



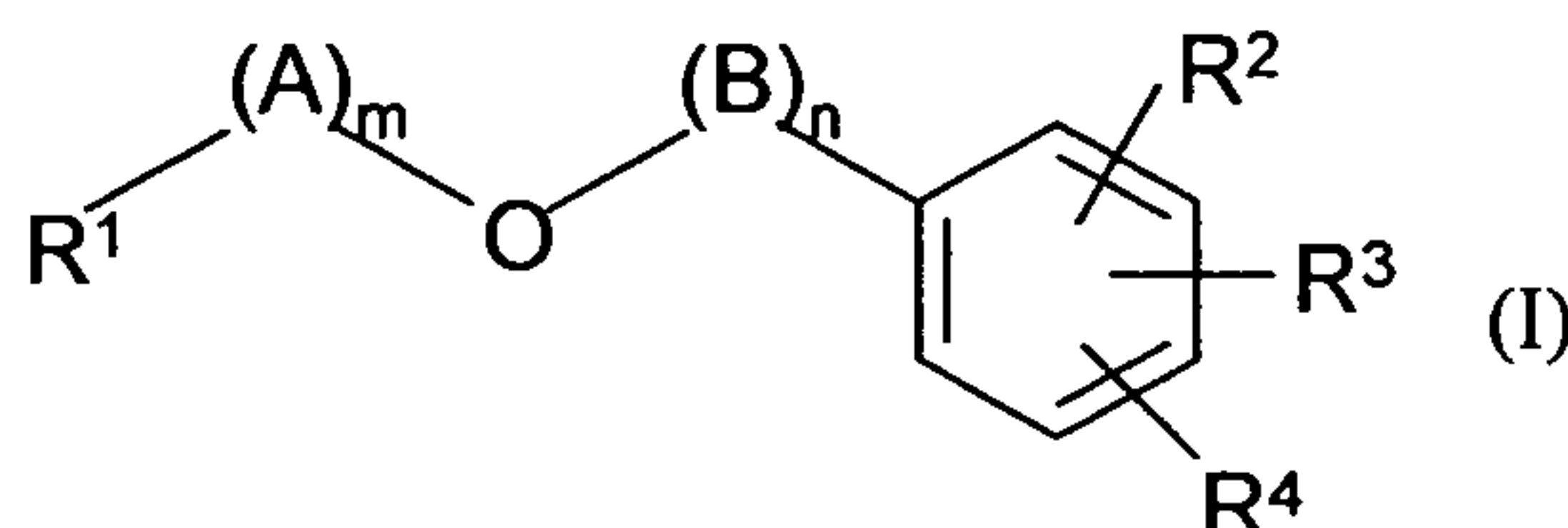
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(54) Titre : PHENYLEETHERS PESTICIDES SUBSTITUES
(54) Title: PESTICIDAL SUBSTITUTED PHENYLEETHERS



(57) **Abrégé/Abstract:**

The invention relates to the use of phenylether derivatives of formula (I), to compositions thereof for the control of pests, including arthropods and helminths.



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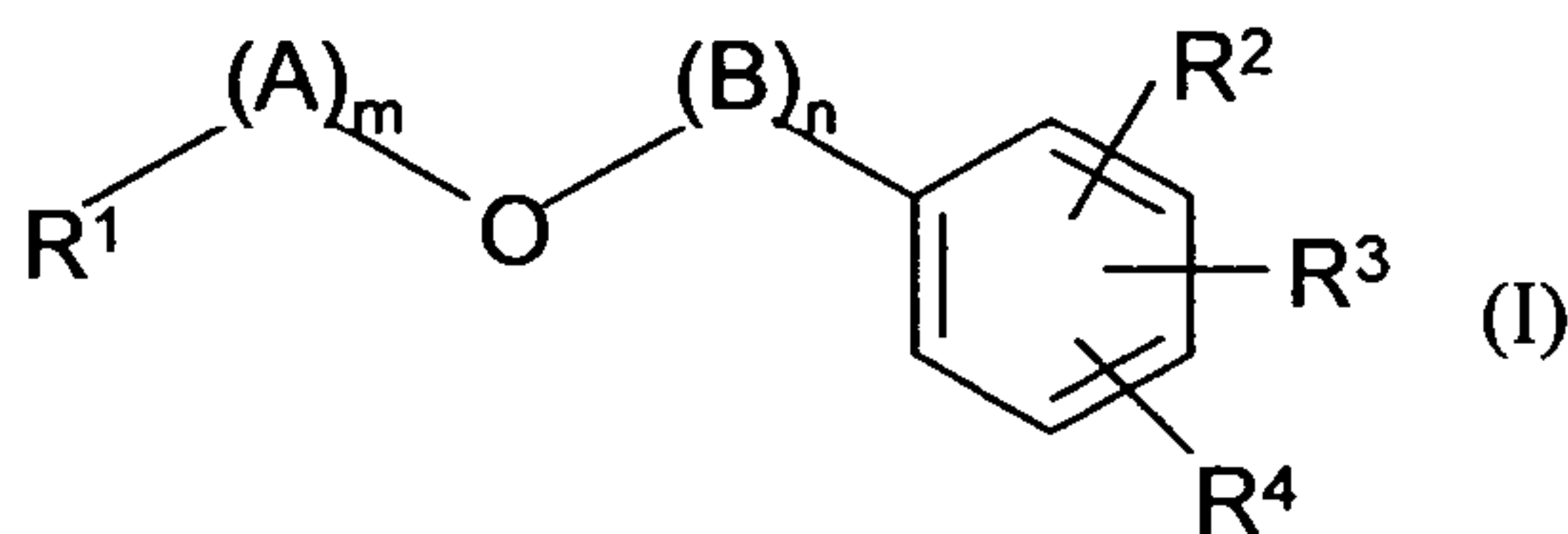
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(54) Title: PESTICIDAL SUBSTITUTED PHENYLEETHERS



(57) **Abstract:** The invention relates to the use of phenylether derivatives of formula (I), to compositions thereof for the control of pests, including arthropods and helminths.

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Pesticidal substituted Phenylethers

Description

The invention relates to the use of novel phenylether derivatives, to compositions thereof for the control of pests, including arthropods and helminths.

Many phenylethers are already known as synthetic intermediates from (see e.g. WO 03/101993, WO 03/024949, WO 95/14013, WO 95/14014, WO 93/15046, DE 3624349).

In DE 2418572 and DE 2418571 certain phenylethers are described as acaricides and insecticides. However, the phenylethers from these patents are not structurally related to the phenylethers described below in our patent application.

Modern pesticides must meet a wide range of demands, for example regarding level, duration and spectrum of action, use spectrum, toxicity, combination with other active substances, combination with formulation auxiliaries or synthesis, and since the occurrence of resistances is possible, the development of such substances can never be regarded as concluded, and there is constantly a high demand for novel compounds which are advantageous over the known compounds, at least as far as some aspects are concerned.

It is an object of the present invention to provide new pesticides which may be used as ectoparasiticides in stock animals or in domestic companion animals.

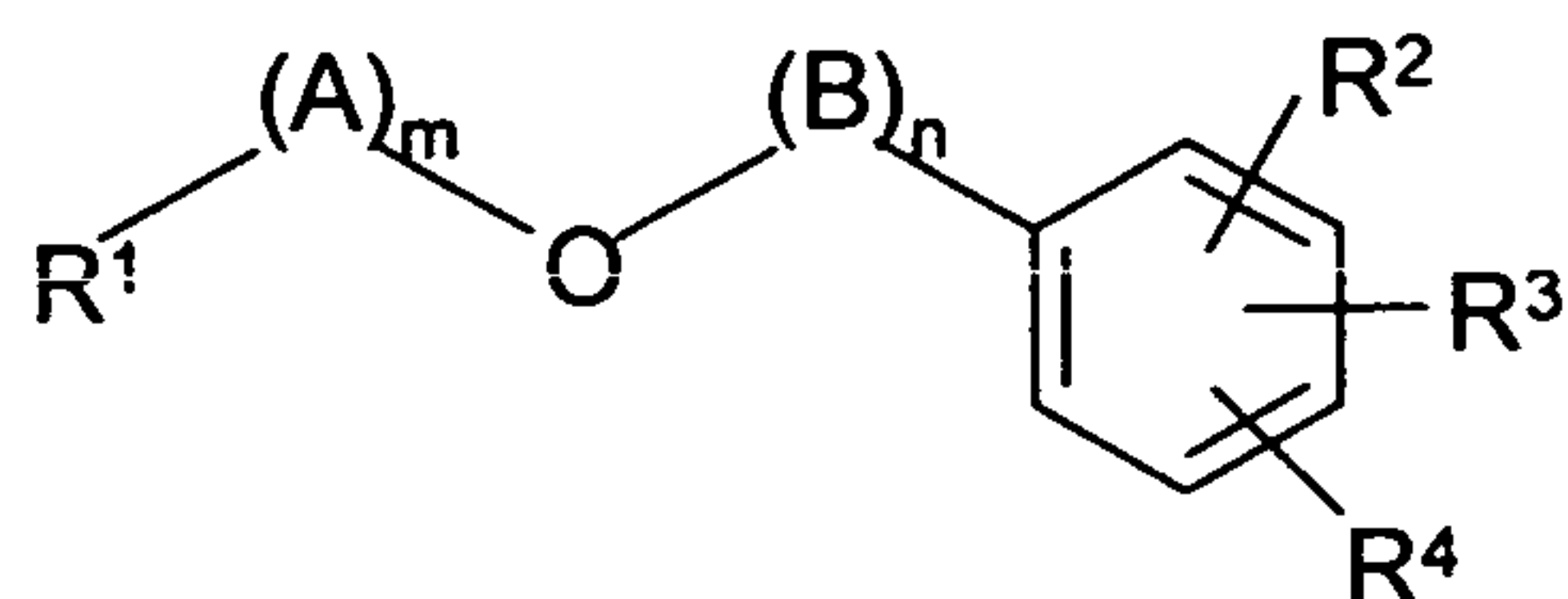
Another object of the invention is to provide new pesticides which may be used in lower dose than existing pesticides.

Another object of the invention is to provide new pesticides which are safer to the user and the environment.

Another object of the invention is to provide new pesticides which do not have the same biochemical mode of action as known pesticides and are active against pests that have developed resistance against commercial pesticides.

These objects are met in whole or in part by the present invention.

The present invention relates to the use of compounds which is a phenylether derivative of formula (I) or a pesticidally acceptable salt thereof,



(I)

wherein:

R^1 is phenyl, which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₄)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

or is (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₁₀)-bicycloalkyl, (C₆-C₁₀)-bicycloalkenyl, which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

or is indanyl or tetralinyl, which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

or is (C₃-C₇)-alkyl; which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

R^2 and R^3 are independently hydrogen, halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy ;

R^4 is hydrogen, halogen, (C₁-C₆)-alkyl, (C₂-C₆)-alkenyl, (C₂-C₆)-alkinyl, (C₁-C₆)-haloalkyl, (C₂-C₆)-haloalkenyl, (C₂-C₆)-haloalkinyl, (C₃-C₇)-cycloalkyl, (C₃-C₇)-cycloalkenyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy, (C₃-C₇)-cycloalkyloxy, (C₁-C₆)-alkoxy-(C₁-C₆)-alkyl, (C₁-C₄)-haloalkoxy-(C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl-(C₁-C₆)-alkyl, (C₃-C₇)-cycloalkenyl-(C₁-C₆)-alkyl, CO(C₁-C₆)-alkyl, COO(C₁-C₆)-alkyl, CHO; CN, (C₁-C₆)-alkylthio, (C₁-C₄)-haloalkylthio, (C₁-C₄)-alkylsulfinyl, (C₁-C₄)-haloalkylsulfinyl, (C₁-C₄)-alkylsulfonyl or (C₁-C₄)-haloalkylsulfonyl ;

A is a divalent (C₁-C₄)-alkylene unit and

B is a divalent (C₁-C₄)-alkylene unit;

and wherein m is 0 or 1 and n is 0 or 1,

for the control of pests, in particular for the control of arthropods, including insects and arachnids, and helminths, including nematodes.

5 The invention also encompasses any stereoisomer, enantiomer or geometric isomer, and mixtures thereof.

By the term "pesticidally acceptable salts" is meant salts the anions or cations of which are known and accepted in the art for the formation of salts for pesticidal use.

10 The expression "one or more radicals selected from the group consisting of" in the definition is to be understood as meaning in each case one or more identical or different radicals selected from the stated group of radicals, unless specific limitations are defined expressly.

In the present specification, including the accompanying claims, the aforementioned substituents have the following meanings:

Halogen atom means fluorine, chlorine, bromine or iodine.

15 The term "halo" before the name of a radical means that this radical is partially or completely halogenated, that is to say, substituted by F, Cl, Br or I, in any combination, preferably by F or Cl.

Alkyl groups and portions thereof (unless otherwise defined) may be straight- or branched-chain.

The expression "(C₁-C₆)-alkyl" is to be understood as meaning an unbranched or branched hydrocarbon radical having 1, 2, 3, 4, 5 or 6 carbon atoms, such as, for example a methyl, ethyl, propyl, isopropyl, 1-butyl, 2-butyl, 2-methylpropyl or tert-butyl radical.

20 Alkyl radicals and also in composite groups, unless otherwise defined, preferably have 1 to 4 carbon atoms.

25 "(C₁-C₆)-haloalkyl" means an alkyl group mentioned under the expression "(C₁-C₆)-alkyl" in which one or more hydrogen atoms are replaced by the same number of identical or different halogen atoms, such as monohaloalkyl, perhaloalkyl, CF₃, CHF₂, CH₂F, CHFCH₃, CF₃CH₂, CF₃CF₂, CHF₂CF₂, CH₂FCHCl, CH₂Cl, CCl₃, CHCl₂ or CH₂CH₂Cl.

"(C₁-C₆)-alkoxy" means an alkoxy group whose carbon chain has the meaning given under the expression "(C₁-C₆)-alkyl". "Haloalkoxy" is, for example, OCF₃, OCHF₂, OCH₂F, CF₃CF₂O, OCH₂CF₃ or OCH₂CH₂Cl.

"(C₂-C₆)-alkenyl" means an unbranched or branched non-cyclic carbon chain having a number of carbon atoms which corresponds to this stated range and which contains at least one double bond which can be located in any position of the respective unsaturated radical. "(C₂-C₆)-alkenyl" accordingly denotes, for example, the vinyl, allyl, 2-methyl-2-propenyl, 2-butenyl, pentenyl, 2-methylpentenyl or the hexenyl group.

"(C₂-C₆)-alkinyl" means an unbranched or branched non-cyclic carbon chain having a number of carbon atoms which corresponds to this stated range and which contains one triple bond which can be located in any position of the respective unsaturated radical. "(C₂-C₆)-alkinyl" accordingly denotes, for example, the propargyl, 1-methyl-2-propynyl, 2-butyne or 3-butyne group.

Cycloalkyl groups preferably have from three to seven carbon atoms in the ring and are optionally substituted by halogen or alkyl.

"(C₁-C₄)-alkylene" is to be understood as meaning an unbranched or branched alkanediyl group having 1 to 4 carbon atoms, e.g. -CH₂-, -CH₂-CH₂-, -CH₂-CH₂-CH₂- or -CH₂-CH(CH₃)-.

"Cycloalkyl" groups preferably have from three to eight carbon atoms in the ring, "bicycloalkyl" groups preferably have from six to ten carbon atoms in the rings and both groups are optionally substituted e.g. by halogen or alkyl.

The expression "(C₃-C₇)-cycloalkyl-(C₁-C₆)-alkyl" means a (C₁-C₆)alkyl group which is substituted by a (C₃-C₇)cycloalkyl ring.

In compounds of formula (I) the following examples of radicals are provided:

An example of alkyl substituted by cycloalkyl is cyclopropylmethyl;

an example of alkyl substituted by alkoxy is methoxymethyl (CH₂OCH₃).

A preferred embodiment of the present invention relates to the use of compounds of formula (I) for the control of pests, wherein

R¹ is phenyl, which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or is (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₉)-bicycloalkyl, (C₆-C₉)-bicycloalkenyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or is indanyl, tetralinyl,

5 which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or is (C₃-C₇)-alkyl;

and/or

10 R² and R³ are independently hydrogen, halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

and/or

15 R⁴ is hydrogen, halogen, (C₁-C₆)-alkyl, (C₂-C₆)-alkenyl, (C₂-C₆)-alkinyl, (C₁-C₃)-haloalkyl, (C₂-C₃)-haloalkenyl, (C₃-C₇)-cycloalkyl, (C₃-C₇)-cycloalkenyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy, (C₃-C₇)-cycloalkoxy, (C₁-C₆)-alkoxy-(C₁-C₆)-alkyl, (C₁-C₃)-haloalkoxy-(C₁-C₆)-alkyl, CO(C₁-C₄)-alkyl, COO(C₁-C₄)-alkyl, CHO; CN, (C₁-C₄)-alkylthio, (C₁-C₃)-haloalkylthio, (C₁-C₄)-alkylsulfinyl, (C₁-C₃)-haloalkylsulfinyl, (C₁-C₄)-alkylsulfonyl, (C₁-C₃)-haloalkylsulfonyl;

and/or

20 A is a divalent unit selected from the group CH₂, C₂H₄, C₃H₆;

and/or

B is a divalent unit selected from the group CH₂, C₂H₄, C₃H₆;

and wherein m is 0 or 1 and n is 0 or 1.

In particular preferred residues of compounds of formula (I) are for

25 R¹ phenyl, which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₉)-bicycloalkyl, (C₆-C₉)-bicycloalkenyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

R² and R³ independently hydrogen, halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

R⁴ hydrogen, halogen, (C₁-C₆)-alkyl, (C₂-C₆)-alkenyl, (C₂-C₆)-alkinyl, (C₁-C₃)-haloalkyl, (C₂-C₃)-haloalkenyl, (C₃-C₇)-cycloalkyl, (C₃-C₇)-cycloalkenyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy, (C₃-C₇)-cycloalkyloxy, (C₁-C₆)-alkoxy-(C₁-C₆)-alkyl, (C₁-C₃)-haloalkoxy-(C₁-C₆)-alkyl, CO(C₁-C₄)-alkyl, COO(C₁-C₄)-alkyl, CHO; CN;

In particular preferred is also the use of compounds of formula (I), wherein A is a divalent CH₂ unit and/or B is a divalent CH₂ unit and wherein m is 1 and n is 0 or n is 1 and m is 0 or m and n are 1 or m and n are 0.

The compounds of formula (I) can be prepared by the application or adaptation of known methods (i.e. methods heretofore used or described in the chemical literature). In the following description of processes when symbols appearing in formulae are not specifically defined, it is understood that they are "as defined above" in accordance with the first definition of each symbol in the specification.

It is known from prior art that compounds of formula (I) wherein A, B, R¹, R², R³, R⁴ and m, n are as defined above, may be prepared by the reaction of a hydroxy compound of formula (II)

R¹-(A)_m-OH (II)

with halogenides of formula (III) (wherein Ph is phenyl)

Hal-(B)_n-Ph(R²,R³,R⁴) (III)

to generate phenylethers or phenylalkylethers of formula (I).

The reaction is performed in the presence of bases like alkali hydrides, alkali hydroxides, alkali alcoholates, alkali carbonates in organic solvents. The reaction can be performed without or with catalysts such as metal salts like copper salts, nickel salts or palladium salts or phase transfer catalysts like quaternary ammonium salts or quaternary phosphonium salts.

The synthesis may be carried out also as described e.g. in Palucki, Michael; Wolfe, John P.; Buchwald, Stephen L.; JACSAT; J. Am. Chem. Soc.; EN; 119; 14; 1997; 3395 - 3396

It is also known from prior art that compounds of formula (I) wherein A, B, R¹, R², R³, R⁴ and m, n are as defined above, may be prepared by the reaction of a halogen compound of formula (IV)



with hydroxy compounds of formula (V)



to generate phenylethers or phenylalkylethers of formula (I).

The reaction is performed in the presence of bases like alkali hydrides, alkali hydroxides, alkali alcoholates, alkali carbonates in organic solvents. The reaction can be performed without or with catalysts such as metal salts like copper-salts, nickel-salts or palladium salts or phase transfer
10 catalysts like quaternary ammonium salts or quaternary phosphonium salts.

