



شهادة اعتماد الفرمونات والمواد الجاذبة والطاردة والمواد المضافة والمواد ذات التأثير الميكانيكي أو الفيزيائي.

Approval Certificate of Pheromones, Attractants, Repellents , Additives (Adjuvants), Materials with mechanical or physical effect .

Sustainable Communities Sector  
Municipal Affairs Department  
Chemical Section

قطاع المجتمعات المستدامة  
إدارة الشؤون البلدية  
قسم الكيماويات

Date of Certification	25 September 2018	تاريخ إصدار الشهادة
Product name	PROVECTA	اسم المنتج
Type of Material	Materials with Mechanical or Physical effect	نوع المادة
Manufacturer	ICB Pharma	اسم الشركة المنتجة
Country of origin	Poland	بلد المنشأ
Importing Comp.	Ecovar Trading LLC	الشركة المستوردة

Manager Director

Eng. Yousif Alahmed Al Rayssi  
Director, Municipal Affairs Department

مدير الإدارة





## ADVANTAGES

- ✓ Highly efficacious for the control of numerous insect pests.
- ✓ Physical mode of action reduces the possibility of insect pests becoming resistant.
- ✓ Synergistic effect permits a reduced rate of insecticide.
- ✓ Perfect in locations where pesticide pressure is highest; leading to greater chance of resistance.
- ✓ Combines different modes of action mechanisms: neurotoxic and physical.
- ✓ Non-toxic.
- ✓ Spreads quickly and evenly over the treated surface, enhancing the uptake and penetration of the insecticide.
- ✓ Changes the profile (duration) of exposure of the insect to the insecticide.
- ✓ Perfect tool to deal with the increasing problem of insecticide resistance.



Quick and even spreading increases the likelihood that the insecticide will be transferred to the insect.



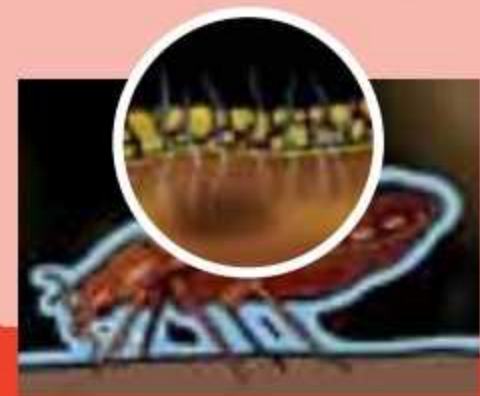
When applied, **Provecta**® creates a three dimensional network structure, thanks to the unique 3D-IsN® Technology.



Pests are immobilized, which increases the transfer of the insecticide (modified exposure profile).



Valves of the respiratory spiracles in insect exoskeleton are immobilized.



**Provecta**® increases the likelihood that the insecticide will be transferred onto the insect body.





# PROVECTA®

## HYBRID ADJUVANT EFFICACY ENHANCER WITH A PHYSICAL MODE OF ACTION.

Modifies the exposure profile enhancing the bioavailability of the active ingredient(s). Provides an even deposition of the active ingredient on the treated surface.



**WARNING! READ THE PACKAGE LEAFLET BEFORE USE!**



**PROVECTA® SHOULD BE USED IN 0,1 % ( 1ML/1L ) DOSE, MIXED WITH AN INSECTICIDE SPRAY SOLUTION PREPARED IN ADVANCE.**



**WORKING SOLUTION ( PROVECTA® WITH A SPRAY SOLUTION ) SHOULD BE USED WITHIN 6 HOURS FROM PREPARATION.**



**STORE IN THE ORIGINAL PACKAGE, AT 0° – 30°C,  
KEEP AWAY FROM CHILDREN.**

**100ml** Net content

Expiry date: 5 years from the date of manufacture  
A batch number and date of manufacture shown  
on the container

**ICBpharma** 

**PROVECTA<sup>®</sup>**

**HYBRID ADJUVANT EFFICACY ENHANCER  
WITH A PHYSICAL MODE OF ACTION.**

Modifies the exposure profile enhancing the bioavailability of the active ingredient(s). Provides an even deposition of the active ingredient on the treated surface.

**100ml**

Store in the original package, at 0° - 30°C.  
Keep away from children.



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## SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1. Product identifier

Trade name: **PROVECTA**

### 1.2. Relevant identified uses of the substance or mixture and uses advised against:

#### 1.2.1. Relevant identified uses

Adjuvant (spreader and immobilizing agent). NOT INSECTICIDE.

