Figure 1

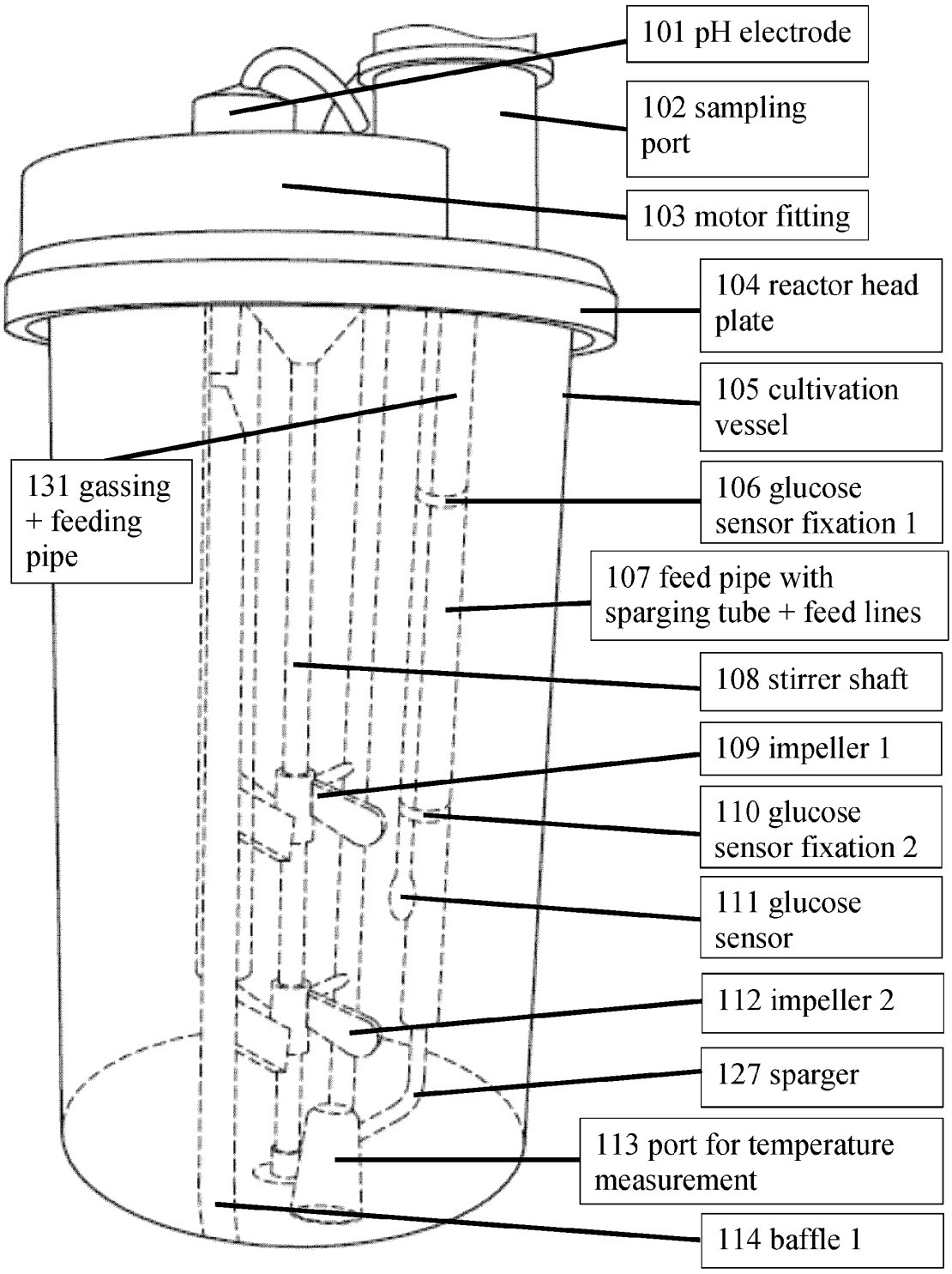

101 pH electrode
102 sampling port
103 motor fitting
104 reactor head plate
105 cultivation vessel
131 gassing + feeding pipe
106 glucose sensor fixation 1
107 feed pipe with sparging tube + feed lines
108 stirrer shaft
109 impeller 1
110 glucose sensor fixation 2
111 glucose sensor
112 impeller 2
127 sparger
113 port for temperature measurement
114 baffle 1

