of Medical Sciences, Moscow	Lab test	Mosquito Aedes aegypti, Culex pipiens
1998	Yap H.H. Vector Control Research Unit, Malaysia	Lab test	Mosquito Aedes albopictus, Anopheles maculatus
1998	Yap H.H. Vector Control Research Unit, Malaysia	Field test	Mosquito Aedes albopictus, Culex quinquefasciatus
2000	Multinovic et al. EKOSAN Co. Faculty of Pharmacy, Yugoslavia	In-vivo labtest	Mosquito Aedes aegypt
2000	Usavadee et al. National Institute of Health, Nonthaburi, Thailand	Lab test Field test	Mosquito Aedes aegypti, Culex quinquefasciatus, Culex Tritaeniorhynchus, Anopheles dirus
2002	Peter B.A. et al Department of Health Sciences, Sydney, Australia	Field test	Mosquito Verrallinia funerus, Ochlerotatus vigilix, Aedes aegypt, Biting midge Culicoides ornatus
2004	Cilek J.E. Mulrennan Research Laboratory A&M, FL, USA	Lab test	Mosquito Aedes aegypti, Culex quinquefasciatus
2005	Naucke T.J. et al Institute for Medical Parasitology, Bonn, Germany	Lab test	Sand flies Phlebotomus mascittii, Phlebotomus duboscqi
2006	Scott Carroll Carroll-Loye Biological Reserch, Davis, CA, USA	Field test	Mosquito Anopheles freeborni, Aedes melanimon, Aedes vexans, Aedes nigromaculus, Culex tarsalis, Culex erythrothorax, Culiseta incidens
2006	Scott Carroll Carroll-Loye Biological Reserch, Davis, CA, USA	Lab test	Ticks Ixodes scapularis
2007	Hill N., (Kröpke R. et al.) London School of Hygiene and Tropical Medicine, London,UK	Field test	Mosquito Anopheles darlingi, Anopheles, albitarsus, Aedes aegypti, Culex pedroi
2009	Combescot Catherine Faculty of Medicine, Tours, France	in-vitro test	Louse Pediculus humanus



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MARKETING INFORMATION:

■ US-CDA RECOMMENDATION FOR “LONG LASTING PROTECTION”

In May 2008, the US-CDC recommended the use of 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester
“products containing these active ingredients typically provide reasonably long-lasting protection”.

CDC, Centers for Disease Control

■ EXCELLENT TOXICOLOGICAL PROFILE:

EPA classification as **Biopesticide**

3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester **“is practically non-toxic to mammals including infants and children...”**

In 1997, US-EPA-OPP's Biochemical Classification Committee classified 3-[N-Butyl-N-acetyl]-aminopropionic acid, ethyl ester as a biochemical, based on facts that it is functionally identical to naturally occurring beta alanine in that both repel insects, the basic molecular structure is identical, the end groups are not likely to contribute to toxicity and it acts to control the target pest via a non-toxic mode of action.



■ GENTLE TO THE ENVIRONMENT

BIODEGRADATION:

Closed bottle test (OECD 301D):

Biodegradation of 11% after 28 days

Sewage treatment simulation assay (OECD 303A):

Biodegradation at 99% and showed complete mineralization



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SAFETY PROFILE OF IR3535:

■ ACUTE TOXICITY:

TYPE:

Acute **ORAL** toxicity

Acute **DERMAL** toxicity

Acute **INHALATIVE** toxicity

CLASSIFICATION:

NOT toxic ✓

NOT toxic ✓

NOT toxic ✓



The official detailed testresults are available upon simple request.

■ LOCAL TOLERANCE:

SKIN irritation

EYE irritation

SKIN Sensitisation

NOT irritating to the skin ✓

IRRITATING to the eyes

NOT sensitising to the skin ✓

The official detailed testresults are available upon simple request.