#### 1.2.2. Uses advised against

No data

### 1.3. Details of the supplier of the safety data sheet:

ICB Pharma Tomasz Świętosławski, Paweł Świętosławski Spółka Jawna

Address: ul. Moździerzowców 6a, 43-602 Jaworzno

Tel.: +48 32 6600006

Fax: +48 32 6600011

e-mail: office@icbpharma.pl

Person responsible for MSDS: Dawid Liszka; e-mail: david@icbpharma.pl

### 1.4. Emergency telephone number:

+48 32 6600006 (active at 8:00 – 16:00 h)

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture:

#### According to the Regulation (WE) no 1272/2008 (as amended)

Acute toxicity 4 (inh) Hazard Category 4 with assigned phrase stating the type of hazard  
 H332 Harmful if inhaled

Eye irritation, Hazard Category 2 with assigned phrase stating the type of hazard  
 H319 Causes serious eye irritation

Aquatic Chronic 2 Hazard Category 2 with assigned phrase stating the type of hazard  
 H411 Toxic to aquatic life with long lasting effects

#### According to the Directive 1999/45/EC (as amended)

Xn – Harmful with assigned R phrase:

R 20 – Harmful by inhalation

Xi – Irritant with assigned R phrase:

R 36 – Irritating to eyes

N – Dangerous for the environment with assigned R phrase:

R 51/53 – Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Health hazard: product is harmful if inhaled, irritant in contact with eyes

Environmental Hazards: product classified as toxic to environment, may cause long-term adverse effects in the aquatic environment

Physical/chemical hazards: no data

Fire hazard: no data

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## 2.2. Label elements

According to the Regulation (WE) 1272/2008

Pictograms:



**Signal Word: Warning**

### Hazard statements:

H319 Causes serious eye irritation

H332 Harmful if inhaled

H411 Toxic to aquatic life with long lasting effects

### Precautionary Statement:

#### General:

P101 If medical advice is needed, have product container or label at hand

### Prevention:

P261 Avoid breathing dust/fume/gas/mist/vapours/spray

P264 Wash face thoroughly after handling

P271 Use only outdoors or in a well-ventilated area

P273 Avoid release to the environment

P280 Wear eye protection/face protection

### Response:

P 304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

P312 Call a POISON CENTER or doctor/physician if you feel unwell

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P337+P313 If eye irritation persists: Get medical advice/attention

### Storage:

-

### Disposal:

P501 Dispose of contents/container in accordance with local/regional/national/international regulation

### Hazardous Ingredient:

Polyalkyleneoxide Modified Heptamethyltrisiloxane

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According to the Directive 1999/45/EC (as amended)

**Pictograms:**



Xn – Harmful



N – Dangerous for the environment

**Hazard statements R:**

R 20 – Harmful by inhalation

R 36 – Irritating to eyes

R 51/53 – Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

**Safety phrases S:**

S 25 – Avoid contact with eyes

S 26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S 46 – If swallowed, seek medical advice immediately and show this container or label

S 61 – Avoid release to the environment. Refer to special instructions/safety data sheets

**Hazardous Ingredients:**

Polyalkyleneoxide Modified Heptamethyltrisiloxane

**2.3. Other hazards:**

The mixture doesn't meet the criteria for PBT or vPvB in accordance with Annex XIII of REACH Regulation.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

**3.2. Mixtures**

The product is a mixture.

Chemical composition: Polyalkyleneoxide Modified Heptamethyltrisiloxane (CAS 67674-67-3), polydimethylsiloxane (CAS 63148-62-9), harmless additives.

The classification of dangerous substance contained in the product are given in Table 3.1 and 3.2 of Annex VI to the Regulation of the European Parliament and Council Regulation (EC) No 1272/2008 (Regulation GHS), including Commission Regulation (EC) 790/2009 (1 ATP), the manufacturer and available literature data.

No CAS	No EINECS	Index number	REACH registration number	Chemical name	Quantity	Hazard category	Phrases H, R
67674-67-3	not assigned	not assigned	no data	Polyalkyleneoxide Modified Heptamethyltrisiloxane	> 90 % wag.	Acute Tox. 4 (inh), Eye Irrit. 2, Aquatic Chronic 2*	H332, 319, 411
						Xn, Xi, N**	R20-36-51/53

\* Classification according to Regulation (WE) 1272/2008

\*\* Classification according to the Directive 67/548/EEC (as amended)

For the wording of the listed risk phrases and hazard category refer to section 16.

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## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

#### General recommendations

Remove the injured person from a polluted environment. Place in a lateral position. Provide fresh air and heat. In the event of health problems, immediately contact doctor. Show MSDS of product.

**Contamination of the skin:** Remove contaminated clothing. Contaminated areas of the skin wash thoroughly with water with soap. In the case of persistent irritation consult a doctor.

**Contamination of the eyes:** Flush contaminated eyes with wide-open eyelids a continuous stream of water for about 15 minutes. In the case of persistent irritation consult an ophthalmologist.

**Inhalation:** After inhalation of aerosol/mist seek medical advice immediately. Artificial respiration and/or oxygen may be necessary.

**Ingestion:** Rinse mouth immediately and then drink plenty of water, seek medical attention. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions.

### 4.2. Most important symptoms and effects, both acute and delayed

**Acute symptoms** – no data

**Delayed symptoms** – no data

**Effects of exposure** – no data

### 4.3. Indication of any immediate medical attention and special treatment needed

**Note to Physician:** No specific antidote, treat symptomatically.

In case of contact with the company emergency number or Poison Control Centre person should have a product container, label or this MSDS.

