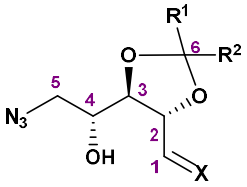
CLAIMS

1. A compound of **formula V** or **VI**, selected from:



Formula V, X=NOR^3; Formula VI, X=O

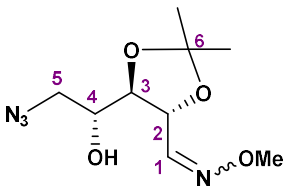
Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^3 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, isopropyl, butyl, isobutyl, *tert*-butyl, pentyl; or aryl including phenyl, methylphenyl, ethylphenyl, each of these groups being substituted or not;

in particular

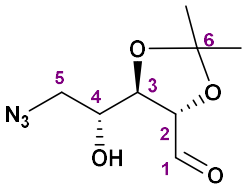
5-Azido-5-deoxy-2:3-isopropylidene-D-arabinose *O*-methyloxime (**5**):



Compound (5)

or

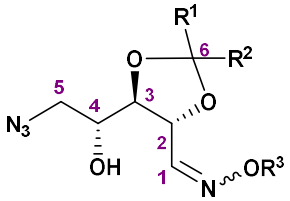
5-Azido-5-deoxy-2:3-isopropylidene-D-arabinose (**6**):



Compound (6)

2. Method of preparation of compound of **formula VI** or of specific compound (**6**) as defined in claim 1, comprising the chemical reaction of:

either a compound of **formula V**:



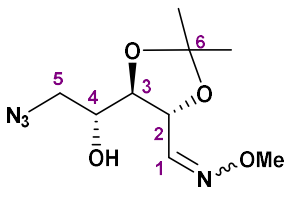
Formula (V)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^3 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, isopropyl, butyl, isobutyl, *tert*-butyl, pentyl; or aryl including phenyl, methylphenyl, ethylphenyl, each of these groups being substituted or not;

or the specific compound (**5**), named 5-azido-5-deoxy-2:3-isopropylidene-D-arabinose *O*-methyloxime:

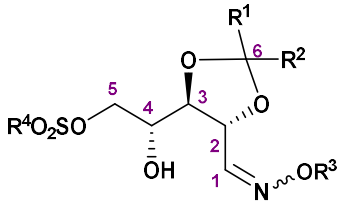


Compound (5)

with an aqueous solution of an organic or inorganic acid in the presence of an aldehyde.

3. Method of preparation of compound of **formula V** or of specific compound (**5**) as defined in claim 1 or claim 2, comprising the chemical reaction of:

either a compound of **formula IV**:



Formula (IV)

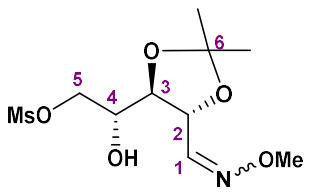
Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^3 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, isopropyl, butyl, isobutyl, *tert*-butyl, pentyl; or aryl including phenyl, methylphenyl, ethylphenyl, each of these groups being substituted or not;

and R^4 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl; a C_1 to C_6 perfluoroalkyl including trifluoromethyl, pentafluoroethyl; or aryl including *para*-methylphenyl, *para*-nitrophenyl; each of these groups being substituted or not.

or the specific compound (**4**), named 2:3-isopropylidene-5-*O*-methanesulfonyl-D-arabinose *O*-methyloxime:

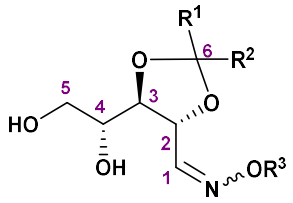


Compound (4)

with an organic or inorganic azide salt in a non-polar solvent or in polar aprotic solvent.