■ PHOTOINDUCED TOXICITY:



Phototoxicity

Photoallergy

NOT phototoxic ✓

NOT photoallergenic ✓

■ GENOTOXICITY / MUTAGENICITY:



In vitro

In vivo

NOT genotoxic ✓

NOT genotoxic ✓





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SAFETY PROFILE OF IR3535:

REPEAT DOSE TOXICITY:

ORAL application:

NO systematic effects up to the highest dose tested

NO neurotoxicity

DERMAL application:

NO skin irritation after dermal application

Oral testing: 90d on dog, 28 days on rat, 28 days on dog and 28 days on rabbit.
Dermal testing: 90 days on rat.

Detailed testresults available upon simple request.

REPRODUCTIVE TOXICITY:

NO teratogenic

NO effects on reproduction

AQUATIC TOXICITY:



Acute **FISH** toxicology

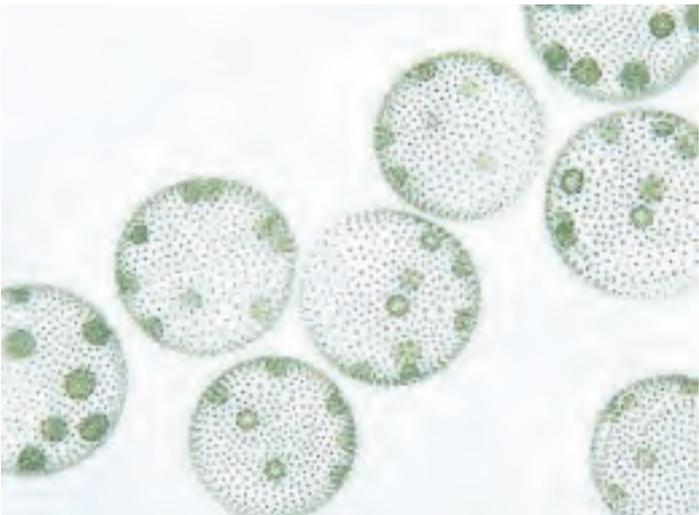
NOT toxic

Acute **DAPHNIA** immobilization

NO immobilization

ALGAE toxicity

NOT toxic





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COMPARISON IR3535[®] <=> DEET

ENDPOINT

ACUTE TOXICITY

IR3535[®]



DEET



LOCAL TOLERANCE



GENOTICITY



REPEAT DOSE TOXICITY



REPRODUCTIVE TOXICITY



AQUATIC TOXICITY



CLASSIFICATION AND LABELLING:

Eye Irrit. 2
H319 (Causes serious eye irrit.)



Acute Tox. 4
Eye Irrit. 2
Skin Irrit. 2
Aquatic Chronic 3
H302 (HARful if swallowed)
H319 (Causes serious eye irrit.)
H315 (Causes skin irrit.)
H412 (Harmful to aquatic lifes with long-lasting effects)



All testreports and results are available upon simple request.



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GENERAL CONCLUSION AS TO WHY PEOPLE SHOULD BUY OUR PRODUCT:

- ✓ **SENTZ[®] TICK-OFF IS THE BEST OF IT'S CLASS!**
- ✓ **LONGEST PROVEN PROTECTION TIME: UP TO 9,3 HOURS!**
- ✓ **100% ODORLESS: NO ALARMING SCENTS TO INFORM GAME OF OUR PRESENCE!**
- ✓ **APPLICABLE ON SKIN, FABRIC AND ANIMALS LIKE HUNTING DOGS AND HORSES!**
- ✓ **SAFEST PRODUCT OF IT'S CLASS!**
- ✓ **HARMLESS FOR CHILDREN!**
- ✓ **PROTECTS AGAINST MOST BITING INSECTS!**
- ✓ **PROVEN EFFICACY IN VARIOUS DOMESTIC-AND COSMETIC PRODUCTS!**
- ✓ **MEETS UP TO ALL INTERNATIONAL REGULATIONS!**
- ✓ **COMES AS AN AEROSOL OR A PUMPSPRAY!**
- ✓ **APPLICABLE ON SKIN, FABRIC AND ANIMALS!**



All testresults and reports that support this document are availal