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

Suitable extinguishing agents: CO<sub>2</sub>, alcohol-resistant foams, water spray

Extinguishing media which must not be used for safety reasons: solid stream of water

### 5.2. Special hazards arising from the substance or mixture

The combustion / thermal decomposition of the product may produce carbon oxides, silicone oxide, formaldehyde, other harmful gases. Avoid inhalation of combustion products, may pose a threat to health.

### 5.3. Advice for firefighters

Strictly apply the breathing apparatus and protective clothing for fire fighting or during clean-up work immediately after a fire in an enclosed, or poorly ventilated areas.

**General:** inform about the fire, call the appropriate emergency services. Remove from the endangered area unauthorized persons, not involved in extinguishing the fire, order evacuation if necessary.

**Additional notes:** Cool closed containers exposed to fire with water spray. Packaging which are not covered by the fire, exposed to fire or high temperature should be if possible removed from the hazardous area.

Fire residues and contaminated waters dispose in according to applicable regulations.

Do not introduce contaminated waters into drains.



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## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid direct contact with releasing product (liquid, vapours). Avoid contact with skin, eyes and clothing.

### 6.2. Environmental precautions

Do not allow to enter drains, groundwater, soil and open water courses. Spilled product should be protected against spreading using dams or barriers. In case of water contamination inform local authorities.

### 6.3. Methods and material for containment and cleaning up

Protect damaged packaging. Try to cut off the source of environmental contamination (seal damaged container and put in an emergency container.) Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder). Dispose of absorbed material in accordance with regulations. Collect waste in suitable containers, which can be labeled and sealed. Incinerate or take to a special waste disposal site in accordance with local authority regulations. Clean contaminated floors and objects thoroughly with water and detergents, observing environmental regulations. Ventilate the room.

### 6.4. Reference to other sections

Personal protective equipment – section 8

Waste disposal – section 13

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

Avoid contact with eyes and skin. Do not taste or swallow. Wash hands and face after handling.

Avoid inhalation of vapors and spray mists. Ensure adequate ventilation /exhaust in the workplace, prevent the formation of harmful concentrations of vapour in the air, work in well ventilated areas.

Observe good personal hygiene and wear protective clothing in accordance with information set out in section 8.

### Special measures for protection against fire and explosion:

Static electricity and formation of sparks must be prevented. All equipment used when handling the product must be grounded.

### Industrial hygiene

- ensure good ventilation (overall and local exhausted ventilation)
- ensure place for eyes and skin rinsing
- wash hands with soap and water before eating, smoking and after work
- use general caution while working with chemical substances

### 7.2. Conditions for safe storage, including any incompatibilities

Keep only in the original container. Keep unused container tightly closed.

Keep the product away from children, food, beverage and animal feed.

### 7.3. Specific end use(s)

See section 1.2

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## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

#### Occupational Exposure Limit Value:

There is no exposure standard allocated to hazardous components of this product.

### 8.2. Exposure controls

**Technical exposure controls:** adequate ventilation

General (mechanical) room ventilation is expected to be satisfactory if handled at low temperatures or in covered equipment. Special, local ventilation is needed at points where vapors can be expected to escape to the workplace air.

#### Personal protection:

**a) Respiratory protection** – respirator with an ABEK filter; at high concentration use respiratory protection with independent air supply.

**b) Hand protection** – recommended protective gloves made of: butyl rubber, neoprene, nitrile rubber, polyvinylchloride, Material of gloves must be resistant to the product. As the product is a mixture of several substances, the resistance of material of gloves can not be calculated in advance and therefore has to be checked before use. From the manufacturer's advice should be obtained information about the time of the penetration of substances and such time must be respected.

**c) Eye protection** – recommended safety glasses with side-shields

**d) Skin protection** – wear protective clothing, safety shoes

#### Environmental exposure controls:

Do not allow to enter large amounts of product into ground water, sewage, waste water or soil.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

<b>Appearance:</b>	liquid
<b>Colour:</b>	opalescent
<b>Odour:</b>	slight
<b>Odour threshold:</b>	no data
<b>pH:</b>	no data
<b>Melting point/freezing point:</b>	no data
<b>Initial boiling point and boiling range:</b>	no data
<b>Flash point:</b>	> 100°C
<b>Evaporation rate:</b>	no data
<b>Flammability:</b>	no data
<b>Upper/lower flammability or explosive limits:</b>	no data
<b>Vapour pressure:</b>	no data
<b>Vapour density:</b>	no data
<b>Density:</b>	1,02 – 1,03 g/cm <sup>3</sup>
<b>Solubility in water:</b>	almost insoluble (< 0,01%)
<b>Solubility in other solvents:</b>	no data
<b>Partition coefficient: n-octanol/water:</b>	no data
<b>Auto-ignition temperature:</b>	no data
<b>Decomposition temperature:</b>	no data
<b>Viscosity:</b>	no data
<b>Explosive properties:</b>	doesn't concern
<b>Oxidising properties:</b>	doesn't concern

**9.2. Other information** no data

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## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

Under the properly conditions of storage and handling - no reactivity

### 10.2. Chemical stability

Stable under normal conditions (see Section 7 – storage conditions)

### 10.3. Possibility of hazardous reactions

No

### 10.4 Conditions to avoid

High temperature, direct sunlight

### 10.5. Incompatible materials

No

### 10.6 Hazardous decomposition products

No hazardous decomposition products if stored and handled as prescribed/indicated.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects:

#### Acute toxicity:

Acute Oral Toxicity LD50: no data

Acute Dermal Toxicity LD50: no data

Acute Inhalation Toxicity LC50: no data

Product is classified as harmful if inhaled.

