

CLAIMS

1. A method for the production of psilocybin comprising:

contacting a prokaryotic host cell with one or more expression vectors, wherein each expression vector comprises a psiD gene, a psiK gene and a psiM gene all under control of a single promoter in operon configuration, wherein the promoter is selected from the group consisting of Lac, Lac UV5, tac, trc, GAP, and xylA promoter; or wherein each expression vector comprises a psiD gene, a psiK gene and a psiM gene, wherein each gene is under control of a separate promoter in pseudooperon configuration, wherein the promoter is selected from the group consisting of Lac, Lac UV5, tac, trc, GAP, and xylA promoter; and culturing the host cell.

2. The method of claim 1, wherein the psiD comprises the amino acid sequence of SEQ ID NO: 8 or a sequence having at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% sequence identity thereto.

3. The method of claim 1, wherein the psiK comprises the amino acid sequence of SEQ ID NO: 9 or a sequence having at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% sequence identity thereto.

4. The method of claim 1, wherein the psiM comprises the amino acid sequence of SEQ ID NO: 10 or a sequence having at least 60%, at least 70%, at least 80%, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, or at least 99% sequence identity thereto.

5. The method of claim 1, wherein the prokaryotic cell is selected from the group consisting of *Escherichia coli*, *Corynebacterium glutamicum*, *Vibrio natriegens*, *Bacillus subtilis*, *Bacillus megaterium*, *Escherichia coli* Nissle 1917, *Clostridium acetobutylicum*, *Streptomyces coelicolor*, *Lactococcus lactis*, *Pseudomonas putida*, *Streptomyces clavuligerus*, and *Streptomyces venezuelae*.

6. The method of any one of claims 1-5, wherein the host cell is cultured with a supplement independently selected from the group consisting of 4-hydroxyindole, serine, methionine and combinations thereof.

7. The method of claim 6, wherein the supplement is fed continuously to the host cell.
8. The method of claim 1, wherein the host cell is grown in an actively growing culture.