Table S1. Mass and energy balances of Aspen HYSYS simulation of unmodified process of glycerol carbonate production

	Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Total Phase Properties																		
Vapour Fraction		0,00000	0,00000	0,00000	0,00000	1	0,00000	0,4573	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000
Temperature	*C*	25	25	49,5080685	95	95	95	95	80	268.2	120	120.1	275.3	130.7	21.12	21.19	50.14	28.20
Pressure	kPa	101.13	101.13	101.13	101.13	101.13	101.13	101.13	101.13	20	20	101.3	20	10	10	101.3	30	20
Mass enthalpy	kJ/kg	-7358	-2187	-3502	-3336	-3095	-2703	-2845	-3080	-1943	-2371	-2371	-1813	-6843	-3523	-3523	-2493	−7460.6
Mass Flow	kg/h	1379	4046,4	5425.4	5425.4	1520.3	3466.2	5425.4	5425.4	1754.1	1754.1	1754.1	1713.2	40.9	3671.3	3671.3	2952.9	718.4
Compositions																		
Comp Mass Frac (Glycerol)		1	0,00000	0.2542	0.2542	0,00000	0.0159	0.0102	0.0102	0.0314	0.0314	0.0314	0.0094	0.9535	0,00000	0,00000	0,00000	0,00000
Comp Mass Frac (Dimethyl Carbonate*)		0,00000	1	0.7458	0.7458	0.6898	0.4039	0.5072	0.5072	0.0008	0.0008	0.0008	0,00000	0.0343	0.2509	0.2509	0.9313	0.0001
Comp Mass Frac (Glycerol Carbonate*)		0,00000	0,00000	0,00000	0,00000	0.0002	0,48970	0,31290	0,31290	0,96780	0,96780	0,96780	0,00000	0,01210	0,00000	0,00000	0,00000	0,00000
Comp Mass Frac (Methanol)		0,00000	0,00000	0,00000	0,00000	0,31010	0,09050	0,16980	0,16980	0,00000	0,00000	0,00000	0.9906	0,00000	0.7491	0.7491	0.0687	0.9999

Table S2. Mass and energy balances of Aspen HYSYS simulation of modified process of glycerol carbonate production

	Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Total Phase Properties														
Vapour Fraction		0	0	0	0	1	0	0,999968585	0	0	0	0	0	0
Temperature	*C*	25	25	49,5080685	95	95	95	94,99998488	70	78,77971755	94,90811141	91,10116997	109,8144592	91,101871
Pressure	*atm*	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004	1,000000004
Molar Flow	*kgmole/h*	14,97366831	44,96	105,8972386	105,8972386	120,8635389	0,003799601	120,8673385	120,8673385	59,82636461	61,04097357	46,00692824	15,03404513	45,96357024
Mass Flow	*kg/h*	1379,000002	4046,4	9638,43332	9638,43332	9637,926127	0,339528525	9638,265656	9638,265656	3650,54116	5987,724481	4216,948338	1770,776125	4213,033319
Liquid Volume Flow	*m3/h*	1,093767326	3,785219832	8,722258138	8,722258138	8,835505492	0,000292646	8,835798138	8,835798138	3,721787571	5,114010551	3,846906813	1,267103721	3,84327098
Heat Flow	*kJ/h*	-10147219,015	-8993310,8643	-28321687,8587	-27794642,3586	-21595153,3821	-997,5400	-21596150,9221	-25910965,6606	-12833167,4939	-12875201,6035	-9189675,989	-3675274,784	-9181157,979
Compositions														
Comp Mole Frac (Glycerol)	*mole*	1	0	0,14140	0,14140	0,00003	0,10729	0,00003	0,00003	0,00000	0,00006	0,00000	0,00024	0,00000
Comp Mole Frac (Dimethyl Carbonate*)	*mole*	0	1	0,81516	0,81516	0,59035	0,50435	0,59035	0,59035	0,49870	0,68017	0,89999	0,00748	0,89992
Comp Mole Frac (Glycerol Carbonate*)	*mole*	0	0	0,03767	0,03767	0,15686	0,25178	0,15686	0,15686	0,00085	0,30977	0,08674	0,99228	0,08679
Comp Mole Frac (Methanol)	*mole*	0	0	0,00577	0,00577	0,25277	0,13658	0,25276	0,25276	0,50045	0,01001	0,01328	0,00000	0,01328
Energy Streams														
	Unit	**Q-100**	**Q-101**	**Q-102**	**Q-103**	**Q-104**	**Q-105**	**Q-106**	**Q-103**	**Q-104**	**Q-105**	**Q-106**		
Heat Flow	*kJ/h*	527045,5001	6198491,437	4314814,739	6098185,011	6298653,222	4568916,399	4579036,312	6098185,011	6298653,222	4568916,399	4579036,312		