

Supporting Information for

**Feasibility of efficient direct butanol production from food waste
without nutrient supplement by *Clostridium*
saccharoperbutylacetonicum N1-4**

**Xiaona Wang^{a,1}, Haishu Sun^{a,1}, Yonglin Wang^a, Fangxia Wang^a, Wenbin Zhu^a,
Chuanfu Wu^{a,b}, Qunhui Wang^{a,b}, Ming Gao^{a,b,*}**

*^a Department of Environmental Engineering, School of Energy and Environmental
Engineering, University of Science and Technology Beijing, 30 Xueyuan Road, Haidian
District, Beijing 100083, China*

*^b Beijing Key Laboratory on Resource-oriented Treatment of Industrial Pollutants,
University of Science and Technology Beijing, 30 Xueyuan Road, Haidian District,
Beijing 10083, China*

¹Xiaona Wang and Haishu Sun contributed equally to this work.

** Correspondence to: Ming Gao*

*Department of Environmental Science and Engineering, University of Science and
Technology Beijing, Beijing Key Laboratory on Resource-oriented Treatment of
Industrial Pollutants, 30 Xueyuan Road, Haidian District, Beijing 100083, China,
TEL/FAX: +86-(010)-6233-2778,
E-mail: gaoming402@gmail.com*

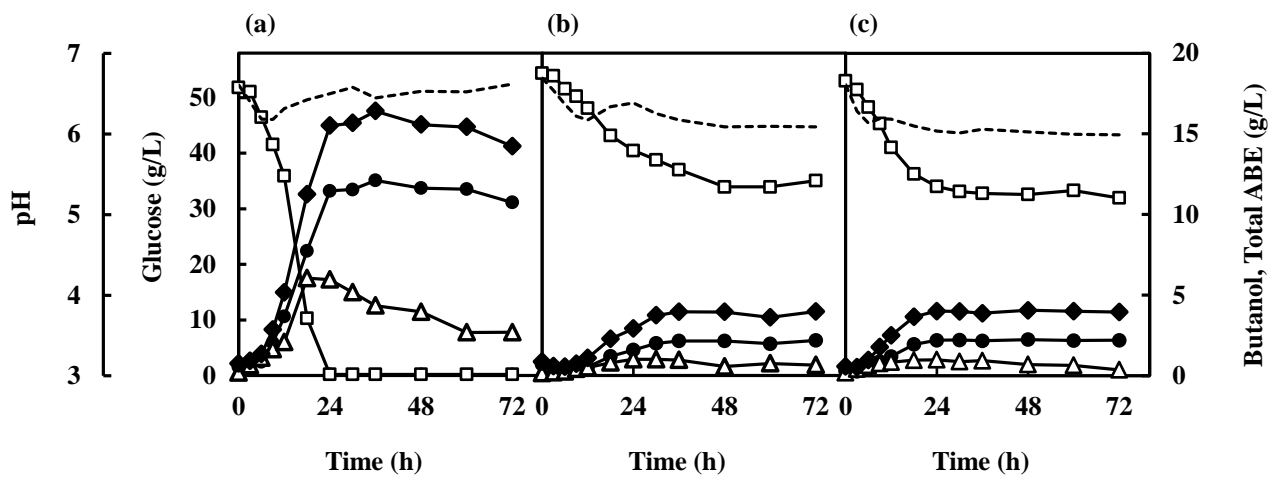


Figure. S1. Time course of batch culture with different ABE-producing clostridia using 50 g/L glucose as substrate. (a) *Clostridium saccharoperbutylacetonicum* N1-4; (b) *Clostridium acetobutylicum* ATCC 824; (c) *Clostridium beijerinckii* NCIMB 8052. \square , glucose concentration; \triangle , dry cell weight; \bullet , butanol concentration; \blacklozenge , total solvents concentration; dashed line, pH.

