

Glycerol utilization as a sole carbon source disrupts the membrane architecture and solventogenesis in *Clostridium beijerinckii* NCIMB 8052

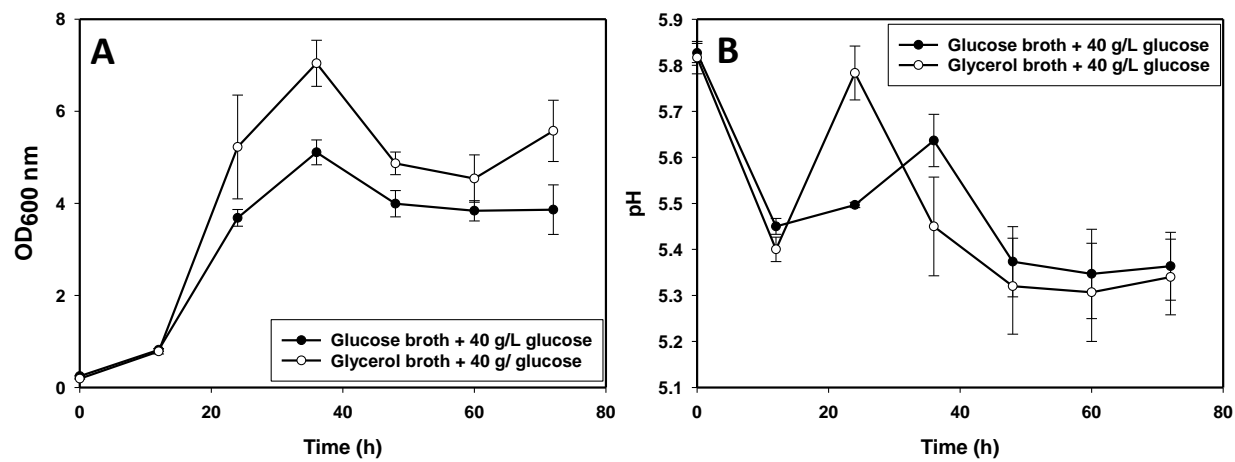


Figure S1. Optical density and culture pH of *C. beijerinckii* grown in culture broth following initial growth of the organism for 24 h on glycerol or glucose. **A:** optical density, **B:** culture pH.

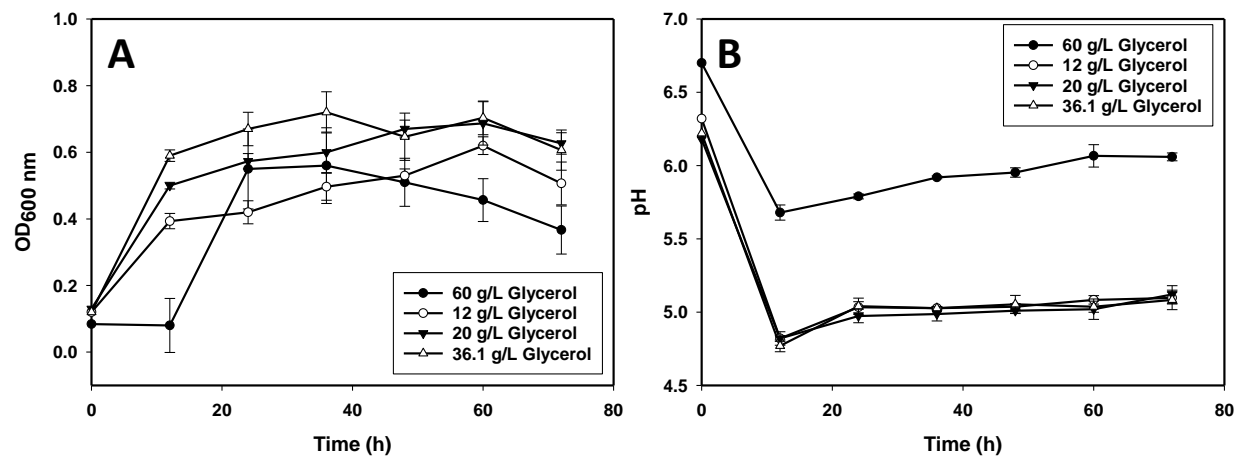


Figure S2. Optical density and culture pH of *C. beijerinckii*-pre-grown glycerol and glucose culture broths with additional supply of 40 g/L glucose. **A:** optical density, **B:** culture pH.