The synthesis may be carried out also as described e.g. in:

Kawamatsu, Yutaka; Sohda, Takashi; Imai, Yoshio; EJMCAS; Eur. J. Med. Chem. Chim. Ther.; EN; 16; 4; 1981; 355-362;

Noji, Masahiro; Ohno, Tomoko; Fuji, Koji; Futaba, Noriko; Tajima, Hiroyuki; Ishii, Keitaro;
15 JOCEAH; J. Org. Chem.; EN; 68; 24; 2003; 9340 – 9347;

Machin, Peter J.; Hurst, David N.; Bradshaw, Rachel M.; Blaber, Leslie C.; Burden, David T.; et al.; JMCMAR; J. Med. Chem.; EN; 26; 11; 1983; 1570-1576;

Summa, Vincenzo; Petrocchi, Alessia; Pace, Paola; Matassa, Victor G.; Francesco, Raffaele De; Altamura, Sergio; Tomei, Licia; Koch, Uwe; Neuner, Philippe; JMCMAR; J. Med. Chem.; EN; 47;
20 1; 2004; 14 – 17;

Foot, Jonathan S.; Giblin, Gerard M.; Taylor, Richard J. K.; ORLEF7; Org. Lett.; EN; 5; 23; 2003; 4441 – 4444;

Edmondson, Scott D.; Mastracchio, Anthony; He, Jiafang; Chung, Christine C.; Forrest, Michael J.; Hofsess, Scott; MacIntyre, Euan; Metzger, Joseph; O'Connor, Naphtali; Patel, Kajal; Tong,
25 Xinchun; et al.; BMCLE8; Bioorg. Med. Chem. Lett.; EN; 13; 22; 2003; 3983 – 3988;

or Dow Chem. Co.; US 2109458; 1936

Biological Scope of the invention:

According to a further feature of the present invention there is provided a method for the control of pests at a locus which comprises applying thereto an effective amount of a compound of formula (I) or a salt thereof. For this purpose, the said compound is normally used in the form of a pesticidal composition (i.e. in association with compatible diluents or carriers and/or surface active agents suitable for use in pesticidal compositions), for example as hereinafter described.

The term "compound of the invention" as used hereinafter embraces a phenylether or phenylalkylether derivative of formula (I) as defined above and a pesticidally acceptable salt thereof.

One aspect of the present invention as defined above is a method for the control of pests at a locus. The locus includes, for example, the pest itself, the place (plant, field, forest, orchard, waterway, soil, plant product, or the like) where the pest resides or feeds, or a place susceptible to future infestation by the pest. The compound of the invention may therefore be applied directly to the pest, to the place where the pest resides or feeds, or to the place susceptible to future infestation by the pest.

As is evident from the foregoing pesticidal uses, the present invention provides pesticidally active compounds and methods of use of said compounds for the control of a number of pest species which includes: arthropods, especially insects or mites, or plant nematodes. The compound of the invention may thus be advantageously employed in practical uses, for example, in agricultural or horticultural crops, in forestry, in veterinary medicine or livestock husbandry, or in public health.

The compounds of the invention may be used for example in the following applications and on the following pests:

For the control of soil insects, such as corn rootworm, termites (especially for protection of structures), root maggots, wireworms, root weevils, stalkborers, cutworms, root aphids, or grubs. They may also be used to provide activity against plant pathogenic nematodes, such as root-knot, cyst, dagger, lesion, or stem or bulb nematodes, or against mites. For the control of soil pests, for example corn rootworm, the compounds are advantageously applied to or incorporated at an effective rate into the soil in which crops are planted or to be planted or to the seeds or growing plant roots.

In the area of public health, the compounds are especially useful in the control of many insects, especially filth flies or other Dipteran pests, such as houseflies, stableflies, soldierflies, hornflies, deerflies, horseflies, midges, punkies, blackflies, or mosquitoes.

In the protection of stored products, for example cereals, including grain or flour, groundnuts, animal feedstuffs, timber or household goods, e.g. carpets and textiles, compounds of the invention

are useful against attack by arthropods, more especially beetles, including weevils, moths or mites, for example *Ephestia* spp. (flour moths), *Anthrenus* spp. (carpet beetles), *Tribolium* spp. (flour beetles), *Sitophilus* spp. (grain weevils) or *Acarus* spp. (mites).

In the control of cockroaches, ants or termites or similar arthropod pests in infested domestic or industrial premises or in the control of mosquito larvae in waterways, wells, reservoirs or other running or standing water.

For the treatment of foundations, structures or soil in the prevention of the attack on building by termites, for example, *Reticulitermes* spp., *Heterotermes* spp., *Coptotermes* spp..

In agriculture against adults, larvae and eggs of Lepidoptera (butterflies and moths), e.g. *Heliothis* spp. such as *Heliothis virescens* (tobacco budworm), *Heliothis armigera* and *Heliothis zea*. Against adults and larvae of Coleoptera (beetles) e.g. *Anthonomus* spp. e.g. *grandis* (cotton boll weevil), *Leptinotarsa decemlineata* (Colorado potato beetle), *Diabrotica* spp. (corn rootworms). Against Heteroptera (Hemiptera and Homoptera) e.g. *Psylla* spp., *Bemisia* spp., *Trialeurodes* spp., *Aphis* spp., *Myzus* spp., *Megoura viciae*, *Phylloxera* spp., *Nephotettix* spp. (rice leaf hoppers), *Nilaparvata* spp..

Against Diptera e.g. *Musca* spp.. Against Thysanoptera such as *Thrips tabaci*. Against Orthoptera such as *Locusta* and *Schistocerca* spp., (locusts and crickets) e.g. *Gryllus* spp., and *Acheta* spp. for example, *Blatta orientalis*, *Periplaneta americana*, *Blatella germanica*, *Locusta migratoria migratorioides*, and *Schistocerca gregaria*. Against Collembola e.g. *Periplaneta* spp. and *Blatella* spp. (roaches).

Against arthropods of agricultural significance such as Acari (mites) e.g. *Tetranychus* spp., and *Panonychus* spp..

Against nematodes which attack plants or trees of importance to agriculture, forestry or horticulture either directly or by spreading bacterial, viral, mycoplasma or fungal diseases of the plants. For example root-knot nematodes such as *Meloidogyne* spp. (e.g. *M. incognita*).

The active compounds of structure (I) of the invention are suitable for the protection of plants and plant organs, for increasing yields, improvement in quality of the produce and for the control of zoopests, especially insects, arachnids, helminths, nematodes and molluscs that occur in agriculture, horticulture, in animal breeding, in forestry, in garden and leisure facilities, in storage and material protection and in the hygiene sector with good plant tolerance, favourable mammalian toxicity and good environmental compatibility. They can be used preferably as plant protection agents. They are active against normal sensitive and resistant species as well as against all or individual developmental stages. The above named pests include:

the order Anoplura (Phthiraptera) e.g. *Damalinia* spp., *Haematopinus* spp., *Linognathus* spp., *Pediculus* spp., *Trichodectes* spp.

The class of Arachnida e.g. *Acarus siro*, *Aceria sheldoni*, *Aculops* spp., *Aculus* spp., *Amblyomma* spp., *Argas* spp., *Boophilus* spp., *Brevipalpus* spp., *Bryobia praetiosa*, *Chorioptes* spp.,
 5 *Dermanyssus gallinae*, *Eotetranychus* spp., *Epitrimerus pyri*, *Eutetranychus* spp., *Eriophyes* spp.,
Hemitarsonemus spp., *Hyalomma* spp., *Ixodes* spp., *Latrodectus mactans*, *Metatetranychus* spp.,
Oligonychus spp., *Ornithodoros* spp., *Panonychus* spp., *Phyllocoptruta oleivora*,
Polyphagotarsonemus latus, *Psoroptes* spp., *Rhipicephalus* spp., *Rhizoglyphus* spp., *Sarcoptes*
 10 *spp.*, *Scorpio maurus*, *Stenotarsonemus* spp., *Tarsonemus* spp., *Tetranychus* spp., *Vasates lycopersici*.

The class of Bivalva e.g. *Dreissena* spp.

The order Chilopoda e.g. *Geophilus* spp., *Scutigera* spp.

The order Coleoptera e.g. *Acanthoscelides obtectus*, *Adoretus* spp., *Agelastica alni*, *Agriotes* spp.,
Amphimallon solstitialis, *Anobium punctatum*, *Anoplophora* spp., *Anthonomus* spp., *Anthrenus*
 15 *spp.*, *Apogonia* spp., *Atomaria* spp., *Attagenus* spp., *Bruchidius obtectus*, *Bruchus* spp., *Ceuthorhynchus* spp.,
Cleonus mendicus, *Conoderus* spp., *Cosmopolites* spp., *Costelytra zealandica*, *Curculio* spp.,
Cryptorhynchus lapathi, *Dermestes* spp., *Diabrotica* spp., *Epilachna* spp., *Faustinus cubae*,
Gibbium psylloides, *Heteronychus arator*, *Hylamorpha elegans*, *Hylotrupes bajulus*, *Hypera postica*,
Hypothenemus spp., *Lachnosterna consanguinea*, *Leptinotarsa decemlineata*, *Lissorhoptrus*
 20 *oryzophilus*, *Lixus* spp., *Lyctus* spp., *Meligethes aeneus*, *Melolontha melolontha*, *Migdolus* spp.,
Monochamus spp., *Naupactus xanthographus*, *Niptus hololeucus*, *Oryctes rhinoceros*, *Oryzaephilus surinamensis*,
Otiorrhynchus sulcatus, *Oxycetonia jucunda*, *Phaedon cochleariae*, *Phyllophaga* spp.,
Popillia japonica, *Premnotrypes* spp., *Psylliodes chrysocephala*, *Ptinus* spp., *Rhizobius ventralis*,
Rhizopertha dominica, *Sitophilus* spp., *Sphenophorus* spp., *Sternechus* spp., *Symphyletes* spp.,
 25 *Tenebrio molitor*, *Tribolium* spp., *Trogoderma* spp., *Tychius* spp., *Xylotrechus* spp., *Zabrus* spp.

The order Collembola e.g. *Onychiurus armatus*.

The order Dermaptera e.g. *Forficula auricularia*.

The order Diplopoda e.g. *Blaniulus guttulatus*.

The order Diptera e.g. *Aedes* spp., *Anopheles* spp., *Bibio hortulanus*, *Calliphora erythrocephala*,
 30 *Ceratitis capitata*, *Chrysomyia* spp., *Cochliomyia* spp., *Cordylobia anthropophaga*, *Culex* spp.,
Cuterebra spp., *Dacus oleae*, *Dermatobia hominis*, *Drosophila* spp., *Fannia* spp., *Gastrophilus* spp.,
Hylemyia spp., *Hyppobosca* spp., *Hypoderma* spp., *Liriomyza* spp., *Lucilia* spp., *Musca* spp.,

Nezara spp., Oestrus spp., Oscinella frit, Pegomyia hyoscyami, Phorbia spp., Stomoxys spp.,
Tabanus spp., Tannia spp., Tipula paludosa, Wohlfahrtia spp.

The class Gastropoda e.g. Arion spp., Biomphalaria spp., Bulinus spp., Deroceras spp., Galba spp.,
Lymnaea spp., Oncomelania spp., Succinea spp.

5 The class of Helminths e.g. Ancylostoma duodenale, Ancylostoma ceylanicum, Ancylostoma
braziliensis, Ancylostoma spp., Ascaris lubricoides, Ascaris spp., Brugia malayi, Brugia timori,
Bunostomum spp., Chabertia spp., Clonorchis spp., Cooperia spp., Dicrocoelium spp, Dictyocaulus
filaria, Diphylobothrium latum, Dracunculus medinensis, Echinococcus granulosus, Echinococcus
10 multilocularis, Enterobius vermicularis, Fasciola spp., Haemonchus spp., Heterakis spp., Hymeno-
lepis nana, Hyostrogylus spp., Loa Loa, Nematodirus spp., Oesophagostomum spp., Opisthorchis
spp., Onchocerca volvulus, Ostertagia spp., Paragonimus spp., Schistosoma spp, Strongyloides
fuelleborni, Strongyloides stercoralis, Strongyloides spp., Taenia saginata, Taenia solium,
Trichinella spiralis, Trichinella nativa, Trichinella britovi, Trichinella nelsoni, Trichinella
pseudopsiralis, Trichostrongylus spp., Trichuris trichuria, Wuchereria bancrofti.

15 In addition protozoa such as Eimeria may be controlled.

The order Heteroptera e.g. Anasa tristis, Antestiopsis spp., Blissus spp., Calocoris spp.,
Campylomma livida, Cavelerius spp., Cimex spp., Creontiades dilutus, Dasynus piperis, Dichelops
furcatus, Diconocoris hewetti, Dysdercus spp., Euschistus spp., Eurygaster spp., Heliopeltis spp.,
Horcias nobilellus, Leptocoris spp., Leptoglossus phyllopus, Lygus spp., Macropes excavatus,
20 Miridae, Nezara spp., Oebalus spp., Pentomidae, Piesma quadrata, Piezodorus spp., Psallus
seriatus, Pseudacysta perseae, Rhodnius spp., Sahlbergella singularis, Scotinophora spp., Stephanitis
nashi, Tibraca spp., Triatoma spp.

The order Homoptera e.g. Acyrthosipon spp., Aeneolamia spp., Agonosceana spp., Aleurodes spp.,
Aleurolobus barodensis, Aleurothrixus spp., Amrasca spp., Anuraphis cardui, Aonidiella spp.,
25 Aphanostigma piri, Aphis spp., Arboridia apicalis, Aspidiella spp., Aspidiotus spp., Atanus spp.,
Aulacorthum solani, Bemisia spp., Brachycaudus helichrysi, Brachycolus spp., Brevicoryne
brassicae, Calligypona marginata, Carneiocephala fulgida, Ceratovacuna lanigera, Cercopidae,
Ceroptastes spp., Chaetosiphon fragaefolii, Chionaspis tegalensis, Chlorita onukii, Chromaphis
juglandicola, Chrysomphalus ficus, Cicadulina mbila, Cocomytilus halli, Coccus spp.,
30 Cryptomyzus ribis, Dalbulus spp., Dialeurodes spp., Diaphorina spp., Diaspis spp., Doralis spp.,
Drosicha spp., Dysaphis spp., Dysmicoccus spp., Empoasca spp., Eriosoma spp., Erythroneura
spp., Euscelis bilobatus, Geococcus coffeae, Homalodisca coagulata, Hyalopterus arundinis, Icerya
spp., Idiocerus spp., Idioscopus spp., Laodelphax striatellus, Lecanium spp., Lepidosaphes spp.,
Lipaphis erysimi, Macrosiphum spp., Mahanarva fimbriolata, Melanaphis sacchari, Metcalfiella

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The order Isoptera e.g. *Reticulitermes* spp., *Odontotermes* spp..

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The order Siphonaptera e.g. *Ceratophyllus* spp., *Xenopsylla cheopis*.

30

The order Thysanoptera e.g. *Baliothrips biformis*, *Enneothrips flavens*, *Frankliniella* spp., *Heliothrips* spp., *Hercinothrips femoralis*, *Kakothrips* spp., *Rhipiphorothrips cruentatus*, *Scirtothrips* spp., *Taeniothrips cardamoni*, *Thrips* spp.

The order Thysanura e.g. *Lepisma saccharina*.

5 The plant parasitic nematodes include, for example, *Anguina* spp., *Aphelenchoides* spp., *Belonoaimus* spp., *Bursaphelenchus* spp., *Ditylenchus dipsaci*, *Globodera* spp., *Heliocotylenchus* spp., *Heterodera* spp., *Longidorus* spp., *Meloidogyne* spp., *Pratylenchus* spp., *Radopholus similis*, *Rotylenchus* spp., *Trichodorus* spp., *Tylenchorhynchus* spp., *Tylenchulus* spp., *Tylenchulus semipenetrans*, *Xiphinema* spp.

10 The compounds of structure (I) of the invention are characterised particularly by strong action against aphids (e.g. *Aphis gossypii* and *Myzus persicae*), beetle larvae (e.g. *Phaedon cochleariae*), butterfly caterpillars (e.g. *Plutella xylostella*, *Spodoptera exigua* and *Spodoptera frugiperda*).

The compounds of the invention can optionally also be used in certain concentrations or application amounts as herbicides, safeners, growth regulators, or as agents for improving plant properties or as
15 microbiocides, for example as fungicides, antimycotics, bactericides, viricides (including agents against viroids) or as agents against MLO (Mycoplasma-like organism) and RLO (Rickettsia-like organism). They may also be optionally used as intermediates or precursors for the synthesis of further active compounds.

According to the invention all plants and plant parts can be treated. Plants are hereby understood to
20 mean all plants and plant populations such as desirable and undesirable wild plants or cultigens (including naturally occurring cultigens). Cultigens can be plants that can be obtained by conventional breeding and optimisation methods or by biotechnology or genetic engineering methods or combinations of these methods, including transgenic plants and including plant varieties that are protectable or not protectable by plant varieties protection rights. Plant parts are understood to be all
25 above ground and below ground parts and organs of the plants such as scion, leaf, blossom and root, including, for example, leaves, needles, stalks, stems, blossoms, fruiting bodies, fruits and seed as well as roots, bulbs, rhizomes. Harvest crops as well as vegetative and generative reproduction material, for example cuttings, bulbs, rhizomes, shoots and seed also belong to plant parts.

The treatment according to the invention of plants and plant parts with the active compound can be
30 carried out directly or by action on their environment, habitat or storage facility by means of the normal treatment methods, for example, by immersion, spraying, evaporation, misting, scattering, painting, injecting, and with reproductive material, in particular with seed, also by single or multiple jacketing.

In the field of veterinary medicine or livestock husbandry or in the maintenance of public health against arthropods which are parasitic internally or externally upon vertebrates, particularly warm-blooded vertebrates, for example domestic animals, e.g. cattle, sheep, goats, equines, swine, poultry, dogs or cats, for example Acarina, including ticks (e.g. soft-bodied ticks including Argasidae spp. e.g. Argas spp. and Ornithodoros spp. (e.g. Ornithodoros moubata); hard-bodied ticks including Ixodidae spp., e.g. Boophilus spp. e.g. Boophilus microplus, Rhipicephalus spp. e.g. Rhipicephalus appendiculatus and Rhipicephalus sanguineus; mites (e.g. Damalinia spp.); fleas (e.g. Ctenocephalides spp. e.g. Ctenocephalides felis (cat flea) and Ctenocephalides canis (dog flea)); lice e.g. Menopon spp.; Diptera (e.g. Aedes spp., Anopheles spp., Musca spp., Hypoderma spp.); Hemiptera.; Dictyoptera (e.g. Periplaneta spp., Blatella spp.); Hymenoptera; for example against infections of the gastro-intestinal tract caused by parasitic nematode worms, for example members of the family Trichostrongylidae.

These parasites further include:

15 The order Anoplurida e.g. Haematopinus spp., Linognathus spp., Pediculus spp., Phtirus spp., Solenopotes spp.

The order Mallophagida and the suborders Amblycerina and Ischnocerina e.g. Trimenopon spp., Menopon spp., Trinoton spp., Bovicola spp., Werneckiella spp., Lepikentron spp., Damalina spp., Trichodectes spp., Felicola spp.

20 The order Diptera and the suborders Nematocerina and Brachyicerina e.g. Aedes spp., Anopheles spp., Culex spp., Simulium spp., Eusimulium spp., Phlebotomus spp., Lutzomyia spp., Culicoides spp., Chrysops spp., Hybomitra spp., Atylotus spp., Tabanus spp., Haematopota spp., Philipomyia spp., Braula spp., Musca spp., Hydrotaea spp., Stomoxys spp., Haematobia spp., Morellia spp., Fannia spp., Glossina spp., Calliphora spp., Lucilia spp., Chrysomyia spp., Wohlfahrtia spp.,
25 Sarcophaga spp., Oestrus spp., Hypoderma spp., Gasterophilus spp., Hippobosca spp., Lipoptena spp., Melophagus spp.

The order Siphonapterida e.g. Pulex spp., Ctenocephalides spp., Xenopsylla spp., Ceratophyllus spp.

The order Heteropterida e.g. Cimex spp., Triatoma spp., Rhodnius spp., Panstrongylus spp.

30 The order Blattarida e.g. Blatta orientalis, Periplaneta americana, Blattella germanica, Supella spp.

The subclass Acari (Acarina) and the order Meta- and Mesostigmata e.g. Argas spp., Ornithodoros spp., Otobius spp., Ixodes spp., Amblyomma spp., Boophilus spp., Dermacentor spp.,

Haemophysalis spp., Hyalomma spp., Rhipicephalus spp., Dermanyssus spp., Raillietia spp., Pneumonyssus spp., Sternostoma spp., Varroa spp.

