acid (*Appl Environ Microbiol*., 2012, 78(9): 3325 to 3337). However, unlike succinic acid, NADH is not used as a direct substrate in the biosynthesis pathway of putrescine, and no association has been reported between formate dehydrogenase and putrescine production.

[Disclosure]

[Technical Problem]

The present inventors have made efforts to increase putrescine production in a putrescine-producing microorganism, and as a result, they have confirmed that the overexpression of formate dehydrogenase can increase the levels of NADH and ATP in a putrescine-producing microorganism, and thus, the putrescine production can be increased, thereby completing the present disclosure.

[Technical Solution]

An object of the present disclosure is to provide a putrescine-producing microorganism of the genus *Corynebacterium* in which the activity of formate dehydrogenase (Fdh) is increased compared to that before modification.

Another object of the present disclosure is to provide a method of producing putrescine using the microorganism.

In one aspect, the present disclosure refers to a putrescine-producing microorganism of the genus *Corynebacterium*, in which the microorganism of the genus Corynebacterium comprises a gene encoding a formate dehydrogenase (Fdh) having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 10 and having the activity of a Fdh consisting of the amino acid sequence of SEQ ID NO: 10. In another aspect, the present disclosure refers to a method of producing putrescine, comprising: (a) culturing the microorganism as disclosed herein in a medium; and (b) recovering putrescine from the microorganism or the cultured medium obtained in step (a).

[Advantageous Effects of the Invention]

The microorganism of the genus *Corynebacterium* with increased putrescine productivity of the present disclosure is modified so that the activity of formate dehydrogenase (FDH) can be increased, which leads to an increase in the production of NADH and ATP. As a result, the microorganism can increase putrescine production and can be effectively used for

large-scale production of putrescine.

[Brief Description of Drawings]

FIG. 1 shows an SDS-PAGE gel image illustrating the results of overexpression of CbFdh using an *Escherichia coli* host, in which Lane 1 represents the result of expression of a protein in a cell lysate which was expressed in *E. coli* BL21 DE3 at 18°C for 24 hours; Lane 2

[Claims]

[Claim 1]

A putrescine-producing microorganism of the genus *Corynebacterium*, in which the microorganism of the genus *Corynebacterium* comprises a gene encoding a formate dehydrogenase (Fdh) having at least 90% sequence identity to the amino acid sequence of SEQ ID NO: 10 and having the activity of a Fdh consisting of the amino acid sequence of SEQ ID NO: 10.

[Claim 2]

The microorganism according to claim 1, wherein the Fdh is derived from *Candida boidinii*.

[Claim 3]

The microorganism according to claim 1, wherein the Fdh consists of the amino acid sequence of SEQ ID NO: 10.

[Claim 4]

The microorganism according to claim 1, wherein the activity of ornithine decarboxylase (ODC) is further introduced.

[Claim 5]

The microorganism according to claim 1, wherein the activity of acetyltransferase which acetylates putrescine is further weakened compared to its endogenous activity.

[Claim 6]

The microorganism according to claim 1, wherein the activity of the protein that exhibits the activity of exporting putrescine is increased compared to its endogenous activity.

[Claim 7]

The microorganism according to claim 1, wherein the microorganism is *Corynebacterium glutamicum.*

[Claim 8]

A method of producing putrescine, comprising:

(a) culturing the microorganism of any one of claims 1 to 7 in a medium; and

(b) recovering putrescine from the microorganism or the cultured medium obtained in step (a).

[Claim 9]

The method according to claim 8, wherein the microorganism is cultured in a medium not containing formic acid.

[Claim 10]

The method according to claim 8, wherein the microorganism is cultured under an aerobic condition.