What is claimed is:

1. A method for controlling the metabolic profile of a fermentation culture comprising at least one carboxydotrophic acetogenic microorganism, the method comprising:
    a. flowing a gaseous substrate comprising CO and CO_2 to a first bioreactor comprising a culture of the microorganism in a liquid nutrient medium to produce at least one product derived from acetyl CoA and at least one product derived from pyruvate; and
    b. adjusting the amount of CO_2 dissolved in the liquid nutrient medium, wherein an increase in the amount of CO_2 dissolved in the liquid nutrient medium results in an increased ratio of products derived from pyruvate to products derived from acetyl CoA and a decrease in the amount of CO_2 dissolved in the liquid nutrient medium results in a decreased ratio of products derived from pyruvate to products derived from acetyl CoA, where the amount of CO_2 dissolved in the liquid nutrient medium is adjusted by: 1) controlling the flow of CO_2 to the bioreactor; 2) controlling the concentration of CO_2 in the inlet gas; 3) controlling the CO2 partial pressure in the bioreactor; 4) controlling the agitation rate within the bioreactor; or 5) controlling the amount of CO consumed by the culture.

2. The method of claim 1, wherein the fermentation is carried out at a pressure of greater than 250 kPag such that the concentration of CO_2 dissolved in the liquid nutrient medium is increased.

3. The method of claim 1, wherein the fermentation is carried out at a pressure of less than 200 kPag such that the concentration of CO_2 dissolved in the liquid nutrient medium is reduced.

4. The method of claim 1, wherein the concentration of CO_2 in the gaseous substrate provided to the bioreactor is from 15% to 65% by volume.

5. The method of claim 1, wherein the concentration of CO_2 in the gaseous substrate provided to the bioreactor is increased over time.

6. The method of claim 1, wherein the at least one product derived from pyruvate is selected from the group consisting of 2,3-butanediol, lactate, succinate, methyl ethyl ketone (MEK), 2-butanol, propanediol, 2-propanol, isopropanol, acetoin, isobutanol, citramalate, butadiene and poly lactic acid (PLA).

7. The method of claim 1, further comprising passing an exit gas comprising CO_2 from the first bioreactor either back to the first bioreactor or to a second bioreactor for use as a substrate.

8. The method of claim 7, wherein the exit gas comprising CO_2 is blended with at least one gaseous substrate prior to being fed to the first bioreactor or the second bioreactor.

9. The method of claim 7, wherein at least one additional gaseous substrate is fed to the second bioreactor for use as a substrate.

10. The method of claim 7, further comprising taking an exit gas from the second bioreactor and passing it to the first bioreactor for use as a substrate.

11. The method of claim 1, further comprising increasing a rate of CO oxidation via a ferredoxin dependent carbon monoxide dehydrogenase.

12. The method of claim 1, wherein the microorganism is selected from the group consisting of *Moorella, Clostridium, Ruminococcus, Acetobacterium, Eubacterium, Butyribacterium, Oxobacter, Methanosarcina,* and *Desulfotomaculum.*

13. The method of claim 1, wherein the microorganism is selected from the group consisting of *Clostridium autoethanogenum, Clostridium ljungdahlii, Clostridium ragsdalei, Clostridium carboxidivorans,* and *Clostridium coskatii*.

14. The method of claim 1, wherein the product derived from acetyl CoA is ethanol and the product derived from pyruvate is 2,3-butanediol.

15. The method of claim 1, wherein the amount of CO_2 dissolved in the liquid nutrient medium is greater than 11.05 mM such that the at least one product derived from pyruvate is produced at a rate of at least 2.18 g/L/day.

16. The method of claim 1, wherein the amount of CO_2 dissolved in the liquid nutrient medium is greater than 26.1 mM such that the at least one product derived from pyruvate is produced at a rate of at least 8 g/L/day.