5 The order Actinedida (Prostigmata) and Acaridida (Astigmata) e.g. Acarapis spp., Cheyletiella spp., Ornithocheyletia spp., Myobia spp., Psorergates spp., Demodex spp., Trombicula spp., Listrophorus spp., Acarus spp., Tyrophagus spp., Caloglyphus spp., Hypodectes spp., Pterolichus spp., Psoroptes spp., Chorioptes spp., Otodectes spp., Sarcoptes spp., Notoedres spp., Knemidocoptes spp., Cytodites spp., Laminosioptes spp.

10 In a preferred aspect of the invention the compounds of formula (I) are used for the control of parasites of animals. Preferably the animal to be treated is a domestic companion animal such as a dog or a cat.

In a further aspect of the invention the compounds of formula (I) or salts or compositions thereof are used for the preparation of a veterinary medicament.

15 The compounds of the invention of structure (I) are also suitable for the control of arthropods that affect agricultural animals such as cattle, sheep, goats, horses, pigs, donkeys, camels, buffalo, rabbits, chickens, turkeys, ducks, geese, bees, other domestic animals such as dogs, cats, cage birds, aquarium fish as well as so-called experimental animals such as hamsters, guinea pigs, rats and mice. By control of these arthropods death rates and performance loss (in meat, milk, wool, hides, eggs, honey, etc.) will be reduced so that a more economic and simpler animal husbandry is possible by the use of the compounds of the invention.

20 The use of the active compounds in veterinary sector and animal husbandry is carried out by known means by enteric administration in the form of, for example, tablets, capsules, drinks, drenches, granulates, pastes, boli, the feed-through process, suppositories, by parenteral administration by, for example, injection (intramuscular, subcutaneous, intravenous, interperitoneal, among others), implants, by nasal application, by dermal administration in the form of, for example, dipping,
25 spraying, pour-on and spot-on, washing, powdering and with the help of appliances containing the active compound such as collars, ear markers, tail markers, limb bands, halters, marking devices, etc.

30 During use in cattle, poultry, domestic animals, etc., the active compounds of structure (I) can be used as formulations (for example, powder, emulsions, flowable agents) that contain the active compounds in an amount of 1 to 80 wt.%, directly or after 100 to 10,000 times dilution or as a chemical bath.

Moreover it has been found that the compounds of the invention exhibit high insecticidal action against insects that destroy technical materials.

As example and preferably - but not limiting - the following insects are named:

Beetles such as *Hylotrupes bajulus*, *Chlorophorus pilosis*, *Anobium punctatum*, *Xestobium rufovillosum*, *Ptilinus pecticornis*, *Dendrobium pertinex*, *Ernobius mollis*, *Priobium carpini*, *Lyctus brunneus*, *Lyctus africanus*, *Lyctus planicollis*, *Lyctus linearis*, *Lyctus pubescens*, *Trogoxylon aequale*, *Minthes rugicollis*, *Xyleborus spec.* *Tryptodendron spec.* *Apate monachus*, *Bostrychus capucins*, *Heterobostrychus brunneus*, *Sinoxylon spec.* *Dinoderus minutus*;

Hymenoptera such as *Sirex juvencus*, *Urocerus gigas*, *Urocerus gigas taignus*, *Urocerus augur*;

Termites such as *Kaloterms flavicollis*, *Cryptoterms brevis*, *Heteroterms indicola*, *Reticuliterms flavipes*, *Reticuliterms santonensis*, *Reticuliterms lucifugus*, *Mastoterms darwiniensis*, *Zootermopsis nevadensis*, *Coptoterms formosanus*;

Silverfish such as *Lepisma saccharina*.

Within the present context technical materials are understood to mean non-living materials such as preferably plastics, adhesives, glues, paper and cardboard, leather, wood, wood fabrication products and paints.

The ready-to-use agents can optionally include further insecticides and optionally one or more fungicides.

In respect of possible mixing partners reference is made to the above-named insecticides and fungicides.

At the same time the compounds of the invention can be used for protection against fouling of objects, especially ships' hulls, screens, nets, buildings, wharfs and signal installations that come into contact with sea or brackish water.

Moreover, the compounds of the invention can be used in combination with other active compounds as anti-fouling agents.

The active compounds are suitable for the control of zoopests in household, hygiene and storage protection, especially insects, arachnids and mites that appear in enclosed spaces such as apartments, factory halls, offices, vehicle cabins, etc. They can be used alone or in combination with other active compounds and auxiliaries in household insecticidal products for the control of these pests. They are active against sensitive and resistant species as well as against all development stages. These pests include:

The order Scorpionidea e.g. *Buthus occitanus*.

The order Acarina e.g. *Argas persicus*, *Argas reflexus*, *Bryobia* spp., *Dermanyssus gallinae*, *Glyciphagus domesticus*, *Ornithodoros moubat*, *Rhipicephalus sanguineus*, *Trombicula alfreddugesi*, *Neutrombicula autumnalis*, *Dermatophagoides pteronissimus*, *Dermatophagoides forinae*.

5 The order Araneae e.g. *Aviculariidae*, *Araneidae*.

The order Opiliones e.g. *Pseudoscorpiones chelifer*, *Pseudoscorpiones cheiridium*, *Opiliones phalangium*.

The order Isopoda e.g. *Oniscus asellus*, *Porcellio scaber*.

The order Diplopoda e.g. *Blaniulus guttulatus*, *Polydesmus* spp..

10 The order Chilopoda e.g. *Geophilus* spp..

The order Zygentoma e.g. *Ctenolepisma* spp., *Lepisma saccharina*, *Lepismodes inquilinus*.

The order der Blattaria e.g. *Blatta orientalis*, *Blattella germanica*, *Blattella asahinai*, *Leucophaea maderae*, *Panchlora* spp., *Parcoblatta* spp., *Periplaneta australasiae*, *Periplaneta americana*, *Periplaneta brunnea*, *Periplaneta fuliginosa*, *Supella longipalpa*.

15 The order Saltatoria e.g. *Acheta domesticus*.

The order Dermaptera e.g. *Forficula auricularia*.

The order Isoptera e.g. *Kaloterms* spp., *Reticulitermes* spp.

The order Psocoptera e.g. *Lepinatus* spp., *Liposcelis* spp.

20 The order Coleoptera e.g. *Anthrenus* spp., *Attagenus* spp., *Dermestes* spp., *Latheticus oryzae*, *Necrobia* spp., *Ptinus* spp., *Rhizopertha dominica*, *Sitophilus granarius*, *Sitophilus oryzae*, *Sitophilus zeamais*, *Stegobium paniceum*.

25 The order Diptera e.g. *Aedes aegypti*, *Aedes albopictus*, *Aedes taeniorhynchus*, *Anopheles* spp., *Calliphora erythrocephala*, *Chrysozona pluvialis*, *Culex quinquefasciatus*, *Culex pipiens*, *Culex tarsalis*, *Drosophila* spp., *Fannia canicularis*, *Musca domestica*, *Phlebotomus* spp., *Sarcophaga carnaria*, *Simulium* spp., *Stomoxys calcitrans*, *Tipula paludosa*.

The order Lepidoptera e.g. *Achroia grisella*, *Galleria mellonella*, *Plodia interpunctella*, *Tinea cloacella*, *Tinea pellionella*, *Tineola bisselliella*.

The order Siphonaptera e.g. *Ctenocephalides canis*, *Ctenocephalides felis*, *Pulex irritans*, *Tunga penetrans*, *Xenopsylla cheopis*.

The order Hymenoptera e.g. *Camponotus herculeanus*, *Lasius fuliginosus*, *Lasius niger*, *Lasius umbratus*, *Monomorium pharaonis*, *Paravespula* spp., *Tetramorium caespitum*.

5 The order Anoplura e.g. *Pediculus humanus capitis*, *Pediculus humanus corporis*, *Pemphigus* spp., *Phylloera vastatrix*, *Phthirus pubis*.

The order Heteroptera e.g. *Cimex hemipterus*, *Cimex lectularius*, *Rhodinus prolixus*, *Triatoma infestans*.

10 The use in the household insecticidal sector is carried out alone or in combination with other suitable active compounds such as phosphates, carbamates, pyrethroids, neonicotinoids, growth regulators or active compounds from other known classes of insecticides.

Use is carried out with aerosols, non-pressurised spray agents, e.g. pump and dusting sprays, nebulisers, misters, foamers, gels, evaporation products with evaporation platelets of cellulose or plastic, liquid evaporators, gel and membrane evaporators, propeller-driven evaporators, non-
15 energy or passive evaporation systems, fly papers, fly traps, and fly gels, as granulates or dusts, in scatter bait or bait stations.

A further feature of the invention thus relates to the use of a compound of formula (I) or a salt thereof, or of a composition thereof, for the control of pests.

20 In practical use for the control of arthropods, especially insects or mites, or helminths, especially nematode pests of plants, a method, for example, comprises applying to the plants or to the medium in which they grow an effective amount of a compound of the invention. For such a method, the compound of the invention is generally applied to the locus in which the arthropod or nematode infestation is to be controlled at an effective rate in the range of about 2g to about 1kg of the active compound per hectare of locus treated. Under ideal conditions, depending on the pest to be
25 controlled, a lower rate may offer adequate protection. On the other hand, adverse weather conditions, resistance of the pest or other factors may require that the active ingredient be used at higher rates. The optimum rate depends usually upon a number of factors, for example, the type of pest being controlled, the type or the growth stage of the infested plant, the row spacing or also the method of application. Preferably an effective rate range of the active compound is from about
30 10g/ha to about 400g/ha, more preferably from about 50g/ha to about 200 g/ha.

The active materials of the plants can be converted into the normal formulations such as solutions, emulsions, spray powders, water- and oil-based suspensions, powders, dusting agents, pastes,

soluble powders, soluble granulates, spreading granulates, suspension-emulsion concentrates, active compound impregnated natural materials, active compound impregnated synthetic materials, fertilisers and microencapsulation in polymeric materials.

These formulations can be prepared by known methods, for example by mixing the active compound with diluents, that is solvents and/or solid carriers, optionally with the use of surfactants, that is emulsifiers and/or dispersants and/or foaming agents. The preparation of the formulations is carried out in suitable plants or also before or during use.

Materials that can be used as auxiliaries are those suitable to impart special properties on the material itself and/or preparations derived from it (e.g. spray emulsions, seed dressings) such as certain technical properties and/or special biological properties. Suitable auxiliaries are: diluents, solvents and carriers.

Suitable diluents are, for example, water, polar and non-polar organic liquids, for example from the class of aromatic and non-aromatic hydrocarbons (such as paraffin, alkylbenzenes, alkylnaphthalenes, chlorobenzenes), alcohols and polyols (that can be optionally substituted, etherified and/or esterified), ketones (such as acetone, cyclohexanone), esters (also fats and oils) and (poly)ethers, the simple and substituted amines, amides, lactams (such as N-alkylpyrrolidones) and lactones, sulphones and sulfoxides (such as dimethylsulphoxide).

Where water is used as diluent organic solvents, for example, can also be used as auxiliary solvents. Such suitable liquid solvents are essentially: aromatics such as xylene or toluene, or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes, methylene chloride, aliphatic hydrocarbons such as cyclohexane or paraffins, for example natural oil fractions, mineral and vegetable oils, alcohols such as butanol or glycol as well as their ethers and esters, ketones such as acetone, methylethylketone, methylisobutylketone or cyclohexanone, highly polar solvents such as dimethylsulphoxide, as well as water.

When a pest is soil-borne, the active compound generally in a formulated composition, is distributed evenly over the area to be treated (for example broadcast or band treatment) in any convenient manner and is applied at rates from about 10g/ha to about 400 g/ha, preferably from about 50g/ha to about 200 g/ha. When applied as a root dip to seedlings or drip irrigation to plants the liquid solution or suspension contains from about 0.075 to about 1000 mg/l, preferably from about 25 to about 200 mg/l. Application may be made, if desired, to the field or crop-growing area generally or in close proximity to the seed or plant to be protected from attack. The compound of the invention can be washed into the soil by spraying with water over the area or can be left to the natural action of rainfall.

During or after application, the formulated compound can, if desired, be distributed mechanically in the soil, for example by ploughing, disking, or use of drag chains. Application can be prior to planting, at planting, after planting but before sprouting has taken place, or after sprouting.

5 The compound of the invention and methods of control of pests therewith are of particular value in the protection of field, forage, plantation, glasshouse, orchard or vineyard crops, of ornamentals, or of plantation or forest trees, for example: cereals (such as wheat or rice), cotton, vegetables (such as peppers), field crops (such as sugar beets, soybeans or oil seed rape), grassland or forage crops (such as maize or sorghum), orchards or groves (such as of stone or pit fruit or citrus), ornamental plants, flowers or vegetables or shrubs under glass or in gardens or parks, or forest trees (both
10 deciduous and evergreen) in forests, plantations or nurseries.

They are also valuable in the protection of timber (standing, felled, converted, stored or structural) from attack, for example, by sawflies or beetles or termites.

They have applications in the protection of stored products such as grains, fruits, nuts, spices or tobacco, whether whole, milled or compounded into products, from moth, beetle, mite or grain
15 weevil attack. Also protected are stored animal products such as skins, hair, wool or feathers in natural or converted form (e.g. as carpets or textiles) from moth or beetle attack as well as stored meat, fish or grains from beetle, mite or fly attack.

Additionally, the compound of the invention and methods of use thereof are of particular value in the control of arthropods or helminths which are injurious to, or spread or act as vectors of diseases
20 domestic animals, for example those hereinbefore mentioned, and more especially in the control of ticks, mites, lice, fleas, midges, or biting, nuisance or myiasis flies. The compounds of the invention are particularly useful in controlling arthropods or helminths which are present inside domestic host animals or which feed in or on the skin or suck the blood of the animal, for which purpose they may be administered orally, parenterally, percutaneously or topically.

25 The compositions hereinafter described for application to growing crops or crop growing loci or as a seed dressing may, in general, alternatively be employed in the protection of stored products, household goods, property or areas of the general environment. Suitable means of applying the compounds of the invention include:

30 to growing crops as foliar sprays (for example as an in-furrow spray), dusts, granules, fogs or foams or also as suspensions of finely divided or encapsulated compositions as soil or root treatments by liquid drenches, dusts, granules, smokes or foams; to seeds of crops via application as seed dressings, e.g. by liquid slurries or dusts;

to animals infested by or exposed to infestation by arthropods or helminths, by parenteral, oral or topical application of compositions in which the active ingredient exhibits an immediate and/or prolonged action over a period of time against the arthropods or helminths, for example by incorporation in feed or suitable orally-ingestible pharmaceutical formulations, edible baits, salt
5 licks, dietary supplements, pour-on formulations, sprays, baths, dips, showers, jets, dusts, greases, shampoos, creams, wax smears or livestock self-treatment systems;

to the environment in general or to specific locations where pests may lurk, including stored products, timber, household goods, or domestic or industrial premises, as sprays, fogs, dusts, smokes, wax-smears, lacquers, granules or baits, or in tricklefeeds to waterways, wells, reservoirs
10 or other running or standing water.

The compounds of formula (I) are particularly useful for the control of parasites of animals when applied orally, and in a further preferred aspect of the invention the compounds of formula (I) are used for the control of parasites of animals by oral application. The compounds of the formula (I) or salts thereof may be administered before, during or after meals. The compounds of the formula
15 (I) or salts thereof may be mixed with a carrier and/or foodstuff.

The compound of the formula (I) or salt thereof is administered orally in a dose to the animal in a dose range generally from 0.1 to 500 mg/kg of the compound of the formula (I) or salt thereof per kilogram of animal body weight (mg/kg).

The frequency of treatment of the animal, preferably the domestic animal to be treated by the
20 compound of the formula (I) or salt thereof is generally from about once per week to about once per year, preferably from about once every two weeks to once every three months.

The compounds of the invention may be administered most advantageously with another parasitically effective material, such as an endoparasiticide, and/or an ectoparasiticide, and/or an endectoparasiticide. For example, such compounds include macrocyclic lactones such as
25 avermectins or milbemycins e.g., ivermectin, pyratel or an insect growth regulator such as lufenuron or methoprene.

The compounds of the formula (I) can also be employed for controlling harmful organisms in crops of known genetically engineered plants or genetically engineered plants yet to be developed. As a rule, the transgenic plants are distinguished by especially advantageous properties, for example by
30 resistances to particular crop protection agents, resistances to plant diseases or pathogens of plant diseases, such as particular insects or microorganisms such as fungi, bacteria or viruses. Other particular properties concern, for example, the harvested material with regard to quantity, quality, storage properties, composition and specific constituents. Thus, transgenic plants are known where

the starch content is increased, or the starch quality is altered, or where the harvested material has a different fatty acid composition.

All plants that have received by genetic engineering modification genetic material that imparts particularly advantageous valuable properties ("traits") to these plants belong to the transgenic (obtained by genetic engineering) plants or plant varieties to be preferably treated in accordance with the invention. Examples of such properties are improved plant growth, increased tolerance toward high or low temperatures, increased tolerance toward drought or toward water or soil salt content, improved blossoming performance, simplified harvesting, accelerated ripening, increased harvest yields, improved quality and/or nutritional value of the crop, better storage life and/or processing of the crop. Further and particularly emphasised examples of such properties are increased resistance of the plants toward zoopests and microbial pests, such as toward insects, mites, pathogenic plant fungi, bacteria and/or viruses as well as an increased tolerance of the plants toward certain herbicides. Examples of such transgenic plants are the important cultigens such as cereals (wheat, rice), maize, soy, potato, sugar beet, tomato, peas, and other vegetable varieties, cotton, tobacco, rape as well as fruit plants (with the fruits apple, pear, citrus fruits and grapes), whereby maize, soy, potato, cotton, tobacco and rape are especially emphasised. Properties ("traits") especially emphasised are the increased tolerance of the plants toward insects, arachnids, nematodes and gastropods through the toxins formed in the plants, especially those that are produced in the plants (hereinafter known as "Bt plants") by the genetic material from *Bacillus thuringiensis* (e.g. from the genes CryIA(a), CryIA(b), CryIA(c), CryIIA, CryIIIA, CryIIIB2, Cry9c Cry2Ab, Cry3Bb and CryIF as well as their combinations). Also particularly emphasised as properties ("traits") is the increased resistance of plants toward fungi, bacteria and viruses through systemically acquired resistance (SAR), systemin, phytoalexine, elicitors and resistance genes and correspondingly expressed proteins and toxins. Further particularly emphasised properties ("traits") are the increased tolerance of the plants to certain active herbicidal compounds, for example imidazolinones, sulphonylureas, glyphosate or phosphinotricin (e.g. "PAT"-gene). The respective genes imparting the desired properties ("traits") can also occur in the transgenic plants in combination with each other. Examples of such "Bt plants" are maize varieties, cotton varieties, soy varieties and potato varieties that are marketed under the trade marks YIELD GARD® (e.g. maize, cotton, soy), KnockOut® (e.g. maize), StarLink® (e.g. maize), Bollgard® (cotton), Nucotn® (cotton) and NewLeaf® (potato). Examples of herbicide tolerant plants are maize varieties, cotton varieties and soy varieties that are marketed under the trade marks Roundup Ready® (tolerance toward glyphosate, e.g. maize, cotton, soy), Liberty Link® (tolerance toward phosphinotricin, e.g. rape), IMI® (tolerance toward imidazolinones) and STS® (tolerance toward sulphonyl ureas, e.g. maize). Also mentioned as herbicide resistant (conventionally bred for herbicide tolerance) plants are those varieties marketed under the name Clearfield® (e.g. maize).

Naturally these statements also apply to plant varieties developed or marketed in the future with these genetic properties ("traits") or those developed in the future.

The use in economically important transgenic crops of useful plants and ornamentals is preferred, for example of cereals such as wheat, barley, rye, oats, millet, rice, cassava and maize or else crops of sugar beet, cotton, soya, oilseed rape, potatoes, tomatoes, peas and other types of vegetables.

When used in transgenic crops, in particular those which have resistances to insects, effects are frequently observed, in addition to the effects against harmful organisms to be observed in other crops, which are specific for application in the transgenic crop in question, for example an altered or specifically widened spectrum of pests which can be controlled, or altered application rates which may be employed for application.

The invention therefore also relates to the use of compounds of the formula (I) for controlling harmful organisms in transgenic crop plants.