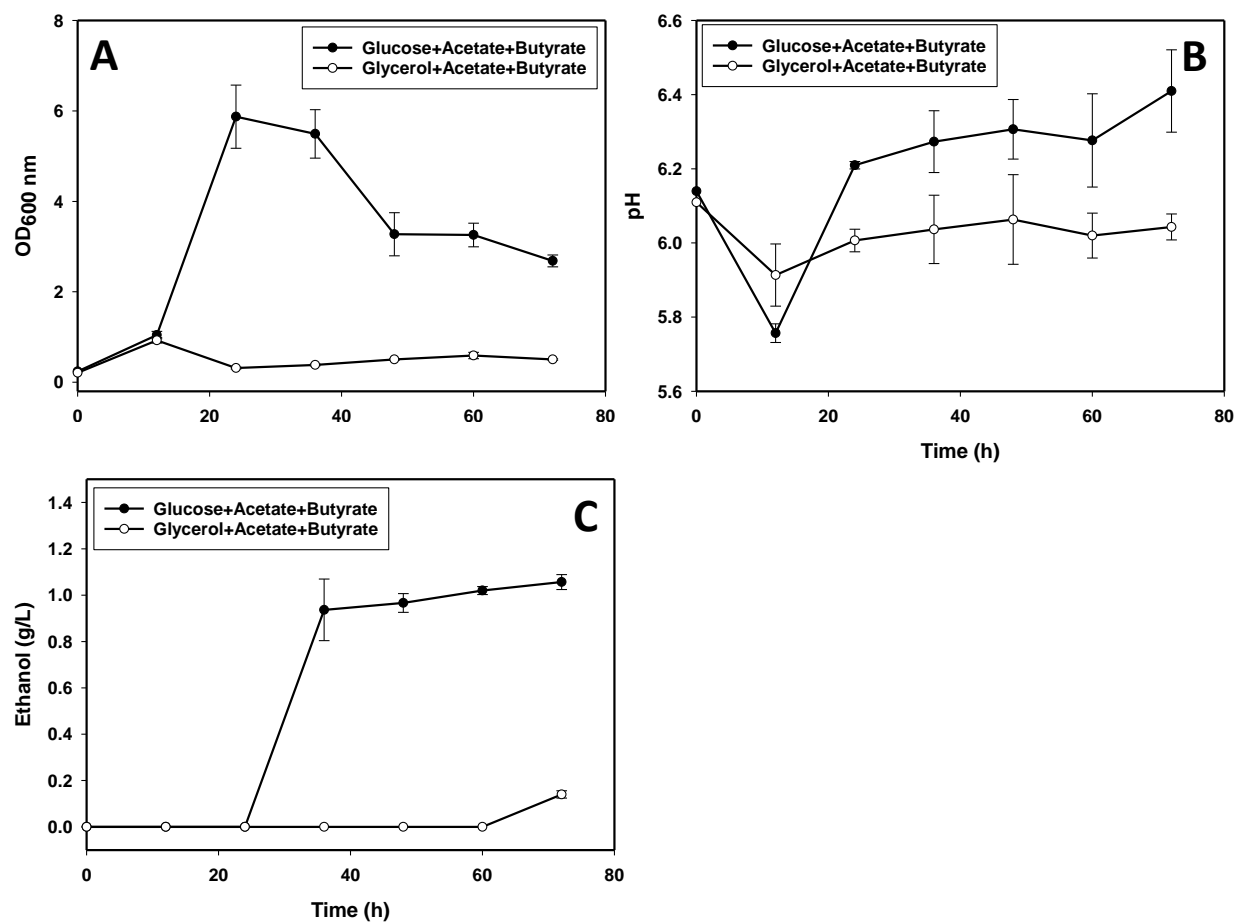


Figure S3. Optical density, pH and ethanol profiles of *C. beijerinckii* grown on glycerol and glucose as a sole carbon source with the supply of 6 and 3.5 g/L acetate and butyrate. **A:** optical density, **B:** culture pH, **C:** ethanol profile.

