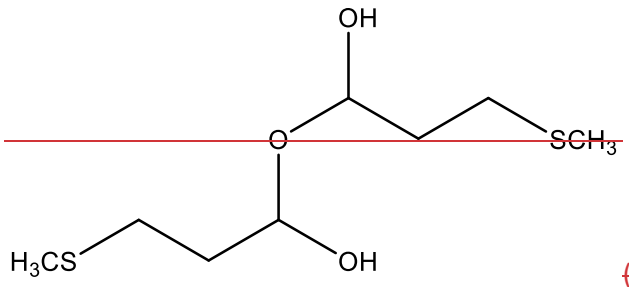
Claims

1. Composition comprising
40% to 95% by weight of 3-methylthiopropionaldehyde,
1% to 20% by weight of 3-methylthiopropane-1,1-diol,
2% to 25% by weight of a compound of formula I



(I)

and
2.5% to 25% by weight of water.

2. Composition according to Claim 1, comprising
40% to 94.5% by weight of 3-methylthiopropionaldehyde,
1% to 20% by weight of 3-methylthiopropane-1,1-diol,
2% to 25% by weight of a compound of formula I and
2.5% to 25% by weight of water.

3. Composition according to Claim 1 or 2, comprising
40% to 92% by weight of 3-methylthiopropionaldehyde,
1% to 20% by weight of 3-methylthiopropane-1,1-diol,
2% to 25% by weight of a compound of formula I and

5% to 10% by weight of water.

4. Use of 3-methylthiopropane-1,1-diol or of a compound I according to Claim 1 or of a composition according to any of Claims 1 to 3 for the storage and/or transport of 3-methylthiopropionaldehyde.

5. Use according to Claim 4, characterized in that the storage and/or transport are conducted at temperatures between 0 and 60°C, preferably 5 to 40°C, for a period of time of up to 12 months, preferably up to 8 months, particularly preferably up to 4 months.

6. Use of 3-methylthiopropane-1,1-diol or of a compound I according to Claim 1 or of a composition according to any of Claims 1 to 3 for the production of 2-hydroxy-4-(methylthio)butyronitrile.

7. Use of 3-methylthiopropane-1,1-diol or of a compound I according to Claim 1 or of a composition according to any of Claims 1 to 3 for the production of methionine hydantoin.

8. Use of 3-methylthiopropane-1,1-diol or of a compound I according to Claim 1 or of a composition according to any of Claims 1 to 3 for the production of methionine.

9. Use of 3-methylthiopropane-1,1-diol or of a compound I according to Claim 1 or of a composition according to any of Claims 1 to 3 for the production of 2-hydroxy-4-(methylthio)butyric acid.

10. Process for producing a composition according to any of Claims 1 to 3, characterized in that 3-methylthiopropionaldehyde is reacted, while mixing intensively, with 2.5% to 25% by weight, preferably with 5.0% to 20% by weight, particularly preferably with 5.0% to 10% by weight of water, based on the total amount of 3-methylthiopropionaldehyde and water used, at a temperature of 0 to 100°C, preferably at 3 to 70°C, very particularly preferably at 5 to 40°C.

11. Process according to Claim 10, characterized in that the duration of the reaction is 0.5 to 72 h, preferably 1 to 48 h.

12. Process according to either of Claims 10 and 11, characterized in that the 3-methylthiopropionaldehyde used has been distilled beforehand.

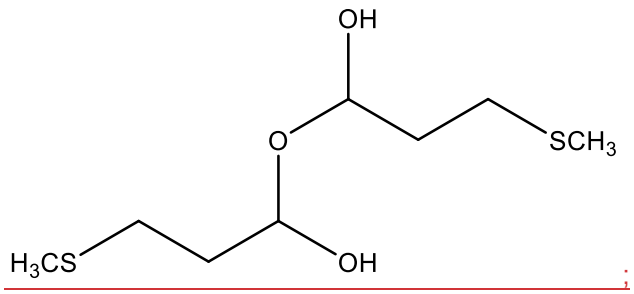
13. Process for producing 2-hydroxy-4-(methylthio)butyronitrile, characterized in that 3-methylthiopropane-1,1-diol or a compound I according to Claim 1 or a composition according to any of Claims 1 to 3 is reacted with hydrocyanic acid in the presence of an amine base.

