CLAIMS

1. Process for the preparation of L-methionine, comprising at least the steps of:

a) preparation of a mixture comprising:

1) dimethyl disulfide (DMDS),
2) a catalytic amount of amino acid bearing a thiol group or of a thiol-group-containing peptide,
3) a catalytic amount of enzyme catalysing the reaction for the reduction of the disulfide bridge of said amino acid bearing a thiol group or of said thiol-group-containing peptide,
4) hydrogen,
5) a catalytic amount of enzyme catalysing the reaction for the reduction of hydrogen,
6) a catalytic amount of a cofactor common to the two enzymes of the catalytic system (dehydrogenase and reductase),

b) carrying out the enzymatic reaction to form the methyl mercaptan (CH_3-SH),

c) addition of a precursor of L-methionine and conversion of said precursor with the methyl mercaptan formed in step b), and

d) recovery and optional purification of the L-methionine formed.

2. Process according to Claim 1, comprising at least the steps of:

a') preparation of a mixture comprising:

- dimethyl disulfide (DMDS),
- a catalytic amount of amino acid bearing a thiol group or of a thiol-group-containing peptide,
- a catalytic amount of reductase enzyme corresponding to said amino acid bearing a thiol group or to said thiol-group-containing peptide,
- a catalytic amount of NADPH,

b') addition of hydrogen with a catalytic amount of hydrogen dehydrogenase enzyme,

c') carrying out the enzymatic reaction to form methyl mercaptan (CH_3-SH),

9. Process according to any one of Claims 1 to 6, wherein the synthesis of methyl mercaptan from DMDS and the synthesis of L-methionine from said methyl mercaptan are carried out in one and the same reactor.

10. Process according to Claim 9, comprising at least the following steps:
Step 1': preparation of an L-methionine precursor,
Step 2': enzymatic reduction of DMDS in a reactor R1 with *in situ* formation of methyl mercaptan and concomitant enzymatic synthesis of L-methionine in the same reactor with the precursor obtained in step 1',
Step 3' (optional): recycling loop of the hydrogen and methyl mercaptan in the reactor R1, at step 2', and
Step 4': recovery and optionally purification of the l-methionine formed.

11. Process according to any one of the preceding claims, carried out batchwise or continuously.

12. Process according to any one of the preceding claims, wherein the ideal hydrogen/DMDS molar ratio varies from 0.01 to 100, preferably between 1 and 20, over the whole of the reaction.

13. Process according to any one of the preceding claims, wherein the DMDS/L-methionine precursor molar ratio is between 0.1 and 10, generally between 0.5 and 5, and preferably the molar ratio is stoichiometric (molar ratio = 0.5).

14. Process according to any one of the preceding claims, wherein the reaction temperature is within a range extending from 10°C to 50°C, preferably from 15°C to 45°C, more preferably from 20°C to 40°C.