transferase encoded by the *metA* gene has a low stability even as a wild-type protein, and stability thereof may further deteriorate by introducing a variation to free feedback. There is a need to remove feedback inhibition of the *metA* gene and improve enzymatic stability to develop stains having high O-succinyl homoserine-producing capability.

[0008] Most microorganisms in nature use O-succinyl homoserine or O-acetyl homoserine as an intermediate for biosynthesis of methionine. In general, MetA produces O-succinyl homoserine, and homoserine O-acetyltransferase (MetX) produces O-acetyl homoserine. In addition, unlike MetA, MetX is not affected by feedback inhibition and has a high enzymatic stability.

SUMMARY

[0008a] In one aspect, the present disclosure refers to a polypeptide having O-succinyl homoserine transferase activity, the polypeptide comprises SEQ ID NO: 1, wherein the amino acid at position 313 is substituted to arginine, and the amino acid at position 176 is substituted to asparagine, tryptophan, histidine or glycine.

[0008b] In another aspect, the present disclosure refers to a polynucleotide encoding the polypeptide having the O-succinyl homoserine transferase activity as described herein.

[0008c] In another aspect, the present disclosure refers to a microorganism of the genus Corynebacterium producing O-succinyl homoserine, wherein the microorganism comprises the polypeptide as described herein having the O-succinyl homoserine transferase activity or wherein, in the microorganism, the polypeptide as described herein having the O-succinyl homoserine transferase activity is overexpressed.

[0008d] In another aspect, the present disclosure refers to a method of producing O-succinyl homoserine, the method comprising: culturing a microorganism of the genus *Corynebacterium* producing O-succinyl homoserine as described herein in a culture medium; and separating or recovering O-succinyl homoserine from the microorganism cultured in the culturing step or the culture medium.

[0008e] In another aspect, the present disclosure refers to a method of producing L-methionine, the method comprising: a) culturing a microorganism of the genus *Corynebacterium* producing O-succinyl homoserine as described herein in a culture medium; and (b) reacting the O-succinyl homoserine with a sulfide.

Claims

1. A polypeptide having O-succinyl homoserine transferase activity, the polypeptide comprises SEQ ID NO: 1, wherein the amino acid at position 313 is substituted to arginine, and the amino acid at position 176 is substituted to asparagine, tryptophan, histidine or glycine.

2. The polypeptide of claim 1, wherein the polypeptide comprises at least one amino acid sequence selected from the group consisting of amino acid sequences of SEQ ID NOs: 63, 75, 95, and 97.

3. A polynucleotide encoding the polypeptide of claim 1 having the O-succinyl homoserine transferase activity.

4. The polynucleotide of claim 3, wherein the polynucleotide comprises at least one nucleic acid sequence selected from the group consisting of nucleic acid sequences of SEQ ID NOs: 64, 76, 96, and 98.

5. A microorganism of the genus Corynebacterium producing O-succinyl homoserine, wherein the microorganism comprises the polypeptide of claim 1 having the O-succinyl homoserine transferase activity or wherein, in the microorganism, the polypeptide of claim 1 having the O-succinyl homoserine transferase activity is overexpressed.

6. The microorganism of claim 5, wherein the microorganism of the genus Corynebacterium has further enhanced aspartokinase activity compared to endogenous activity of this enzyme in non-mutated microorganisms.

7. The microorganism of claim 5, wherein the microorganism of the genus Corynebacterium is Corynebacterium glutamicum.

8. The microorganism of claim 5, wherein activity of at least one enzyme selected from the group consisting of cystathionine synthase, O-acetyl homoserine (thiol)-lyase, and homoserine kinase is inactivated in the microorganism of the genus Corynebacterium.

9. The microorganism of claim 5, wherein the microorganism of the genus Corynebacterium has further enhanced aspartokinase activity compared to non-mutated microorganisms and activity of at least one enzyme selected from the group consisting of cystathionine synthase, O-acetyl homoserine (thiol)-lyase, and homoserine kinase is inactivated.

10. A method of producing O-succinyl homoserine, the method comprising:
culturing a microorganism of the genus Corynebacterium producing O-succinyl

homoserine according to any one of claims 5 to 9 in a culture medium; and
separating or recovering O-succinyl homoserine from the microorganism cultured in the culturing step or the culture medium.

11. A method of producing L-methionine, the method comprising:
(a) culturing a microorganism of the genus Corynebacterium producing O-succinyl homoserine according to any one of claims 5 to 9 in a culture medium; and
(b) reacting the O-succinyl homoserine with a sulfide.

12. The method of claim 11, further comprising separating or recovering O-succinyl homoserine from the cultured microorganism or the culture medium in step (a).

13. The method of claim 11, further comprising separating or recovering L-methionine produced by the reaction between O-succinyl homoserine and the sulfide in step (b).