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alkyl)amino, each of which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy, or represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyloxy, C<sub>3</sub>-C<sub>6</sub>-cycloalkylthio or C<sub>3</sub>-C<sub>6</sub>-cycloalkylamino, each of which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

R<sup>19</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl which is optionally substituted by cyano, hydroxyl, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy, or represents C<sub>3</sub>-C<sub>6</sub>-alkenyl or C<sub>3</sub>-C<sub>6</sub>-alkynyl, each of which is optionally substituted by cyano or halogen, or represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

R<sup>20</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl which is optionally substituted by cyano, hydroxyl, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy, or represents C<sub>3</sub>-C<sub>6</sub>-alkenyl or C<sub>3</sub>-C<sub>6</sub>-alkynyl, each of which is optionally substituted by cyano or halogen, or represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl, or represents phenyl which is optionally substituted by nitro, cyano, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, or together with R<sup>19</sup> represents C<sub>2</sub>-C<sub>6</sub>-alkanediyl or C<sub>2</sub>-C<sub>5</sub>-oxaalkanediyl, each of which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl,

X<sup>4</sup> represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, and

X<sup>5</sup> represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, for controlling insects.

In the definitions, the hydrocarbon chains, such as in alkyl, alkenyl or alkanediyl—are in each case straight-chain or branched—including in combination with heteroatoms, such as an alkoxy.

Optionally substituted radicals may, unless indicated otherwise, be mono- or polysubstituted, where in the case of polysubstitutions the substituents may be identical or different.

Depending inter alia on the nature of the substituents, the compounds of the formula (I) can be present as geometrical and/or optical isomers or isomer mixtures of varying composition which, if desired, can be separated in a customary manner. The invention provides both the pure isomers and the isomer mixtures, and their use, and compositions comprising them. However, hereinbelow, for the sake of simplicity, only compounds of the formula (I) are referred to, although what is meant are both the pure compounds and, if appropriate, any mixtures having varying proportions of isomeric compounds.

Preferred meanings of the radicals defined in formula (I) are given below.

Het preferably represents a heterocycle selected from the following group of heterocycles:

pyrid-3-yl, 2-chloropyrid-5-yl, 2-methylpyrid-5-yl, 1-oxido-3-pyridinio, 2-chloro-1-oxido-5-pyridinio, 2,3-dichloro-1-oxido-5-pyridinio, tetrahydrofuran-3-yl, 5-methyltetrahydro-furan-3-yl, 2-chlorothiazol-5-yl.

A preferably represents —N(R<sup>1</sup>)(R<sup>2</sup>) or S(R<sup>2</sup>).

R<sup>1</sup> preferably represents hydrogen, methyl, ethyl, n- or i-propyl, phenylmethyl, phenylethyl, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, ethenyl, 1-propenyl, 2-propenyl, ethynyl, 1-propynyl or 2-propynyl.

R<sup>2</sup> preferably represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, ethenyl, 1-propenyl, 2-propenyl, ethynyl, 1-propynyl, 2-propynyl, —C(=O)—CH<sub>3</sub> or benzyl.

R preferably represents hydrogen, methyl, ethyl, n- or i-propyl, ethenyl, 1-propenyl, 2-propenyl, ethynyl, 1-propynyl, 2-propynyl, —C(=O)—CH<sub>3</sub> or benzyl or together with R<sup>2</sup> preferably represents one of the following groups:

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—CH<sub>2</sub>—CH<sub>2</sub>—, —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>—, —CH<sub>2</sub>—O—CH<sub>2</sub>—, —CH<sub>2</sub>—S—CH<sub>2</sub>—, —CH<sub>2</sub>—NH—CH<sub>2</sub>—, —CH<sub>2</sub>—N(CH<sub>3</sub>)—CH<sub>2</sub>—.

X preferably represents N—NO<sub>2</sub> or N—CN.

Het particularly preferably represents a heterocycle selected from the following group of heterocycles:

2-chloropyrid-5-yl, 2-methylpyrid-5-yl, 1-oxido-3-pyridinio, 2-chloro-1-oxido-5-pyridinio, 2,3-dichloro-1-oxido-5-pyridinio, tetrahydrofuran-3-yl, 5-methyltetrahydrofuran-3-yl, 2-chlorothiazol-5-yl.

A particularly preferably represents —N(R<sup>1</sup>)(R<sup>2</sup>).

R<sup>1</sup> particularly preferably represents hydrogen, methyl or ethyl.

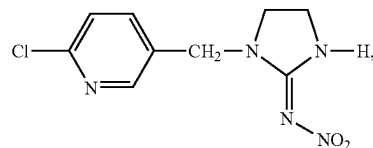
R<sup>2</sup> particularly preferably represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, ethenyl, 1-propenyl, 2-propenyl, ethynyl, 1-propynyl, 2-propynyl, —C(=O)—CH<sub>3</sub> or benzyl.

R particularly preferably represents hydrogen, methyl, ethyl, or —C(=O)—CH<sub>3</sub> or together with R<sup>2</sup> particularly preferably represents one of the following groups:

—CH<sub>2</sub>—CH<sub>2</sub>—, —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>—, —CH<sub>2</sub>—O—CH<sub>2</sub>—, —CH<sub>2</sub>—S—CH<sub>2</sub>—.

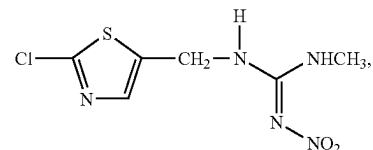
Preferred compounds of the formula (I) which may be mentioned are the neonicotinoids listed in “The Pesticide Manual”, 13<sup>th</sup> Edition, 2003 (British Crop Protection Council).

A very particularly preferred compound is imidacloprid of the formula



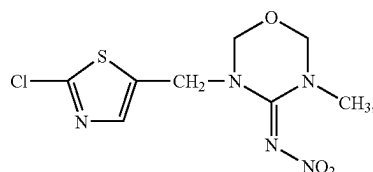
known, for example, from EP A1 0 192 060.

A further very particularly preferred compound is clothianidin of the formula



known, for example, from EP A2 0 376 279.

A further very particularly preferred compound is thia-methoxam of the formula



known, for example, from EP A2 0 580 553.