According to a further feature of the present invention there is provided a pesticidal composition comprising one or more compounds of the invention as defined above, in association with, and preferably homogeneously dispersed in one or more compatible pesticidally acceptable diluents or carriers and/or surface active agents [i.e. diluents or carriers and/or surface active agents of the type generally accepted in the art as being suitable for use in pesticidal compositions and which are compatible with compounds of the invention].

In practice, the compounds of the invention most frequently form parts of compositions. These compositions can be employed to control arthropods, especially insects, or plant nematodes or mites. The compositions may be of any type known in the art suitable for application to the desired pest in any premises or indoor or outdoor area. These compositions contain at least one compound of the invention as the active ingredient in combination or association with one or more other compatible components which are for example, solid or liquid carriers or diluents, adjuvants, surface-active-agents, or the like appropriate for the intended use and which are agronomically or medicinally acceptable. These compositions, which may be prepared by any manner known in the art, likewise form a part of this invention.

The compounds of the invention, in their commercially available formulations and in the use forms prepared from these formulations may be present in mixtures with other active substances such as insecticides, attractants, sterilants, acaricides, nematocides, fungicides, growth regulatory substances or herbicides.

The pesticides include, for example, phosphoric esters, carbamates, carboxylic esters, formamidines, tin compounds and materials produced by microorganisms.

Preferred components in mixtures are:

Fungicides:

Nucleic acid synthesis inhibitors

5 benalaxyl, benalaxyl-M, bupirimate, chiralaxyl, clozylacon, dimethirimol, ethirimol, furalaxyl,
 hymexazol, metalaxyl, metalaxyl-M, ofurace, oxadixyl, oxolinic acid

Inhibitors of mitosis and cell division

 benomyl, carbendazim, diethofencarb, fuberidazole, pencycuron, thiabendazole, thiophanate-
 methyl, zoxamis

Inhibitor of respiratory complex I

10 diflumetorim

Inhibitors of respiratory complex II

 boscalid, carboxin, fenfuram, flutolanil, furametpyr, mepronil, oxycarboxin, penthiopyrad,
 thiifluzamide

Inhibitor of respiratory complex III

15 azoxystrobin, cyazofamide, dimoxystrobin, enestrobin, famoxadone, fenamidone,
 fluoxastrobin, kresoximmethyl, metominostrobin, orysastrobin, pyraclostrobin, picoxystrobin

Decouplers

 dinocap, fluazinam

Inhibitors of ATP production

20 fentin acetate, fentin chloride, fentin hydroxide, silthiofam

Inhibitor of amino acid and protein biosynthesis

andoprim, blasticidin-S, cyprodinil, kasugamycin, kasugamycin hydrochloride hydrate, mepaniprim, pyrimethanil

Inhibitors of signal transduction

fenpiclonil, fludioxonil, quinoxifen

5 Inhibitors of fat and membrane synthesis

chlozolate, iprodione, procymidone, vinclozolin

ampropylfos, potassium ampropylfos, edifenphos, iprobenfos (IBP), isoprothiolane, pyrazophos

tolclofos-methyl, biphenyl

10 iodocarb, propamocarb, propamocarb hydrochloride

Inhibitors of ergosterol biosynthesis

fenhexamide,

15 azaconazole, bitertanol, bromuconazole, cyproconazole, diclobutrazole, difenoconazole, diniconazole, diniconazole-M, epoxiconazole, etaconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, furconazole, furconazole-cis, hexaconazole, imibenconazole, ipconazole, metconazole, myclobutanil, paclobutrazole, penconazole, propiconazole, prothioconazole, simeconazole, tebuconazole, tetraconazole, triadimefon, triadimenol, triticonazole, uniconazole, voriconazole, imazalil, imazalil sulphate, oxpoconazole, fenarimol, flurprimidol, nuarimol, pyrifenoxy, triforin, pefurazoate, prochloraz, triflumizole, viniconazole,

20 aldimorph, dodemorph, dodemorph acetate, fenpropimorph, tridemorph, fenpropidin, spiroxamine,

naftifin, pyributicarb, terbinafin

Inhibitors of cell wall synthesis

25 bentiavalicarb, bialaphos, dimethomorph, flumorph, iprovalicarb, polyoxins, polyoxorim, validamycin A

Inhibitors of melanin biosynthesis

capropamide, diclocymet, fenoxanil, phthalide, pyroquilon, tricyclazole

Resistance induction

acibenzolar-S-methyl, probenazole, tiadinil

5 Multisite

captafol, captan, chlorothalonil, copper salts: copper hydroxide, copper naphthenate, copper oxychloride, copper sulphate, copper oxide, oxine-copper and Bordeaux mixture, dichlofluanid, dithianon, dodin, dodin freie base, ferbam, fluorofolpet, guazatin, guazatin acetate, iminoctadin, iminoctadine albesilate, iminoctadine triacetate, mancopper, mancozeb, 10 maneb, metiram, metiram zinc, propineb, sulphur and sulphur preparations containing calcium polysulphide, thiram, tolylfluanid, zineb, ziram

Unknown mechanism

amibromdol, benthiazole, bethoxazin, capsimycin, carvone, quinoline methionate, chloropicrin, cufraneb, cyflufenamide, cymoxanil, dazomet, debacarb, diclomezine, 15 dichlorophen, dicloran, difenzoquat, difenzoquat methyl sulphate, diphenylamine, ethaboxam, ferimzone, flumetover, flusulfamide, fluopicolide, fluoroimide, hexachlorobenzene, 8-hydroxyquinoline sulphate, irumamycin, methasulphocarb, metrafenone, methyl isothiocyanate, mildiomyacin, natamycin, nickel dimethyldithiocarbamate, nitrothal-isopropyl, octhilinone, oxamocarb, oxyfenthiiin, pentachlorophenol and salts, 2-phenylphenol and salts, 20 piperalin, propanosin -sodium, proquinazid, pyrrolnitrin, quintozen, tecloftalam, tecnazen, triazoxido, trichlamide, zarilamide and 2,3,5,6-tetrachloro-4-(methylsulphonyl)pyridine, N-(4-chloro-2-nitrophenyl)-N-ethyl-4-methylbenzenesulphonamide, 2-amino-4-methyl-N-phenyl-5-thiazole carboxamide, 2-chloro-N-(2,3-dihydro-1,1,3-trimethyl-1H-inden-4-yl)-3-pyridine carboxamide, 3-[5-(4-chlorophenyl)-2,3-dimethylisoxazolidin-3-yl]pyridine, cis-1-(4- 25 chlorophenyl)-2-(1H-1,2,4-triazol-1-yl)cycloheptanol, 2,4-dihydro-5-methoxy-2-methyl-4-[[[1-[3-(trifluoromethyl)-phenyl]ethyliden]amino]oxy]methyl]phenyl]-3H-1,2,3-triazol-3-one (185336-79-2), methyl 1-(2,3-dihydro-2,2-dimethyl-1H-inden-1-yl)-1H-imidazole-5-carboxylate, 3,4,5-trichloro-2,6-pyridine dicarbonitriol, methyl 2-[[[cyclopropyl[(4-methoxyphenyl) imino]methyl]thio]methyl]-.alpha.-(methoxymethylen)-benzacetate, 4- 30 chloro-alpha-propinyloxy-N-[2-[3-methoxy-4-(2-propinyloxy)phenyl]ethyl]-benzacetamide, (2S)-N-[2-[4-[[3-(4-chlorophenyl)-2-propinyl]oxy]-3-methoxyphenyl]ethyl]- 3-methyl-2-

[(methylsulphonyl)amino]-butanamide, 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidine, 5-chloro-6-(2,4,6-trifluorophenyl)-N-[(1R)-1,2,2-trimethylpropyl][1,2,4]triazolo[1,5-a]pyrimidine-7-amine, 5-chloro-N-[(1R)-1,2-dimethylpropyl]-6-(2,4,6-trifluorophenyl) [1,2,4]triazolo[1,5-a]pyrimidine-7-amine, N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2,4-dichloronicotinamide, N-(5-bromo-3-chloropyridin-2-yl)methyl-2,4-dichloronicotinamide, 2-butoxy-6-iodo-3-propylbenzopyranon-4-one, N-[(Z)-[(cyclopropylmethoxy) imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl]-2-benzacetamide, N-(3-ethyl-3,5,5-trimethylcyclohexyl)-3-formylamino-2-hydroxybenzamide, 2-[[[1-[3(1-fluoro-2-phenylethyl)oxy]phenyl ethylidene]amino]oxy]methyl]-alpha-(methoxyimino)-N-methyl-alphaE-benzacetamide, N-{2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethyl}-2-(trifluoromethyl)benzamide, N-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, N-(6-Methoxy-3-pyridinyl)-cyclopropane carboxamide, 1-[(4-methoxyphenoxy)methyl]-2,2-dimethylpropyl-1H-imidazole-1-carboxylic acid, O-[1-[(4-methoxyphenoxy)methyl]-2,2-dimethylpropyl]-1H-imidazole-1-carbothioic acid, 2-(2-{[6-(3-chlor-2-methylphenoxy)-5-fluoropyrimidin-4-yl]oxy}phenyl)-2-(methoxyimino)-N-methylacetamide

Bactericides:

bronopol, dichlorophen, nitrapyrin, nickel dimethyldithiocarbamate, kasugamycin, octhilinon, furan carboxylic acid, oxytetracyclin, probenazol, streptomycin, tecloftalam, copper sulphate and other copper preparations.

Insecticide / Acaricide / Nematicide:

Acetylcholinesterase (AChE) inhibitors

carbamates,
 for example alanycarb, aldicarb, aldoxycarb, allyxycarb, aminocarb, bendiocarb, benfuracarb, bufencarb, butacarb, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, cloethocarb, dimetilan, ethiofencarb, fenobucarb, fenothiocarb, formetanate, furathiocarb, isoprocarb, metam-sodium, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, promecarb, propoxur, thiodicarb, thiofanox, trimethacarb, XMC, xylylcarb, triazamate

organophosphates,
 for example acephate, azamethiphos, azinphos (-methyl, -ethyl), aromophos-ethyl, aromfenvinfos (-methyl), autathiofos, cadusafos, carbophenothion, chlorethoxyfos, chlorfenvinphos, chlormephos, chlorpyrifos (-methyl/-ethyl), coumaphos, cyanofenphos, cyanophos, chlorfenvinphos, demeton-S-methyl, demeton-S-methylsulphone, dialifos, di-

5 azinone, dichlofenthione, dichlorvos/DDVP, dicrotophos, dimethoate, dimethylvinphos, di-
 oxabenzofos, disulfoton, EPN, ethion, ethoprophos, etrimfos, famphur, fenamiphos,
 fenitrothion, fensulfothion, fenthion, flupyrzofos, fonofos, formothion, fosmethilan, fos-
 thiazate, heptenophos, iodofenphos, iprobenfos, isazofos, isofenphos, isopropyl O-
 10 salicylate, isoxathion, malathion, mecarbam, methacrifos, methamidophos, methidathion,
 mevinphos, monocrotophos, naled, omethoate, oxydemeton-methyl, parathion (-methyl/
 -ethyl), phenthoate, phorate, phosalone, phosmet, phosphamidone, phosphocarb, Phoxim,
 pirimiphos (-methyl/-ethyl), profenofos, propaphos, propetamphos, prothiofos, prothoate,
 15 pyraclofos, pyridaphenthion, pyridathion, quinalphos, sebufos, sulfotep, sulprofos,
 10 tebupirimfos, temephos, terbufos, tetrachlorvinphos, thiometon, triazophos, triclofon,
 vamidothion

Sodium channel modulators / voltage-dependent sodium channel blockers

pyrethroids,
 for example acrinathrin, allethrin (d-cis-trans, d-trans), beta-cyfluthrin, bifenthrin,
 15 bioallethrin, bioallethrin-S-cyclopentyl-isomer, bioethanomethrin, biopermethrin,
 bioresmethrin, chlovaporthrin, cis-cypermethrin, cis-resmethrin, cis-permethrin, clocythrion,
 cycloprothrin, cyfluthrin, cyhalothrin, cypermethrin (alpha-, beta-, theta-, zeta),
 cyphenothrin, deltamethrin, empenthrin (1R-isomer), esfenvalerate, etofenprox, fenfluthrin,
 fenpropathrin, fenpyrithrin, fenvalerate, flubrocycythrinate, flucythrinate, flufenprox,
 20 flumethrin, fluvalinate, fubfenprox, gamma-cyhalothrin, imiprothrin, kadethrin, lambda-
 cyhalothrin, metofluthrin, permethrin (cis-, trans-), phenothrin (1R-trans isomer),
 prallethrin, profluthrin, protrifenbute, pyresmethrin, resmethrin, RU 15525, silafluofen,
 tau-fluvalinate, tefluthrin, terallethrin, tetramethrin (-1R- isomer), tralomethrin,
 transfluthrin, ZXI 8901, pyrethrins (pyrethrum)

25 DDT

oxadiazines,
 for example indoxacarb

Acetylcholine receptor agonists/antagonists

chloronicotinyis,
 30 for example acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, nithiazine,
 thiacloprid, thiamethoxam

 nicotine, bensultap, cartap

diafenthiuron

organotin

compounds,

for example azocyclotin, cyhexatin, fenbutatin-oxide

Decouplers of oxidative phosphorylation by interruption of H-proton gradients

pyrrole,

5 for example chlorfenapyr

dinitrophenols,

for example binapacyrl, dinobuton, dinocap, DNOC

Site I electron transport inhibitors

METI's,

10 for example fenazaquin, fenpyroximate, pyrimidifen, pyridaben, tebufenpyrad, tolfenpyrad

hydramethylnon

dicofol

Site II electron transport inhibitors

rotenones

15 Site III electron transport inhibitors

acequinocyl, fluacrypyrim

microbial disruptors of insect intestinal membrane

Bacillus thuringiensis strains

Inhibitors of fat synthesis

20 tetronic acids,

for example spirodiclofen, spiromesifen

tetramic acids,

for example spirotetramat (CAS-Reg.-No.: 203313-25-1) and 3-(2,5-dimethylphenyl)-8-methoxy-2-oxo-1-azaspiro[4.5]dec-3-en-4-yl ethyl carbonate (alias: carbonic acid, 3-(2,5-dimethylphenyl)-8-methoxy-2-oxo-1-azaspiro[4.5]dec-3-en-4-yl ethyl ester, CAS-Reg.-
25 No.: 382608-10-8)

carboxamides,

for example flonicamid

octopaminergic agonists,

for example amitraz

5 Inhibitor of magnesium-stimulated ATPase,

propargite

benzoic acid dicarboxamides,

for example flubendiamide

Nereistoxin analogous,

10 for example thiocyclam hydrogen oxalate, thiosultap-sodium

Agonists of the ryanodin receptor,

benzoic acid dicarboxamides,

for example flubendiamide

Biologicals, hormones or pheromones

15 azadirachtin, Bacillus spec., Beauveria spec., codlemone, Metarrhizium spec.,
Paecilomyces spec., thuringiensin, Verticillium spec.

Active compounds with unknown or non-specific mode of action

fumigants,

for example aluminium phosphide, methyl bromide, sulphuryl fluoride

20 feeding inhibitors,

for example cryolite, flonicamid, pymetrozine

mite growth inhibitors,

for example clofentezine, etoxazole, hexythiazox

amidoflumet, benclothiaz, benzoximate, bifenazate, bromopropylate, buprofezin, quinomethionate, chlordimeform, chlorobenzilate, chloropicrin, clothiazoben, cycloprene, cyflumetofen, dicyclanil, fenoxacrim, fentrifanil, flubenzimine, flufenimer, flutenzin, gossyplure, hydramethylnone, japonilure, metoxadiazone, petroleum, piperonyl butoxide, potassium oleate, pyridalyl, sulfluramid, tetradifon, tetrasul, triarathene, verbutin

A mixture with other known active compounds such as herbicides, fertilisers, growth regulators, safeners, semiochemicals or also with agents for improving plant properties is also possible.

The abovementioned components for combinations are known active substances, many of which are described in Ch.R Worthing, S.B. Walker, The Pesticide Manual, 12th Edition, British Crop Protection Council, Farnham 2000.

The effective use doses of the compounds employed in the invention can vary within wide limits, particularly depending on the nature of the pest to be eliminated or degree of infestation, for example, of crops with these pests. In general, the compositions according to the invention usually contain about 0.05 to about 95% (by weight) of one or more active ingredients according to the invention, about 1 to about 95% of one or more solid or liquid carriers and, optionally, about 0.1 to about 50% of one or more other compatible components, such as surface-active agents or the like.

In the present account, the term "carrier" denotes an organic or inorganic ingredient, natural or synthetic, with which the active ingredient is combined to facilitate its application, for example, to the plant, to seeds or to the soil. This carrier is therefore generally inert and it must be acceptable (for example, agronomically acceptable, particularly to the treated plant).

Suitable as solid carriers are:

for example, ammonium salts and natural mineral powders such as kaolin, clays, talc, chalk, quartz attapulgite, montmorillonite or diatomaceous earth, and synthetic mineral powders such as highly dispersed silica, aluminium oxide and silicates, suitable as carriers for granulates are: for example crushed and fractionated natural minerals such as calcite, marble, pumice, sepiolite, dolomite as well as synthetic granulates of inorganic and organic flours as well as granulates from organic materials such as paper, sawdust, coconut shells, maize ears and tobacco stalks; suitable as emulsifiers and foaming agents are; for example non-ionogenic and anionic emulsifiers such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkylsulphates, arylsulphonates and protein hydrolysates; suitable as dispersant are non-ionic and/or ionic materials, for example from the class of alcohol-POE and/or POP ethers, acid- and/or POP or POE esters, alkyl-aryl- and/or POP or POE ethers, fat- and/or POP or POE adducts, POE- and/or POP-polyol derivatives, POE- and/or POP-sorbitan or sugar adducts, alkyl or aryl sulphates, sulphonates and phosphates or the respective PO ether

adducts. In addition suitable oligo- or polymers, for example starting from vinylic monomers, of acrylic acid, from EO and/or PO alone or in combination with, for example (poly)alcohols or (poly)amines. In addition lignin and its sulphonic acid derivatives, simple and modified celluloses, aromatic and/or aliphatic sulphonic acids as well as their adducts with formaldehyde can be used .

5 The carrier may also be liquid, for example: water; alcohols, particularly butanol or glycol, as well as their ethers or esters, particularly methylglycol acetate; ketones, particularly acetone, cyclohexanone, methylethyl ketone, methylisobutylketone, or isophorone; petroleum fractions such as paraffinic or aromatic hydrocarbons, particularly xylenes or alkyl naphthalenes; mineral or vegetable oils; aliphatic chlorinated hydrocarbons, particularly trichloroethane or methylene
10 chloride; aromatic chlorinated hydrocarbons, particularly chlorobenzenes; water-soluble or strongly polar solvents such as dimethylformamide, dimethyl sulphoxide, or N-methylpyrrolidone; liquefied gases; or the like or a mixture thereof.

The surface-active agent may be an emulsifying agent, dispersing agent or wetting agent of the ionic or non-ionic type or a mixture of such surface-active agents.

15 Amongst these are e.g., salts of polyacrylic acids, salts of lignosulphonic acids, salts of phenolsulphonic or naphthalenesulphonic acids, polycondensates of ethylene oxide with fatty alcohols or fatty acids or fatty esters or fatty amines, substituted phenols (particularly alkylphenols or arylphenols), salts of sulphosuccinic acid esters, taurine derivatives (particularly alkyltaurates), phosphoric esters of alcohols or of polycondensates of ethylene oxide with phenols, esters of fatty
20 acids with polyols, or sulphate, sulphonate or phosphate functional derivatives of the above compounds. The presence of at least one surface-active agent is generally essential when the active ingredient and/or the inert carrier are only slightly water soluble or are not water soluble and the carrier agent of the composition for application is water.

Compositions of the invention may further contain other additives such as adhesives or colorants.
25 Adhesives such as carboxymethylcellulose or natural or synthetic polymers in the form of powders, granules or lattices, such as arabic gum, polyvinyl alcohol or polyvinyl acetate, natural phospholipids, such as cephalins or lecithins, or synthetic phospholipids can be used in the formulations. It is possible to use colorants such as inorganic pigments, for example: iron oxides, titanium oxides or Prussian Blue; organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs or
30 metal phthalocyanine dyestuffs; or trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum or zinc.

For their agricultural application, the compounds of the invention are therefore generally in the form of compositions, which are in various solid or liquid forms.