Figure 2

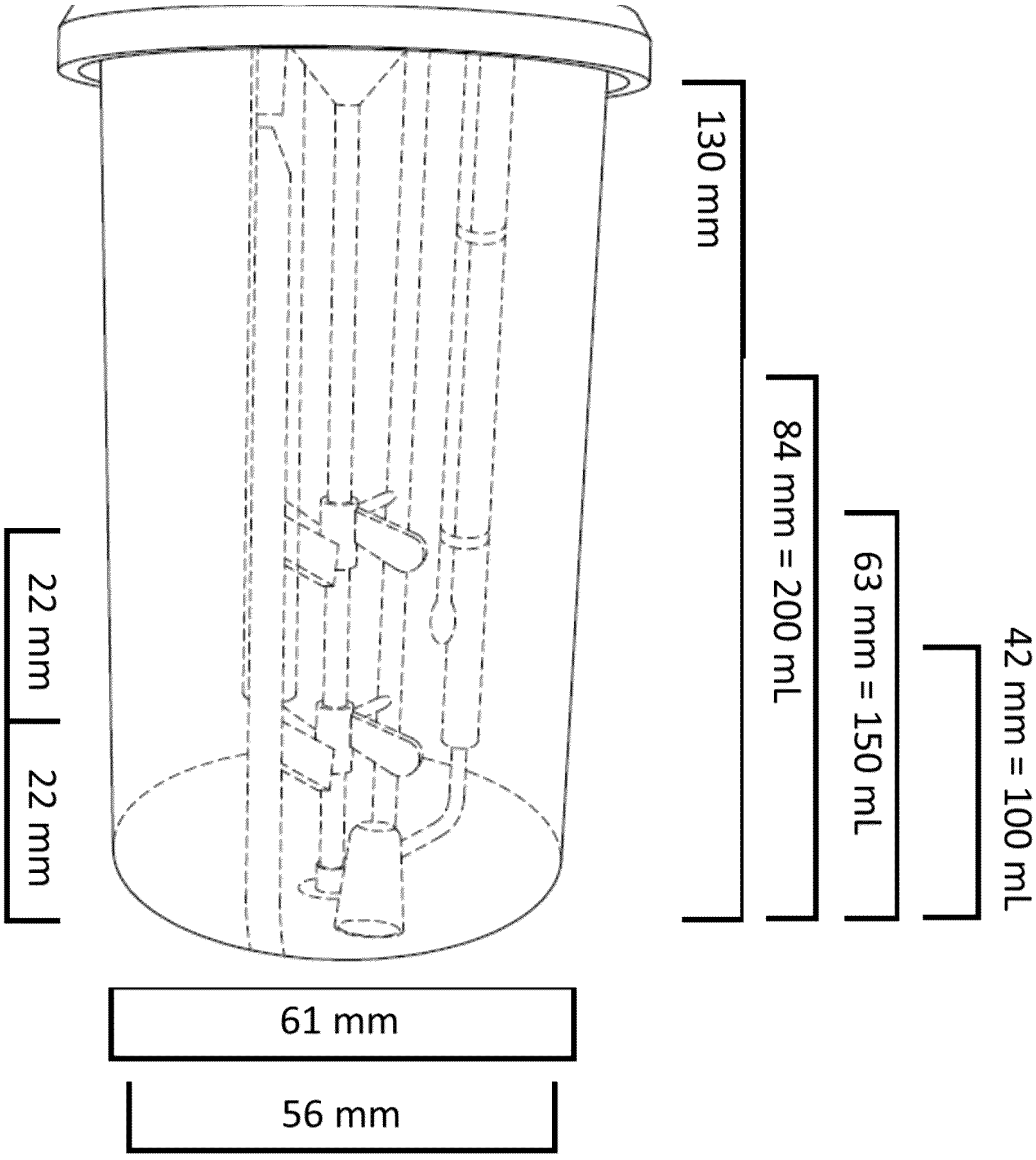


Figure 3

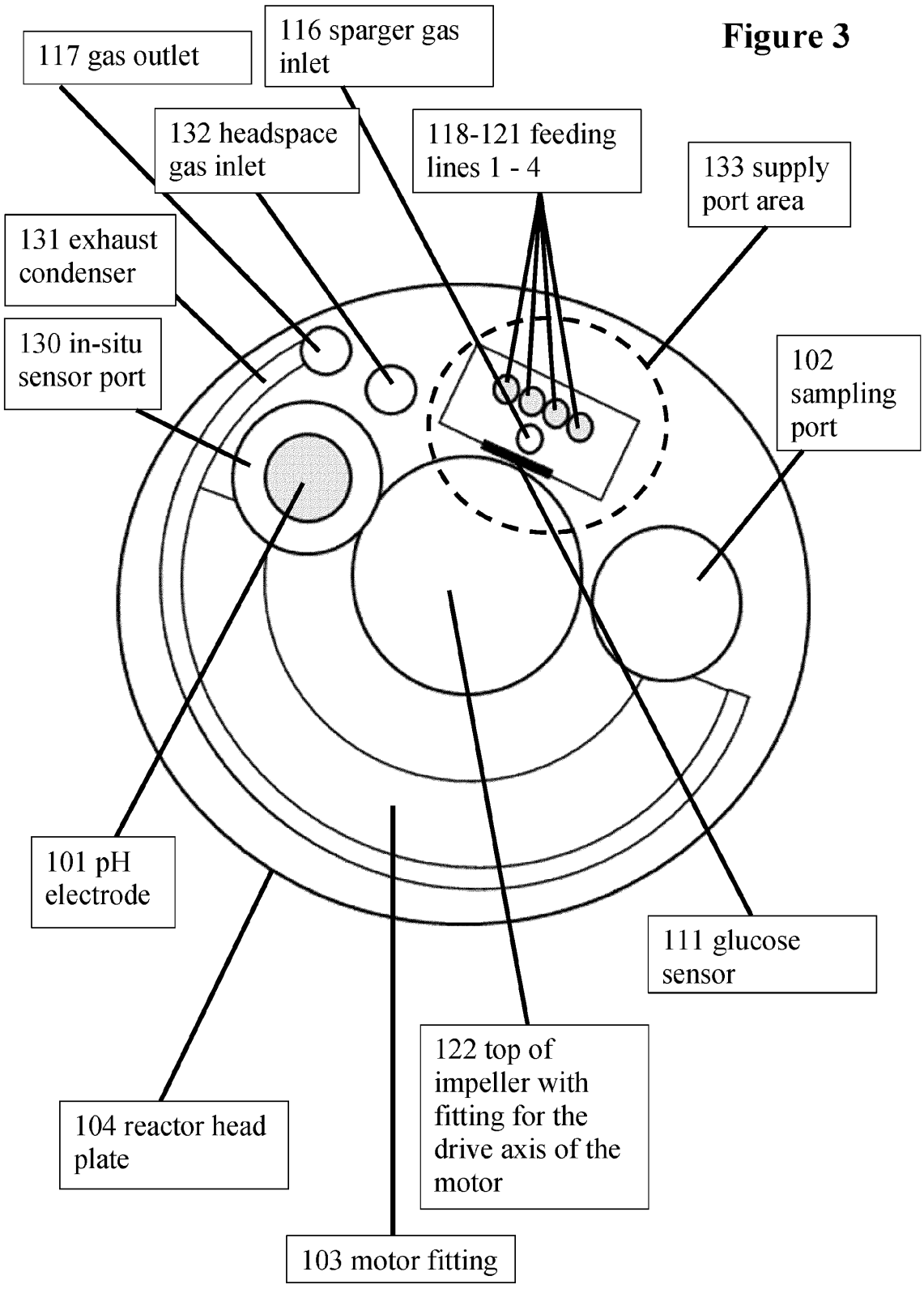

117 gas outlet
116 sparger gas inlet
132 headspace gas inlet
118-121 feeding lines 1 - 4
133 supply port area
131 exhaust condenser
130 in-situ sensor port
102 sampling port
101 pH electrode
111 glucose sensor
104 reactor head plate
122 top of impeller with fitting for the drive axis of the motor
103 motor fitting

Figure 4

