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, which comprises a substitution of an amino acid at position 313 in an amino acid sequence of SEQ ID NO: 1 with arginine and a substitution of an amino acid at position 176 in an amino acid sequence of SEQ ID NO: 1 with 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 a polypeptide having the O-succinyl homoserine transferase activity as described herein or wherein, in the microorganism, the polypeptide having the O-succinyl homoserine transferase activity as described herein 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.

DESCRIPTION OF EMBODIMENTS

TECHNICAL PROBLEM

[0009] As a result of intensive efforts to increase production of O-succinyl homoserine, the present inventors have found a protein having O-succinyl homoserine-synthesizing activity, thereby completing the present disclosure.

SOLUTION TO PROBLEM

[0010] An object of the present disclosure is to provide a polypeptide having O-succinyl homoserine transferase activity and including a substitution of arginine for an amino acid at position 313 and a substitution of an amino acid other than glutamine for an amino acid at position 176 in an amino acid sequence of SEQ ID NO: 1.

[0011] Another object of the present disclosure is to provide a polynucleotide encoding the polypeptide.

[0012] Another object of the present disclosure is to provide a microorganism of the genus *Corynebacterium* producing O-succinyl homoserine and including a polypeptide having the O-succinyl homoserine transferase activity.

[0013] Another object of the present disclosure is to provide a method of producing O-succinyl homoserine including culturing the microorganism in a culture medium, and separating or recovering O-succinyl homoserine from the microorganism cultured in the culturing step or the culture medium.

[0014] Another object of the present disclosure is to provide a method of producing

CLAIMS

1. A polypeptide having O-succinyl homoserine transferase activity, which comprises a substitution of an amino acid at position 313 in an amino acid sequence of SEQ ID NO: 1 with arginine and a substitution of an amino acid at position 176 in an amino acid sequence of SEQ ID NO: 1 with 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 having the O-succinyl homoserine transferase activity of claim 1.

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 a polypeptide having the O-succinyl homoserine transferase activity of claim 1 or wherein, in the microorganism, the polypeptide having the O-succinyl homoserine transferase activity of claim 1 is overexpressed.

6. The microorganism of claim 5, wherein the microorganism of the genus *Corynebacterium* has further enhanced aspartokinase activity compared to 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).