Solid forms of compositions which can be used are dusting powders (with a content of the compound of the invention, ranging up to 80%), wettable powders or granules (including water dispersible granules), particularly those obtained by extrusion, compacting, impregnation of a granular carrier, or granulation starting from a powder (the content of the compound of the invention, in these wettable powders or granules being between about 0.5 and about 80%). Solid homogenous or heterogenous compositions containing one or more compounds of the invention, for example granules, pellets, briquettes or capsules, may be used to treat standing or running water over a period of time. A similar effect may be achieved using trickle or intermittent feeds of water dispersible concentrates as described herein.

Liquid compositions, for example, include aqueous or non-aqueous solutions or suspensions (such as emulsifiable concentrates, emulsions, flowables, dispersions, or solutions) or aerosols. Liquid compositions also include, in particular, emulsifiable concentrates, dispersions, emulsions, flowables, aerosols, wettable powders (or powder for spraying), dry flowables or pastes as forms of compositions which are liquid or intended to form liquid compositions when applied, for example as aqueous sprays (including low and ultra-low volume) or as fogs or aerosols.

Liquid compositions, for example, in the form of emulsifiable or soluble concentrates most frequently comprise about 5 to about 80% by weight of the active ingredient, while the emulsions or solutions which are ready for application contain, in their case, about 0.01 to about 20% of the active ingredient. Besides the solvent, the emulsifiable or soluble concentrates may contain, when required, about 2 to about 50% of suitable additives, such as stabilizers, surface-active agents, penetrating agents, corrosion inhibitors, colorants or adhesives. Emulsions of any required concentration, which are particularly suitable for application, for example, to plants, may be obtained from these concentrates by dilution with water. These compositions are included within the scope of the compositions which may be employed in the present invention. The emulsions may be in the form of water-in-oil or oil-in-water type and they may have a thick consistency.

The liquid compositions of this invention may, in addition to normal agricultural use applications be used for example to treat substrates or sites infested or liable to infestation by arthropods (or other pests controlled by compounds of this invention) including premises, outdoor or indoor storage or processing areas, containers or equipment or standing or running water.

All these aqueous dispersions or emulsions or spraying mixtures can be applied, for example, to crops by any suitable means, chiefly by spraying, at rates which are generally of the order of about 100 to about 1,200 liters of spraying mixture per hectare, but may be higher or lower (eg. low or ultra-low volume) depending upon the need or application technique. The compound or compositions according to the invention are conveniently applied to vegetation and in particular to roots or leaves having pests to be eliminated. Another method of application of the compounds or

compositions according to the invention is by chemigation, that is to say, the addition of a formulation containing the active ingredient to irrigation water. This irrigation may be sprinkler irrigation for foliar pesticides or it can be ground irrigation or underground irrigation for soil or for systemic pesticides.

5 The concentrated suspensions, which can be applied by spraying, are prepared so as to produce a stable fluid product which does not settle (fine grinding) and usually contain from about 10 to about 75% by weight of active ingredient, from about 0.5 to about 30% of surface-active agents, from about 0.1 to about 10% of thixotropic agents, from about 0 to about 30% of suitable additives, such as anti-foaming agents, corrosion inhibitors, stabilizers, penetrating agents, adhesives and, as
10 the carrier, water or an organic liquid in which the active ingredient is poorly soluble or insoluble. Some organic solids or inorganic salts may be dissolved in the carrier to help prevent settling or as antifreezes for water.

The wettable powers (or powder for spraying) are usually prepared so that they contain from about 10 to about 80% by weight of active ingredient, from about 20 to about 90% of a solid carrier, from
15 about 0 to about 5% of a wetting agent, from about 3 to about 10% of a dispersing agent and, when necessary, from about 0 to about 80% of one or more stabilizers and/or other additives, such as penetrating agents, adhesives, anti-caking agents, colorants, or the like. To obtain these wettable powders, the active ingredient is thoroughly mixed in a suitable blender with additional substances which may be impregnated on the porous filler and is ground using a mill or other suitable grinder.
20 This produces wettable powders, the wettability and the suspendability of which are advantageous. They may be suspended in water to give any desired concentration and this suspension can be employed very advantageously in particular for application to plant foliage.

The "water dispersible granules (WG)" (granules which are readily dispersible in water) have compositions which are substantially close to that of the wettable powders.

25 They may be prepared by granulation of formulations described for the wettable powders, either by a wet route (contacting finely divided active ingredient with the inert filler and a little water, e.g. 1 to 20% by weight, or with an aqueous solution of a dispersing agent or binder, followed by drying and screening), or by a dry route (compacting followed by grinding and screening).

30 The rates and concentrations of the formulated compositions may vary according to the method of application or the nature of the compositions or use thereof. Generally speaking, the compositions for application to control arthropod or plant nematode pests usually contain from about 0.00001% to about 95%, more particularly from about 0.0005% to about 50% by weight of one or more compounds of the invention, or of total active ingredients (that is to say the compounds of the invention, together with other substances toxic to arthropods or plant nematodes, synergists, trace

elements or stabilizers). The actual compositions employed and their rate of application will be selected to achieve the desired effect(s) by the farmer, livestock producer, medical or veterinary practitioner, pest control operator or other person skilled in the art.

5 Solid or liquid compositions for application topically to animals, timber, stored products or household goods usually contain from about 0.00005% to about 90%, more particularly from about 0.001% to about 10%, by weight of one or more compounds of the invention. For administration to animals orally or parenterally, including percutaneously solid or liquid compositions, these normally contain from about 0.1% to about 90% by weight of one or more compounds of the invention. Medicated feedstuffs normally contain from about 0.001% to about 3% by weight of
10 one or more compounds of the invention. Concentrates or supplements for mixing with feedstuffs normally contain from about 5% to about 90%, preferably from about 5% to about 50%, by weight of one or more compounds of the invention. Mineral salt licks normally contain from about 0.1% to about 10% by weight of one or more compounds of formula (I) or pesticidally acceptable salts thereof.

15 Dusts or liquid compositions for application to livestock, goods, premises or outdoor areas may contain from about 0.0001% to about 15%, more especially from about 0.005% to about 2.0%, by weight, of one or more compounds of the invention. Suitable concentrations in treated waters are between about 0.0001 ppm and about 20 ppm, more particularly about 0.001 ppm to about 5.0 ppm. of one or more compounds of the invention, and may be used therapeutically in fish farming
20 with appropriate exposure times. Edible baits may contain from about 0.01% to about 5%, preferably from about 0.01% to about 1.0%, by weight, of one or more compounds of the invention.

When administered to vertebrates parenterally, orally or by percutaneous or other means, the dosage of compounds of the invention, will depend upon the species, age, or health of the
25 vertebrate and upon the nature and degree of its actual or potential infestation by arthropod or helminth pests. A single dose of about 0.1 to about 100 mg, preferably about 2.0 to about 20.0 mg, per kg body weight of the animal or doses of about 0.01 to about 20.0 mg, preferably about 0.1 to about 5.0 mg, per kg body weight of the animal per day, for sustained medication, are generally suitable by oral or parenteral administration. By use of sustained release formulations or devices,
30 the daily doses required over a period of months may be combined and administered to animals on a single occasion.

The following Compositions A - M illustrate compositions for use against arthropods, especially mites or insects, or plant nematodes, which comprise, as active ingredient, compounds of the invention, such as those described in preparative examples. The compositions described in
35 Compositions A - M can each be diluted to give a sprayable composition at concentrations suitable

for use in the field. Generic chemical descriptions of the ingredients (for which all of the following percentages are in weight percent), used in the Compositions A - M exemplified below, are as follows:

	Trade Name	Chemical Description
5	Ethylan BCP	Nonylphenol ethylene oxide condensate
	Soprophor BSU	Tristyrylphenol ethylene oxide condensate
	Arylan CA	A 70% w/v solution of calcium dodecylbenzenesulfonate
	Solvesso 150	Light C ₁₀ aromatic solvent
	Arylan S	Sodium dodecylbenzenesulfonate
10	Darvan NO ₂	Sodium lignosulphonate
	Celite PF	Synthetic magnesium silicate carrier
	Sopropon T36	Sodium salts of polycarboxylic acids
	Rhodigel 23	Polysaccharide xanthan gum
	Bentone 38	Organic derivative of magnesium montmorillonite
15	Aerosil	Microfine silicon dioxide

Composition A

A water soluble concentrate is prepared with the composition as follows:

Active ingredient	7%
Ethylan BCP	10%
N-methylpyrrolidone	83%

- 20 To a solution of Ethylan BCP dissolved in a portion of N-methylpyrrolidone is added the active ingredient with heating and stirring until dissolved. The resulting solution is made up to volume with the remainder of the solvent.

Composition B

An emulsifiable concentrate (EC) is prepared with the composition as follows:

25	Active ingredient	25%(max)
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Soprophor BSU	10%
Arylan CA	5%
N-methylpyrrolidone	50%
Solvesso 150	10%

- 5 The first three components are dissolved in N-methylpyrrolidone and to this is then added the Solvesso 150 to give the final volume.

Composition C

A wettable powder (WP) is prepared with the composition as follows:

Active ingredient	40%
Arylan S	2%
Darvan NO ₂	5%
Celite PF	53%

- 10 The ingredients are mixed and ground in a hammer-mill to a powder with a particle size of less than 50 microns.

Composition D

An aqueous-flowable formulation is prepared with the composition as follows:

Active ingredient	40.00%
Ethylan BCP	1.00%
Sopropon T360.	0.20%
Ethylene glycol.	5.00%
Rhodigel 230.	0.15%
Water	53.65%

- 15 The ingredients are intimately mixed and are ground in a bead mill until a mean particle size of less than 3 microns is obtained.

Composition E

An emulsifiable suspension concentrate is prepared with the composition as follows:

Active ingredient	30.0%
Ethylan BCP	10.0%
Bentone 38	0.5%
Solvesso 150	59.5%

The ingredients are intimately mixed and ground in a beadmill until a mean particle size of less than 3 microns is obtained.

Composition F

5 A water dispersible granule is prepared with the composition as follows:

Active ingredient	30%
Darvan No 2	15%
Arylan S	8%
Celite PF	47%

The ingredients are mixed, micronized in a fluid-energy mill and then granulated in a rotating pelletizer by spraying with water (up to 10%). The resulting granules are dried in a fluid-bed drier to remove excess water.

10 Composition G

A dusting powder is prepared with the composition as follows:

Active ingredient	1 to 10%
Talc powder-superfine	99 to 90%

15 The ingredients are intimately mixed and further ground as necessary to achieve a fine powder. This powder may be applied to a locus of arthropod infestation, for example refuse dumps, stored products or household goods or animals infested by, or at risk of infestation by, arthropods to control the arthropods by oral ingestion. Suitable means for distributing the dusting powder to the locus of arthropod infestation include mechanical blowers, handshakers or livestock self treatment devices.

Composition H

20 An edible bait is prepared with the composition as follows:

Active ingredient	0.1 to 1.0%
Wheat flour	80%
Molasses	19.9 to 19%

The ingredients are intimately mixed and formed as required into a bait form. This edible bait may be distributed at a locus, for example domestic or industrial premises, e.g. kitchens, hospitals or stores, or outdoor areas, infested by arthropods, for example ants, locusts, cockroaches or flies, to control the arthropods by oral ingestion.

Composition I

A solution formulation is prepared with a composition as follows:

Active ingredient	15%
Dimethyl sulfoxide	85%

The active ingredient is dissolved in dimethyl sulfoxide with mixing and or heating as required. This solution may be applied percutaneously as a pour-on application to domestic animals infested by arthropods or, after sterilization by filtration through a polytetrafluoroethylene membrane (0.22 micrometer pore size), by parenteral injection, at a rate of application of from 1.2 to 12 ml of solution per 100 kg of animal body weight.

Composition J

A wettable powder is prepared with the composition as follows:

Active ingredient	50%
Ethylan BCP	5%
Aerosil	5%
Celite PF	40%

The Ethylan BCP is absorbed onto the Aerosil which is then mixed with the other ingredients and ground in a hammer-mill to give a wettable powder, which may be diluted with water to a concentration of from 0.001% to 2% by weight of the active compound and applied to a locus of infestation by arthropods, for example, dipterous larvae or plant nematodes, by spraying, or to

domestic animals infested by, or at risk of infection by arthropods, by spraying or dipping, or by oral administration in drinking water, to control the arthropods.

Composition K

5 A slow release bolus composition is formed from granules containing the following components in varying percentages(similar to those described for the previous compositions) depending upon need:

Active ingredient
Density agent
Slow-release agent
Binder

10 The intimately mixed ingredients are formed into granules which are compressed into a bolus with a specific gravity of 2 or more. This can be administered orally to ruminant domestic animals for retention within the reticulo-rumen to give a continual slow release of active compound over an extended period of time to control infestation of the ruminant domestic animals by arthropods.

Composition L

A slow release composition in the form of granules, pellets, brickettes or the like can be prepared with compositions as follows:

Active ingredient 0.5 to 25%
Polyvinyl chloride 75 to 99.5%
Dioctyl phthalate (plasticizer)

15

The components are blended and then formed into suitable shapes by melt-extrusion or molding. These composition are useful, for example, for addition to standing water or for fabrication into collars or eartags for attachment to domestic animals to control pests by slow release.

Composition M

20 A water dispersible granule is prepared with the composition as follows:

Active ingredient	85%(max)
Polyvinylpyrrolidone	5%
Attapulgate clay	6%
Sodium lauryl sulfate	2%
Glycerine	2%

The ingredients are mixed as a 45% slurry with water and wet milled to a particle size of 4 microns, then spray-dried to remove water.

Synthesis examples

5 Example 1:

2-Fluor-4-benzyloxy-acetophenon (Compound number 01-49)

To a mixture of 2-fluoro-4-hydroxyacetophenone (1.00 g, 6.5 mmol) in acetonitrile (10 mL) were added benzylbromide (1.22 g, 7.1 mmol) and potassium carbonate (1.16, 8.4 mmol). The mixture was stirred at 80°C for 6 hours. Extractive workup (heptane-ethyl acetate, water) gave the title
 10 product (Compound 01-49) as a solid 1.50 g; ¹H-NMR (ppm): 2,59, CH₃; 5,11, OCH₂; 6,69, 6,82, 7,40, 7,88, ArH.

Example 2:

4-Cyclopentylmethoxy-acetophenon (Compound number 05-07)

To a mixture of cyclopentylmethanol (0.55 g, 5.6 mmol) and sodium hydride (0.28 g, 60%, 7.1
 15 mmol) in DMF (10 mL) under inert atmosphere was added 4-fluoroacetophenone (0.70 g, 5.1 mmol). The mixture was stirred at 140°C for 7 hours. Extractive workup (heptane-ethyl acetate, water) and chromatography gave the title product (Compound 05-07) as an oil, 0.68 g; ¹H-NMR (ppm): 1,37; 1,63; 1,85; 2,37; 2,55; 3,89; 6,92; 7,92;

The following compounds were prepared analogously to the examples 1 and 2 (the listed
 20 compound numbers refer to the compounds shown in tables 1-6):

01-01, 01-03, 01-09, 01-17, 01-25, 01-26, 01-41, 01-49, 01-50, 01-57, 01-63, 01-65, 01-66, 01-76,
 01-78, 01-81, 01-99, 01-102, 01-103, 01-108, 01-112, 01-116, 01-121, 01-122, 01-131, 01-132, 02-
 02, 02-03, 02-05, 02-26, 02-33, 02-34, 02-35, 02-36, 03-90, 03-106, 04-01, 04-13, 05-03, 05-04,
 05-07, 05-08, 05-13, 05-15, 05-21, 05-109, 05-110, 05-115, 05-117, 05-125, 05-129, 05-136, 05-
 25 138, 06-01.

Tables:

The following preferred compounds shown in Tables 1 to 6 also form part of the present invention, and were or may be prepared in accordance with, or analogously to, the above-mentioned Examples 1 or 2 or the above-described general methods.

5 Where subscripts are omitted they are intended, for example CH₂ means CH₂.

In the Tables Me means methyl, Et means ethyl, Pr means propyl, Bu means butyl and Ph means phenyl, C₄H₉ or nButyl means n-butyl, iC₄H₉ or iButyl means iso-butyl, tC₄H₉ or tButyl means tert.-butyl, C₂H₄ means ethylene (-CH₂CH₂-), cC₃H₅ or cPropyl means cyclopropyl.

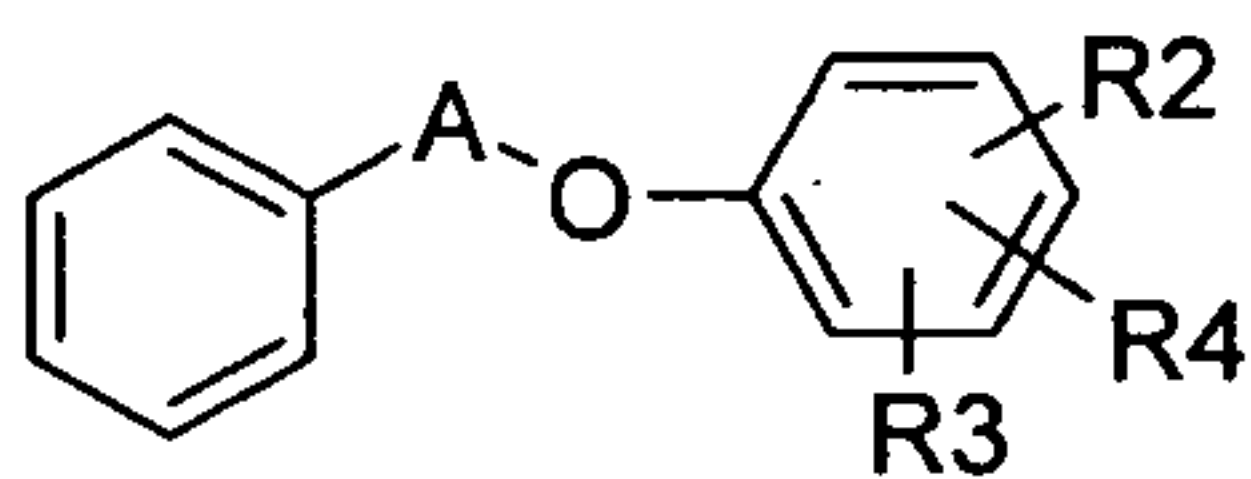
NMR spectra shift values are given in ppm.

10 "CA RegNo" means Chemical Abstract Registration Number.

Compound numbers are given for reference purposes only.