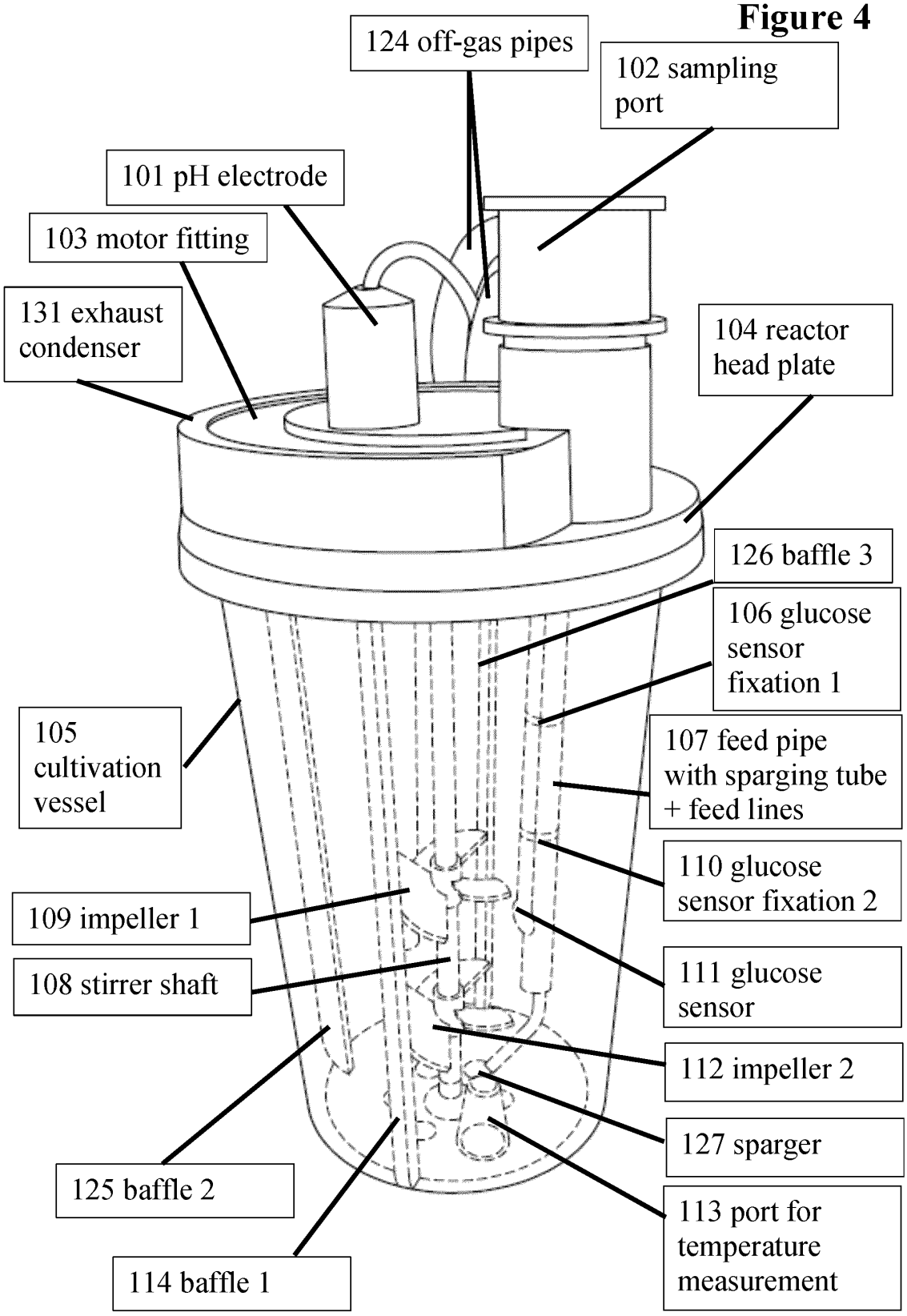

124 off-gas pipes
102 sampling port
101 pH electrode
103 motor fitting
131 exhaust condenser
104 reactor head plate
126 baffle 3
106 glucose sensor fixation 1
105 cultivation vessel
107 feed pipe with sparging tube + feed lines
110 glucose sensor fixation 2
109 impeller 1
108 stirrer shaft
111 glucose sensor
112 impeller 2
127 sparger
125 baffle 2
113 port for temperature measurement
114 baffle 1

