

Figure 1

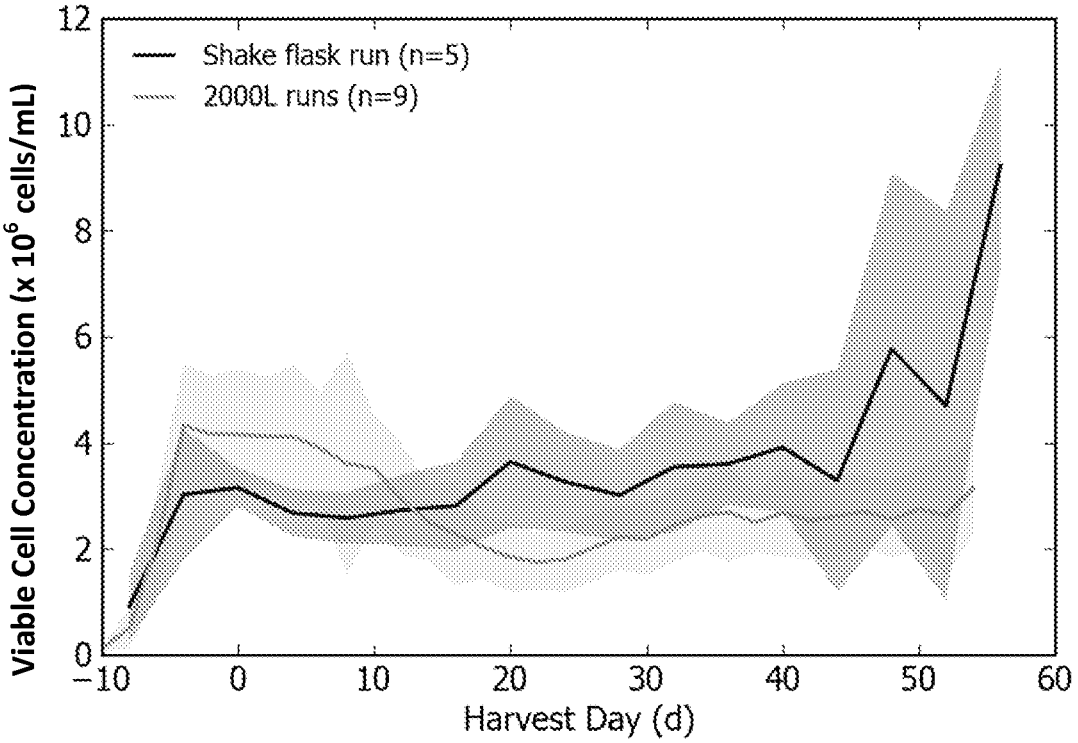


Figure 2

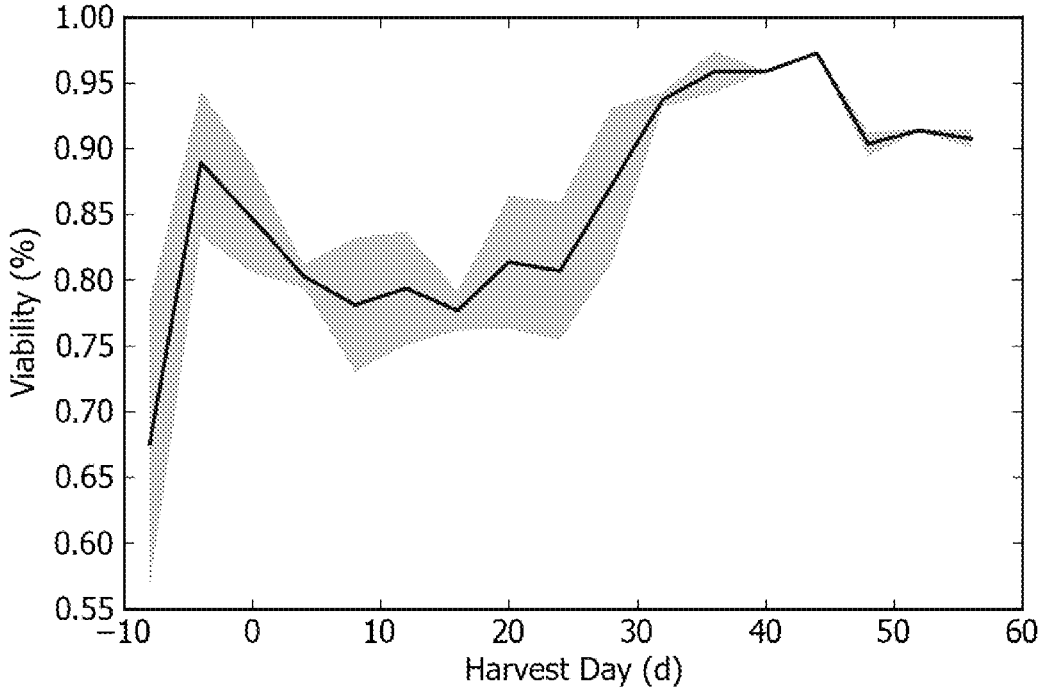