Table S1. List of compounds detected in cultures of *C. beijerinckii* grown on glycerol or glucose

Compound	Glu+A		Gly+A		Gly-A	
	Cell extract	Broth extract	Cell extract	Broth extract	Cell extract	Broth extract
Butanol	+	+	-	-	-	-
2,2-Dimethoxybutane	+	-	+	-	+	+
Butyric acid	+	+	+	+	+	+
Phenol	+	+	-	-	-	-
Phthalic acid	+	-	-	-	-	-
Cyclopentaneundecanoic acid, methyl ester	+	-	-	-	-	-
Tetradecanoic acid	+	+	+	-	+	-
Cyclopentadecane	+	-	-	-	-	-
Hexadecanoic acid, methyl ester	+	-	+	-	+	-
n-Hexadecanoic acid	+	+	+	+	+	-
Hexadecanoic acid, butyl ester	+	-	-	-	-	-
Glycerol	-	-	+	+	+	+
Cyclopentane	-	-	+	-	-	-
Acetate	-	+	+	+	-	-
Cyclotetradecane	-	-	+	-	-	-
Crotonaldehyde	-	-	+	-	-	-
Propanamide	-	-	+	-	-	-
Benzoic acid	+	+	+	+	+	+
1,13-Tetradecadiene	-	-	-	-	+	-
9-Octadecene	-	-	-	-	+	-
1,5,9-Cyclododecatriene	-	-	-	-	+	-
1-Octadecene	-	+	-	-	-	-
1,2,3,4-Butanetetrol, [S-(R*,R*)]- dl-threitol	-	-	-	+	-	-
1,15-Hexadecadiene	-	-	-	-	-	+
5-Octadecene	-	-	-	-	-	+

Glu+A = glucose + acetate; Gly+A = glycerol + acetate; Gly-A = glycerol – acetate.

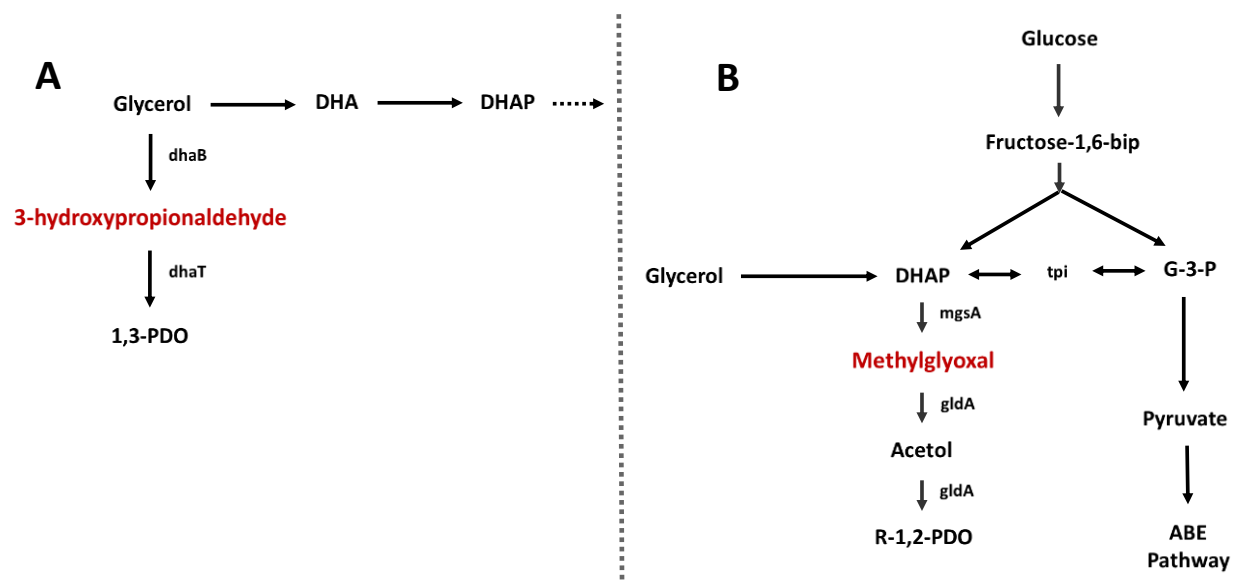


Figure S4. Possible pathways that may lead to accumulation of toxic intermediates in cultures of *C. beijerinckii* grown solely on glycerol. **A:** The toxic metabolite 3-hydroxypropionaldehyde may accumulate via an uncharacterized incomplete 1,3-PDO pathway. **B:** Methylglyoxal may accumulate due to weak or incomplete transformation to 1,2-PDO. dhaB – glycerol dehydratase, dhaT – 1,3-PDO dehydrogenase, mgsA – methylglyoxal synthase, gldA – glycerol dehydrogenase.