#### Skin corrosion/irritation: No data available

Product is classified as irritant in contact with eyes

#### Serious eye damage/irritation: No data available

#### Respiratory or skin sensitisation: No data available

**Germ cell mutagenicity:** No data available. Hazardous ingredients of the product aren't mentioned on the list of mutagenic substances

**Carcinogenicity:** No data available. Hazardous ingredients of the product aren't mentioned on the list of carcinogenic substances.

**Reproductive toxicity:** No data available. Hazardous ingredients of the product aren't mentioned on the list of reproductive toxicity substances.

**STOT-single exposure:** No data available

**STOT-repeated exposure:** No data available

**Aspiration hazard:** No data available

**Potential health effects:** WARNING! The product is not fully investigated

**Skin** – may cause skin irritation or sensitisation, may act harmful as adsorbed through skin

**Eyes** – may cause irritation and redness of the conjunctiva, tearing

**Ingestion** – may act harmful

**Inhalation** – may cause irritation of the respiratory tract and mucous membranes

### Toxicological data for hazardous ingredient (Polyalkyleneoxide Modified Heptamethyltrisiloxane)

Acute oral toxicity LD50 (Rat): > 2000 mg/kg

Acute inhalation toxicity LC50 (Rat): 2 mg/l Exposure time: 4 h Aerosol.

Acute inhalation toxicity LC50 (Rat): > 11,78 mg/l Exposure time: 4 h 5% diluted aqueous solution Aerosol.

Acute dermal toxicity LD50 (Rat): > 4000 mg/kg

Skin irritation (Rabbit) Exposure time: 4 h – Slightly irritating

Eye irritation (Rabbit) – Strongly irritating



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## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity:

Acute Toxicity to fish: no data

Acute Toxicity to aquatic invertebrates: no data

### 12.2. Persistence and degradability:

Siloxanes are removed from the water by sedimentation and binding to sewage sludge.

In soil, siloxanes are degraded.

### 12.3. Bioaccumulative potential:

No data

### 12.4. Mobility in soil:

No data

### 12.5. Results of PBT and vPvB assessment:

Product doesn't contain PBT or vPvB substances

### 12.6. Other adverse effects:

Product classified as toxic to the aquatic environment, may cause long-term adverse effects in the aquatic environment. Product is hazardous for environment in handling form.

Take care that the product has not penetrated into the soil, drinking water sources, water tanks etc.

### Ecotoxicological data for hazardous ingredient (Polyalkyleneoxide Modified Heptamethyltrisiloxane)

Acute Toxicity to fish LC50 (Rainbow Trout): 4,5 mg/l Exposure time: 96 h Method: OECD-Guideline 203

NOEC (Rainbow Trout): 3,2 mg/l Exposure time: 96 h Method: OECD-Guideline 203

Acute Toxicity to aquatic invertebrates EC 50 (Daphnia magna): 24 mg/l Exposure time: 48 h Method: OECD-Guideline 202

NOEC (Daphnia magna): 5,6 mg/l Exposure time: 48 h Method: OECD-Guideline 202

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods:

Dispose of waste in accordance with all Federal, State and Local regulations.

Waste of product can be incinerated when in compliance with local regulations.

**Waste of product:** communicate with the manufacturer of the product on the possibility of processing waste. If it's not possible, deliver it to utilization in plants permitted to waste collection, transport, waste recovery and disposal. Do not introduce waste of product into sewage.

### Disposing of the packaging:

Treat them as a waste product. Dispose of as unused product.

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#### SECTION 14: TRANSPORT INFORMATION

**14.1. UN number:** 3082  
**14.2. UN proper shipping name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID N.O.S.  
 (Polyalkyleneoxide Modified Heptamethyltrisiloxane)  
**14.3. Transport hazard class:** 9  
**14.4. Packing group:** III  
**14.5. Environmental hazards:** yes  
**14.6. Special precautions for user:** see section 7.1  
     **Road transport (ADR):**  
     **Classification code:** M6  
     **Warning label:** 9  
     **Packing instruction:** P001  
     **Code of movement restriction through underpass:** E  
     **Marine transport (IMDG):**  
     **EmS** F-A, S-F  
     **Marine pollutant** yes  
**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:** no data



#### SECTION 15: REGULATORY INFORMATION

##### 15.1. Safety, health and environmental regulations/legislation specific for the mixture

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council from 18.12.2006 concerning the Registration, Evaluation, Authorization and Restriction from Chemicals (REACH)
  - Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
  - Commission Regulation (EU) No. 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
  - Dangerous Substance Directive 67/548/EEC, Dangerous Preparations Directive 1999/45/EC
  - European agreement concerning international road transport of dangerous products (ADR)
- Federal, State and Local regulations.*