Table 1: Compounds of formula (I) in which the substituents have the following meanings:

A is CH₂; variation of R₂, R₃, R₄



15

Compound number		R ₂	R ₃	R ₄	Beilstein or CA RegNo	NMR 1H NMR (ppm)
01-	01	H	H	4-COCH ₃	54696-05-8	
01-	02	H	H	4-COC ₂ H ₅	4495-66-3	
01-	03	H	H	4-COnC ₃ H ₇	26945-71-1	
01-	04	H	H	4-COiC ₃ H ₇		
01-	05	H	H	4-COnC ₄ H ₉		
01-	06	H	H	4-COiC ₄ H ₉		
01-	07	H	H	4-COsecC ₄ H ₉		
01-	08	H	H	4-COtC ₄ H ₉		
01-	09	H	H	3-COCH ₃	34068-01-4	

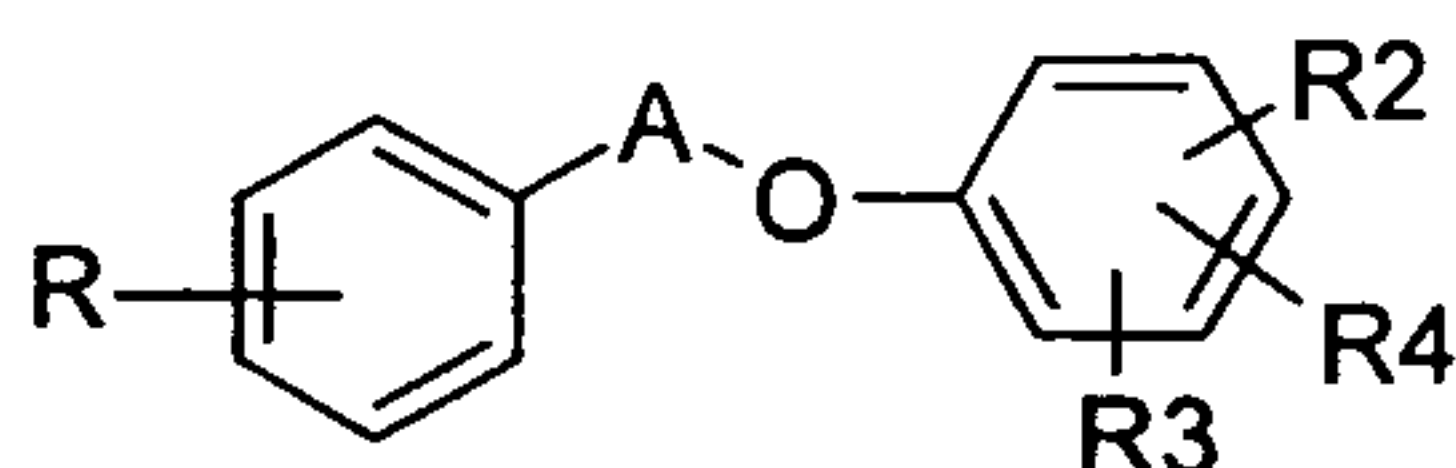
01-	10	H	H	3-COC2H5		
01-	11	H	H	3-COC3H7		
01-	12	H	H	3-COiC3H7		
01-	13	H	H	3-COnC4H9		
01-	14	H	H	3-COiC4H9		
01-	15	H	H	3-COsecC4H9		
01-	16	H	H	3-COtC4H9		
01-	17	H	H	2-COCH3	31165-67-0	
01-	18	H	H	2-COC2H5		
01-	19	H	H	2-COC3H7		
01-	20	H	H	2-COiC3H7		
01-	21	H	H	2-COnC4H9		
01-	22	H	H	2-COiC4H9		
01-	23	H	H	2-COsecC4H9		
01-	24	H	H	2-COtC4H9		
01-	25	H	H	4-COOMe	32122-11-5	
01-	26	H	H	4-COOEt	56441-55-5	
01-	27	H	H	4-COOnPr		
01-	28	H	H	4-COOiPr		
01-	29	H	H	4-COOnBu		
01-	30	H	H	4-COOiBu		
01-	31	H	H	4-COOsecBu		
01-	32	H	H	4-COOtBu		
01-	33	H	H	3-COOMe		
01-	34	H	H	3-COOEt		
01-	35	H	H	3-COOnPr		
01-	36	H	H	3-COOiPr		
01-	37	H	H	3-COOnBu		
01-	38	H	H	3-COOiBu		
01-	39	H	H	3-COOsecBu		
01-	40	H	H	3-COOtBu		
01-	41	H	H	2-COOMe	55142-16-0	
01-	42	H	H	2-COOEt		
01-	43	H	H	2-COOnPr		
01-	44	H	H	2-COOiPr		
01-	45	H	H	2-COOnBu		
01-	46	H	H	2-COOiBu		

01-	47	H	H	2-COOsecBu		
01-	48	H	H	2-COOtBu		
01-	49	3-F	H	4-COCH ₃	119776-15-7	2,59; 5,11; 6,69, 6,82, 7,40, 7,88
01-	50	2-F	H	4-COCH ₃	81227-99-8	
01-	51	3-Cl	H	4-COCH ₃	69241-07-2	
01-	52	2-Cl	H	4-COCH ₃		
01-	53	3-Br	H	4-COCH ₃		
01-	54	2-Br	H	4-COCH ₃		
01-	55	3-I	H	4-COCH ₃		
01-	56	2-I	H	4-COCH ₃	BRN7026610	
01-	57	3-Me	H	4-COCH ₃	608119-82-0	2,53; 2,56; 5,09; 6,80; 7,38; 7,72;
01-	58	2-Me	H	4-COCH ₃	56443-69-7	
01-	59	3-OMe	H	4-COCH ₃	56879-12-0	
01-	60	2-OMe	H	4-COCH ₃		
01-	61	3-CF ₃	H	4-COCH ₃		
01-	62	2-CF ₃	H	4-COCH ₃		
01-	63	3-OMe	2-Me	4-COCH ₃		
01-	64	2-OMe	3-Me	4-COCH ₃		
01-	65	H	H	4-Me		
01-	66	H	H	4-Et		
01-	67	H	H	4-nPr		
01-	68	H	H	4-iPr		
01-	69	H	H	4-nBu		
01-	70	H	H	4-iBu		
01-	71	H	H	4-secBu		
01-	72	H	H	4-tBu		
01-	73	H	H	4-cPr		
01-	74	H	H	4-cBu		
01-	75	H	H	4-cPentyl		
01-	76	H	H	4-cHexyl	BRN3331730	
01-	77	H	H	4-cHeptyl		
01-	78	H	H	4-CN	52805-36-4	
01-	79	3-F	H	4-CN	BRN8836619	
01-	80	2-F	H	4-CN		
01-	81	3-Cl	H	4-CN	BRN9555841	

01-	82	2-Cl	H	4-CN		
01-	83	3-Br	H	4-CN		
01-	84	2-Br	H	4-CN		
01-	85	3-I	H	4-CN		
01-	86	2-I	H	4-CN		
01-	87	3-Me	H	4-CN	BRN9555540	
01-	88	2-Me	H	4-CN		
01-	89	3-OMe	H	4-CN		
01-	90	2-OMe	H	4-CN	52805-34-2	
01-	91	3-CF3	H	4-CN		
01-	92	2-CF3	H	4-CN		
01-	93	H	H	4-F		
01-	94	H	H	4-Cl		
01-	95	H	H	4-Br	6793-92-6	
01-	96	H	H	4-I		
01-	97	2-F	H	4-F		
01-	98	2-F	H	4-Cl		
01-	99	2-F	H	4-Br	BRN7637897	
01-	100	2-F	H	4-I		
01-	101	2-Cl	H	4-F		
01-	102	2-Cl	H	4-Cl		
01-	103	2-Cl	H	4-Br	56872-27-6	
01-	104	2-Cl	H	4-I		
01-	105	2-Br	H	4-F		
01-	106	2-Br	H	4-Cl		
01-	107	2-Br	H	4-Br	BRN3284880	
01-	108	2-Me	H	4-Br		
01-	109	2-Me	H	4-F		
01-	110	2-Me	H	4-Cl		
01-	111	3-Cl	H	4-F		
01-	112	3-Cl	H	4-Cl		
01-	113	H	H	4-CH2OMe	BRN5028168	
01-	114	H	H	4-CH2OEt	BRN7094284	
01-	115	H	H	4-CH2OCH2CF3		
01-	116	H	H	4-CH2OnPr		
01-	117	H	H	4-CH2OiPr		

01-	118	H	H	4-CH ₂ OnBu		
01-	119	H	H	4-C ₂ H ₄ OMe		
01-	120	H	H	4-C ₂ H ₄ OEt		
01-	121	H	H	4-C ₂ H ₄ OnPr		
01-	122	H	H	4-C ₂ H ₄ OnBu		
01-	123	H	H	4-CF ₃		
01-	124	3-F	H	4-CF ₃		
01-	125	2-F	H	4-CF ₃		
01-	126	3-Cl	H	4-CF ₃		
01-	127	2-Cl	H	4-CF ₃		
01-	128	3-Br	H	4-CF ₃		
01-	129	2-Br	H	4-CF ₃		
01-	130	3-I	H	4-CF ₃		
01-	131	2-I	H	4-CF ₃		
01-	132	3-Me	H	4-SMe		
01-	133	3-Me	H	4-SOMe		
01-	134	3-Me	H	4-SO ₂ Me		

Table 2: Compounds of Formula (I) in which the substituents have the following meanings:

A is CH₂; R₂=H; variation of R, R₃, R₄

Compound number	R	R ₃	R ₄	Beilstein or CA RegNo	NMR 1H NMR (ppm)
02- 01	2-F	H	4-COCH ₃	93291-62-4	
02- 02	3-F	H	4-COCH ₃		
02- 03	4-F	H	4-COCH ₃	72293-96-0	
02- 04	2,3-F ₂	H	4-COCH ₃		
02- 05	2,4-F ₂	H	4-COCH ₃	187532-79-2	2,56; 5,14; 6,85; 6,90; 7,01; 7,47; 7,94
02- 06	2,5-F ₂	H	4-COCH ₃		
02- 07	2,6-F ₂	H	4-COCH ₃	187532-78-1	
02- 08	3,4-F ₂	H	4-COCH ₃		

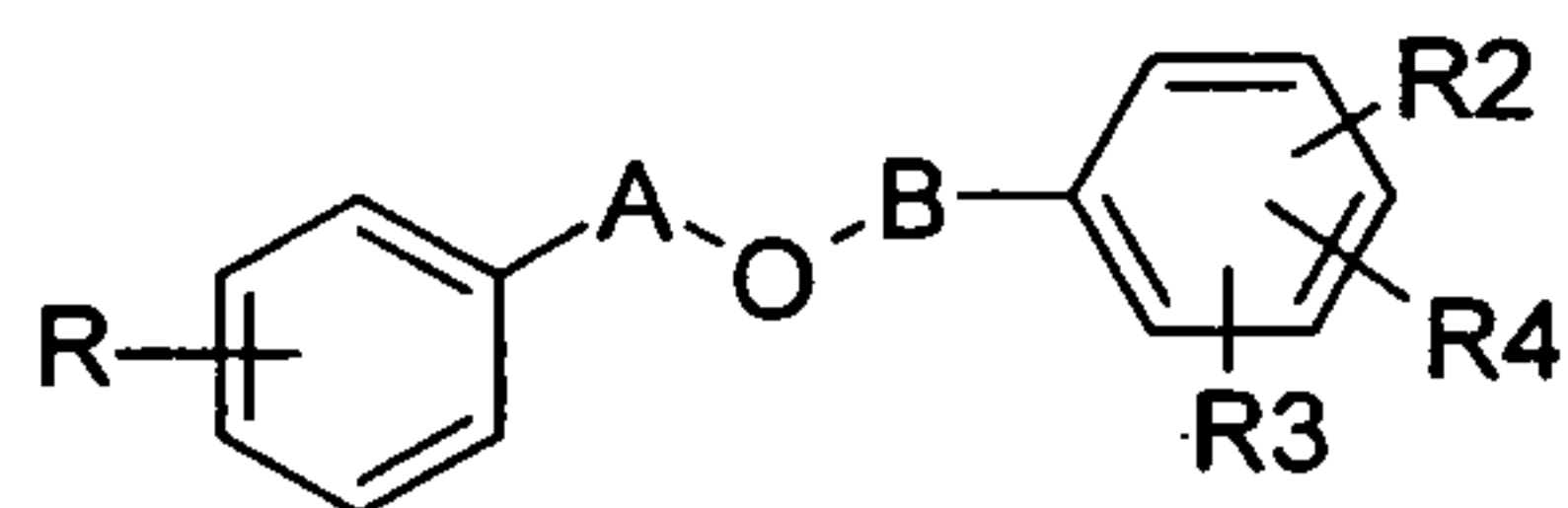
02-	09	3,5-F2	H	4-COCH3		
02-	10	2-Cl	H	4-COCH3	72293-95-9	
02-	11	3-Cl	H	4-COCH3		
02-	12	4-Cl	H	4-COCH3	61035-74-3	
02-	13	2,3-Cl2	H	4-COCH3		
02-	14	2,4-Cl2	H	4-COCH3	61292-27-1	
02-	15	2,5-Cl2	H	4-COCH3		
02-	16	2,6-Cl2	H	4-COCH3		
02-	17	3,4-Cl2	H	4-COCH3		
02-	18	3,5-Cl2	H	4-COCH3		
02-	19	2-Br	H	4-COCH3		
02-	20	3-Br	H	4-COCH3		
02-	21	4-Br	H	4-COCH3	694443-80-6	
02-	22	2-I	H	4-COCH3		
02-	23	3-I	H	4-COCH3		
02-	24	4-I	H	4-COCH3		
02-	25	2-Me	H	4-COCH3	72293-94-8	
02-	26	3-Me	H	4-COCH3		
02-	27	4-Me	H	4-COCH3	79615-78-4	
02-	28	2,3-Me2	H	4-COCH3		
02-	29	2,4-Me2	H	4-COCH3		
02-	30	2,5-Me2	H	4-COCH3		
02-	31	2,6-Me2	H	4-COCH3		
02-	32	3,4-Me2	H	4-COCH3		
02-	33	3,5-Me2	H	4-COCH3		
02-	34	2-CF3	H	4-COCH3	478163-22-3	
02-	35	3-CF3	H	4-COCH3	79615-77-3	
02-	36	4-CF3	H	4-COCH3	93291-56-6	
02-	37	2-OCF3	H	4-COCH3		
02-	38	3-OCF3	H	4-COCH3		
02-	39	4-OCF3	H	4-COCH3		
02-	40	2-OMe	H	4-COCH3	170916-37-7	
02-	41	3-OMe	H	4-COCH3		
02-	42	4-OMe	H	4-COCH3	72293-97-1	
02-	43	2-OEt	H	4-COCH3		
02-	44	3-OEt	H	4-COCH3		
02-	45	4-OEt	H	4-COCH3		

02-	46	2-F	3-F	4-COCH3		
02-	47	3-F	3-F	4-COCH3		
02-	48	4-F	3-F	4-COCH3		
02-	49	2,3-F2	3-F	4-COCH3		
02-	50	2,4-F2	3-F	4-COCH3		
02-	51	2,5-F2	3-F	4-COCH3		
02-	52	2,6-F2	3-F	4-COCH3		
02-	53	3,4-F2	3-F	4-COCH3		
02-	54	3,5-F2	3-F	4-COCH3		
02-	55	2-F	3-Cl	4-COCH3		
02-	56	3-F	3-Cl	4-COCH3		
02-	57	4-F	3-Cl	4-COCH3		
02-	58	2,3-F2	3-Cl	4-COCH3		
02-	59	2,4-F2	3-Cl	4-COCH3		
02-	60	2,5-F2	3-Cl	4-COCH3		
02-	61	2,6-F2	3-Cl	4-COCH3		
02-	62	3,4-F2	3-Cl	4-COCH3		
02-	63	3,5-F2	3-Cl	4-COCH3		
02-	64	2-F	3-Me	4-COCH3		
02-	65	3-F	3-Me	4-COCH3		
02-	66	4-F	3-Me	4-COCH3		
02-	67	2,3-F2	3-Me	4-COCH3		
02-	68	2,4-F2	3-Me	4-COCH3		
02-	69	2,5-F2	3-Me	4-COCH3		
02-	70	2,6-F2	3-Me	4-COCH3		
02-	71	3,4-F2	3-Me	4-COCH3		
02-	72	3,5-F2	3-Me	4-COCH3		
02-	73	2-F	H	4-COOMe		
02-	74	3-F	H	4-COOMe		
02-	75	4-F	H	4-COOMe		
02-	76	2,3-F2	H	4-COOMe		
02-	77	2,4-F2	H	4-COOMe		
02-	78	2,5-F2	H	4-COOMe		
02-	79	2,6-F2	H	4-COOMe		
02-	80	3,4-F2	H	4-COOMe		
02-	81	3,5-F2	H	4-COOMe		
02-	82	2-Cl	H	4-COOMe		

02-	83	3-Cl	H	4-COOMe		
02-	84	4-Cl	H	4-COOMe		
02-	85	2-Br	H	4-COOMe		
02-	86	3-Br	H	4-COOMe		
02-	87	4-Br	H	4-COOMe		
02-	88	2-F	2-F	Br		
02-	89	3-F	2-F	Br		
02-	90	4-F	2-F	Br		
02-	91	2,3-F2	2-F	Br		
02-	92	2,4-F2	2-F	Br		
02-	93	2,5-F2	2-F	Br		
02-	94	2,6-F2	2-F	Br		
02-	95	3,4-F2	2-F	Br		
02-	96	3,5-F2	2-F	Br		
02-	97	2-Cl	2-F	Br		
02-	98	3-Cl	2-F	Br		
02-	99	4-Cl	2-F	Br		
02-	100	2-Br	2-F	Br		
02-	101	3-Br	2-F	Br		
02-	102	4-Br	2-F	Br		
02-	103	2-F	H	CN		
02-	104	3-F	H	CN		
02-	105	4-F	H	CN		
02-	106	2,3-F2	H	CN		
02-	107	2,4-F2	H	CN		
02-	108	2,5-F2	H	CN		
02-	109	2,6-F2	H	CN		
02-	110	3,4-F2	H	CN		
02-	111	3,5-F2	H	CN		
02-	112	2-Cl	H	CN		
02-	113	3-Cl	H	CN		
02-	114	4-Cl	H	CN		
02-	115	2-Br	H	CN		
02-	116	3-Br	H	CN		
02-	117	4-Br	H	CN		
02-	118	2-F	H	cC6H11		
02-	119	3-F	H	cC6H11		

02-	120	4-F	H	cC6H11		
02-	121	2,3-F2	H	cC6H11		
02-	122	2,4-F2	H	cC6H11		
02-	123	2,5-F2	H	cC6H11		
02-	124	2,6-F2	H	cC6H11		
02-	125	3,4-F2	H	cC6H11		
02-	126	3,5-F2	H	cC6H11		
02-	127	2-Cl	H	cC6H11		
02-	128	3-Cl	H	cC6H11		
02-	129	4-Cl	H	cC6H11		
02-	130	2-Br	H	cC6H11		
02-	131	3-Br	H	cC6H11		
02-	132	4-Br	H	cC6H11		

Table 3: Compounds of Formula (I) in which the substituents have the following meanings:

A is CH₂; B is CH₂; R₂=H; variation of R, R₃, R₄

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Compound number	R	R ₃	R ₄	Beilstein or CA RegNo	NMR 1H NMR (ppm)
03- 01	H	H	4-COCH ₃		
03- 02	2-F	H	4-COCH ₃		
03- 03	3-F	H	4-COCH ₃		
03- 04	4-F	H	4-COCH ₃		
03- 05	2,3-F ₂	H	4-COCH ₃		
03- 06	2,4-F ₂	H	4-COCH ₃		
03- 07	2,5-F ₂	H	4-COCH ₃		
03- 08	2,6-F ₂	H	4-COCH ₃		
03- 09	3,4-F ₂	H	4-COCH ₃		
03- 10	3,5-F ₂	H	4-COCH ₃		
03- 11	2-Cl	H	4-COCH ₃		

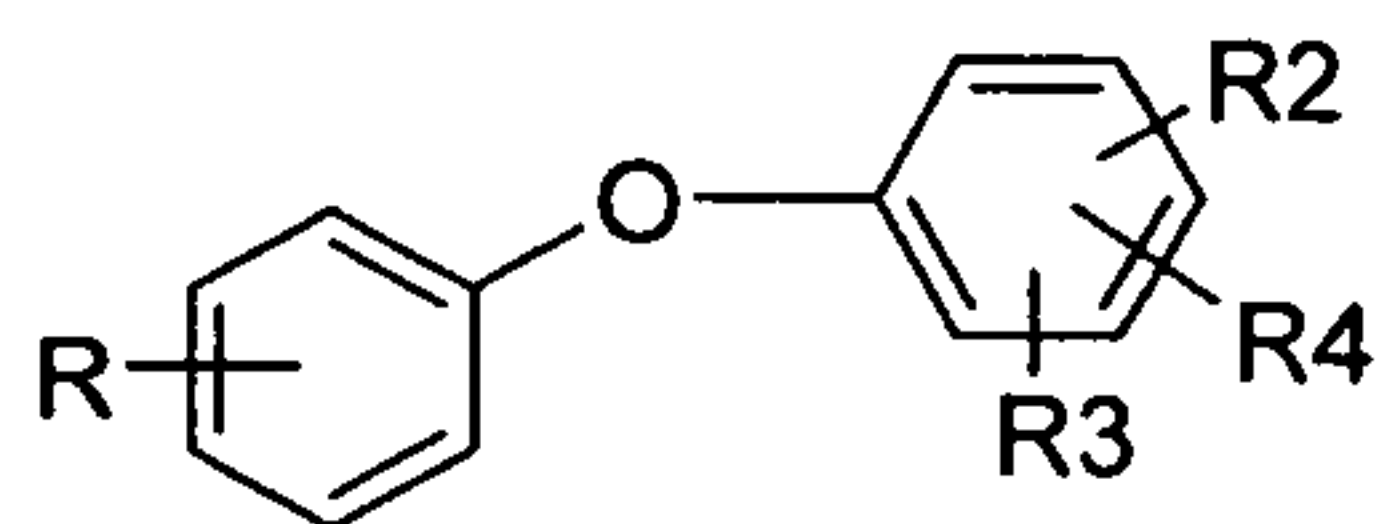
03-	12	3-Cl	H	4-COCH3		
03-	13	4-Cl	H	4-COCH3		
03-	14	2,3-Cl2	H	4-COCH3		
03-	15	2,4-Cl2	H	4-COCH3		
03-	16	2,5-Cl2	H	4-COCH3		
03-	17	2,6-Cl2	H	4-COCH3		
03-	18	3,4-Cl2	H	4-COCH3		
03-	19	3,5-Cl2	H	4-COCH3		
03-	20	2-Br	H	4-COCH3		
03-	21	3-Br	H	4-COCH3		
03-	22	4-Br	H	4-COCH3		
03-	23	2-I	H	4-COCH3		
03-	24	3-I	H	4-COCH3		
03-	25	4-I	H	4-COCH3		
03-	26	2-Me	H	4-COCH3		
03-	27	3-Me	H	4-COCH3		
03-	28	4-Me	H	4-COCH3		
03-	29	2,3-Me2	H	4-COCH3		
03-	30	2,4-Me2	H	4-COCH3		
03-	31	2,5-Me2	H	4-COCH3		
03-	32	2,6-Me2	H	4-COCH3		
03-	33	3,4-Me2	H	4-COCH3		
03-	34	3,5-Me2	H	4-COCH3		
03-	35	2-CF3	H	4-COCH3		
03-	36	3-CF3	H	4-COCH3		
03-	37	4-CF3	H	4-COCH3		
03-	38	2-OCF3	H	4-COCH3		
03-	39	3-OCF3	H	4-COCH3		
03-	40	4-OCF3	H	4-COCH3		
03-	41	2-OMe	H	4-COCH3		
03-	42	3-OMe	H	4-COCH3		
03-	43	4-OMe	H	4-COCH3		
03-	44	2-OEt	H	4-COCH3		
03-	45	3-OEt	H	4-COCH3		
03-	46	4-OEt	H	4-COCH3		
03-	47	2-F	3-F	4-COCH3		
03-	48	3-F	3-F	4-COCH3		

