Claims

1. A biocidal substance comprising

(b) at least one isothiazolinone from the group consisting of 1,2-benzisothiazolin-3-one and 2-methyl-4-isothiazolin-3-one

and

(b) at least one N-alkyl-guanidinium salt,

where, if the biocidal substance comprises only 2-methyl-4-isothiazolin-3-one as component (a), the biocidal substance furthermore comprises either

- no 5-chloro-2-methyl-4-isothiazolin-3-one or
- comprises 5-chloro-2-methyl-4-isothiazolin-3-one, where then the weight ratio of 2-methyl-4-isothiazolin-3-one to 5-chloro-2-methyl-4-isothiazolin-3-one is at least 0.35:1, preferably at least 1:1, such as, for example, 1:1 to 1000:1, particularly preferably at least 2:1, such as, for example, 2:1 to 1000:1, very particularly preferably at least 10:1, such as, for example, 10:1 to 1000:1 and yet further preferably at least 50:1, such as, for example, 50:1 to 1000:1.

2. The biocidal substance as claimed in claim 1, characterized in that it comprises 1,2-benzisothiazolin-3-one and 2-methyl-4-isothiazolin-3-one.

3. The biocidal substance as claimed in claim 1 or 2, characterized in that it comprises, as at least one N-alkyl-guanidinium salt, those of the formula (I),

$[H_2N\text{-}(C{=}NH_2)\text{-}NH\text{-}R]^+X^-$ (I)

in which R is a C_8–C_{18} alkyl radical and X^- is a monovalent anion or 1/p equivalents of a p-valent anion, where p is a natural number of 2 or more.

4. The biocidal substance as claimed in claim 3, characterized in that in formula (I) R is n-dodecyl.

5. The biocidal substance as claimed in any one of claims 1 to 4, characterized in that the weight ratio of components (a) and (b) to one another is 10:1 to 1:10, preferably 5:1 to 1:5 and particularly preferably 2:1 to 1:5.

6. The biocidal substance as claimed in any one of claims 2 to 5, characterized in that the weight ratio of BIT and MIT is 1:100 to 100:1, preferably 3:1 to 1:3 and particularly preferably 1.5:1 to 1:2.5.

7. The biocidal substance as claimed in any one of claims 1 to 6, characterized in that the sum of components (a) and (b) is 1 to 80% by weight, preferably 2 to 70% by weight and particularly preferably 4 to 50% by weight, based on the total weight of the biocidal substance.

8. The biocidal substance as claimed in any one of claims 1 to 7, characterized in that it comprises, as component c), additionally either no, one or more further biocidal active ingredients which are preferably selected from the group consisting of bronopol, benzylhemiformal, trimethylene-2-methylisothiazolinon-3-one, N-methylbenzisothiazolinone, 2-n-octylisothiazolin-3-one, tetramethylolacetylenediurea (TMAD), 1,3-bis(hydroxymethyl)-5,5-dimethylimidazolidine-2,4-dione (DMDMH), p-chloro-m-cresol, dimethylolurea, 1,2-dibromo-2,4-dicyanobutane, 2,2-dibromo-3-nitrilopropionamide, glutardialdehyde, ethylene glycol hemiformal, ethylene glycol bis-hemiformal, N-methylolurea, thiabendazole, carbendazim, zinc pyrithione, sodium pyrithione, 2-phenoxyethanol, phenoxypropanol, o-phenylphenol, chlorophene and quarternary ammonium salts, such as e.g. N-alkyl-N,N-dimethylbenzylammonium chloride, and CMIT.

9. The biocidal substance as claimed in claim 8, characterized in that it comprises 0.2 and 20% by weight, preferably between 0.5 and 10% by weight and particularly preferably between 0.5 and 5% by weight of component c), based on the total weight of the biocidal substance.

10. The biocidal substance as claimed in any one of claims 1 to 9, characterized in that it is present in the form of solutions, emulsions, suspensions, powders, foams, pastes, granules, aerosols and microencapsulations in polymeric substances.

11. The biocidal substance as claimed in any one of claims 1 to 10, characterized in that, in each case independently, it further comprises or in each case does not comprise: interface-active substances, wetting agents, emulsifiers, dispersants, stabilizers, adhesives and thickeners, spreading agents, organic solvents, fragrances and dyes, buffer substances, buffer systems or pH regulators, solid carriers, water.

12. A technical material containing a biocidal substance as claimed in any one of claims 1 to 11.

13. The technical material as claimed in claim 12, characterized in that it is one of the following:

- a coating, such as paint, ink, plaster
- a starch solution or slurry or other product produced on the basis of starch such as e.g. printing thickener
- a slurry of other raw materials such as colored pigments (e.g. iron oxide pigments, carbon black pigments, titanium dioxide pigments) or a slurry of inorganic fillers and pigments such as kaolin, calcium carbonate, gypsum, bentonite, magnesium silicate, smectite or talc
- a construction chemical product such as a concrete additive, for example based on molasses, lignosulfonate or polyacrylates, a bitumen emulsion or a joint sealant
- a glue or adhesive based on known animal, vegetable or synthetic raw materials
- a polymer dispersion based on e.g. polyacrylate, polystyrene acrylate, styrene butadiene, polyvinyl acetate, etc.
- a detergent or cleaner for industrial and domestic use
- a mineral oil or mineral oil product such as e.g. diesel fuel
- a cooling lubricant for metal working based on mineral oil-containing, semisynthetic or synthetic concentrates
- an auxiliary for the leather, textile or photochemical industry
- a pre-product or intermediate of the chemical industry, e.g. during dye production and storage
- an ink or wash

- a wax or clay emulsion.

14. A method for protecting technical materials against infestation with and/or destruction by or controlling of microorganisms, characterized in that the technical material is brought into contact with at least one biocidal substance as claimed in any one of claims 1 to 11.

