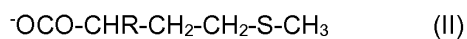


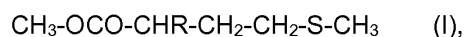
## CLAIMS

1. A process of producing a demethylation product of the formula (II):



wherein R is -OH or -NH<sub>2</sub>,

- 5 comprising a demethylation step of reacting a methyl ester of the formula (I):



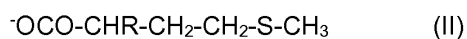
wherein R has the same meaning as above,

with a hydrogen sulfide anion to obtain methane thiol and the demethylation product of the formula (II).

- 10 2. The process according to claim 1, comprising recovering the methane thiol formed in the demethylation step.

- 15 3. A process according to claim 2, wherein the methane thiol recovered is used in a hydrothiolation step.

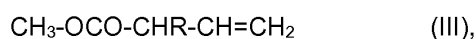
4. A process of producing a demethylation product of the formula (II):



wherein R is -OH or -NH<sub>2</sub>,

- 20 comprising:

- a1) a hydrothiolation step of reacting a compound of the formula (III):



Wherein R has the same meaning as above,

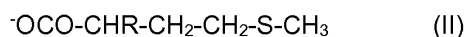
With methane thiol to obtain a methyl ester of the formula (I):

- 25 
$$\text{CH}_3\text{-OCO-CHR-CH}_2\text{-CH}_2\text{-S-CH}_3 \quad (\text{I}),$$

wherein R has the same meaning as above, and

- b) a demethylation step of reacting the methyl ester of the formula (I) with a hydrogen sulfide anion to obtain methane thiol and the demethylation product of the formula (II).

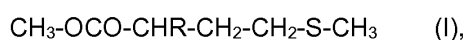
- 30 5. A process of producing a demethylation product of the formula (II):



wherein R is -OH

comprising:

a2) a metallo-silicate catalyzed step of contacting a sugar with a metallo-silicate material in the presence of methanol and methane thiol to obtain a methyl ester product of the formula (I):



wherein R has the same meaning as above, and then

b) a demethylation step of reacting the methyl ester of the formula (I) with a hydrogen sulfide anion to obtain methane thiol and the demethylation product of the formula (II).

6. The process according to any one of claims 1 to 5, wherein the demethylation step is carried out in a demethylation reaction zone.
7. The process according to any one of claims 3 or 4, wherein the hydrothiolation step is carried out in a hydrothiolation reaction zone.
8. The process according to claim 5, wherein the metallo-silicate catalyzed step is carried out in a metallo-silicate catalyzed zone.
9. The process according to any one of the preceding claims, wherein the hydrogen sulfide anion is provided in the form of a hydrogen sulfide salt.
10. The process according to claim 9, wherein the metal hydrogen sulfide compound is selected from the group consisting of LiSH, NaSH, KSH,  $\text{Ca}(\text{SH})_2$ ,  $\text{Mg}(\text{SH})_2$ ; or combinations thereof.
11. The process according to any one of claims 1 to 10, comprising recovering the demethylation product formed in the form of a carboxylic acid or a carboxylate salt.
12. The process according to any one of claims 1 to 11, wherein the demethylation step is carried out in the presence of a demethylation solvent having a dielectric constant in the range of from 15 to 100.
13. The process according to claim 12, wherein the demethylation solvent is selected from the group consisting of DMSO, dimethylformamide, HMPA, acetonitrile, acetone, ethanol, methanol or water; or mixtures thereof.

14. The process according to any one of claims 1 to 13, wherein the demethylation step is carried out at a temperature in the range of from 0 °C to 200 °C, preferably at a temperature from 30 °C to 100 °C.

15. The process according to any one of claims 1 to 14, wherein the demethylation step is carried out at an oxygen partial pressure below 0.1 bar (10kPa), preferably in the range of from 0.00001 bar (1 Pa) to 0.1 bar (10 kPa).

16. The process according to any one of claims 1 to 15, wherein the demethylation step is carried out at a pressure in the range of from 0.1 bar (10 kPa) to 10 bar (1000 kPa).

17. The process according to any one of claims 1 to 16, wherein the initial molar ratio of hydrogen sulfide anion relative to the methyl ester of the formula (I) is in the range of from 1:100 to 100:1.

18. The process according to any one of claims 2 to 17, comprising using all or some of the methane thiol recovered from the demethylation reaction zone in the hydrothiolation reaction zone and/or the metallo-silicate catalyzed zone.

19. The process according to any one of claims 1 to 18, comprising recovering all or some unreacted hydrogen sulfide anion from the demethylation reaction zone.

20. The process according to any one of claims 1 to 19, comprising recovering all or some unreacted methyl ester of the formula (I) from the demethylation reaction zone.

21. The process according to any one of claims 1 to 20, wherein the demethylation step is conducted as a batch or a fed-batch process.

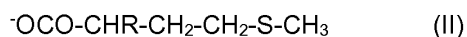
22. The process according to any one of claims 1 to 20, wherein the demethylation step is conducted as a continuous process and the methyl ester of the formula (I) and the hydrogen sulfide anion are provided to a demethylation reaction zone; and the methane thiol and the demethylation product formed in the demethylation reaction zone are recovered from the demethylation reaction zone.

23. The process according to any one of claims 2 to 22, wherein the hydrothiolation step is conducted as a continuous process and the compound of formula (III) and methane thiol are provided to a hydrothiolation reaction zone; and the methyl ester of the formula (I) formed in the hydrothiolation reaction zone is recovered from the hydrothiolation reaction zone in a stream which is led to the demethylation reaction zone.

24. The process according to any one of the preceding claims, wherein the carboxylate salt is exposed to an ion exchange step.

25. The process according to any one of claims 3 to 24, wherein solvent is used in the hydrothiolation step or the metallo-silicate catalyzed step and a step of removing some or all of the solvent is conducted between the hydrothiolation step or the metallo-silicate catalyzed step and the demethylation step.

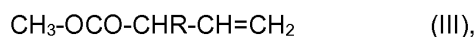
26. A process of producing a demethylation product of the formula (II):



wherein R is -OH or -NH<sub>2</sub>,

comprising:

c) an integrated step of reacting a compound of the formula (III):



Wherein R has the same meaning as above,

in the presence of methane thiol and a hydrogen sulfide anion to obtain the demethylation product of the formula (II).