4. Method of preparation of compound of **formula IV** or of specific compound (**4**) as defined in claim 3, comprising the chemical reaction of:

either a compound of **formula III**:



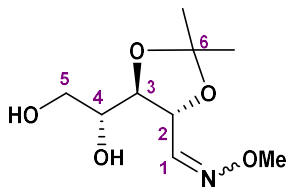
Formula (III)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^3 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, isopropyl, butyl, isobutyl, *tert*-butyl, pentyl; or aryl including phenyl, methylphenyl, ethylphenyl, each of these groups being substituted or not;

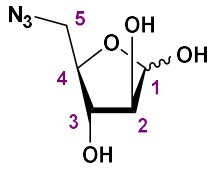
or the specific compound (**3**), named 2:3-isopropylidene-D-arabinose *O*-methyloxime:



Compound (3)

with a sulfonyl chloride or sulfonic anhydride in the presence of an organic base and in the presence or not of a polar aprotic solvent.

5. Use of compound of **formula VI** or of specific compound (**6**), as defined in claim 1, for the synthesis of 5-azido-5-deoxy-D-arabinofuranose or **Ara-N_3** (**7**):

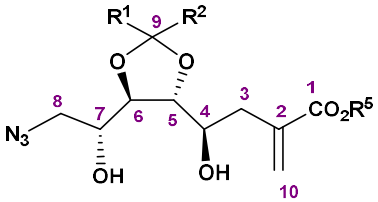


Compound (7)

comprising reacting synthesis intermediate of **formula VI,** under reaction conditions providing removal of protecting group of compound of **formula VI** with an aqueous solution of an organic or inorganic acid in a polar aprotic solvent or non-polar solvent.

6. Use of compound of **formula VI** or of specific compound (**6**), as defined in claim 1, for the synthesis of:

either a compound of **formula VIIIa**:



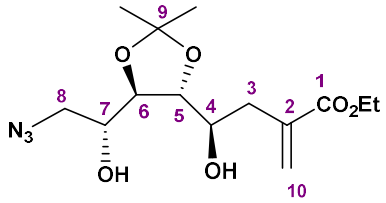
Formula (VIIIa)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not;

or the specific compound (**8a**), named ethyl (4*R*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-methylenebutanoate:

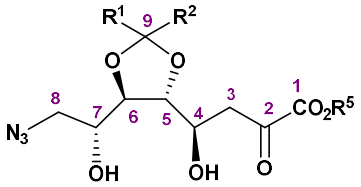


Compound (8a)

by reaction of compound of **formula VI** or (**6**) with alkyl 2-(halomethyl)acrylate, in the presence of a metal such as indium, and the presence or not of an aqueous solution of an organic or inorganic acid, in a protic solvent or in a mixture of water and a polar aprotic solvent.

7. Use of compound of **formula VIIIa** or of specific compound (**8a**), as defined in claim 6, for the preparation of:

either a compound of **formula IXa**:



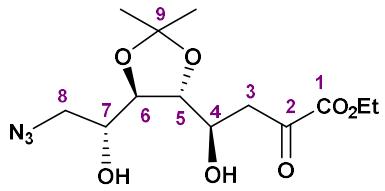
Formula (IXa)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not;

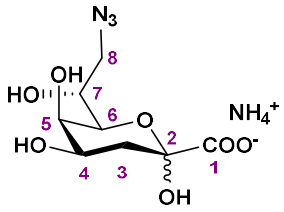
or the specific compound (**9a**), named (4*R*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-oxobutanoate:



Compound (9a)

comprising performing an ozonolysis of compound of **formula VIIIa** or of specific compound (**8a**), with ozone in a protic solvent , at a temperature between -100 and 0°C, and then the unstable intermediate compound being reacted with a reducing agent, in a protic solvent.

8. Use of compound of **formula IXa** or of specific compound (**9a**) as defined in claim 7, for the preparation of ammonium 8-azido-3,8-dideoxy-D-manno-oct-2-ulosonate or **Kdo-N_3** (**10a**):

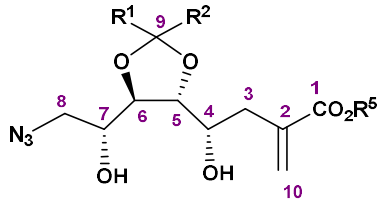


Compound (10a)

comprising deprotecting compound of **formula IXa** or specific compound (**9a**), with an aqueous solution of an organic or inorganic acid.

