

**Table S3. Core model (iGD726) biomass composition.**

Component	Percent dry mass	Composition - %
DNA <sup>a</sup>	2.8	Guanine - 31.05 Cytosine - 31.05 Adenine - 18.95 Thymine - 18.95
RNA <sup>b</sup>	7.1	Guanine - 28.09 Cytosine - 28.09 Adenine - 21.91 Uracil - 21.91
Protein <sup>c</sup>	49.3	Lysine - 3.20 Alanine - 12.01 Leucine 10.19 Phenylalanine - 3.94 Arginine 7.33 Glutamine - 2.90 Glycine - 8.46 Methionine - 2.44 Valine - 7.58 Proline - 5.03 Tyrosine - 2.29 Aspartate - 5.31 Glutamate - 5.84 Histidine - 2.11 Threonine - 5.15 Cysteine - 0.93 Isoleucine - 5.48 Tryptophan - 1.38 Asparagine - 2.64 Serine - 5.80
Phosphatidylglycerol <sup>d</sup>	1.001	Phosphatidylglycerol-1-palmitoleoyl-2-palmitic - 0.4 Phosphatidylglycerol-1,2-palmitic-2-palmitic - 1.4 Phosphatidylglycerol-1-cis-vaccenoyl-2-palmitoleoyl - 1.8 Phosphatidylglycerol-1-cis-vaccenoyl-2-palmitic - 24.9 Phosphatidylglycerol-1-palmitic-2-cis-vaccenoyl - 1.7 Phosphatidylglycerol-1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated) - 1.1 Phosphatidylglycerol-1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl - 1.1 Phosphatidylglycerol-1-cis-vaccenoyl(cyclopropanated)-2-palmitic - 2.6 Phosphatidylglycerol-1-cis-vaccenoyl-2-cis-vaccenoyl - 57.3 Phosphatidylglycerol-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl - 7.3 Phosphatidylglycerol-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated) - 0.3
Cardiolipin <sup>d</sup>	0.398	Cardiolipin-1,2-(1-palmitoleoyl-2-palmitic) - 0.4 Cardiolipin-1,2-(1,2-palmitic) - 1.4 Cardiolipin-1,2-(1-cis-vaccenoyl-2-palmitoleoyl) - 1.8 Cardiolipin-1,2-(1-cis-vaccenoyl-2-palmitic) - 24.9 Cardiolipin-1,2-(1-palmitoleoyl-2-palmitic) - 1.7 Cardiolipin-1,2-(1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated)) - 1.1 Cardiolipin-1,2-(1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl) - 1.1 Cardiolipin-1,2-(1-cis-vaccenoyl(cyclopropanated)-2-palmitic) - 2.6 Cardiolipin-1,2-(1-cis-vaccenoyl-2-cis-vaccenoyl) - 57.3 Cardiolipin-1,2-(1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl) - 7.3 Cardiolipin-1,2-(1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated)) - 0.3
Phosphatidylethanolamine <sup>d</sup>	1.754	Phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitoleoyl - 0.9 Phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitic - 7.0 Phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated) - 1.05 Phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl - 1.05 Phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-palmitic - 2.9 Phosphatidylethanolamine-1,2-cis-vaccenoyl - 47.2 Phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl - 35.5 Phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated) - 4.4
Monomethylethanolamine <sup>d</sup>	1.491	Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitoleoyl - 0.9 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitic - 7.0 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated) - 1.05 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl - 1.05 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-palmitic - 2.9 Monomethyl-phosphatidylethanolamine-1,2-cis-vaccenoyl - 47.2 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl - 35.5 Monomethyl-phosphatidylethanolamine-1-cis-vaccenoyl(cyclopropanated)-2-cis-