Figure 5

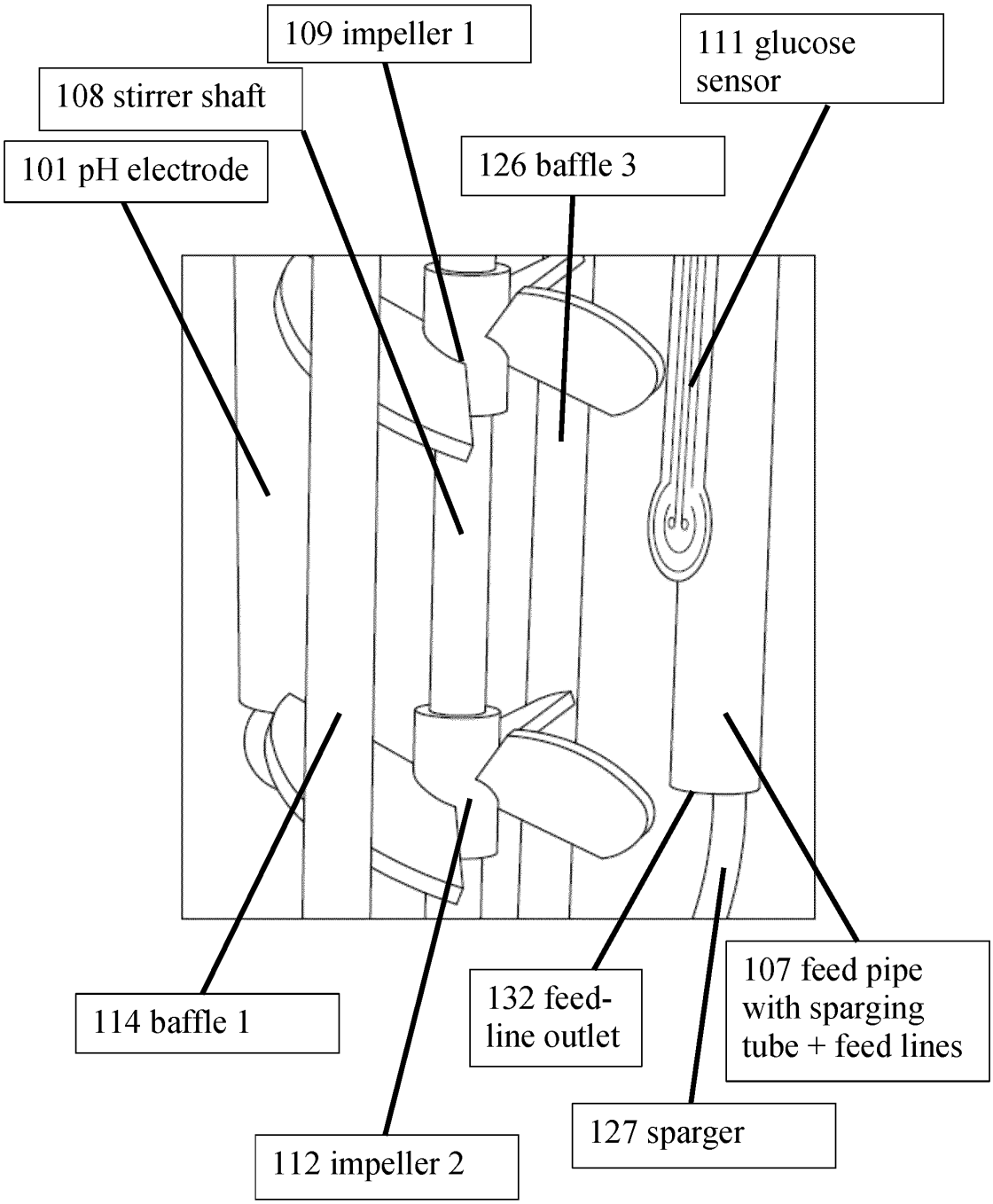

109 impeller 1
111 glucose sensor
108 stirrer shaft
101 pH electrode
126 baffle 3
114 baffle 1
132 feed-line outlet
107 feed pipe with sparging tube + feed lines
127 sparger
112 impeller 2