14. Process for producing methionine hydantoin, characterized in that 3-methylthiopropane-1,1-diol or a compound I according to Claim 1 or a composition according to any of Claims 1 to 3 is reacted in the presence of water with hydrocyanic acid, ammonia and carbon dioxide.

15. Process for producing D,L-methionine by means of reaction of a composition according to any of Claims 1 to 3 with HCN, NH_3, carbon dioxide to give methionine hydantoin and subsequent alkaline hydrolysis to give the methionine alkali metal salt and then neutralization with acid to give methionine.

~~16. Composition according to Claim 1, produced by a process according to any of Claims 10 to 12.~~

1. A composition, comprising:
3 methylthiopropionaldehyde, in a range of from 40 to 95 wt. %;
3 methylthiopropane-1,1-diol, in a range of from 1 to 20 wt. %;
a compound of formula (I), in a range of from 2 to 25 wt. %;



;

and
water, in a range of from 2.5 to 25 wt. %.

2. The composition of claim 1, comprising:
the 3-methylthiopropionaldehyde, in a range of from 40 to 94.5 wt. %.

3. The composition of claim 1, comprising:
the 3-methylthiopropionaldehyde, in a range of from 40 to 92 wt. %; and
the water, in a range of from 5 to 10 wt. %.

4. A method of storing and/or transporting 3-methylthiopropionaldehyde, the method comprising:
contacting the composition of claim 1, 3-methylthiopropane-1,1-diol, or the compound of formula (I), with the 3-methylthiopropionaldehyde.

5. The method of claim 4, conducted at a temperature in a range of from 0 to 60° C., for a period of time of up to 12 months.

6. The method of claim 5, conducted at a temperature in a range of from 5 to 40° C.

7. The method of claim 5, conducted for a period of time of up to 8 months.

8. The method of claim 5, conducted for a period of time of up to 4 months.

9. A method for producing the composition of claim 1, the method comprising:
reacting 3-methylthiopropionaldehyde, while mixing intensively, with 2.5 to 25 wt. % of

water, based on a total amount of the 3-methylthiopropionaldehyde and water used, at a temperature in a range of from 0 to 100° C.

10. The method of claim 9, wherein the reaction is conducted for a duration in a range of from 0.5 to 72 h.

11. The method of claim 9, further comprising:
distilling the 3-methylthiopropionaldehyde before the reacting.

12. A method for producing 2-hydroxy-4-(methylthio)butyronitrile, the method comprising:
reacting the composition of claim 1, 3-methylthiopropane-1,1-diol, or the compound of formula (I), with hydrocyanic acid in the presence of an amine base.

13. A method for producing methionine hydantoin, the method comprising:
reacting the composition of claim 1, 3-methylthiopropane-1,1-diol or the compound of formula (I), in the presence of water with hydrocyanic acid, ammonia, and carbon dioxide.

14. A method for producing D,L-methionine the method comprising:
reacting the composition of claim 1 with HCN, NH_3, and carbon dioxide to give methionine hydantoin; and subsequently
hydrolyzing the methionine hydantoin, under alkaline conditions, to give a methionine alkali metal salt; and then
neutralizing the methionine alkali metal salt with acid to give methionine.

15. The composition of claim 1, produced by a method comprising:
reacting 3-methylthiopropionaldehyde, while mixing intensively, with 2.5 to 25 wt. % of water, based on a total amount of the 3-methylthiopropionaldehyde and water used, at a temperature in a range of from 0 to 100° C.

16. A method of producing 2-hydroxy-4-(methylthio)butyric acid, the method comprising:
producing 2-hydroxy-4-(methylthio)butyronitrile by the method of claim 12; and hydrolyzing the 2-hydroxy-4-(methylthio)butyronitrile in the presence of aqueous sulfuric acid to form a mixture comprising the 2-hydroxy-4-(methylthio)butyric acid and ammonium hydrogen sulfate.