Claims

1. Expression system comprising:

(i) a first gene encoding for a first enzyme linked to a first promoter, wherein the first promoter is a time delay promoter; and

(ii) a second gene encoding for a second enzyme capable of using the product generated by the first enzyme as a substrate, wherein the second gene is operably linked to a second promoter, wherein the second promoter is inducible by the product generated by the first enzyme,

wherein the substrate of the enzyme encoded by the first gene is a hydroxycinnamic acid or derivative thereof selected from the group consisting of ferulic acid, caffeic acid, and p-coumaric acid.

2. The expression system of claim 1, wherein the expression system further comprises a third gene encoding a transcription factor that represses expression of the second gene in the absence of the product generated by the first enzyme, wherein the third gene is operably linked to a third promoter that regulates expression of the third gene.

3. The expression system of claim 1 or 2, wherein (i) the expression system is a cell-based expression system, or (ii) the expression system is a prokaryotic, heterologous expression system.

4. The expression system of any one of claims 1-3, wherein (i) the time delay promoter sequence comprises a consensus sequence set forth in SEQ ID NO:1, or (ii) the time delay promoter sequence comprises a consensus sequence set forth in SEQ ID NO:1 and the time delay promoter is selected from gabDT promoter; otsA promoter; katE promoter; osmY promoter; yhiUV promoter; ecnB promoter; dps promoter; osmE promoter; sodC promoter; rpsV promoter; yahoo promoter and tnaA promoter, or (iii) the time delay promoter sequence comprises a consensus sequence set forth in SEQ ID NO:1 and the time delay promoter comprises a gabDT promoter, wherein the time delay promoter has the nucleotide sequence set forth in SEQ ID NO:3, and/ or (iv) the time delay promoter is

activatable by a transcription factor comprising amino acid sequence set forth in SEQ ID NO:2 or a functional variant.

5. The expression system of any one of claims 1-4, wherein (i) the first gene encodes a feruloyl CoA synthetase, and/ or (ii) the first gene has the nucleotide sequence set forth in SEQ ID NO:4, and/or (iii) the second promoter has the nucleotide sequence set forth in SEQ ID NO:6, and/ or (iv) the second gene has the nucleotide sequence set forth in SEQ ID NO:5.

6. An isolated nucleic acid molecule comprising:

a. a first gene encoding for a first enzyme linked to a first promoter, wherein the first promoter is a time delay promoter; and

b. a second gene encoding for a second enzyme capable of using the product generated by the first enzyme as a substrate, wherein the second gene is operably linked to a second promoter, wherein the second promoter is inducible by the product generated by the first enzyme,

wherein the substrate of the enzyme encoded by the first gene is a hydroxycinnamic acid or derivative thereof selected from the group consisting of ferulic acid, caffeic acid, and p-coumaric acid.

7. The isolated nucleic acid molecule of claim 6, wherein the isolated nucleic acid molecule further comprises a third gene encoding a transcription factor that represses expression of the second gene in the absence of the product generated by the first enzyme, wherein the third gene is operably linked to a third promoter that regulates expression of the third gene.

8. The isolated nucleic acid molecule of claim 6 or 7, wherein the nucleic acid molecule is comprised in a plasmid, the plasmid being a cell-based, wherein the cell is a prokaryotic cell and the plasmid is heterologous.

9. The isolated nucleic acid molecule of any one of claims 6-8, wherein (i) the time delay promoter sequence comprises a consensus sequence set forth in SEQ ID NO:1, or (ii) the time delay promoter sequence comprises a consensus

sequence set forth in SEQ ID NO:1 and the time delay promoter is selected from gabDT promoter; otsA promoter; katE promoter; osmY promoter; yhiUV promoter; ecnB promoter; dps promoter; osmE promoter; sodC promoter; rpsV promoter; yahoo promoter and tnaA promoter, or (iii) the time delay promoter sequence comprises a consensus sequence set forth in SEQ ID NO:1 and the time delay promoter comprises a gabDT promoter, wherein the time delay promoter has the nucleotide sequence set forth in SEQ ID NO:3, and/ or (iv) the time delay promoter is activatable by a transcription factor comprising amino acid sequence set forth in SEQ ID NO:2 or a functional variant.

10. The isolated nucleic acid molecule of any one of claims 6-9, wherein (i) the first gene encodes a feruloyl CoA synthetase, and/ or (ii) the first gene has the nucleotide sequence set forth in SEQ ID NO:4, and/ or (iii) the second promoter has the nucleotide sequence set forth in SEQ ID NO:6, and/ or (iv) the second gene has the nucleotide sequence set forth in SEQ ID NO:5.

11. A host cell comprising the expression system of any one of claims 1-5 or the isolated nucleic acid molecule of any one of claims 6-10.

12. The host cell of claim 11, wherein (i) the host cell is a prokaryotic cell, preferably a bacterial cell, and/ or (ii) the host cell is an E.coli cell.

13. A method of converting a substrate to a product comprising the steps of:

a. subjecting the expression system of any one of claims 1-5 or the host cell according to claim 11 or 12 under conditions that allow the expression of the first and second enzyme; and

b. isolating the product from said host cell,

wherein the product is (i) a hydroxybenzaldehyde, or (ii) vanillin, or (iii) p-hydroxybenzoate.

14. The method of claim 13, wherein the method uses the host cell of claim 11 and further comprises the step of cultivating the host cells under conditions that

allow the growth of the host cells, wherein said step is conducted prior to or simultaneously with step (a).