Figure 6

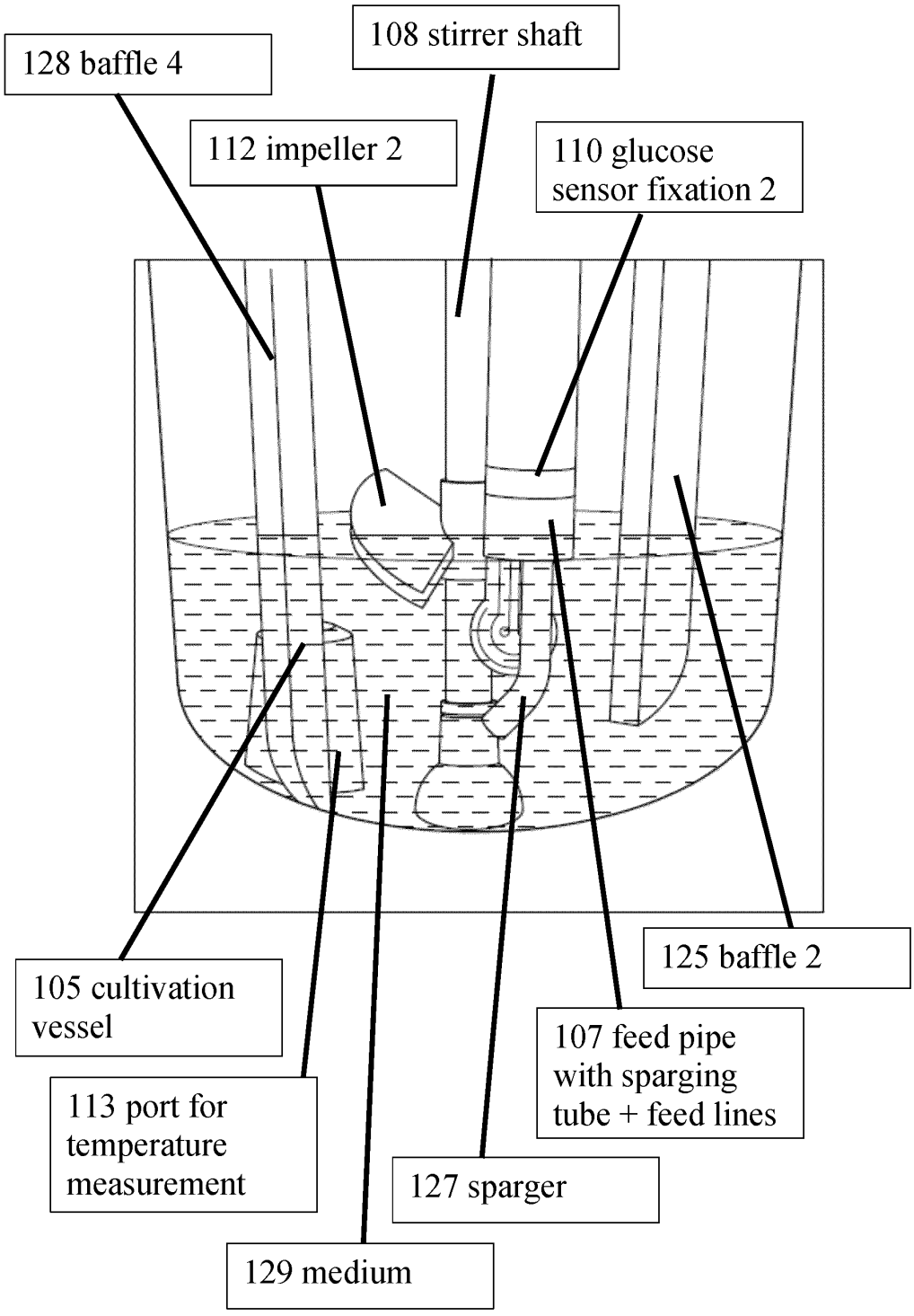

128 baffle 4
108 stirrer shaft
112 impeller 2
110 glucose sensor fixation 2
125 baffle 2
105 cultivation vessel
107 feed pipe with sparging tube + feed lines
113 port for temperature measurement
127 sparger
129 medium