03-	49	4-F	3-F	4-COCH3		
03-	50	2,3-F2	3-F	4-COCH3		
03-	51	2,4-F2	3-F	4-COCH3		
03-	52	2,5-F2	3-F	4-COCH3		
03-	53	2,6-F2	3-F	4-COCH3		
03-	54	3,4-F2	3-F	4-COCH3		
03-	55	3,5-F2	3-F	4-COCH3		
03-	56	2-F	3-Cl	4-COCH3		
03-	57	3-F	3-Cl	4-COCH3		
03-	58	4-F	3-Cl	4-COCH3		
03-	59	2,3-F2	3-Cl	4-COCH3		
03-	60	2,4-F2	3-Cl	4-COCH3		
03-	61	2,5-F2	3-Cl	4-COCH3		
03-	62	2,6-F2	3-Cl	4-COCH3		
03-	63	3,4-F2	3-Cl	4-COCH3		
03-	64	3,5-F2	3-Cl	4-COCH3		
03-	65	2-F	3-Me	4-COCH3		
03-	66	3-F	3-Me	4-COCH3		
03-	67	4-F	3-Me	4-COCH3		
03-	68	2,3-F2	3-Me	4-COCH3		
03-	69	2,4-F2	3-Me	4-COCH3		
03-	70	2,5-F2	3-Me	4-COCH3		
03-	71	2,6-F2	3-Me	4-COCH3		
03-	72	3,4-F2	3-Me	4-COCH3		
03-	73	3,5-F2	3-Me	4-COCH3		
03-	74	H	H	4-COOMe		
03-	75	2-F	H	4-COOMe		
03-	76	3-F	H	4-COOMe		
03-	77	4-F	H	4-COOMe		
03-	78	2,3-F2	H	4-COOMe		
03-	79	2,4-F2	H	4-COOMe		
03-	80	2,5-F2	H	4-COOMe		
03-	81	2,6-F2	H	4-COOMe		
03-	82	3,4-F2	H	4-COOMe		
03-	83	3,5-F2	H	4-COOMe		
03-	84	2-Cl	H	4-COOMe		
03-	85	3-Cl	H	4-COOMe		

03-	86	4-Cl	H	4-COOMe		
03-	87	2-Br	H	4-COOMe		
03-	88	3-Br	H	4-COOMe		
03-	89	4-Br	H	4-COOMe		
03-	90	H	H	4-Br	81395-27-9	
03-	91	2-F	H	4-Br		
03-	92	3-F	H	4-Br		
03-	93	4-F	H	4-Br		
03-	94	2-CF3	H	4-Br		
03-	95	3-CF3	H	4-Br		
03-	96	4-CF3	H	4-Br		
03-	97	2-F	2-F	4-Br		
03-	98	3-F	2-F	4-Br		
03-	99	4-F	2-F	4-Br		
03-	100	2-Cl	2-F	4-Br		
03-	101	3-Cl	2-F	4-Br		
03-	102	4-Cl	2-F	4-Br		
03-	103	2-Br	2-F	4-Br		
03-	104	3-Br	2-F	4-Br		
03-	105	4-Br	2-F	4-Br		
03-	106	H	H	4-CN		4,69; 7,46; 7,56; 7,71;
03-	107	2-F	H	4-CN		
03-	108	3-F	H	4-CN		
03-	109	4-F	H	4-CN		
03-	110	2,3-F2	H	4-CN		
03-	111	2,4-F2	H	4-CN		
03-	112	2,5-F2	H	4-CN		
03-	113	2,6-F2	H	4-CN		
03-	114	3,4-F2	H	4-CN		
03-	115	3,5-F2	H	4-CN		
03-	116	2-Cl	H	4-CN		
03-	117	3-Cl	H	4-CN		
03-	118	4-Cl	H	4-CN		
03-	119	2-Br	H	4-CN		
03-	120	3-Br	H	4-CN		
03-	121	4-Br	H	4-CN		

03-	122	H	H	4-cC6H11		
03-	123	2-F	H	4-cC6H11		
03-	124	3-F	H	4-cC6H11		
03-	125	4-F	H	4-cC6H11		
03-	126	2,3-F2	H	4-cC6H11		
03-	127	2,4-F2	H	4-cC6H11		
03-	128	2,5-F2	H	4-cC6H11		
03-	129	2,6-F2	H	4-cC6H11		
03-	130	3,4-F2	H	4-cC6H11		
03-	131	3,5-F2	H	4-cC6H11		
03-	132	2-Cl	H	4-cC6H11		
03-	133	3-Cl	H	4-cC6H11		
03-	134	4-Cl	H	4-cC6H11		
03-	135	2-Br	H	4-cC6H11		
03-	136	3-Br	H	4-cC6H11		
03-	137	4-Br	H	4-cC6H11		

Table 4: Compounds of Formula (I) in which the substituents have the following meanings:

m, n= 0; R₂=H; variation of R, R₃, R₄

Compound number	R	R ₃	R ₄	Beilstein or CA RegNo	NMR 1H NMR (ppm)
04- 01	H	H	4-COCH ₃	5031-78-7	
04- 02	2-F	H	4-COCH ₃		
04- 03	3-F	H	4-COCH ₃		
04- 04	4-F	H	4-COCH ₃		
04- 05	2,3-F ₂	H	4-COCH ₃		
04- 06	2,4-F ₂	H	4-COCH ₃		
04- 07	2,5-F ₂	H	4-COCH ₃		
04- 08	2,6-F ₂	H	4-COCH ₃		
04- 09	3,4-F ₂	H	4-COCH ₃		

04-	10	3,5-F2	H	4-COCH3		
04-	11	2-Cl	H	4-COCH3		
04-	12	3-Cl	H	4-COCH3		
04-	13	4-Cl	H	4-COCH3	41150-48-5	
04-	14	2,3-Cl2	H	4-COCH3		
04-	15	2,4-Cl2	H	4-COCH3		
04-	16	2,5-Cl2	H	4-COCH3		
04-	17	2,6-Cl2	H	4-COCH3		
04-	18	3,4-Cl2	H	4-COCH3		
04-	19	3,5-Cl2	H	4-COCH3		
04-	20	2-Br	H	4-COCH3		
04-	21	3-Br	H	4-COCH3		
04-	22	4-Br	H	4-COCH3		
04-	23	2-I	H	4-COCH3		
04-	24	3-I	H	4-COCH3		
04-	25	4-I	H	4-COCH3		
04-	26	2-Me	H	4-COCH3		
04-	27	3-Me	H	4-COCH3		
04-	28	4-Me	H	4-COCH3		
04-	29	2,3-Me2	H	4-COCH3		
04-	30	2,4-Me2	H	4-COCH3		
04-	31	2,5-Me2	H	4-COCH3		
04-	32	2,6-Me2	H	4-COCH3		
04-	33	3,4-Me2	H	4-COCH3		
04-	34	3,5-Me2	H	4-COCH3		
04-	35	2-CF3	H	4-COCH3		
04-	36	3-CF3	H	4-COCH3	63349-66-6	
04-	37	4-CF3	H	4-COCH3		
04-	38	2-OCF3	H	4-COCH3		
04-	39	3-OCF3	H	4-COCH3		
04-	40	4-OCF3	H	4-COCH3		
04-	41	2-OMe	H	4-COCH3		
04-	42	3-OMe	H	4-COCH3		
04-	43	4-OMe	H	4-COCH3		
04-	44	2-OEt	H	4-COCH3		
04-	45	3-OEt	H	4-COCH3		
04-	46	4-OEt	H	4-COCH3		

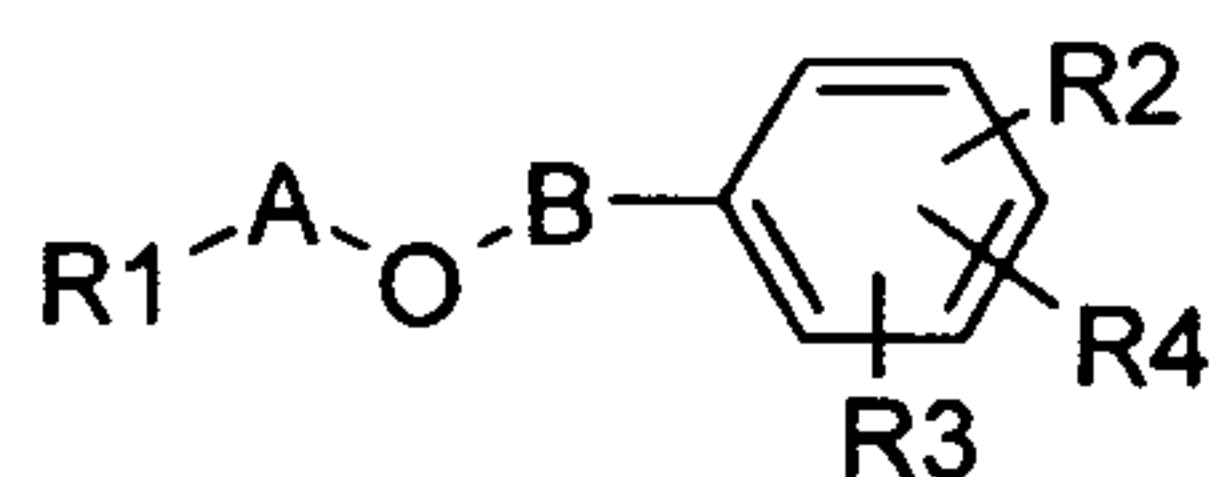
04-	47	2-F	3-F	4-COCH3		
04-	48	3-F	3-F	4-COCH3		
04-	49	4-F	3-F	4-COCH3		
04-	50	2,3-F2	3-F	4-COCH3		
04-	51	2,4-F2	3-F	4-COCH3		
04-	52	2,5-F2	3-F	4-COCH3		
04-	53	2,6-F2	3-F	4-COCH3		
04-	54	3,4-F2	3-F	4-COCH3		
04-	55	3,5-F2	3-F	4-COCH3		
04-	56	2-F	3-Cl	4-COCH3		
04-	57	3-F	3-Cl	4-COCH3		
04-	58	4-F	3-Cl	4-COCH3		
04-	59	2,3-F2	3-Cl	4-COCH3		
04-	60	2,4-F2	3-Cl	4-COCH3		
04-	61	2,5-F2	3-Cl	4-COCH3		
04-	62	2,6-F2	3-Cl	4-COCH3		
04-	63	3,4-F2	3-Cl	4-COCH3		
04-	64	3,5-F2	3-Cl	4-COCH3		
04-	65	2-F	3-Me	4-COCH3		
04-	66	3-F	3-Me	4-COCH3		
04-	67	4-F	3-Me	4-COCH3		
04-	68	2,3-F2	3-Me	4-COCH3		
04-	69	2,4-F2	3-Me	4-COCH3		
04-	70	2,5-F2	3-Me	4-COCH3		
04-	71	2,6-F2	3-Me	4-COCH3		
04-	72	3,4-F2	3-Me	4-COCH3		
04-	73	3,5-F2	3-Me	4-COCH3		
04-	74	H	H	4-COOMe		
04-	75	2-F	H	4-COOMe		
04-	76	3-F	H	4-COOMe		
04-	77	4-F	H	4-COOMe		
04-	78	2,3-F2	H	4-COOMe		
04-	79	2,4-F2	H	4-COOMe		
04-	80	2,5-F2	H	4-COOMe		
04-	81	2,6-F2	H	4-COOMe		
04-	82	3,4-F2	H	4-COOMe		
04-	83	3,5-F2	H	4-COOMe		

04-	84	2-Cl	H	4-COOMe		
04-	85	3-Cl	H	4-COOMe		
04-	86	4-Cl	H	4-COOMe		
04-	87	2-Br	H	4-COOMe		
04-	88	3-Br	H	4-COOMe		
04-	89	4-Br	H	4-COOMe		
04-	90	H	H	Br		
04-	91	2-F	H	Br		
04-	92	3-F	H	Br		
04-	93	4-F	H	Br		
04-	94	2-CF3	H	Br		
04-	95	3-CF3	H	Br		
04-	96	4-CF3	H	Br		
04-	97	2-F	2-F	Br		
04-	98	3-F	2-F	Br		
04-	99	4-F	2-F	Br		
04-	100	2-Cl	2-F	Br		
04-	101	3-Cl	2-F	Br		
04-	102	4-Cl	2-F	Br		
04-	103	2-Br	2-F	Br		
04-	104	3-Br	2-F	Br		
04-	105	4-Br	2-F	Br		
04-	106	H	H	CN		
04-	107	2-F	H	CN		
04-	108	3-F	H	CN		
04-	109	4-F	H	CN		
04-	110	2,3-F2	H	CN		
04-	111	2,4-F2	H	CN		
04-	112	2,5-F2	H	CN		
04-	113	2,6-F2	H	CN		
04-	114	3,4-F2	H	CN		
04-	115	3,5-F2	H	CN		
04-	116	2-Cl	H	CN		
04-	117	3-Cl	H	CN		
04-	118	4-Cl	H	CN		
04-	119	2-Br	H	CN		
04-	120	3-Br	H	CN		

04-	121	4-Br	H	CN		
04-	122	H	H	cC6H11		
04-	123	2-F	H	cC6H11		
04-	124	3-F	H	cC6H11		
04-	125	4-F	H	cC6H11		
04-	126	2,3-F2	H	cC6H11		
04-	127	2,4-F2	H	cC6H11		
04-	128	2,5-F2	H	cC6H11		
04-	129	2,6-F2	H	cC6H11		
04-	130	3,4-F2	H	cC6H11		
04-	131	3,5-F2	H	cC6H11		
04-	132	2-Cl	H	cC6H11		
04-	133	3-Cl	H	cC6H11		
04-	134	4-Cl	H	cC6H11		
04-	135	2-Br	H	cC6H11		
04-	136	3-Br	H	cC6H11		
04-	137	4-Br	H	cC6H11		

Table 5: Compounds of Formula (I) in which the substituents have the following meanings:

R2, R3 = H; variation of R1-A, B, R4, (R3 in 05-128 – 05-135)



5

Compound number		R1-A	B	R3, R4	Beilstein or CA RegNo	NMR 1H NMR (ppm)
05-	01	nC5H11		4-COCH3		
05-	02	nC6H13		4-COCH3		
05-	03	nC7H15		4-COCH3		
05-	04	nC8H17		4-COCH3		
05-	05	nC9H19		4-COCH3		
05-	06	nC10H21		4-COCH3		
05-	07	cC5H9-CH2		4-COCH3		1,37; 1,63; 1,85; 2,37; 2,55; 3,89;

						6,92; 7,92;
05-	08	cC6H11-CH2		4-COCH3		
05-	09	cC7H13-CH2		4-COCH3		
05-	10	cC8H15-CH2		4-COCH3		
05-	11	cHex-1-enyl-CH2		4-COCH3		
05-	12	cHex-2-enyl-CH2		4-COCH3		
05-	13	cHex-3-enyl-CH2		4-COCH3		
05-	14	cC5H9-C2H4		4-COCH3		
05-	15	cC6H11-C2H4		4-COCH3		
05-	16	cC7H13-C2H4		4-COCH3		
05-	17	cC8H15-C2H4		4-COCH3		
05-	18	cHex-1-enyl-C2H4		4-COCH3		
05-	19	cHex-2-enyl-C2H4		4-COCH3		
05-	20	cHex-3-enyl-C2H4		4-COCH3		
05-	21	2-Bicyclo[2.2.1.] heptyl-CH2		4-COCH3		
05-	22	1-Indanyl		4-COCH3		
05-	23	2-Indanyl		4-COCH3		
05-	24	1-Indanyl-CH2		4-COCH3		
05-	25	2-Indanyl-CH2		4-COCH3		
05-	26	1-Tetralinyl		4-COCH3		
05-	27	2-Tetralinyl		4-COCH3		
05-	28	1-Tetralinyl-CH2		4-COCH3		
05-	29	2-Tetralinyl-CH2		4-COCH3		
05-	30	nC5H11		H		
05-	31	nC6H13		H		
05-	32	nC7H15		H		
05-	33	nC8H17		H		
05-	34	nC9H19		H		
05-	35	nC10H21		H		
05-	36	cC5H9-CH2		H		
05-	37	cC6H11-CH2		H		
05-	38	cC7H13-CH2		H		
05-	39	cC8H15-CH2		H		
05-	40	cHex-1-enyl-CH2		H		
05-	41	cHex-2-enyl-CH2		H		
05-	42	cHex-3-enyl-CH2		H		

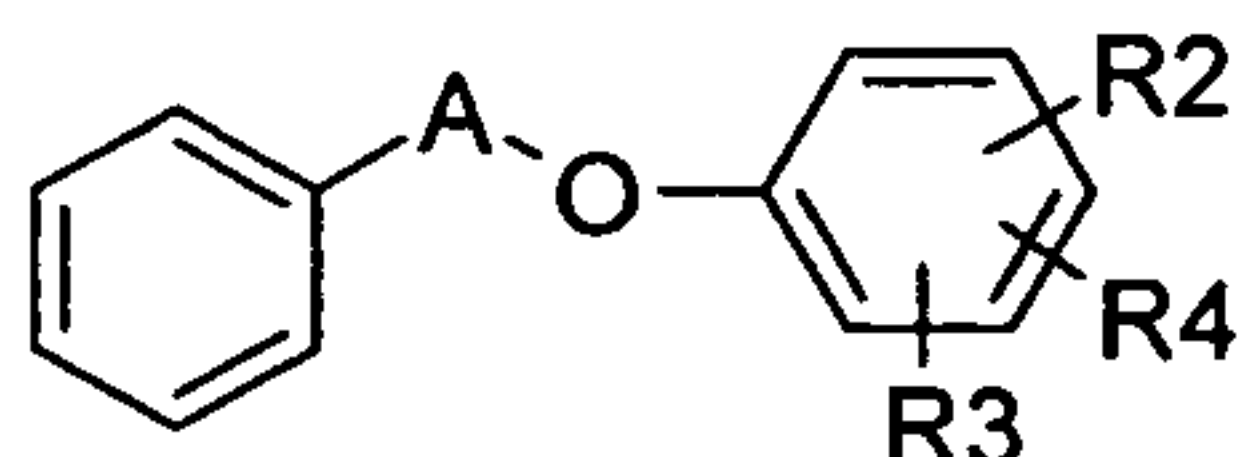
05-	43	cC5H9-C2H4		H		
05-	44	cC6H11-C2H4		H		
05-	45	cC7H13-C2H4		H		
05-	46	cC8H15-C2H4		H		
05-	47	cHex-1-enyl-C2H4		H		
05-	48	cHex-2-enyl-C2H4		H		
05-	49	cHex-3-enyl-C2H4		H		
05-	50	2-Bicyclo[2.2.1.] heptyl-CH2		H		
05-	51	1-Indanyl		H		
05-	52	2-Indanyl		H		
05-	53	1-Indanyl-CH2		H		
05-	54	2-Indanyl-CH2		H		
05-	55	1-Tetralinyl		H		
05-	56	2-Tetralinyl		H		
05-	57	1-Tetralinyl-CH2		H		
05-	58	2-Tetralinyl-CH2		H		
05-	59	nC5H11	CH2	4-COCH3		
05-	60	nC6H13	CH2	4-COCH3		
05-	61	nC7H15	CH2	4-COCH3		
05-	62	nC8H17	CH2	4-COCH3		
05-	63	nC9H19	CH2	4-COCH3		
05-	64	nC10H21	CH2	4-COCH3		
05-	65	cC5H9-CH2	CH2	4-COCH3		
05-	66	cC6H11-CH2	CH2	4-COCH3		
05-	67	cC7H13-CH2	CH2	4-COCH3		
05-	68	cC8H15-CH2	CH2	4-COCH3		
05-	69	cHex-1-enyl-CH2	CH2	4-COCH3		
05-	70	cHex-2-enyl-CH2	CH2	4-COCH3		
05-	71	cHex-3-enyl-CH2	CH2	4-COCH3		
05-	72	cC5H9-C2H4	CH2	4-COCH3		
05-	73	cC6H11-C2H4	CH2	4-COCH3		
05-	74	cC7H13-C2H4	CH2	4-COCH3		
05-	75	cC8H15-C2H4	CH2	4-COCH3		
05-	76	cHex-1-enyl-C2H4	CH2	4-COCH3		
05-	77	cHex-2-enyl-C2H4	CH2	4-COCH3		
05-	78	cHex-3-enyl-C2H4	CH2	4-COCH3		

