CLAIMS

1. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative, wherein the 1,2-dione is 1,2-butanedione, 2,3-butanedione, 1,2-cyclohexanedione, 1,2-diphenylethanedione or 9,10-phenanthrenequinone;

converting said arabinose derivative to a triprotected xylose derivative;

converting said xylose derivative to a triprotected nitrile;

converting said nitrile to a protected diol and

deprotecting said diol.

2. The method of claim 1 further comprising converting said arabinose derivative to said xylose derivative through an activated system wherein said activated system is optionally isolated before conversion.

3. The method of claim 1 further comprising converting said xylose derivative to said nitrile using an activated system, wherein said activated system is optionally isolated before conversion followed by displacement by a cyano source.

4. The method of claim 1 further comprising obtaining said nitrile after purifying said xylose derivative.

5. The method of claim 1 further comprising converting said arabinose derivative to said xylose derivative by a Mitsunobu inversion reaction to form an inverted ester derivative and saponification.

6. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative, wherein the 1,2-dione is 1,2-butanedione, 2,3-butanedione, 1,2-cyclohexanedione, 1,2-diphenylethanedione or 9,10-phenanthrenequinone;

converting said arabinose derivative to a triprotected xylose derivative; converting said xylose derivative to a triprotected nitrile;

converting said nitrile to a protected isofagomine salt and

deprotecting said isofagomine salt.

7. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative, wherein the 1,2-dione is 1,2-butanedione, 2,3-butanedione, 1,2-cyclohexanedione, 1,2-diphenylethanedione or 9,10-phenanthrenequinone;

converting said arabinose derivative to a triprotected xylose derivative;

converting said xylose derivative to a triprotected nitrile;

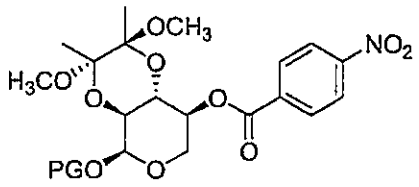
reducing said nitrile to a triprotected primary amine;

deprotecting said primary amine to a diol and

using catalytic hydrogenation.

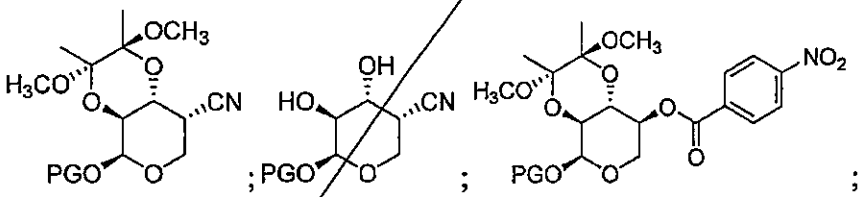
8. The method of claims 1, 6 and 7 wherein protecting of said anomeric hydroxyl group of D-(-)-arabinose is accomplished using an alcohol, an activating agent and optionally a solvent; and formation of said arabinose derivative is accomplished using an acid and an alcohol.

9. A compound of the formula



10. The compound of claim 9 wherein PG is benzyl.

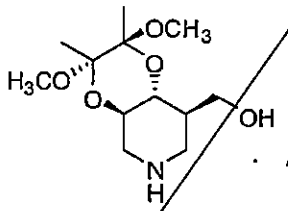
11. A compound selected from the group consisting of



;

;

; and



· AcOH

12. The compounds of claim 11, wherein PG is benzyl.

13. A method for preparing isofagomine, its derivatives, or acid salts thereof comprising the step of converting the compound of any one of claims 9 to 12 to make isofagomine, its derivatives, or acid salts thereof.

CLAIMS

1. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative;

converting said arabinose derivative to a triprotected xylose derivative;

converting said xylose derivative to a triprotected nitrile;

converting said nitrile to a protected diol and

deprotecting said diol.

2. The method of claim 1 further comprising converting said arabinose derivative to said xylose derivative through an activated system wherein said activated system is optionally isolated before conversion.

3. The method of claim 1 further comprising converting said xylose derivative to said nitrile using an activated system, wherein said activated system is optionally isolated before conversion followed by displacement by a cyano source.

4. The method of claim 1 further comprising obtaining said nitrile after purifying said xylose derivative.

5. The method of claim 1 further comprising converting said arabinose derivative to said xylose derivative by a Mitsunobu inversion reaction to form an inverted ester derivative and saponification.

6. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative;

converting said arabinose derivative to a triprotected xylose derivative;

converting said xylose derivative to a triprotected nitrile;

converting said nitrile to a protected isofagomine salt and

deprotecting said isofagomine salt.

7. A method for preparing isofagomine, its derivatives, or acid salts thereof, comprising protecting the anomeric hydroxyl group of D-(-)-arabinose with a protecting group to form a glycoside, wherein the protecting group is benzyl, methoxybenzyl, chlorobenzyl, diphenylmethyl, methyl, ethyl, isopropyl or cyclohexylmethyl;

protecting the 2- and 3- hydroxyl groups of said glycoside using a 1,2-dione to form a triprotected arabinose derivative;

converting said arabinose derivative to a triprotected xylose derivative;

converting said xylose derivative to a triprotected nitrile;

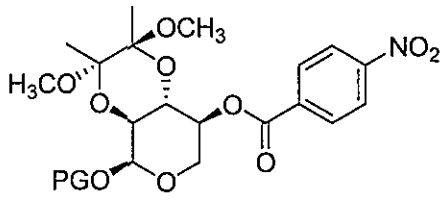
reducing said nitrile to a triprotected primary amine;

deprotecting said primary amine to a diol and

using catalytic hydrogenation.

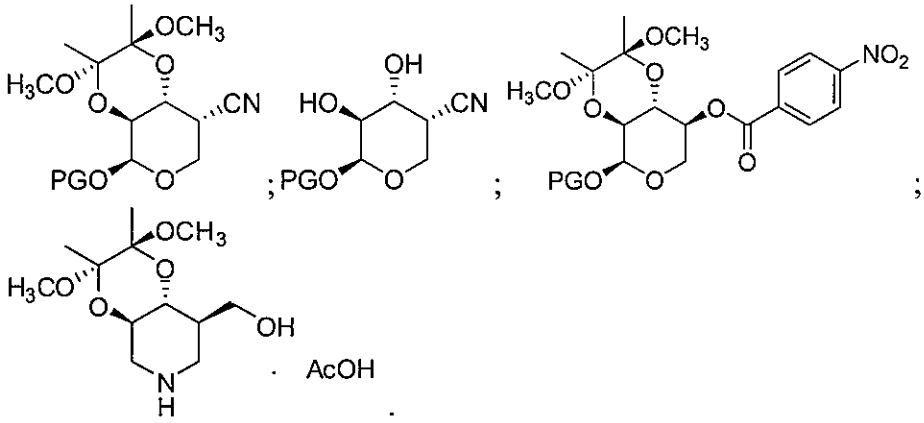
8. The method of claims 1, 6 and 7 wherein protecting of said anomeric hydroxyl group of D-(-)-arabinose is accomplished using an alcohol, an activating agent and optionally a solvent; and formation of said arabinose derivative is accomplished using an acid and an alcohol.

9. A compound of the formula



10. The compound of claim 9 wherein PG is benzyl.

11. A compound selected from the group consisting of



12. The compounds of claim 11, wherein PG is benzyl.

13. A method for preparing isofagomine, its derivatives, or acid salts thereof comprising the step of converting the compound of any one of claims 9 to 12 to make isofagomine, its derivatives, or acid salts thereof.

14. The method of claims 1, 6 and 7, wherein the 1,2-dione is 2,3-butanedione.