Figure 7

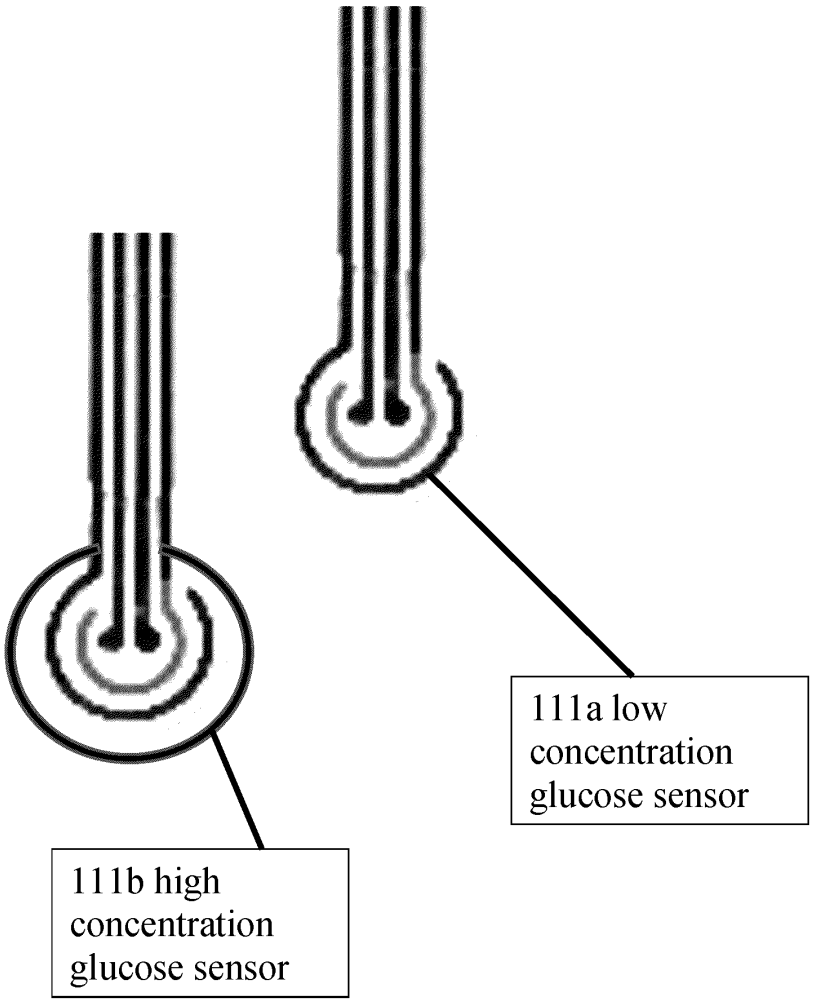

111a low concentration glucose sensor
111b high concentration glucose sensor

Figure 8

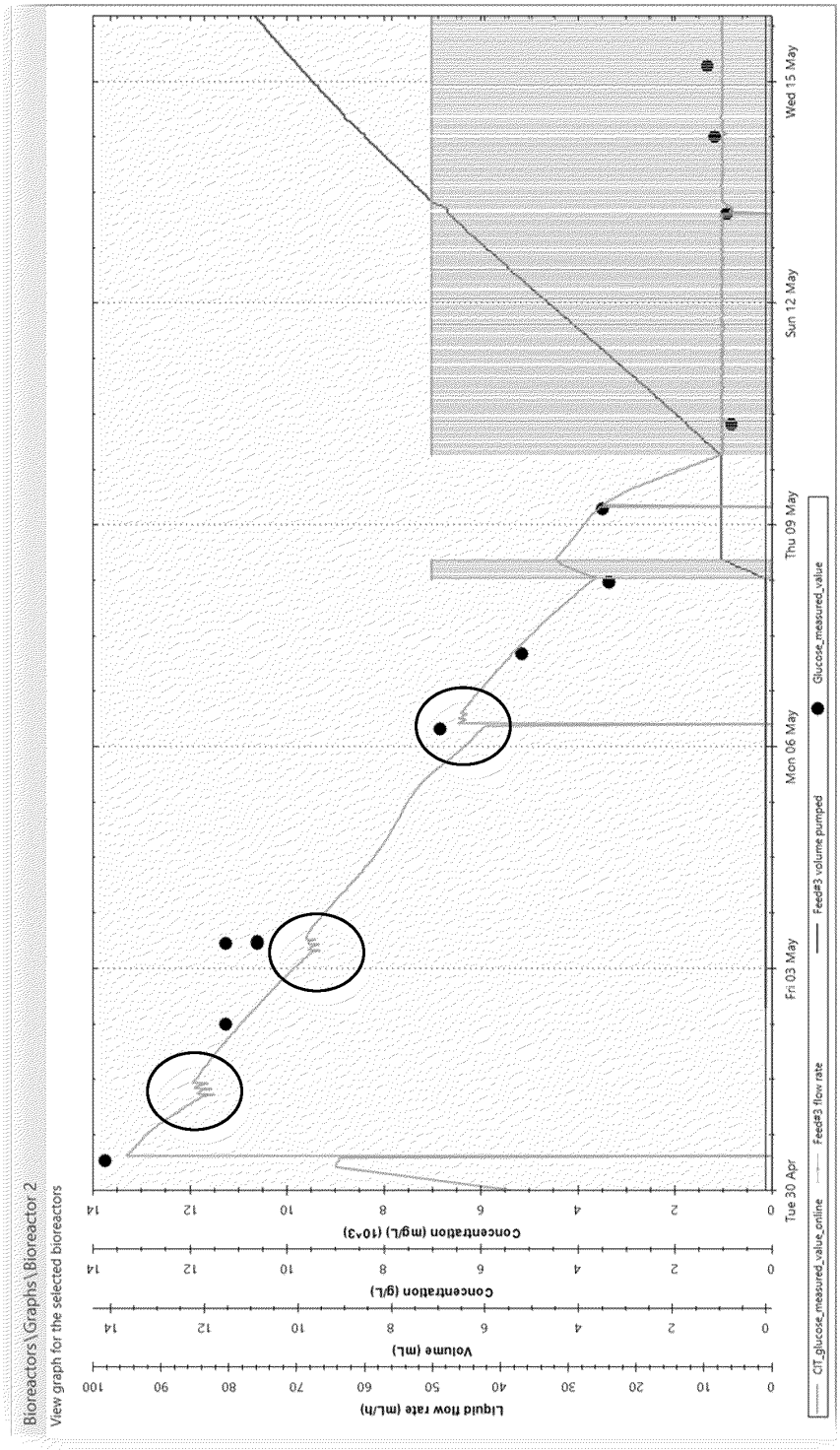

Bioreactors\Graphs\Bioreactor 2
View graph for the selected bioreactors
Liquid flow rate (mL/h)
Volume (mL)
Concentration (g/L)
Concentration (mg/L) (10^3)
Tue 30 Apr
Fri 03 May
Mon 06 May
Thu 09 May
Sun 12 May
Wed 15 May
CIT_glucose_measured_value_online
Feed#3 flow rate
Feed#3 volume pumped
Glucose_measured_value

