

**Additional file 4: List of the most highly transcribed genes during *C. beijerinckii* DSM6423 glucose fermentation at T3h**

Rank	Gene ID	Name	Product	average rpkm
1	CIBE_5676	-	putative cell wall binding repeat-containing protein	205.83
2	CIBE_5631	-	putative cell wall binding repeat-containing protein	190.15
3	CIBE_0314	-	conserved protein of unknown function	188.91
4	CIBE_0311	-	conserved protein of unknown function	187.33
5	CIBE_0312	-	conserved protein of unknown function	167.41
6	CIBE_5303	-	conserved protein of unknown function	131.05
7	CIBE_5304	-	conserved protein of unknown function	128.91
8	CIBE_0313	-	conserved protein of unknown function	109.01
9	CIBE_1020	rpsU	ribosomal protein S21	101.33
10	CIBE_6108	ssbA	single-strand DNA-binding protein	99.20
11	CIBE_1250	-	Cytochrome C551	97.71
12	CIBE_0170	rplB	ribosomal protein L2 (BL2)	97.04
13	CIBE_1637	rbr3A	Reverse rubrerythrin-1	86.31
14	CIBE_0348	groEL	chaperonin large subunit	84.01
15	CIBE_0678	-	Ribonuclease, Rne/Rng family	81.89
16	CIBE_4606	eutE	Ethanolamine utilization protein EutE	79.82
17	CIBE_6109	rpsF	ribosomal protein S6 (BS9)	77.39
18	CIBE_0769	gapA	glyceraldehyde-3-phosphate dehydrogenase	73.96
19	CIBE_0169	rplW	ribosomal protein L23	71.38
20	CIBE_4608	yodR	putative acyloate-acetoacetate CoA-transferase	71.09
21	CIBE_0162	rpsL	ribosomal protein S12 (BS12)	69.39
22	CIBE_2172	-	conserved protein of unknown function	68.89
23	CIBE_6132	rpmH	ribosomal protein L34	64.12
24	CIBE_0061	-	3D domain protein	63.37
25	CIBE_5186	nifJ	Pyruvate-flavodoxin oxidoreductase	63.02
26	CIBE_3174	rpsU	ribosomal protein S21	62.53
27	CIBE_0175	rplP	ribosomal protein L16	61.91
28	CIBE_0195	rpsM	ribosomal protein S13	61.36
29	CIBE_0168	rplD	ribosomal protein L4	60.49
30	CIBE_2171	-	RNA polymerase, sigma 28 subunit, FliA/WhiG family	59.77
31	CIBE_0347	groES	chaperonin small subunit	59.31
32	CIBE_0161	rpoC	RNA polymerase (beta' subunit)	58.43
33	CIBE_0158	rplJ	ribosomal protein L10 (BL5)	57.55
34	CIBE_0177	rpsQ	ribosomal protein S17 (BS16)	56.19
35	CIBE_5628	-	putative cell wall binding repeat-containing protein	54.39
36	CIBE_1402	-	conserved protein of unknown function	51.75
37	CIBE_0680	-	conserved protein of unknown function	50.29
38	CIBE_4609	adc	Acetoacetate decarboxylase	50.27
39	CIBE_0184	rplF	ribosomal protein L6 (BL8)	49.98
40	CIBE_0194	-	protein of unknown function	48.34
41	CIBE_0178	rplNA	ribosomal protein L14	48.04
42	CIBE_0339	yngF	putative Methylglutaconyl-CoA hydratase	47.77
43	CIBE_0340	acdA	acyl-CoA dehydrogenase	47.66
44	CIBE_0174	rpsC	ribosomal protein S3 (BS3)	46.49
45	CIBE_0155	nusG	transcription antitermination factor	46.45
46	CIBE_4607	yodS	putative aminoacyloate CoA-transferase	46.44
47	CIBE_0183	rpsH	ribosomal protein S8 (BS8)	46.17
48	CIBE_2315	fbaA	fructose-1,6-bisphosphate aldolase	45.70
49	CIBE_0180	rplE	ribosomal protein L5 (BL6)	44.85