05-	79	2-Bicyclo[2.2.1.] heptyl-CH2	CH2	4-COCH3		
05-	80	1-Indanyl	CH2	4-COCH3		
05-	81	2-Indanyl	CH2	4-COCH3		
05-	82	1-Indanyl-CH2	CH2	4-COCH3		
05-	83	2-Indanyl-CH2	CH2	4-COCH3		
05-	84	1-Tetralinyl	CH2	4-COCH3		
05-	85	2-Tetralinyl	CH2	4-COCH3		
05-	86	1-Tetralinyl-CH2	CH2	4-COCH3		
05-	87	2-Tetralinyl-CH2	CH2	4-COCH3		
05-	88	nC5H11	CH2	H		
05-	89	nC6H13	CH2	H		
05-	90	nC7H15	CH2	H		
05-	91	nC8H17	CH2	H		
05-	92	nC9H19	CH2	H		
05-	93	nC10H21	CH2	H		
05-	94	cC5H9-CH2	CH2	H		
05-	95	cC6H11-CH2	CH2	H		
05-	96	cC7H13-CH2	CH2	H		
05-	97	cC8H15-CH2	CH2	H		
05-	98	cHex-1-enyl-CH2	CH2	H		
05-	99	cHex-2-enyl-CH2	CH2	H		
05-	100	cHex-3-enyl-CH2	CH2	H		
05-	101	cC5H9-C2H4	CH2	H		
05-	102	cC6H11-C2H4	CH2	H		
05-	103	cC7H13-C2H4	CH2	H		
05-	104	cC8H15-C2H4	CH2	H		
05-	105	cHex-1-enyl-C2H4	CH2	H		
05-	106	cHex-2-enyl-C2H4	CH2	H		
05-	107	cHex-3-enyl-C2H4	CH2	H		
05-	108	2-Bicyclo[2.2.1.] heptyl-CH2	CH2	H		
05-	109	1-Indanyl	CH2	H	2040-45-1	
05-	110	2-Indanyl	CH2	H	78370-74-8	
05-	111	1-Indanyl-CH2	CH2	H		
05-	112	2-Indanyl-CH2	CH2	H		
05-	113	5-F-1-Indanyl	CH2	H		

05-	114	5-Cl-1-Indanyl	CH2	H		
05-	115	5-Br-1-Indanyl	CH2	H		
05-	116	1-Tetralinyl	CH2	H		
05-	117	2-Tetralinyl	CH2	H		
05-	118	1-Tetralinyl-CH2	CH2	H		
05-	119	2-Tetralinyl-CH2	CH2	H		
05-	120	1-Indanyl	CH2	4-CN		
05-	121	2-Indanyl	CH2	4-CN		
05-	122	1-Indanyl-CH2	CH2	4-CN		
05-	123	2-Indanyl-CH2	CH2	4-CN		
05-	124	1-Indanyl	CH2	3-Me		
05-	125	2-Indanyl	CH2	3-Me		
05-	126	1-Indanyl-CH2	CH2	3-Me		
05-	127	2-Indanyl-CH2	CH2	3-Me		
05-	128	1-Indanyl	CH2	2,4-Cl2		
05-	129	2-Indanyl	CH2	2,4-Cl2		
05-	130	1-Indanyl-CH2	CH2	2,4-Cl2		
05-	131	2-Indanyl-CH2	CH2	2,4-Cl2		
05-	132	1-Indanyl	CH2	4-Br-2-F		
05-	133	2-Indanyl	CH2	4-Br-2-F		
05-	134	1-Indanyl-CH2	CH2	4-Br-2-F		
05-	135	2-Indanyl-CH2	CH2	4-Br-2-F		
05-	136	Ph	CH2	4-COCH3		
05-	137	Ph	CH2	4-COOMe		
05-	138	Ph	CH2	4-CN		

Table 6: Compounds of Formula (I) in which the substituents have the following meanings:

R2=H; variation of A, R3, R4



Compound number		A	R3	R4	Beilstein or CA RegNo	NMR 1H NMR (ppm)
06-	01	C2H4	H	4-COCH3	18099-61-1	

06-	02	C2H4	H	4-COC2H5		
06-	03	C2H4	H	4-COnC3H7		
06-	04	C2H4	H	3-COCH3		
06-	05	C2H4	H	3-COC2H5		
06-	06	C2H4	H	3-COC3H7		
06-	07	C2H4	H	2-COCH3		
06-	08	C2H4	H	2-COC2H5		
06-	09	C2H4	H	2-COC3H7		
06-	10	C2H4	H	4-COOMe		
06-	11	C2H4	H	4-COOEt		
06-	12	C2H4	H	4-COOnPr		
06-	13	C2H4	3-F	4-COCH3		
06-	14	C2H4	2-F	4-COCH3		
06-	15	C2H4	3-Cl	4-COCH3		
06-	16	C2H4	2-Cl	4-COCH3		
06-	17	C2H4	3-Br	4-COCH3		
06-	18	C2H4	2-Br	4-COCH3		
06-	19	C2H4	3-I	4-COCH3		
06-	20	C2H4	2-I	4-COCH3		
06-	21	C2H4	3-Me	4-COCH3		
06-	22	C2H4	2-Me	4-COCH3		
06-	23	C2H4	3-OMe	4-COCH3		
06-	24	C2H4	2-OMe	4-COCH3		
06-	25	C2H4	3-CF3	4-COCH3		
06-	26	C2H4	2-CF3	4-COCH3		
06-	27	C2H4	H	4-CN		
06-	28	C2H4	H	4-F		
06-	29	C2H4	H	4-Cl		
06-	30	C2H4	H	4-Br		
06-	31	C2H4	H	4-I		
06-	32	C2H4	H	4-Me		
06-	33	C2H4	H	4-Et		
06-	34	C2H4	H	4-nPr		
06-	35	C2H4	H	4-iPr		
06-	36	C2H4	H	4-nBu		
06-	37	C2H4	H	4-iBu		
06-	38	C2H4	H	4-secBu		

06-	39	C2H4	H	4-tBu		
06-	40	C2H4	H	4-cPr		
06-	41	C2H4	H	4-cBu		
06-	42	C2H4	H	4-cPentyl		
06-	43	C2H4	H	4-cHexyl		
06-	44	C2H4	H	4-cHeptyl		
06-	45	C2H4	H	4-CH2OMe		
06-	46	C2H4	H	4-CH2OEt		
06-	47	C2H4	H	4-CH2OnPr		
06-	48	C2H4	H	4-CH2OnBu		
06-	49	C2H4	H	4-C2H4OMe		
06-	50	C2H4	H	4-C2H4OEt		
06-	51	C2H4	H	4-C2H4OnPr		
06-	52	C2H4	H	4-C2H4OnBu		
06-	53	C2H4	H	4-CF3		
06-	54	C3H6	H	4-COCH3		
06-	55	C3H6	H	4-COC2H5		
06-	56	C3H6	H	4-COnC3H7		
06-	57	C3H6	H	3-COCH3		
06-	58	C3H6	H	3-COC2H5		
06-	59	C3H6	H	3-COC3H7		
06-	60	C3H6	H	2-COCH3		
06-	61	C3H6	H	2-COC2H5		
06-	62	C3H6	H	2-COC3H7		
06-	63	C3H6	H	4-COOMe		
06-	64	C3H6	H	4-COOEt		
06-	65	C3H6	H	4-COOnPr		
06-	66	C3H6	3-F	4-COCH3		
06-	67	C3H6	2-F	4-COCH3		
06-	68	C3H6	3-Cl	4-COCH3		
06-	69	C3H6	2-Cl	4-COCH3		
06-	70	C3H6	3-Br	4-COCH3		
06-	71	C3H6	2-Br	4-COCH3		
06-	72	C3H6	3-I	4-COCH3		
06-	73	C3H6	2-I	4-COCH3		
06-	74	C3H6	3-Me	4-COCH3		
06-	75	C3H6	2-Me	4-COCH3		

06-	76	C3H6	3-OMe	4-COCH3		
06-	77	C3H6	2-OMe	4-COCH3		
06-	78	C3H6	3-CF3	4-COCH3		
06-	79	C3H6	2-CF3	4-COCH3		
06-	80	C3H6	H	4-CN		
06-	81	C3H6	H	4-F		
06-	82	C3H6	H	4-Cl		
06-	83	C3H6	H	4-Br		
06-	84	C3H6	H	4-I		
06-	85	C3H6	H	4-Me		
06-	86	C3H6	H	4-Et		
06-	87	C3H6	H	4-nPr		
06-	88	C3H6	H	4-iPr		
06-	89	C3H6	H	4-nBu		
06-	90	C3H6	H	4-iBu		
06-	91	C3H6	H	4-secBu		
06-	92	C3H6	H	4-tBu		
06-	93	C3H6	H	4-cPr		
06-	94	C3H6	H	4-cBu		
06-	95	C3H6	H	4-cPentyl		
06-	96	C3H6	H	4-cHexyl		
06-	97	C3H6	H	4-cHeptyl		
06-	98	C3H6	H	4-CH2OMe		
06-	99	C3H6	H	4-CH2OEt		
06-	100	C3H6	H	4-CH2OnPr		
06-	101	C3H6	H	4-CH2OnBu		
06-	102	C3H6	H	4-C2H4OMe		
06-	103	C3H6	H	4-C2H4OEt		
06-	104	C3H6	H	4-C2H4OnPr		
06-	105	C3H6	H	4-C2H4OnBu		
06-	106	C3H6	H	4-CF3		

Pesticidal use:

The following representative test procedure, using compounds of the invention, was conducted to determine the parasitocidal activity of compounds of the invention.

Biological Examples

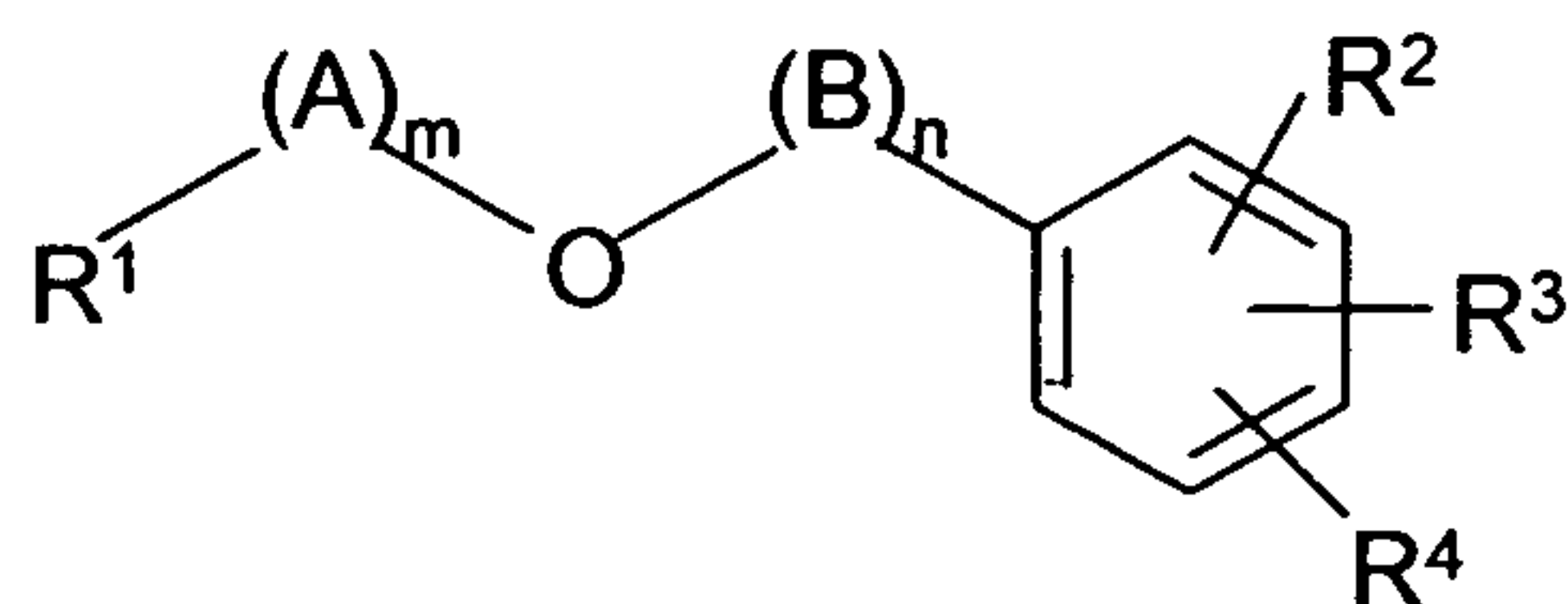
Method A: Screening method to test contact activity against *Rhipicephalus sanguineus* (Brown dog tick)

5 Solutions of the test compounds were dropped onto filter paper, dried and the filter paper placed into test tubes and infested with 20-30 larvae (L1) of *Rhipicephalus sanguineus* and the tubes closed with a clip. The treated *Rhipicephalus sanguineus* were held in a climate chamber (25°C, 90% RH) and the percentage efficacy assessed 24 hours after application in comparison with the untreated control.

10 Compound numbers 01-01, 01-03, 01-09, 01-17, 01-25, 01-26, 01-41, 01-49, 01-50, 01-57, 01-63, 01-65, 01-66, 01-76, 01-78, 01-81, 01-99, 01-102, 01-103, 01-108, 01-112, 01-116, 01-121, 01-122, 01-131, 01-132, 02-02, 02-03, 02-05, 02-26, 02-33, 02-34, 02-35, 02-36, 03-90, 03-106, 04-01, 04-13, 05-03, 05-04, 05-07, 05-08, 05-13, 05-15, 05-21, 05-109, 05-110, 05-115, 05-117, 05-125, 05-129, 05-136, 05-138, 06-01 gave at least 70% contact control of *Rhipicephalus sanguineus* at a test concentration of 1000 ppm.

Patent Claims:

1. Use of compounds of formula (I) or a pesticidally acceptable salt thereof,



(I)

5 wherein:

R¹ is phenyl,

which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₄)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

10 or is (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₁₀)-bicycloalkyl, (C₆-C₁₀)-bicycloalkenyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

15 or is indanyl or tetralinyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

or is (C₃-C₇)-alkyl;

20 which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy;

R² and R³ are independently hydrogen, halogen, (C₁-C₆)-alkyl, (C₁-C₆)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy ;

25

R^4 is hydrogen, halogen, (C₁-C₆)-alkyl, (C₂-C₆)-alkenyl, (C₂-C₆)-alkinyl, (C₁-C₆)-haloalkyl, (C₂-C₆)-haloalkenyl, (C₂-C₆)-haloalkinyl, (C₃-C₇)-cycloalkyl, (C₃-C₇)-cycloalkenyl, (C₁-C₄)-alkoxy, (C₁-C₄)-haloalkoxy, (C₃-C₇)-cycloalkyloxy, (C₁-C₆)-alkoxy-(C₁-C₆)-alkyl, (C₁-C₄)-haloalkoxy-(C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl-(C₁-C₆)-alkyl, (C₃-C₇)-cycloalkenyl-(C₁-C₆)-alkyl, CO(C₁-C₆)-alkyl, COO(C₁-C₆)-alkyl, CHO; CN, (C₁-C₆)-alkylthio, (C₁-C₄)-haloalkylthio, (C₁-C₄)-alkylsulfinyl, (C₁-C₄)-haloalkylsulfinyl, (C₁-C₄)-alkylsulfonyl or (C₁-C₄)-haloalkylsulfonyl;

A is a divalent (C₁-C₄)-alkylene unit and

B is a divalent (C₁-C₄)-alkylene unit;

and wherein m is 0 or 1 and n is 0 or 1,

for the control of pests.

2. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in claim 1 for controlling arthropod pests and/or helminths pests.

3. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in claim 1 or 2 for controlling of insects, arachnids and/or nematodes.

4. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in any one of claims 1 to 3, wherein

R^1 is phenyl,

which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or is (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₉)-bicycloalkyl, (C₆-C₉)-bicycloalkenyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or is indanyl, tetralinyl,

which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy ;

or is (C₃-C₇)-alkyl;

5 and/or

R² and R³ are independently hydrogen, halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy ;

and/or

10 R⁴ is hydrogen, halogen, (C₁-C₆)-alkyl, (C₂-C₆)-alkenyl, (C₂-C₆)-alkinyl, (C₁-C₃)-haloalkyl, (C₂-C₃)-haloalkenyl, (C₃-C₇)-cycloalkyl, (C₃-C₇)-cycloalkenyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy, (C₃-C₇)-cycloalkyloxy, (C₁-C₆)-alkoxy-(C₁-C₆)-alkyl, (C₁-C₃)-haloalkoxy-(C₁-C₆)-alkyl, CO(C₁-C₄)-alkyl, COO(C₁-C₄)-alkyl, CHO; CN, (C₁-C₄)-alkylthio, (C₁-C₃)-haloalkylthio, (C₁-C₄)-alkylsulfinyl, (C₁-C₃)-haloalkylsulfinyl, (C₁-C₄)-alkylsulfonyl, (C₁-C₃)-haloalkylsulfonyl ;

15 and/or

A is a divalent unit selected from the group CH₂, C₂H₄, C₃H₆ ;

and/or

B is a divalent unit selected from the group CH₂, C₂H₄, C₃H₆ ;

and wherein m is 0 or 1 and n is 0 or 1.

20 5. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in any one of claims 1 to 4, wherein

R¹ is phenyl,

25 which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy;

or (C₅-C₈)-cycloalkyl, (C₅-C₈)-cycloalkenyl, (C₆-C₉)-bicycloalkyl, (C₆-C₉)-bicycloalkenyl,

which are unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, (C₁-C₄)-alkyl, (C₁-C₃)-haloalkyl, (C₁-C₄)-alkoxy, (C₁-C₃)-haloalkoxy.

- 5 6. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in any one of claims 1 to 5, wherein A is a divalent CH₂ unit and/or B is a divalent CH₂ unit.
7. The use of a pesticidal composition comprising a compound of formula (I) or a pesticidally acceptable salt thereof as defined in any one of claims 1 to 6, in association with a pesticidally acceptable diluent or carrier and/or surface active agent for controlling pests.
- 10 8. The use of compounds of formula (I) or a pesticidally acceptable salt thereof as claimed in any one of claims 1 to 7 as pesticides which are used as ectoparasiticides in stock animals or in domestic companion animals.
9. The use of compounds of formula (I) as claimed in any one of claims 1 to 6 for the preparation of a veterinary medicament.
- 15 10. A method for the control of pests at a locus which comprises the application of at least one compound of formula (I) or a salt thereof or of a composition as claimed in claim 7 or of a veterinary medicament as claimed in claim 9.

