CLAIMS

1. A recombinant expression vector comprising a promoter inducible by 3-hydroxypropionic acid (3-HP) or a derivative thereof, the promoter comprising two LysR binding sites that are paired with each other for LysR proteins binding and activity, wherein the LysR proteins are reactive to 3-HP or a derivative thereof, wherein the derivative is selected from 3-hydroxyisobutyrate(3HIB) or 3-hydroxybutyrate(3-HB), and each of the LysR binding sites comprises of i) a base sequence selected from SEQ ID NOs: 5 to 43 paired with an inverted repeat sequence consisting of a sequence selected from SEQ ID Nos: 5 to 43;

wherein the recombinant expression vector further comprises a gene encoding a foreign protein linked to the promoter inducible by 3-hydroxypropionic acid (3-HP) or a derivative thereof, wherein the derivative is selected from 3-hydroxyisobutyrate(3HIB) or 3-hydroxybutyrate(3-HB); wherein the foreign protein is glycerol dehydratase (DhaB), DhaB reactivase (GdrAB), or α-ketoglutaric semialdehyde dehydrogenase (KGSADH);

wherein the glycerol dehydratase (DhaB), DhaB reactivase (GdrAB), or α-ketoglutaric semialdehyde dehydrogenase (KGSADH) are overexpressed by using the 3-HP inducible promoter;

wherein a recombinant microorganism with 3-HP producibility is cultured;

wherein the recombinant microorganism is transformed with the recombinant expression vector;

wherein the recombinant microorganism is a strain of *Pseudomonas denitrificans* Δ3hpdhΔ3hibdhIV△3hibdhI; and

wherein 3*hpdh*, 3*hibdh*, and *mmsadh* genes relating to degradation of 3-HP are deleted from the strain of *Pseudomonas denitrificans*.

2. A method of producing 3-hydroxypropionic acid (3-HP), the method comprising:

culturing the recombinant microorganism with 3-HP producibility transformed with the recombinant expression vector of claim 1,

wherein the method further comprising;

overexpressing glycerol dehydratase (DhaB), DhaB reactivase (GdrAB), or α-

ketoglutaric semialdehyde dehydrogenase (KGSADH) by using the 3-HP inducible promoter of claim 1; and

deleting 3hpdh, 3hibdh, and mmsadh genes of claim 1.

3. A recombinant gene expression cassette reactive to 3-hydroxypropionic acid (3-HP) or a derivative thereof, the recombinant gene expression cassette comprising a lysR gene encoding a LysR protein that is reactive to 3-HP or a derivative thereof, a promoter comprising two LysR binding sites that are paired with each other for the LysR protein binding and activity , and a gene encoding a target expression protein, wherein the derivative is selected from 3-hydroxyisobutyrate(3HIB) or 3-hydroxybutyrate(3-HB).

4. The recombinant gene expression cassette of claim 3, wherein the LysR protein or the promoter is derived from a microorganism having degradability of 3-HP.