50	CIBE_0181	rpsNA	ribosomal protein S14	44.49
51	CIBE_0564	mnaA	UDP-N-acetylmannosamine 2-epimerase	44.31
52	CIBE_0186	rpsE	ribosomal protein S5	44.07
53	CIBE_0173	rplV	ribosomal protein L22 (BL17)	43.64
54	CIBE_0100	yabN	putative fusion methylase and nucleotide pyrophosphohydrolase	43.50
55	CIBE_0171	-	protein of unknown function	43.38
56	CIBE_0167	rplC	ribosomal protein L3 (BL3)	42.93
57	CIBE_0166	rpsJ	ribosomal protein S10 (BS13)	42.76
58	CIBE_1391	rpmB	ribosomal protein L28	42.55
59	CIBE_0133	-	Metal-binding protein of ferredoxin fold	42.54
60	CIBE_1413	rpsP	ribosomal protein S16 (BS17)	42.26
61	CIBE_1721	-	conserved protein of unknown function	41.91

62	CIBE_1305	-	conserved protein of unknown function	41.21
63	CIBE_0640	-	conserved protein of unknown function	40.71
64	CIBE_0192	-	conserved protein of unknown function	40.56
65	CIBE_2132	-	Single-stranded DNA-binding protein	40.26
66	CIBE_6107	rpsR	ribosomal protein S18	40.26
67	CIBE_6076	-	Acyl-CoA dehydrogenase	40.10
68	CIBE_1809	rpml	ribosomal protein L35	39.31
69	CIBE_0172	rpsS	ribosomal protein S19 (BS19)	39.17
70	CIBE_0157	rplA	ribosomal protein L1 (BL1)	39.16
71	CIBE_0198	rpoA	RNA polymerase (alpha subunit)	38.97
72	CIBE_0197	rpsD	30S ribosomal subunit protein S4	38.06
73	CIBE_0156	rplK	ribosomal protein L11 (BL11)	37.55
74	CIBE_0088	-	protein of unknown function	37.38
75	CIBE_0204	rplM	ribosomal protein L13	36.68
76	CIBE_0163	rpsG	ribosomal protein S7 (BS7)	36.62
77	CIBE_5209	-	conserved exported protein of unknown function	36.30
78	CIBE_0203	truA	tRNA pseudouridine synthase A	36.03
79	CIBE_0738	-	conserved protein of unknown function	35.47
80	CIBE_0187	rpmD	ribosomal protein L30 (BL27)	35.30
81	CIBE_0176	rpmC	ribosomal protein L29	35.25
82	CIBE_0185	rplR	ribosomal protein L18	34.49
83	CIBE_0196	rpsK	ribosomal protein S11 (BS11)	34.31
84	CIBE_0179	rplX	ribosomal protein L24 (BL23)	33.84
85	CIBE_0191	mapA	methionine aminopeptidase	33.59
86	CIBE_0152	tufA	elongation factor Tu	32.91
87	CIBE_0153	rpmGA	ribosomal protein L33	32.45
88	CIBE_1791	-	conserved protein of unknown function	31.63
89	CIBE_0165	tufA	elongation factor Tu	30.63
90	CIBE_0154	secE	Protein translocase subunit SecE	30.27
91	CIBE_0824	-	Type 11 methyltransferase	30.15
92	CIBE_0188	rplO	ribosomal protein L15	29.54
93	CIBE_0089	spoVG	regulator required for spore cortex synthesis (stage V sporulation)	28.51
94	CIBE_0740	rbr	Rubryerythrin	28.48
95	CIBE_5157	hag	flagellin protein	28.42
96	CIBE_0182	-	protein of unknown function	28.26
97	CIBE_1176	rplY	50S ribosomal protein L25	26.65
98	CIBE_0190	adk	adenylate kinase	26.56
99	CIBE_0343	mmgB	3-hydroxybutyryl-CoA dehydrogenase	26.51
100	CIBE_5882	-	conserved protein of unknown function	26.30
101	CIBE_0679	rplU	ribosomal protein L21 (BL20)	26.15
102	CIBE_1722	-	conserved protein of unknown function	26.15
103	CIBE_1426	rpsB	ribosomal protein S2	26.11
