

Table S1
Cost of the main units in the plant

Model	Type of Equipment	Cost per unit (x10 ⁴ US\$)													
		10,000					35,000								
		L/day					L/day								
		100:0	80:20	50:50	20:80	0:100	0:100	0:100	0:100	0:100	100:0	80:20	50:50	20:80	0:100
Crusher	Wood chipper machine			1.30			1.30	1.30	1.30	1.30					1.30
SE	HP jacketed vessel			3.75			4.13	6.25	7.50	8.13					9.38
Hot water washing	Agitated jacketed vessel			3.00			4.20	5.70	6.90	8.40					9.90
H ₂ O ₂	Agitated jacketed vessel			3.90			5.10	6.90	8.70	1.02					1.20
Neutralize	Agitated jacketed vessel			5.40			6.30	8.40	1.20	1.47					1.71
Centrifuge	Horizontal Spiral Centrifuge			1.54			1.54	1.54	1.54	1.54					1.54
Media tank	Agitated vessel			2.10			2.70	3.60	5.40	6.00					7.20
Storage tank	Vertical vessel			12.0			18.0	24.0	30.0	36.0					42.0
SSF tank	Agitated jacketed vessel			12.0			18.0	24.0	30.0	36.0					42.0
Distillation column	Vacuum distillation column			18.6			20.9	22.5	25.1	27.2					31.2
Membrane	The polyimide 6FDA-NDA/DABA			0.72			0.84	0.11	0.14	0.16					0.25

Table S2
Main unit operations of the plant at various capacities

Model	Type of Equipment	Unit	Size (m ³)					
			10,000 L/day	15,000 L/day	20,000 L/day	25,000 L/day	30,000 L/day	35,000 L/day
SE	HP jacketed vessel	1	3	3.3	5	6	6.5	7.5
Hot water washing	Agitated jacketed vessel	1	10	14	19	23	28	33
H ₂ O ₂	Agitated jacketed vessel	1	12	17	23	29	34	40
Neutralize	Agitated jacketed vessel	1	17	21	28	20	49	57
Media tank	Agitated vessel	1	7	9	12	18	20	24
Storage tank	Vertical vessel	1	40	60	80	100	120	140
SSF tank	Agitated jacketed vessel	21	40	60	80	100	120	140

Table S3
Detailed of purification section

Capacity	10,000					15,000	20,000	25,000	30,000	35,000				
	L/day					L/day	L/day	L/day	L/day	L/day				
EFB:OPT	100:0	80:20	50:50	20:80	0:100	0:100	0:100	0:100	0:100	100:0	80:20	50:50	20:80	0:100
Distillation column														
Number of stages	21					20	20	20	21	21				
Molar reflux ratio	4					4.1	4.1	4.1	4.5	4.7				
Distillation to feed	0.0178					0.0181	0.0812	0.0183	0.0178	0.018				
Feed stage	6					6	6	6	6	6				
Membrane														
Area membrane (m ²)	28.237					42.190	56.271	72.720	84.40	101.77				

Table S4
Capital cost of the plant (x10⁶ US\$) at various capacities

Capacity	10,000 L/day					15,000 L/day	20,000 L/day	25,000 L/day	30,000 L/day	35,000 L/day				
EFB:OPT	100:0	80:20	50:50	20:80	0:100	0:100	0:100	0:100	0:100	100:0	80:20	50:50	20:80	0:100
Equipment cost	3.08	3.08	3.06	3.06	3.07	4.47	5.89	7.34	8.75	10.2	10.2	10.2	10.2	10.2
Installation	1.54	1.54	1.53	1.53	1.53	2.24	2.95	3.67	4.38	5.10	5.10	5.10	5.09	5.10
Process piping	1.23	1.23	1.22	1.22	1.23	1.79	2.36	2.94	3.50	4.08	4.08	4.08	4.07	4.08
Instrumentation	1.08	1.08	1.07	1.07	1.07	1.57	2.06	2.57	3.06	3.57	3.57	3.57	3.56	3.57
Insulation	0.092	0.092	0.091	0.091	0.092	0.134	0.177	0.220	0.263	0.306	0.306	0.306	0.305	0.306
Electrical	0.463	0.463	0.459	0.459	0.460	0.671	0.884	1.10	1.31	1.53	1.53	1.53	1.53	1.53
Buildings	1.39	1.39	1.38	1.38	1.38	2.01	2.65	3.30	3.94	4.59	4.59	4.59	4.58	4.59
Land	0.123	0.123	0.122	0.122	0.123	0.179	0.236	0.294	0.350	0.408	0.408	0.408	0.407	0.408
Engineering	2.25	2.25	2.24	2.236	2.24	3.26	4.30	5.36	6.39	7.45	7.45	7.44	7.43	7.45
Construction	3.15	3.15	3.13	3.13	3.14	4.57	6.02	7.50	8.95	10.4	10.4	10.4	10.4	10.4
Contractor's fee	0.721	0.720	0.715	0.715	0.717	1.04	1.38	1.71	2.04	2.38	2.38	2.38	2.38	2.39
Contingency	1.44	1.44	1.43	1.43	1.43	2.09	2.75	3.43	4.09	4.77	4.77	4.76	4.76	4.77
DFC	16.6	16.6	16.5	16.4	16.5	24.0	31.7	39.4	47.0	54.8	54.8	54.8	54.7	54.9

Table S5
List of operating cost (x10⁵ US\$/year) of the plant at various capacities

Capacity	10,000					15,000	20,000	25,000	30,000	35,000				
	L/day					L/day	L/day	L/day	L/day	L/day				
EFB:OPT	100:0	80:20	50:50	20:80	0:100	0:100	0:100	0:100	0:100	100:0	80:20	50:50	20:80	0:100
Raw Materials	0.221	0.205	0.181	0.158	0.142	0.212	0.283	0.354	0.425	0.775	0.719	0.635	0.551	0.496
Labor	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59
Chemical substance	5.30	5.15	4.89	4.65	4.49	6.73	8.98	11.2	13.5	18.6	18.0	17.1	16.3	15.7
Plant Overhead	1.34	1.34	1.34	1.34	1.34	1.65	1.97	2.30	2.62	2.94	2.94	2.94	2.94	2.95
G and A Expenses	0.268	0.268	0.267	0.267	0.268	0.331	0.395	0.46	0.524	0.589	0.589	0.588	0.588	0.589
Utilities	7.03	6.96	6.92	6.89	6.84	9.06	11.4	12.5	14.6	17.0	16.9	16.7	16.6	16.5
Maintenance	2.78	2.78	2.76	2.76	2.76	4.02	5.31	6.61	0.788	9.18	9.18	9.17	9.16	9.19
Miscellaneous	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Replacement	0.016	0.015	0.014	0.013	0.012	0.019	0.025	0.032	0.038	0.056	0.054	0.051	0.048	0.045
Total operating cost	19.56	19.32	18.98	18.67	18.45	24.6	30.9	36.1	42.1	51.7	51	49.8	48.7	48.0