5. The recombinant gene expression cassette of claim 4, wherein the microorganism having degradability of 3-HP is one selected from the group consisting of *Achromobacter denitrificans, Acidovorax avenae subsp., Acidovorax sp., Acinetobacter baumannii, Aeromonas hydrophilia, Agrobacterium sp.*, *Alcaligenes faecalis, Alcanivorax hongdengensis, Alicycliphilus denitrificans, Alteromonas marina, Amycolatopsis sp.*, *Anaeromyxobacter dehalogenans*, *Azospirillum brasilense*, *Azotobacter vinelandii*, *Beijerinckia indica*, *Bordetella avium*, *Bradyrhizobium japonicum*, *Burkholderia ambifaria*, *Catenulispora acidiphilia*, *Caulobacter sp.*, *Castellaniella defragrans*, *Chromobacterium violaceum*, *Collimonas arenae*, *Comamonas testosteroni*, *Corynebacterium vitaeruminis*, *Cupriavidus necator*, *Curvibacter gracilus*, *Delftia acidovorans*, *Ferrimonas balearica*, *Glaciecola nitratireducens*, *Gordonia bronchialis*, *Hahella chijuensis*, *Halomonas elongata*, *Hirschia litorea*, *Idiomarina sp.*, *Janthinobacterium lividum*, *Kitasatospora setae*, *Kutzneria albida*, *Methylobacterium sp.*, *Methylocystis* sp., *Novosphingobium sp.*, *Oceanimonas smirnovii*, *Paracoccus sp.*, *Parvibaculum lavamentivorans*, *Phenylobacterium kunshanensis*, *Photobacterium gaetbuleda*, *Polynucleobacter necessarius asymbioticus*, *Pseudoalteromonas carrageenovora*, *Pseudogulbenkiania sp.*, *Pseudomonas denitrificans* ATCC13867, *P. knackmussii*, *P. protegens*, *P. fluorescens*, *Pseudoxanthomonas spadix*, *Psychrobacter phenylpyruvicus*, *Ralstonia oxalatica*,

Rhodomicrobium vannielli, *Segniliparus rotundus*, *Shewanella oneidensis*, *Simiduia agarovorans*, *Sinorhizobium meliloti*, *Sphingobium chlorophenolicum*, *Sphingomonas wittichii*, *Sphingopyxis alaskensis*, *Stenotrophomonas maltophilia*, *Streptomyces nodosus*, *Tatlockia micdadei*, *Thalassospira xiamenensis*, *Variovorax paradoxus*, *Verminephrobacter eiseniae*, *Vibrio furnissii*, *Xanthobacter autotrophicus*, *Xanthomonas campestri*, and *Xanthomonas oryzae*.

6. The recombinant gene expression cassette of claim 3, wherein the LysR protein comprises an N-terminal domain having a helix-turn-helix structure and binding to DNA, a C-terminal domain binding to 3-HP or a derivative thereof, and a C-terminal domain contributing to stabilization of a LysR protein dimer.

7. The recombinant gene expression cassette of claim 6, wherein the N-terminal domain having a helix-turn-helix structure and binding to DNA comprises an amino acid sequence represented by SEQ ID NO: 1 or 2.

8. The recombinant gene expression cassette of claim 6, wherein the C-terminal domain binding to 3-HP or a derivative thereof comprises an amino acid sequence represented by SEQ ID NO: 3.

9. The recombinant gene expression cassette of claim 6, wherein the C-terminal domain contributing to stabilization of a LysR protein dimer comprises an amino acid sequence represented by SEQ ID NO: 4.

10. The recombinant gene expression cassette of claim 3, wherein each of the two LysR binding sites to a LysR protein comprises a base sequence selected from SEQ ID NOs: 5 to 43.

11. The recombinant gene expression cassette of claim 10, wherein each of the two LysR binding sites to a LysR protein comprises i) a base sequence selected from SEQ ID Nos. 5 to 43 or ii) an inverted repeat sequence consisting of a sequence selected from SEQ ID Nos: 5 to 43.

12. The recombinant gene expression cassette of claim 11, wherein each of the binding sites to a LysR protein comprises a base sequence selected from SEQ ID NOs: 44 or 45.

13. A recombinant expression vector comprising the recombinant gene expression cassette of any one of claims 3 to 12.

14. A recombinant microorganism transformed with the recombinant expression vector of claim 13.

15. A recombinant microorganism comprising the recombinant gene expression cassette of any one of claims 3 to 12 inserted to a chromosome of a host cell.

16. A method of producing a target expression protein, the method comprising:

culturing the recombinant microorganism with 3-HP producibility transformed with the recombinant expression vector of claim 13.

17. The method of claim 16, wherein the culturing of the recombinant microorganism further comprises adding for 3-hydroxypropionic acid (3-HP) to the culture.