##### 15.2. Chemical safety assessment

Chemical safety assessment was not made for the product

#### 16. Other information

Explanation of risk phrases and hazard category referring hazardous substance contained in product:

Acute Tox. 4 (inh) – Acute Toxicity (inhalation) Hazard Category 4

Eye Irrit. 2 – Serious eye damage/eye irritation Category 2

Aquatic Chronic 2 – Hazardous to the aquatic environment, Chronic Hazard Category 2

H319 Causes serious eye irritation

H332 Harmful if inhaled

H411 Toxic to aquatic life with long lasting effects

Xn – Harmful

Xi – Irritant

N – Dangerous for the environment

R 20 – Harmful by inhalation

R 36 – Irritating to eyes

R 51/53 – Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

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Explanation of abbreviations and acronyms used in the MSDS:

CAS – Chemical Abstracts Service

EINECS – Number assigned to a substance in the European Inventory of Existing Commercial Chemical Substances

PBT – persistence, bioaccumulation potential and toxicity

vPvB – very high durability and very bioaccumulative

LD50 – Lethal Dose, 50%

LC50 – Lethal Concentration, 50%

UN number – identification number of the material (the number of UN, UN number)

ADR – European Agreement concerning the international carriage of dangerous goods by road

MSDS was prepared in accordance with Commission Regulation (EU) No. 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Classification of mixture was made according to content of hazardous components.

Source of data: this MSDS was prepared based on MSDS of ingredients, data of product, our knowledge and experience according to actual legislation.

IUCLID International Uniform Chemical Information Database

ESIS European Chemical Substances Information System

Recommendation and restriction of use: Use according to label. Additional safety information available at producer.

Disclaimer: information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. End user is responsible for inappropriate use of information enclosed in MSDS or inappropriate use of product.

Distribution of MSDS: MSDS is delivered for demand of purchasing, who use product in professional services.



# INTERNATIONAL PEST CONTROL

September/October 2014  
Volume 56 Number 5



Public Health ♦ Agriculture ♦ Horticulture ♦ Forestry ♦ Animal Health



**New adjuvant provides physical boost to insecticides**

Improving and protecting global wheat yields

**Company Profile:**  
**BioGenius**

Termites on boats

**ICUP 2014, Zurich: A review**

Comparative efficacy of 5 commercial cockroach gel formulations

**Plant disease in UK forest nurseries**

The importance of fast fly catch

**Rodent proofing and pre-baiting**

Improved aerosol delivery for public health

**Silica water treatment for mosquito control**



**URBAN PEST  
MANAGEMENT**

# Provecta: a new approach to the inhibition of resistance to insecticides

David Liszka\* and Partho Dhang\*\*

**W**hile insecticides have greatly improved human health and agricultural production worldwide, their usefulness has been limited by the evolution of resistance in many major pests, including some that became pests only as a result of insecticide use. Therefore it is of paramount importance that all future pest control tactics should take into account the possibility of resistance evolution. It is also possible that pest susceptibility, a valuable natural resource is being slowly squandered. It will probably never again be possible to achieve chemical control of insects on the scale achieved between 1945 and 1965 (Wood, 1981). Consequently better pest management requires a newer approach.

Adjuvants have been used for as long as pesticides themselves. In the early part of this century, animal proteins such as calcium caseinate were used as dispersants for lead arsenate and animal bone glues were used as stickers (Witt, 2012). Pesticides that were available then were not effective as now, they were difficult to formulate and dispersed inadequately. Only a few natural colloids and surfactants were available as aids or adjuvants. The focus on formulation aids such as adjuvants continued to grow as a means to enhance maximum effectiveness of a limited number of pesticides available. Today adjuvants are a well recognised part of formulation chemistry and help to increase the efficacy of products. Although these historic developments were all directed towards improvement of agriculture formulations, the concept can also be used in urban pest control. As a consequence it will allow pest susceptibility to continue and reduce resistance built up in urban pests.

Adjuvants play a significant role in reducing several problems encountered during spray application, despite advancements having been made in discovering newer pesticide actives and improving

application techniques. Problems encountered during pesticide application include: drift, coverage, adherence, volatilization, penetration, solubility, surface tension, foaming, suspension, evaporation, stability, incompatibility, alkalinity degradation and odour. Adjuvants are formulated to minimize these problems by buffering and sticking and also by reducing factors like foaming, spreading, evaporation, emulsification, drift, volatilization, and odour. Adjuvants also help highlight where spray has been applied, increasing compatibility, dispersing and wetting.

This article discusses a totally new adjuvant that enhances the efficacy of the formulation through a physical mechanism; a completely new and promising approach to the current problems in the pest control industry. The product "Provecta" is a unique mixture of polymeric compounds that are combined in spray tanks with insecticides for more effective treatment. It generates a specific contact action resulting in dehydration and eventual suffocation through the following mechanisms:

## Spreading

When applied it provides quick and even spread, helping penetration precisely in the treated surface. It also increases the likelihood that the insecticide is transferred to the insect by contact, enhancing the bio-availability of the active ingredient. This is a crucial parameter when dealing with resistant pest populations living in inaccessible locations, e.g. bed bugs (Fig 1).