104	CIBE_2028	-	conserved protein of unknown function	25.60
105	CIBE_6075	-	Beta-lactamase domain protein	24.69
106	CIBE_0869	manX	fused mannose-specific PTS enzymes: IIA component ; IIB component	23.91
107	CIBE_0870	levF	phosphotransferase system (PTS) fructose-specific enzyme IIC component	23.81
108	CIBE_0586	-	conserved protein of unknown function	23.76
109	CIBE_0737	prkA	serine protein kinase	23.61
110	CIBE_1417	rplS	ribosomal protein L19	23.59
111	CIBE_0770	pgk	phosphoglycerate kinase	23.25
112	CIBE_1810	rplT	ribosomal protein L20	22.88
113	CIBE_1010	dnaK	molecular chaperone	22.70
114	CIBE_0341	etfB	Electron transfer flavoprotein subunit beta	22.17
115	CIBE_0741	-	conserved protein of unknown function	22.03
116	CIBE_0189	secY	Protein translocase subunit SecY	21.81
117	CIBE_5055	-	FeoA family protein	21.49
118	CIBE_1808	infC	initiation factor IF-3	19.79
119	CIBE_0567	atpB	ATP synthase subunit a	19.66
120	CIBE_2780	-	conserved protein of unknown function	19.57
121	CIBE_0064	-	conserved protein of unknown function	18.51
122	CIBE_0105	-	Septum formation initiator	18.44
123	CIBE_0739	-	Stage V sporulation protein R	18.06
124	CIBE_0572	atpG	ATP synthase gamma chain	17.93
125	CIBE_1405	acpA	acyl carrier protein	17.40
126	CIBE_0160	rpoB	RNA polymerase (beta subunit)	17.31

127	CIBE_4726	-	conserved protein of unknown function	17.24
128	CIBE_5187	-	Flavodoxin/nitric oxide synthase	17.21
129	CIBE_2018	efp	elongation factor P	17.20
130	CIBE_0629	ribU	Riboflavin transporter RibU	17.18
131	CIBE_0289	rbr	Rubrerythrin	16.78
132	CIBE_2027	-	Stage III sporulation protein AH	16.75
133	CIBE_1031	ppdK	Pyruvate, phosphate dikinase	16.64
134	CIBE_0571	atpA	ATP synthase (subunit alpha, component F1)	16.63
135	CIBE_5226	cysK	cysteine synthase	16.31
136	CIBE_1457	ptsH	histidine-containing phosphocarrier protein of the phosphotransferase system (PTS) (HPr protein)	16.16
137	CIBE_1400	pta	Phosphate acetyltransferase	15.75
138	CIBE_0413	sorD	Sorbitol-6-phosphate 2-dehydrogenase	15.74
139	CIBE_1414	ylqC	putative RNA binding protein	15.68
140	CIBE_1021	yqeY	conserved hypothetical protein	15.68
141	CIBE_5894	-	Glycoside hydrolase	15.49
142	CIBE_4975	hsp	18 kDa heat shock protein	15.35
143	CIBE_0993	spoilAB	anti-sigma factor (antagonist of sigma(F)) and serine kinase	15.31
144	CIBE_3470	adh	NADP-dependent isopropanol dehydrogenase	15.17
145	CIBE_5681	-	Cell wall-binding protein	15.11
146	CIBE_0536	-	Glycosyl transferase, group 1	15.05
147	CIBE_1313	-	conserved exported protein of unknown function	14.94
148	CIBE_1427	tsf	elongation factor Ts	14.75
149	CIBE_1445	rpsO	ribosomal protein S15 (BS18)	14.64
150	CIBE_5968	yaaK	DNA binding protein	14.64
151	CIBE_2050	adh	NADPH-dependent butanol dehydrogenase	14.46
152	CIBE_4431	-	conserved exported protein of unknown function	14.40
153	CIBE_0771	tpiA	triose phosphate isomerase	14.39
