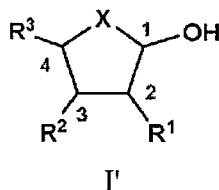


CLAIMS

1. Method for labeling specifically living microorganisms in a sample comprising microorganisms, the method comprising the steps of:

- a) incubating said microorganisms of said sample with at least one modified monosaccharide compound comprising a first reactive chemical group Ra which is capable to chemically react with a second reactive group, so that a residue bearing said first reactive group is incorporated into said living microorganisms, preferably at the surface of said microorganisms, and
- b) contacting said residue incorporated into said microorganism, with a labeling molecule comprising a said second reactive group, for generating the chemical reaction of said first reactive group of said residue incorporated into said living microorganism with said second reactive group of said labeling molecule, resulting in a covalent link,

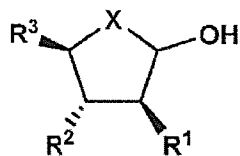
characterized in that the said modified monosaccharide compound has the following formula (I'), or a salt thereof:



- X is O, and
- R1 is H, OH, NH₂, OH and NH₂ being substituted or not by protecting groups thereof, preferably substituted by alkyl, hydroxyalkyl, acyl, formyl or imidoyl groups, and
- R2 is H, OH, NH₂, OH and NH₂ being substituted or not by protecting groups thereof, preferably substituted by alkyl, hydroxyalkyl, acyl, formyl or imidoyl groups,
- R3 is H or an alkyl chain in C1 to C4, each carbon being substituted or not substituted by OH or NH₂, substituted or not by protecting groups thereof, preferably by alkyl, hydroxyalkyl, acyl, formyl or imidoyl groups, and;
- at least R1, R2 or R3, preferably R3, being substituted by said first reactive group Ra.

2. A method according to claim 1 wherein the said modified monosaccharide compound

is a stereoisomer having the formula (I) or a salt thereof

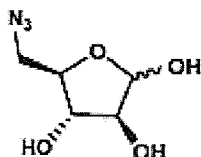


I

3. A method according to anyone of claims 1 to 2 wherein the said modified monosaccharide compound is a compound having the following formula, or a salt thereof wherein:

- R1 and R2 are OH, OH being substituted or not by a protecting group, and
- R3 is -CH₃, -CH₂OH, or -CH₂NH₂, R3 being substituted by said first reactive group Ra.

4. A method according to anyone of claims 1 to 3 wherein said modified monosaccharide compound is a compound having the following stereoisomer formula (Ia), or a salt thereof wherein:



Ia

5. A method according to any one of claims 1 to 4 wherein the first reactive group Ra is selected among groups consisting in or bearing the group azido and groups consisting in or bearing the group alkyne.

6. A method according to any one of claims 1 to 5, wherein the said first reactive group being the group azido, and the said second reactive group is selected among groups consisting in or bearing respectively the groups alkyne and azido, the said second reactive group being preferably the group alkyne, reacting the said azido reactive group with the said alkyne reactive group is carried out in performing an azide alkyne cycloaddition.

7. A method according to anyone of claims 1 to 5 wherein Ra is -N₃ or -C≡CH.

8. A method according to claim 1 to 7, wherein said microorganism is selected among:

- Prokaryotic microorganisms, preferably bacteria, and
- Unicellular eukaryotic microorganisms, preferably unicellular fungi and amoebas.

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9. A method according to claim 8 for labeling bacteria selected among the following species microorganisms:

- a) bacteria: *Acinetobacter baumannii*, *Bacillus cereus*, *Bacillus cereus*, *Bacillus cereus* *paris*, *Bacillus subtilis*, *Cronobacter sakazakii*, *Enterococcus durans*,
 10 *Enterococcus faecalis*, *Escherichia coli* *Klebsiella pneumoniae*, *Legionella pneumoniae*, *Listeria monocytogenes*, *Micrococcus luteus*, *Neisseria gonorrhoeae*, *Neisseria meningitides*, *Proteus mirabilis*, *Providencia stuartii*,
Pseudomonas fluorescens *Migula*, *Pseudomonas fluorescens* *Paris*,
 15 *Salmonella typhimurium*, *Serratia marcescens*, *Staphylococcus aureus*,
Staphylococcus aureus aureus, *Staphylococcus epidermis*, *Staphylococcus saprophyticus*, *Stenotrophomonas maltophilia*, *Streptococcus agalactiae*,
Vibrio cholera, and
- c) fungi: *Aspergillus niger*, *Candida albicans*, *Fusarium* and *Geotrichum candidum*, and
- d) amoebas: *Acanthamoebae castellanii*.

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10. A method according to claims 1 to 9, comprising the further step of:

- c) detecting living microorganism in detecting whether said microorganism
 25 comprise said labeling molecule bound to said living microorganism and/or
 immobilizing said living microorganism bearing said labeling molecule onto a
 solid substrate, wherein said labeling molecule is a molecule comprising a
 detectable substance or capable to react or to be bound to a detectable
 substance or said labeling molecule is a first molecule bearing a said second
 reactive group, said first molecule being capable to react or to be bound to a
 30 second molecule and/or to a solid substrate, preferably said second molecule
 comprising a detectable substance and/or said second molecule being bound or
 capable to be bound to a said solid substrate.

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11. A method according to claim 10, wherein said labeling molecule is a detectable

molecule comprising a detectable substance, the method comprising the step c) of detecting living microorganism in detecting whether said microorganism comprise said detectable molecule bound to said microorganism.

5 12. A method according to claim 10 or 11, wherein said labeling molecule is a first ligand or first binding protein bearing a said second reactive group and in step c) said living microorganism coupled to said first ligand or first binding protein is detected and/or immobilized by contacting said first ligand or first binding protein with a second ligand or second binding protein reacting or binding specifically to said first ligand or
10 first binding protein.

13. A kit for carrying out the method of anyone of claims 1 to 12, comprising:

- a said modified monosaccharide compound of formula (I), and
- a said labeling molecule comprising a said second reactive group capable of
15 reacting with said first reactive group, and
- if required, reactants for generating the reaction of said first reactive group with said second reactive group of said labeling molecule.

14. A kit according to claim 13, further comprising

- a said detectable molecule or said second molecule bearing a detectable substance comprising a fluorochrome or luminescent molecule or an enzyme, and/or
- a solid substrate bearing a said second molecule capable of specifically
20 reacting or binding with said labeling molecule.

25 15. A kit according to claim 14, further comprising a culture or incubation medium allowing the growth of said microorganism.