Figure 9

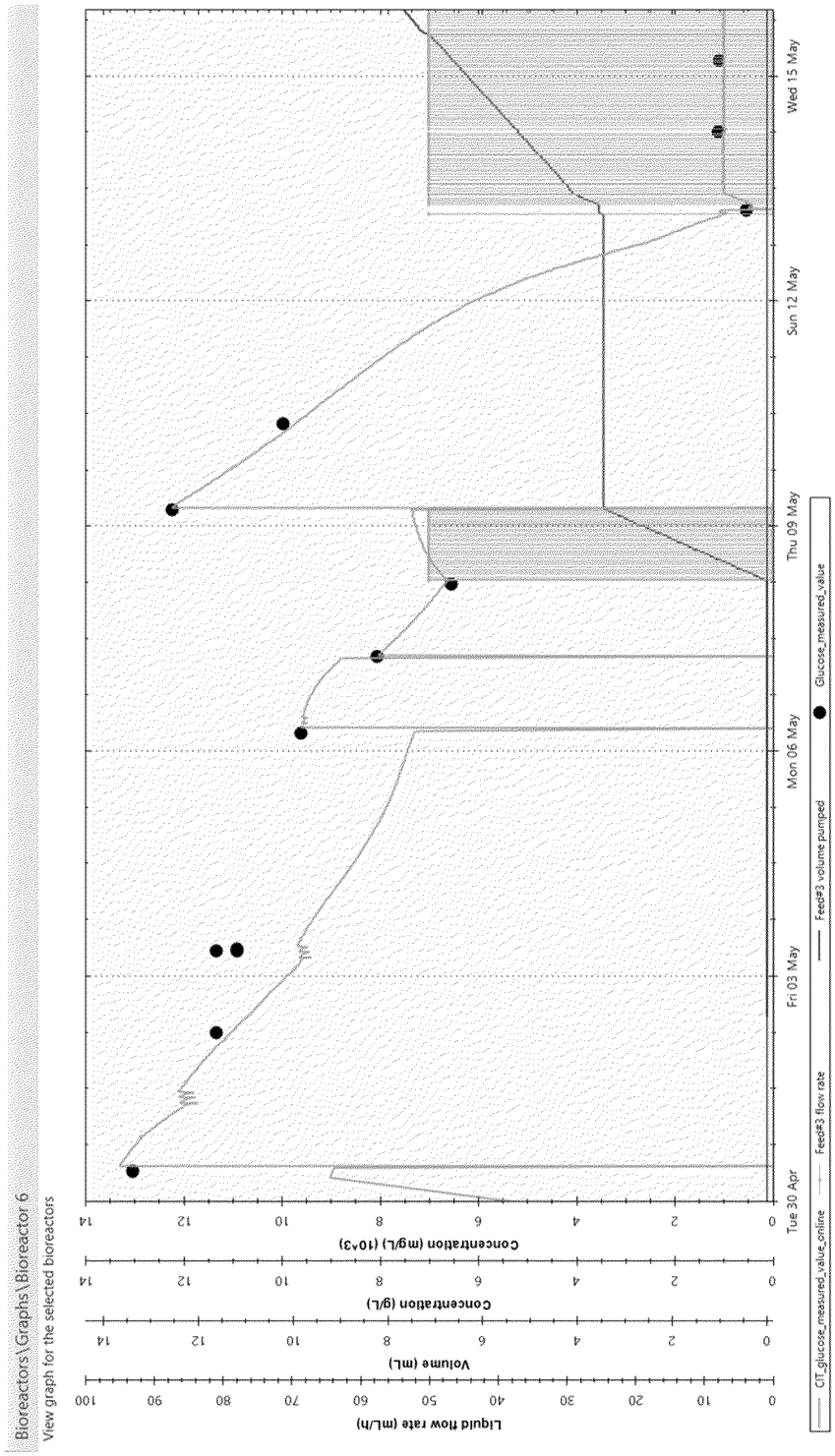

Bioreactors\Graphs\Bioreactor 6
View graph for the selected bioreactors
Liquid flow rate (mL/h)
Volume (mL)
Concentration (g/L)
Concentration (mg/L) (10^3)
Tue 30 Apr
Fri 03 May
Mon 06 May
Thu 09 May
Sun 12 May
Wed 15 May
CT_glucose_measured_value_online
Feed#3 flow rate
Feed#3 volume pumped
Glucose_measured_value