154	CIBE_1009	grpE	Protein GrpE	14.29
155	CIBE_4958	-	conserved protein of unknown function	14.15
156	CIBE_1001	rpsT	ribosomal protein S20 (BS20)	14.05
157	CIBE_0164	fusA	elongation factor G	14.04
158	CIBE_0542	veg	conserved hypothetical protein	13.94
159	CIBE_1358	ylmC	essential sporulation protein	13.90
160	CIBE_5855	pyk	pyruvate kinase	13.83
161	CIBE_0538	yabG	sporulation-specific protease	13.76
162	CIBE_1582	clpX	protein unfolding ATPase required for presentation of proteins to proteases	13.74
163	CIBE_0224	buk	branched-chain fatty-acid kinase	13.73
164	CIBE_5065	glnA	glutamine synthetase	13.69
165	CIBE_5054	-	FeoA family protein	13.68
166	CIBE_1611	-	conserved exported protein of unknown function	13.66
167	CIBE_1586	-	conserved protein of unknown function	13.46
168	CIBE_1831	sepF	Cell division protein SepF	13.45
169	CIBE_1581	clpP	ATP-dependent Clp protease proteolytic subunit	13.30
170	CIBE_0159	rplL	ribosomal protein L12 (BL9)	13.19
171	CIBE_0768	-	Transcriptional regulator, DeoR family	13.01
172	CIBE_1373	spoIVA	morphogenetic stage IV sporulation protein	13.01
173	CIBE_1401	ackA	acetate kinase	12.75
174	CIBE_0570	atpH	ATP synthase subunit delta	12.67
175	CIBE_5682	-	Cell wall-binding protein	12.59
176	CIBE_2783	-	conserved protein of unknown function	12.54
177	CIBE_0554	-	Monogalactosyldiacylglycerol synthase	12.51
178	CIBE_0065	-	conserved exported protein of unknown function	12.42
179	CIBE_5924	glgC	glucose-1-phosphate adenylyltransferase (ADP-glucose pyrophosphorylase) subunit alpha	12.42
180	CIBE_1012	dnaj	co-factor of molecular chaperone	12.10
181	CIBE_1403	rpmF	ribosomal protein L32	12.06
182	CIBE_0193	infA	initiation factor IF-I	11.96
183	CIBE_4106	-	conserved protein of unknown function	11.91
184	CIBE_0215	ptsI	phosphotransferase system (PTS) enzyme I	11.81
185	CIBE_2041	spoOA	response regulator	11.78
186	CIBE_1331	cymR	transcriptional regulator of cysteine biosynthesis	11.69
187	CIBE_3665	-	conserved protein of unknown function	11.68
188	CIBE_0893	dhaS	3-hydroxypropionaldehyde dehydrogenase	11.62
189	CIBE_5170	fliY	flagellar motor switching and energizing phosphatase	11.61
190	CIBE_3469	-	conserved protein of unknown function	11.59
191	CIBE_2402	yqeA	amino acid (carbamate) kinase	11.58

192	CIBE_0342	etfA	electron transfer flavoprotein (alpha subunit)	11.56
193	CIBE_1591	-	conserved protein of unknown function	11.49
194	CIBE_4056	dfx	Desulfoferrodoxin	11.47
195	CIBE_0774	eno	enolase	11.20
196	CIBE_0992	spolIIA	Anti-sigma F factor antagonist	11.20
197	CIBE_6021	-	conserved exported protein of unknown function	11.20
198	CIBE_0318	-	ABC transporter, ATP-binding protein	11.14
199	CIBE_0104	-	Spore cortex biosynthesis protein YabQ	11.09
200	CIBE_2139	asd	aspartate-semialdehyde dehydrogenase	11.01
201	CIBE_2381	-	protein of unknown function	10.93
202	CIBE_5923	-	Glucose-1-phosphate adenylyltransferase	10.88