15. The use of 1,2-benzisothiazolin-3-one or 2-methyl-4-isothiazolin-3-one or N-alkyl-guanidinium salts for producing the biocidal substance as claimed in any one of claims 1 to 11 or the technical material as claimed in claim 12 or 13.

CLAIMS

1. A biocidal substance comprising

(a) (i) 1,2-benzisothiazolin-3-one,

or

(ii) 1,2-benzisothiazolin-3-one and 2-methyl-4-isothiazolin-3-one

and

(b) at least one N-alkyl-guanidinium salt.

2. The biocidal substance as claimed in claim 1, characterized in that it comprises 1,2-benzisothiazolin-3-one and 2-methyl-4-isothiazolin-3-one.

3. The biocidal substance as claimed in claim 1 or 2, characterized in that it comprises, as at least one N-alkyl-guanidinium salt, those of the formula (I),

$[H_2N\text{-}(C{=}NH_2)\text{-}NH\text{-}R]^+X^-$ (I)

in which R is a C_8–C_{18} alkyl radical and X^- is a monovalent anion or 1/p equivalents of a p-valent anion, where p is a natural number of 2 or more.

4. The biocidal substance as claimed in claim 3, characterized in that in formula (I) R is n-dodecyl.

5. The biocidal substance as claimed in any one of claims 1 to 4, characterized in that the weight ratio of components (a) and (b) to one another is 10:1 to 1:10, preferably 5:1 to 1:5 and particularly preferably 2:1 to 1:5.

6. The biocidal substance as claimed in any one of claims 2 to 5, characterized in that the weight ratio of BIT and MIT is 1:100 to 100:1, preferably 3:1 to 1:3 and particularly preferably 1.5:1 to 1:2.5.

7. The biocidal substance as claimed in any one of claims 1 to 6, characterized in that the sum of components (a) and (b) is 1 to 80% by weight, preferably 2 to 70% by weight and particularly preferably 4 to 50% by weight, based on the total weight of the biocidal substance.

8. The biocidal substance as claimed in any one of claims 1 to 7, characterized in that it comprises, as component c), additionally either no, one or more further biocidal active ingredients which are preferably selected from the group consisting of bronopol, benzylhemiformal, trimethylene-2-methylisothiazolinon-3-one, N-methylbenzisothiazolinone, 2-n-octylisothiazolin-3-one, tetramethylolacetylenediurea (TMAD), 1,3-bis(hydroxymethyl)-5,5-dimethylimidazolidine-2,4-dione (DMDMH), p-chloro-m-cresol, dimethylolurea, 1,2-dibromo-2,4-dicyanobutane, 2,2-dibromo-3-nitrilopropionamide, glutardialdehyde, ethylene glycol hemiformal, ethylene glycol bis-hemiformal, N-methylolurea, thiabendazole, carbendazim, zinc pyrithione, sodium pyrithione, 2-phenoxyethanol, phenoxypropanol, o-phenylphenol, chlorophene and quarternary ammonium salts, such as e.g. N-alkyl-N,N-dimethylbenzylammonium chloride, and CMIT.

9. The biocidal substance as claimed in claim 8, characterized in that it comprises 0.2 - 20% by weight, preferably between 0.5 and 10% by weight and particularly preferably between 0.5 and 5% by weight of component c), based on the total weight of the biocidal substance.

10. The biocidal substance as claimed in any one of claims 1 to 9, characterized in that it is present in the form of solutions, emulsions, suspensions, powders, foams, pastes, granules, aerosols and microencapsulations in polymeric substances.

11. The biocidal substance as claimed in any one of claims 1 to 10, characterized in that, in each case independently, it further comprises or in each case does not comprise: interface-active substances, wetting agents, emulsifiers, dispersants, stabilizers, adhesives and thickeners, spreading agents, organic solvents, fragrances and dyes, buffer substances, buffer systems or pH regulators, solid carriers, water.

12. A material selected from the group consisting of:-

a coating, such as paint, ink, plaster;

a starch solution or slurry or other product produced on the basis of starch such as e.g. printing thickener;

a slurry of other raw materials such as colored pigments (e.g. iron oxide pigments, carbon black pigments, titanium dioxide pigments) or a slurry of inorganic fillers and pigments such as kaolin, calcium carbonate, gypsum, bentonite, magnesium silicate, smectite or talc;

a construction chemical product such as a concrete additive, for example based on molasses, lignosulfonate or polyacrylates, a bitumen emulsion or a joint sealant;

a glue or adhesive based on known animal, vegetable or synthetic raw materials;

a polymer dispersion based on e.g. polyacrylate, polystyrene acrylate, styrene butadiene, polyvinyl acetate, etc.;

a detergent or cleaner for industrial and domestic use;

a mineral oil or mineral oil product such as e.g. diesel fuel;

a cooling lubricant for metal working based on mineral oil-containing, semisynthetic or synthetic concentrates;

an auxiliary for the leather, textile or photochemical industry;

a pre-product or intermediate of the chemical industry, e.g. during dye production and storage;

an ink or wash; and

a wax or clay emulsion,

wherein the material contains a biocidal substance as claimed in any one of claims 1 to 11.

13. A method for protecting the material as claimed in claim 12 against infestation with and/or destruction by or controlling of microorganisms, characterized in that the material is brought into contact with at least one biocidal substance as claimed in any one of claims 1 to 11.

14. The use of 1,2-benzisothiazolin-3-one or 1,2-benzisothiazolin-3-one and 2-methyl-4-isothiazolin-3-one and N-alkyl-guanidinium salts for producing the biocidal substance as claimed in any one of claims 1 to 11 or the material as claimed in claim 12.