Phosphatidylcholine <sup>d</sup>	7.670	vaccenoyl(cyclopropanated) - 4.4
		Phosphatidylcholine-1-cis-vaccenoyl-2-palmitoleoyl - 0.9
		Phosphatidylcholine-1-cis-vaccenoyl-2-palmitic - 7.0
		Phosphatidylcholine-1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated) - 1.05
		Phosphatidylcholine-1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl - 1.05
		Phosphatidylcholine-1-cis-vaccenoyl(cyclopropanated)-2-palmitic - 2.9
		Phosphatidylcholine-1,2-cis-vaccenoyl - 47.2
		Phosphatidylcholine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl - 35.5
		Phosphatidylcholine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated) - 4.4
		Sulfoquinovosyldiacylglycerol <sup>d</sup>
Sulfoquinovosyl-1,2-palmitic-sn-glycerol - 17.2		
Sulfoquinovosyl-1-cis-vaccenoyl-2-palmitoleoyl - 1.4		
Sulfoquinovosyl-1-cis-vaccenoyl-2-palmitic - 21.8		
Sulfoquinovosyl-1-palmitic-2-cis-vaccenoyl - 10.1		
Sulfoquinovosyl-1-cis-vaccenoyl-2-palmitoleoyl(cyclopropanated) - 0.75		
Sulfoquinovosyl-1-cis-vaccenoyl(cyclopropanated)-2-palmitoleoyl - 0.75		
Sulfoquinovosyl-1-cis-vaccenoyl(cyclopropanated)-2-palmitic - 3.1		
Sulfoquinovosyl-1-palmitic-2-cis-vaccenoyl(cyclopropanated)-sn-glycerol - 2.3		
Sulfoquinovosyl-1-cis-vaccenoyl-2-cis-vaccenoyl-sn-glycerol - 17.8		
Sulfoquinovosyl-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl-sn-glycerol - 10.5		
Sulfoquinovosyl-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated)-sn-glycerol - 0.5		
Sulfoquinovosyl-1-cis-vaccenoyl-steric-sn-glycerol - 10.8		
Ornithine lipids <sup>d</sup>	0.230	
		Ornithine-1-steric-2-palmitoleoyl - 0.7
		Ornithine-1-palmitic-2-cis-vaccenoyl(cyclopropanated) - 1.0
		Ornithine-1-steric-2-palmitoleoyl(cyclopropanated) - 2.1
		Ornithine-1-cis-vaccenoyl-2-cis-vaccenoyl - 3.0
		Ornithine-1-steric-2-cis-vaccenoyl - 37.1
		Ornithine-1-cis-vaccenoyl-2-cis-vaccenoyl(cyclopropanated) - 5.3
		Ornithine-1-steric-2-cis-vaccenoyl(cyclopropanated) - 49.8
		Ornithine-1-cis-vaccenoyl(cyclopropanated)-2-cis-vaccenoyl(cyclopropanated) - 0.6
Poly-3-hydroxybutyrate	17.6	N/A
Glycogen	0.4	N/A
Lipopolysaccharide	3	N/A
Peptidoglycan	2	N/A
Low molecular weight succinoglycan <sup>e</sup>	4	N/A
High molecular weight succinoglycan <sup>e</sup>	1	N/A
Vitamins, cofactors, coenzymes, ions, and other <sup>f</sup>	Trace	Polyphosphate
		Pantothenate
		Coenzyme A
		NAD <sup>+</sup> ; NADH
		NADP <sup>+</sup> ; NADPH
		FAD <sup>+</sup> , FADH <sub>2</sub>
		Folate; Tetrahydrofolate; 5,10-Methylenetetrahydrofolate
		Thiamine diphosphate
		Riboflavin
		Biotin
		Heme A
		Vitamin B12 coenzyme
		Undecaprenyl diphosphate
		Ubiquinone-8
		Pyridoxal phosphate
		Glutathionine reduced
		Glutathionine oxidized
		All-trans-Phytoene
		Holo-carboxylase
		Co <sup>2+</sup> (Cobalt)
		Mg <sup>+</sup> (Magnesium)
		Ca <sup>2+</sup> (Calcium)
		Mn <sup>2+</sup> (Manganese)
Fe <sup>3+</sup> (Iron)		
Fe <sup>2+</sup> (Iron)		
Zn <sup>2+</sup> (Zinc)		
K <sup>+</sup> (Potassium)		
Na <sup>+</sup> (Sodium)		

<sup>a</sup> Composition based on the overall GC content of *S. meliloti* [1].

- <sup>b</sup> The GC content for mRNA was estimated from the overall GC content of *S. meliloti* [1]. The GC content of tRNA was estimated based on the GC content of the 10 most common codons in *S. meliloti* [1,2]. The GC content of rRNA was determined based on the *rrn* loci of *S. meliloti* [1]. The overall composition of cellular RNA was determined assuming 80% rRNA, 15% tRNA, and 5% mRNA.
- <sup>c</sup> The amino acid composition was estimated based on the codon usage of *S. meliloti* [2].
- <sup>d</sup> The membrane lipid composition used was as previously determined for *S. meliloti* [3].
- <sup>e</sup> A 4:1 ratio of low molecular weight (LMW) to high molecular weight (HMW) succinoglycan was set as previously determined [4].
- <sup>f</sup> Each of these compounds were included at an equal, trace concentration in the biomass.

## REFERENCES

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2. Nakamura Y, Gojobori T, Ikemura T. Codon usage tabulated from international DNA sequence databases: status for the year 2000. *Nucleic Acids Res*. 1999;28: 292.
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