## Immobilization

After application it creates a cross-linked 3-Dimensional network structure on the treated target pest surface, tightly cover-

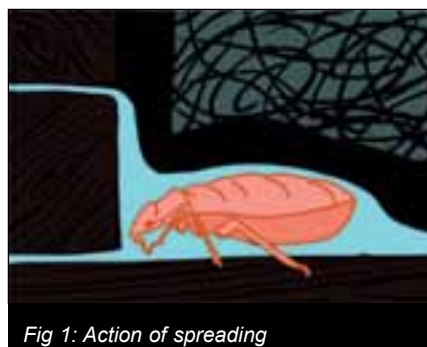


Fig 1: Action of spreading



Fig 2: Immobilization through neurotoxic and physical actions

ing the pest insects and immobilizing them. This leads to increased exposure to the toxicant. It also improves the efficacy through additive effects of the two mechanisms, namely neurotoxic and physical (Fig 2).

## Dehydration and/or suffocation

Once applied, the formulation completely penetrates the body surface of the pest and fills their spiracles (which have hair at the opening for filtering and a valve for controlling air flow) either preventing them from closing or keeping them closed. This leads to dehydration and suffocation. Both

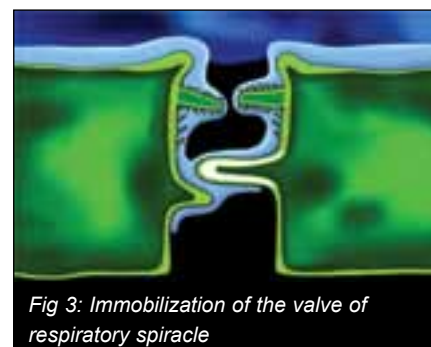


Fig 3: Immobilization of the valve of respiratory spiracle

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the physical effects eventually kill the insect pest (Fig 3).

All these combined features, enhanced spreading, immobilization (exposure profile modification) and physical effects, significantly improves the efficacy of the formulation and results in quicker mortality (Figs 4 to 7).

**Discussion**

Insecticides used in urban pest control can have a strong impact on human health (Dhang, 2011) and the environment. However, their use is constrained by evolving resistance in pest insects, resulting in higher insecticide dos-

ages to provide effective treatments. Demand for safe pest management needs more efficient methods including environmental and non-target species safety. With increase in cost and tighter regulations, a product such as an adjuvant with a unique mode of action, could be a perfect candidate for modern and effective alternative. Provecta, an effective adjuvant with physical action against pests may help deal with the expanding problem of resistance to insecticides.

■ For more information contact david@icbpharma.pl.

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Fig 4. Abbreviations: L = living bed bugs (coordinated movements); KD = bed bugs in "knock down" (tremor, unable to maintain balance); D = dead bed bugs (usually on backs, no movement of any body parts).

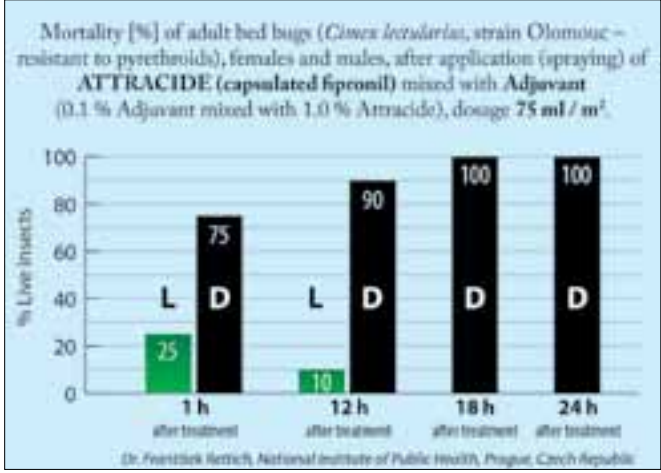


Fig 6. Abbreviations: L = living bed bugs (coordinated movements); KD = bed bugs in "knock down" (tremor, unable to maintain balance); D = dead bed bugs (usually on backs, no movement of any body parts).

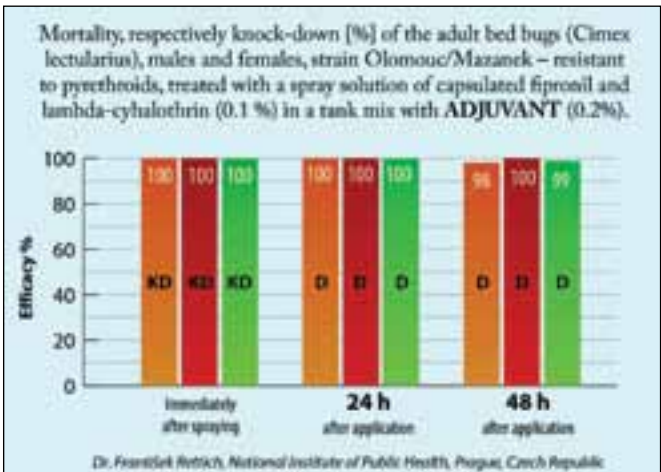


Fig 5. Abbreviations: L = living bed bugs (coordinated movements); KD = bed bugs in "knock down" (tremor, unable to maintain balance); D = dead bed bugs (usually on backs, no movement of any body parts).