9. Use of compound of **formula VI** or specific compound (**6**), as defined in claim 1, for the synthesis of:

either a compound of **formula VIIIb**:



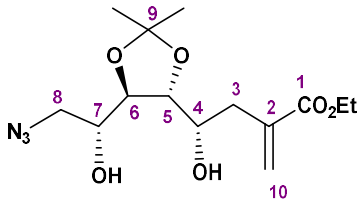
Formula (VIIIb)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not;

or the specific compound (**8b**), named ethyl (4*S*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-methylenebutanoate:

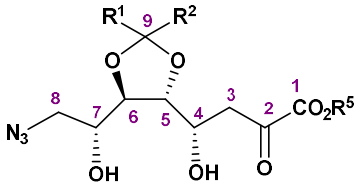


Compound (8b)

by reaction of compound of **formula VI** or specific compound (**6**) with alkyl 2-(halomethyl)acrylate, in the presence of a metal such as indium, and the presence or not of an aqueous solution of an organic or inorganic acid, in a protic solvent or in a mixture of water and a polar aprotic solvent.

10. Use of compound of **formula VIIIb** or of specific compound (**8b**), as defined in claim 9 for the preparation of:

either a compound of **formula IXb**:



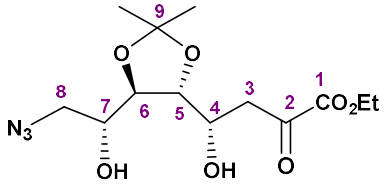
Formula (IXb)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not;

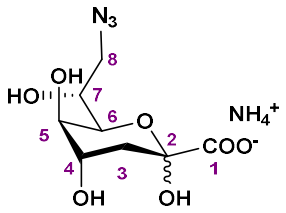
or the specific compound (**9b**), named (4*S*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-oxobutanoate:



Compound (9b)

comprising performing an ozonolysis of compound of **formula VIIIb** or of specific compound (**8b**), with ozone in a protic solvent , at a temperature between -100 and 0°C, and then the unstable intermediate compound being reacted with a reducing agent, in a protic solvent.

11. Use of compound of **formula IXb** or of specific compound (**9b**), as defined in claim 10, for the preparation of ammonium 8-azido-3,8-dideoxy-D-gluco-oct-2-ulosonate or **4eKdo-N_3** (**10b**):

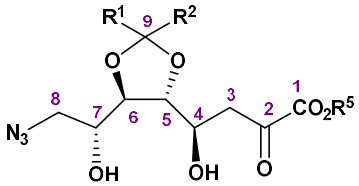


Compound (10b)

comprising deprotecting compound of **formula IXb** or specific compound (**9b**) with an aqueous solution of an organic or inorganic acid.

12. A compound selected from the group consisting of:

a)



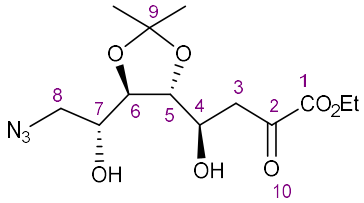
Formula (IXa)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

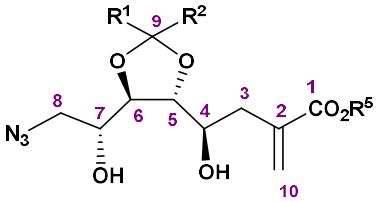
and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not; and

in particular ethyl (4*R*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl}-4-hydroxy-2-oxobutanoate (**9a**), here-below:



Compound (9a);

b)



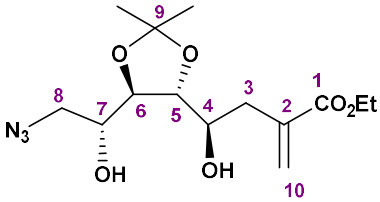
Formula (VIIIa)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

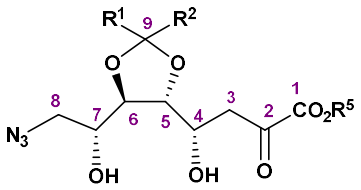
and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not; and

in particular ethyl (4*R*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-methylenebutanoate (**8a**), here-below:



Compound (8a);

c)



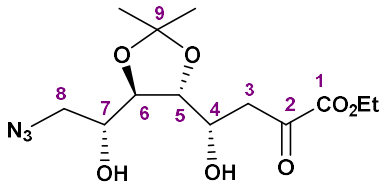
Formula (IXb)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

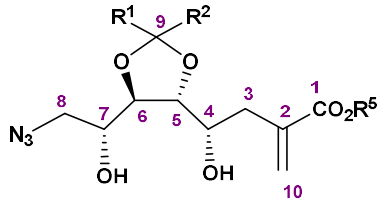
and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not; and

in particular ethyl (4*S*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl}-4-hydroxy-2-oxobutanoate (**9b**), here-below:



Compound (9b);

d)



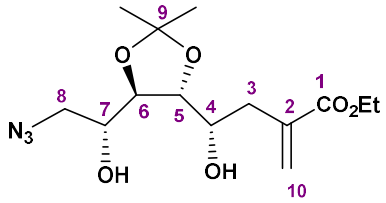
Formula (VIIIb)

Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

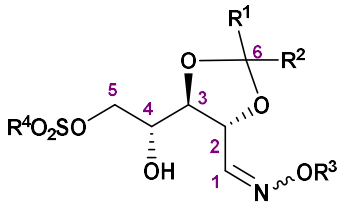
and R^5 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl, *t*-butyl, pentyl, hexyl; or benzyl; each of these groups being substituted or not; and

in particular ethyl (4*S*)-4-{(4*R*,5*R*)-5-[(*R*)-2-azido-1-hydroxyethyl]-2,2-dimethyl-1,3-dioxolan-4-yl)-4-hydroxy-2-methylenebutanoate (**8b**), here-below:



Compound (8b);

e)



Formula (IV)

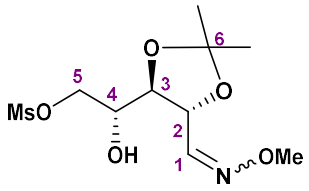
Wherein:

R^1 and R^2 can be independently H; a C_1 to C_6 alkyl including methyl, ethyl, propyl, butyl; aryl including phenyl, *para*-methoxyphenyl; or R^1,R^2 together with the carbon C-6 can be a cyclopentylidene or cyclohexylidene; each of these groups being substituted or not;

and R^3 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl, isopropyl, butyl, isobutyl, *tert*-butyl, pentyl; or aryl including phenyl, methylphenyl, ethylphenyl, each of these groups being substituted or not;

and R^4 can be a C_1 to C_6 alkyl including methyl, ethyl, propyl; a C_1 to C_6 perfluoroalkyl including trifluoromethyl, pentafluoroethyl; or aryl including *para*-methylphenyl, *para*-nitrophenyl; each of these groups being substituted or not;

in particular 2:3-isopropylidene-5-*O*-methanesulfonyl-D-arabinose *O*-methyloxime (**4**), here-below:



Compound (4).

13. Use of a compound of **formula VIIIa** or **VIIIb**, and in particular of formula (**8a**) or (**8b**) as defined in claim 12, to detect *in vitro* Gram negative bacteria, including the following genus of bacteria:

Acinetobacter, Bacteroides, Bartonella, Bordetella, Brachyspira, Brucella, Burkholderia, Campylobacter, Cardiobacterium, Chlamydophila, Chryseobacterium, Clostridium, Coxiella, Cronobacter, Edwardsiella, Ehrlichia, Eikenella, Elizabethkingia, Enterobacter, Escherichia, Francisella, Fusobacterium, Haemophilus, Helicobacter, Klebsiella, Legionella, Leptospira, Morganella, Myxococcus, Neisseria, Neorickettsia, Pasteurella, Plesiomonas, Porphyromonas, Prevotella, Proteus, Providencia, Pseudoalteromonas, Pseudomonas, Rickettsia, Rhodocycclus, Salmonella, Serratia, Sinorhizobium, Shigella, Schewanella, Shewamma, Stenotrophomonas, Streptobacillus, Tenacibaculum, Treponema, Vibrio, Yersinia.