Figure 10

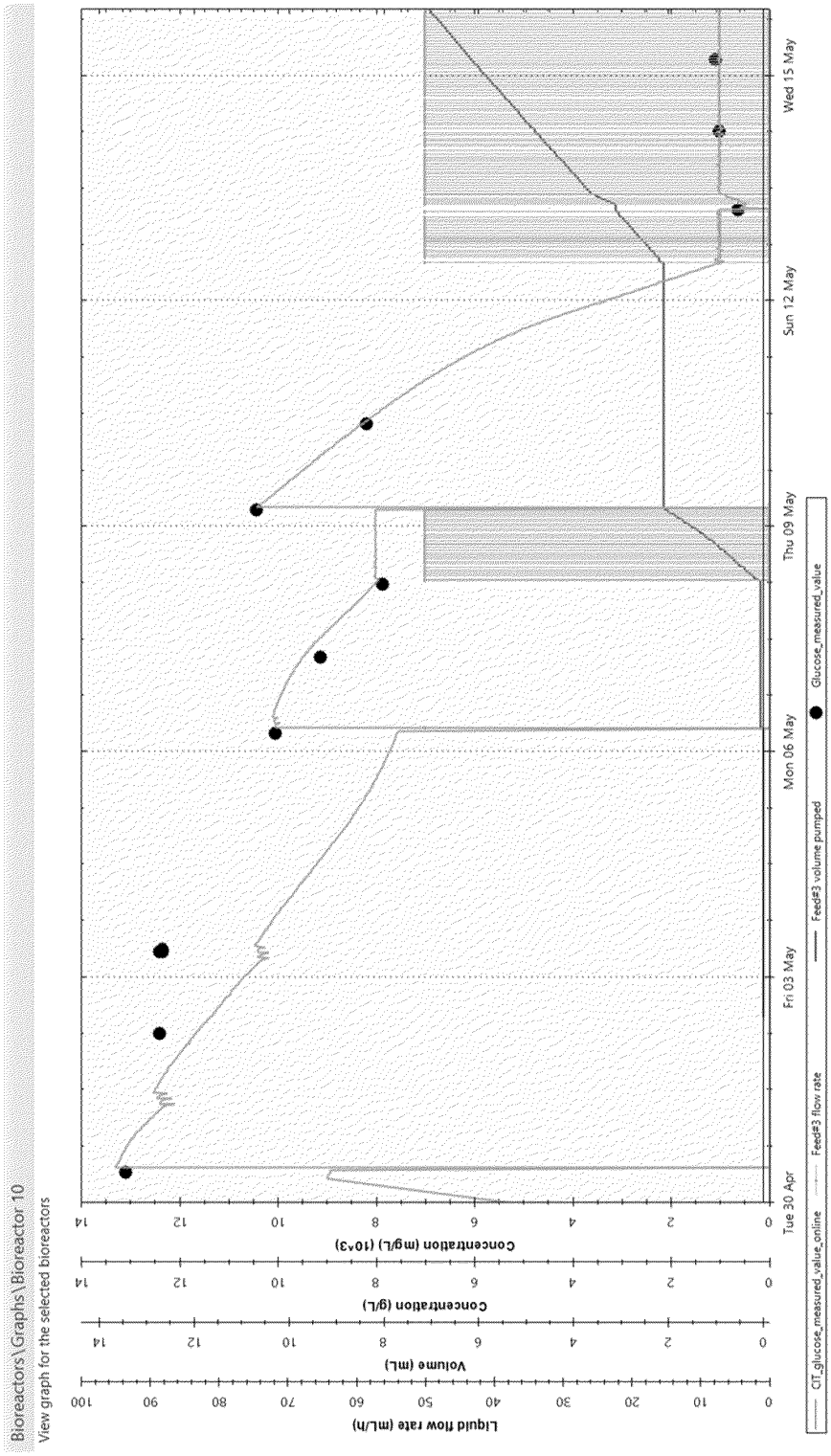

Bioreactors\Graphs\Bioreactor 10
View graph for the selected bioreactors
Liquid flow rate (mL/h)
Volume (mL)
Concentration (g/L)
Concentration (mg/L) (10^3)
Tue 30 Apr
Fri 03 May
Mon 06 May
Thu 09 May
Sun 12 May
Wed 15 May
CIT_glucose_measured_value_online
Feed#3 flow rate
Feed#3 volume pumped
Glucose_measured_value

Figure 11

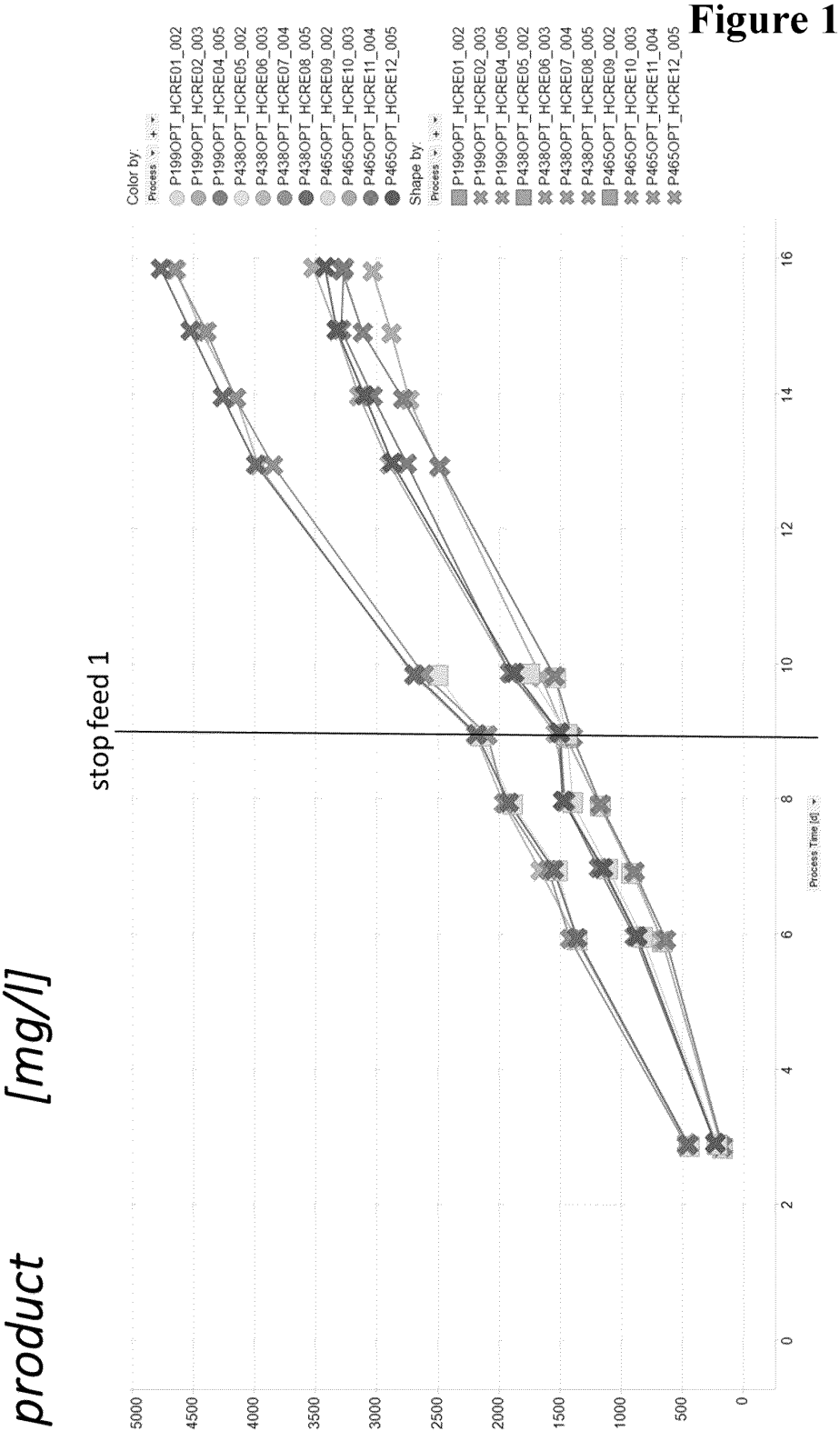

product [mg/l]
stop feed 1
Color by:
Process
P199OPT_HCRE01_002
P199OPT_HCRE02_003
P199OPT_HCRE04_005
P438OPT_HCRE05_002
P438OPT_HCRE06_003
P438OPT_HCRE07_004
P438OPT_HCRE08_005
P465OPT_HCRE09_002
P465OPT_HCRE10_003
P465OPT_HCRE11_004
P465OPT_HCRE12_005
Shape by:
Process
P199OPT_HCRE01_002
P199OPT_HCRE02_003
P199OPT_HCRE04_005
P438OPT_HCRE05_002
P438OPT_HCRE06_003
P438OPT_HCRE07_004
P438OPT_HCRE08_005
P465OPT_HCRE09_002
P465OPT_HCRE10_003
P465OPT_HCRE11_004
P465OPT_HCRE12_005
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
2
4
6
8
10
12
14
16
Process Time [d]

Figure 12