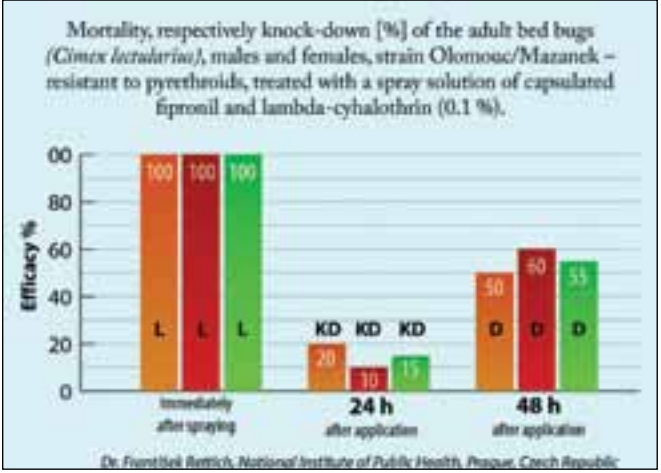
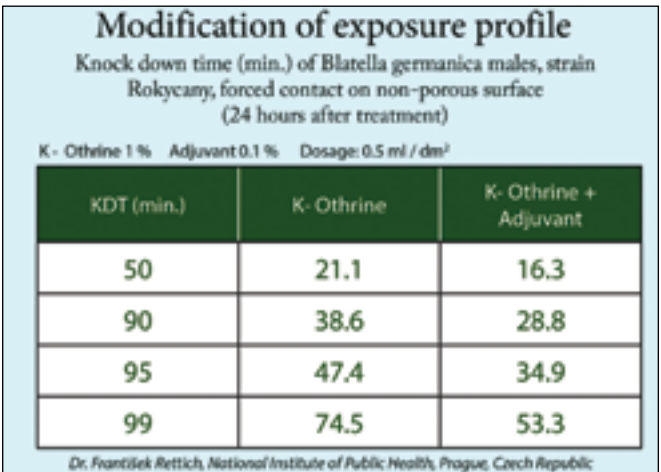


Fig 7. Knock down (insects in tremor, unable to maintain balance). Knockdown time in minutes 50%, 90%, 95% and 99% (KDT50; KDT90; KDT95 and KDT99) values







# An adjuvant with physical mode of action

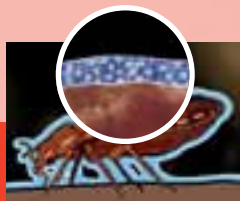
Recommended for professional use  
as a tank mix with insecticides  
to control resistant insect populations, especially  
**bed bugs**,  
in difficult to access locations.

## ADVANTAGES

- ✓ Highly efficacious for the control of numerous insect pests.
- ✓ Physical mode of action reduces the possibility of insect pests becoming resistant.
- ✓ Synergistic effect permits a reduced rate of insecticide.
- ✓ Perfect in locations where pesticide pressure is highest; leading to greater chance of resistance.
- ✓ Combines different modes of action mechanisms: neurotoxic and physical.
- ✓ Non-toxic.
- ✓ Spreads quickly and evenly over the treated surface, enhancing the uptake and penetration of the insecticide.
- ✓ Changes the profile (duration) of exposure of the insect to the insecticide.
- ✓ Perfect tool to deal with the increasing problem of insecticide resistance.



Quick and even spreading increases the likelihood that the insecticide will be transferred to the insect.



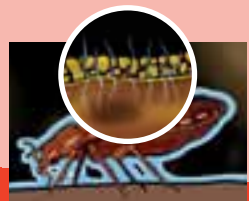
When applied, **Provecta**® creates a three dimensional network structure, thanks to the unique 3D-**ISN**® Technology.



Pests are immobilized, which increases the transfer of the insecticide (modified exposure profile).



Valves of the respiratory spiracles in insect exoskeleton are immobilized.



**Provecta**® increases the likelihood that the insecticide will be transferred onto the insect body.



A patent protected  
**breakthrough solution**  
from ICB Pharma.