Table S1. Solvents production by different ABE-producing clostridia using glucose as substrate

Strains	Max. solvents production (g/L)				Glucose consumption (g/L)	Butanol yield (C-mol/C-mol)	Max. butanol production rate ^a (g/L/h)
	Acetone	Butanol	Ethanol	Total ABE			
<i>C. saccharoperbutylacetonicum</i> N1-4	3.81	12.1	0.483	16.4	51.6	0.364	0.679 (12–18 h)
<i>C. acetobutylicum</i> ATCC 824	1.55	2.15	0.273	3.95	20.5	0.134	0.112 (12–18 h)
<i>C. beijerinckii</i> NCIMB 8052	1.76	2.25	0.0787	4.06	20.4	0.155	0.125 (12–18 h)

Batch cultures were performed using *C. saccharoperbutylacetonicum* N1-4 (30°C), *C. acetobutylicum* ATCC 824 (37°C) and *C. beijerinckii* NCIMB 8052 (37°C) respectively for 72 h in TYA medium containing 50 g/L glucose (working volume, 300 mL; initial dry cell weight, around 0.20 g/L).

^a Butanol production rate (g/L/h) = $(C_2 - C_1) / (t_2 - t_1)$, where C is the butanol concentration (g/L), t is the sampling time (h); the period for the calculation is shown in the following parenthesis.

Native starch is composed of amylose and amylopectin

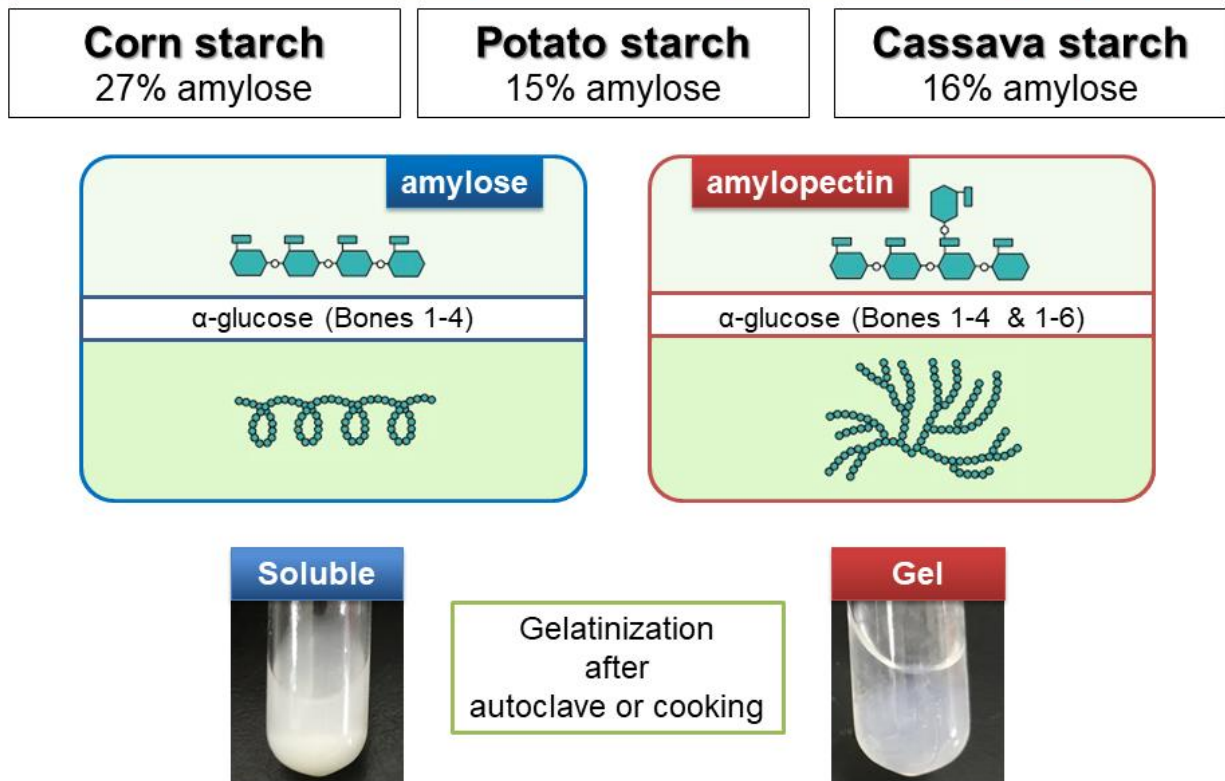


Figure. S2. The experimental phenomenon of amylose and amylopectin gelatinization after autoclave in the batch cultures (preparation of starchy carbon source in the text tube experiments).