203	CIBE_4919	-	SAM-dependent methyltransferase	10.85
204	CIBE_0569	atpF	ATP synthase subunit b	10.67
205	CIBE_1455	rny	endoribonuclease Y	10.58
206	CIBE_3410	opuCA	glycine betaine/carnitine/choline/choline sulfate ABC transporter (ATP-binding protein)	10.48
207	CIBE_2131	-	Deacetylase	10.44
208	CIBE_1580	tig	prolyl isomerase (trigger factor)	10.43
209	CIBE_2390	-	Sporulation stage II, protein M	10.36
210	CIBE_0568	atpE	ATP synthase subunit c	10.32
211	CIBE_5172	-	putative CheW protein	10.25
212	CIBE_0573	atpD	ATP synthase (subunit beta, component F1)	10.23
213	CIBE_0953	trxA	Thioredoxin	10.18
214	CIBE_5707	-	conserved protein of unknown function	10.15
215	CIBE_0097	-	Peptidylprolyl isomerase	10.04
216	CIBE_5881	acpS	holo-acyl carrier protein synthase	9.94
217	CIBE_0280	-	conserved exported protein of unknown function	9.91
218	CIBE_1446	pnpA	polynucleotide phosphorylase (PNPase)	9.91
219	CIBE_5053	-	Ferrous iron transport protein B	9.78
220	CIBE_4850	nox	NADH oxidase	9.74
221	CIBE_0223	ptb	phosphate butyryl coenzyme A transferase	9.72
222	CIBE_0577	-	Sporulation protein	9.65
223	CIBE_1306	-	conserved protein of unknown function	9.56
224	CIBE_1008	hrcA	Heat-inducible transcription repressor HrcA	9.45
225	CIBE_1340	rsmF	pre-16S ribosomal RNA maturation enzyme	9.39
226	CIBE_1344	rnjA	ribonuclease J1	9.39
227	CIBE_0871	levG	phosphotransferase system (PTS) fructose-specific enzyme IID component	9.29
228	CIBE_5717	-	protein of unknown function	9.26
229	CIBE_3001	ftnA	Ferritin	9.11
230	CIBE_0106	yabR	putative RNA degradation protein; polyribonucleotide nucleotidyltransferase or phosphorylase	9.02
231	CIBE_4104	-	Phage-like element pbsx protein XkdM	8.97
232	CIBE_4880	-	Pyruvate flavodoxin/ferredoxin oxidoreductase domain protein	8.94
233	CIBE_5173	cheY	regulator of chemotaxis and motility	8.92
234	CIBE_5742	-	conserved protein of unknown function	8.91
235	CIBE_0994	sigF	RNA polymerase sporulation-specific sigma factor (sigma-F)	8.89
236	CIBE_3436	-	Electron transfer flavoprotein, alpha/beta-subunit-like protein	8.74
237	CIBE_1333	iscU	scaffold protein	8.74
238	CIBE_0579	spolIID	transcriptional regulator	8.68
239	CIBE_0566	-	conserved membrane protein of unknown function	8.62
240	CIBE_2026	-	Stage III sporulation protein AG	8.61
241	CIBE_3435	-	Electron transfer flavoprotein, alpha subunit-like protein	8.57
242	CIBE_1339	yrzL	conserved hypothetical protein	8.52
243	CIBE_0578	-	Peptidase M23B	8.45
244	CIBE_3980	-	conserved protein of unknown function	8.43
245	CIBE_5954	-	conserved protein of unknown function	8.34
246	CIBE_5683	-	putative cell wall binding repeat-containing protein	8.34
247	CIBE_0114	greA	transcription elongation factor	8.26
248	CIBE_1638	-	Appr-1-p processing domain protein	8.24
249	CIBE_5856	pfkA	6-phosphofructokinase	8.17
250	CIBE_4218	acdA	acyl-CoA dehydrogenase	8.13