EN	PROVECTA LABEL TRANSLATION
LEFT COLUMN	
<b>PROVECTA® IN MIXTURE WITH WATER ONLY</b>	
<b>1. BED BUG CONTROL</b>	
<p><b>APPLICATION</b></p> <p>Concentration: 2% (20 ml/ 1l)</p> <p>All places where the pests gather, should be treated thoroughly. The entire infested/ affected area including cracks, crevices, and any location where insects may gather e. g. mattresses, bed frames, head boards, upholstered furniture should be covered.</p>	
<p><b>FOLLOW-UP APPLICATION</b></p> <p>The follow-up application should be applied 10 days later, but no later than 12 days after the initial application. In cases of severe infestation, a third application can be performed.</p>	
<b>2. CRAWLING INSECTS CONTROL (black ants, harvester ants, cockroaches)</b>	
<p>Concentration: ant control -1.0%, cockroach control and other crawling insects - 2.0%. Apply formulation topically only using a fine mister (LV) - recommended droplet size: 80 - 100 microns. Formulation needs to be reapplied whenever the population become sever and upcoming insects have been seen.</p>	
<b>3. FLYING INSECTS - INDOOR TREATMENT (flies, mosquitoes, spiders)</b>	
<p>Concentration: 1.0%</p> <p>Apply formulation topically only using a fine mister (LV) - recommended droplet size: above 50 microns (80 - 100 microns is the optimum range). Ideally apply topically in the evening when insects (especially flies) are resting on surfaces. Formulation needs to be reapplied whenever the population become sever.</p>	
<b>4. FLYING INSECTS - OUTDOOR TREATMENT (mosquitoes)</b>	
<p>Concentration: 0.1%</p> <p>Apply formulation to mosquito resting locations (small trees, bushes etc.) using a fine mister (LV) - recommended droplet size: above 50 microns (80 - 100 microns is the optimum range). <u>Do not exceed 0.1% concentration when applied on insects present on plants.</u> Higher concentrations may cause phytotoxicity (plant damage).</p>	
<b>5. STORAGE PRODUCT PESTS CONTROL (Ephestia kuehniella, Plodia spp.)</b>	

<p>Concentration: 1.0%</p> <p>Apply formulation using a fine mister (LV) - recommended droplet size: 45-60 microns.</p> <p>Ideally apply as a space and topical treatment for both flying and resting individuals.</p>	
<p><b>INSECTICIDE EFFICACY ENHANCER (Provecta® in mixture with insecticide formulation)</b></p>	
<p><b>APPLICATION</b></p> <p>Provecta® should be used in 0,1% (1ml/1l) concentration, mixed with an insecticide spray solution prepared in advance. Prepare an insecticide working solution. Add a proper dose of Provecta®. Shake or stir well.</p>	
<p><b>SPECIAL RECOMMENDATIONS</b></p> <p>Special care should be taken while using Provecta® mixture on the surface susceptible to damage/ stains e.g. mattresses. Trial treatment is recommended before proper treatment.</p>	
<p>CENTER COLUMN</p>	
<p>PHYSICAL MODE OF ACTION "SPRAYABLE ENTRAPPING" FORMULATION FOR EFFECTIVE CONTROL OF RESISTANT POPULATIONS OF CRAWLING AND FLYING INSECTS.</p>	
<p>TO BE USED AS HYBRID INSECTICIDES EFFICACY ENHANCER WITH A PHYSICAL MODE OF ACTION.</p>	
<p>It is recommended to be used for a treatment of resistant pest populations in hardly accessible locations (e.g. bed bugs).</p>	
<p>Modifies the exposure profile of the insects enhancing the bioavailability of the active ingredient(s). Provides an even deposition of the active ingredient on the treated surface.</p>	
<p>It can be applied in dilution with water only (not in mixture with an active ingredient) e.g. in bed bug control strategy. It is recommended in locations where highly resistant population is present.</p>	
<p>PHYSICAL MODE OF ACTION. PRODUCT CAN BE USED IN THE PRESENCE OF STORAGE PRODUCTS. NO RESIDUES, NO WAITING PERIOD.</p>	
<p>WORKING SOLUTION (PROVECTA® WITH INSECTICIDE) SHOULD BE USED WITHIN 6 HOURS FROM PREPARATION.</p>	
<p>STORE IN THE ORIGINAL PACKAGE, AT 0° – 30°C,</p>	



keep AWAY FROM CHILDREN.	
Net content.....	
Right column	
INGREDIENTS: > 60 % polymeric silicone compounds.	
PRECAUTIONARY STATEMENTS*: * for the concentrate	
<p>H319 – irritating for eyes. H332 – harmful when inhaled. H411 – toxic to aquatic organism, causing long-term effects.</p> <p><b>Precautionary statements. General:</b> P101 – as medical advice should be necessary, show the container or the label. P102 – keep away from children.</p> <p><b>Prevention:</b> P261 – avoid inhaling vapour/spray. P273 – avoid releasing into the environment. P280 – use the protective outfit such as gloves, clothes, glasses and masks.</p> <p><b>Response:</b> P305 + P351 + P338 – IN THE EVENT OF CONTACT WITH EYES: rinse gently for a few minutes, take contact lenses out if they are present, continue rinsing. P337 + P313 – IN THE EVENT OF PERSISTING EYE IRRITATION: seek medical advice/ attention.</p> <p><b>Disposal:</b> P501 – empty container should be placed in a hazardous waste collection point.</p>	
CAUTION	
MANUFACTURER: ICB Pharma 10 Lema St. 43-603 Jaworzno, Poland	
Expiry date: 5 years from the date of manufacture	
Batch number: Date of manufacture:	