Figure 3

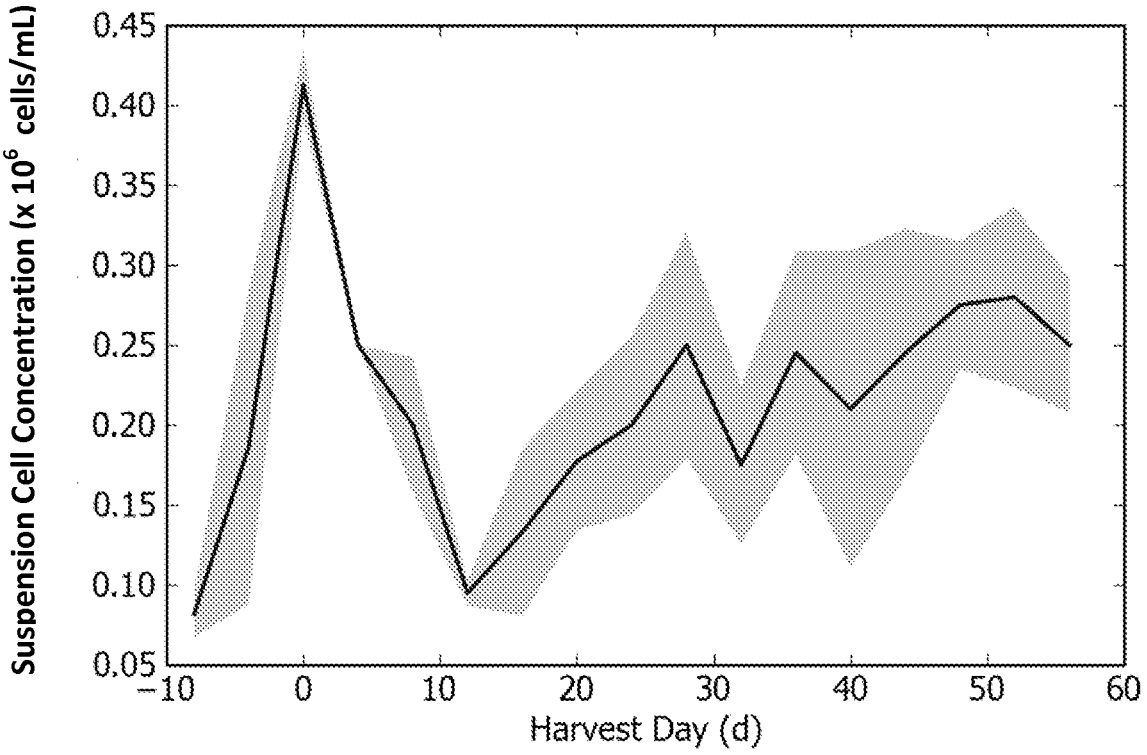


Figure 4

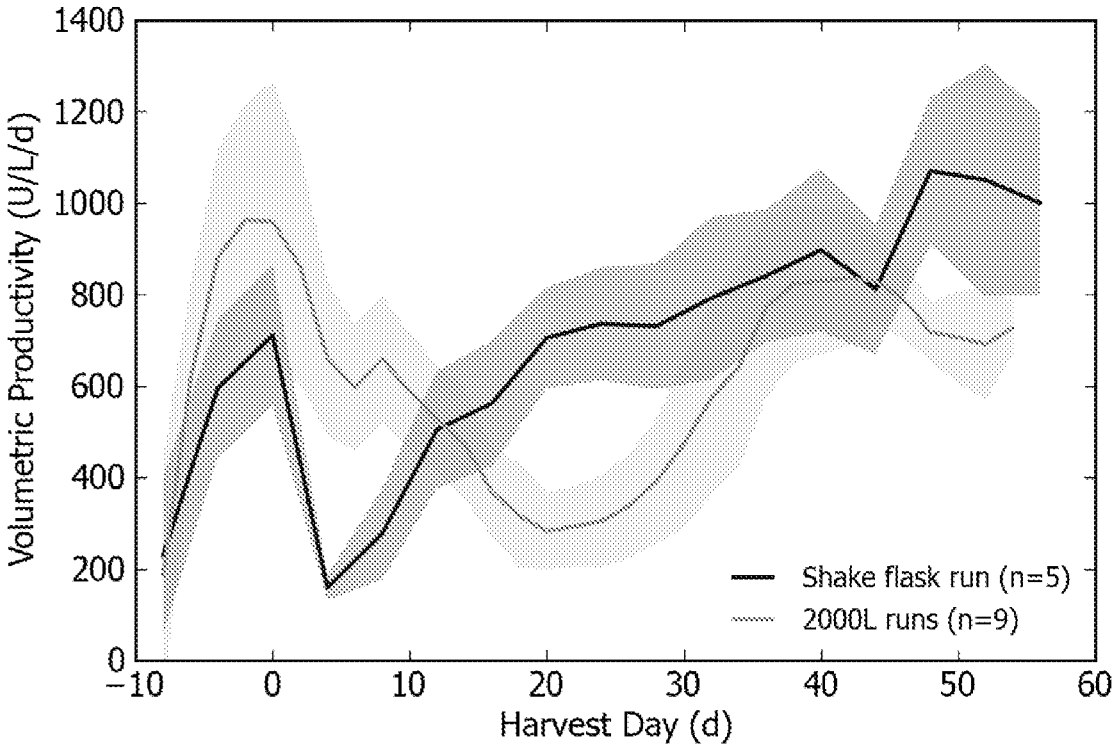


Figure 5

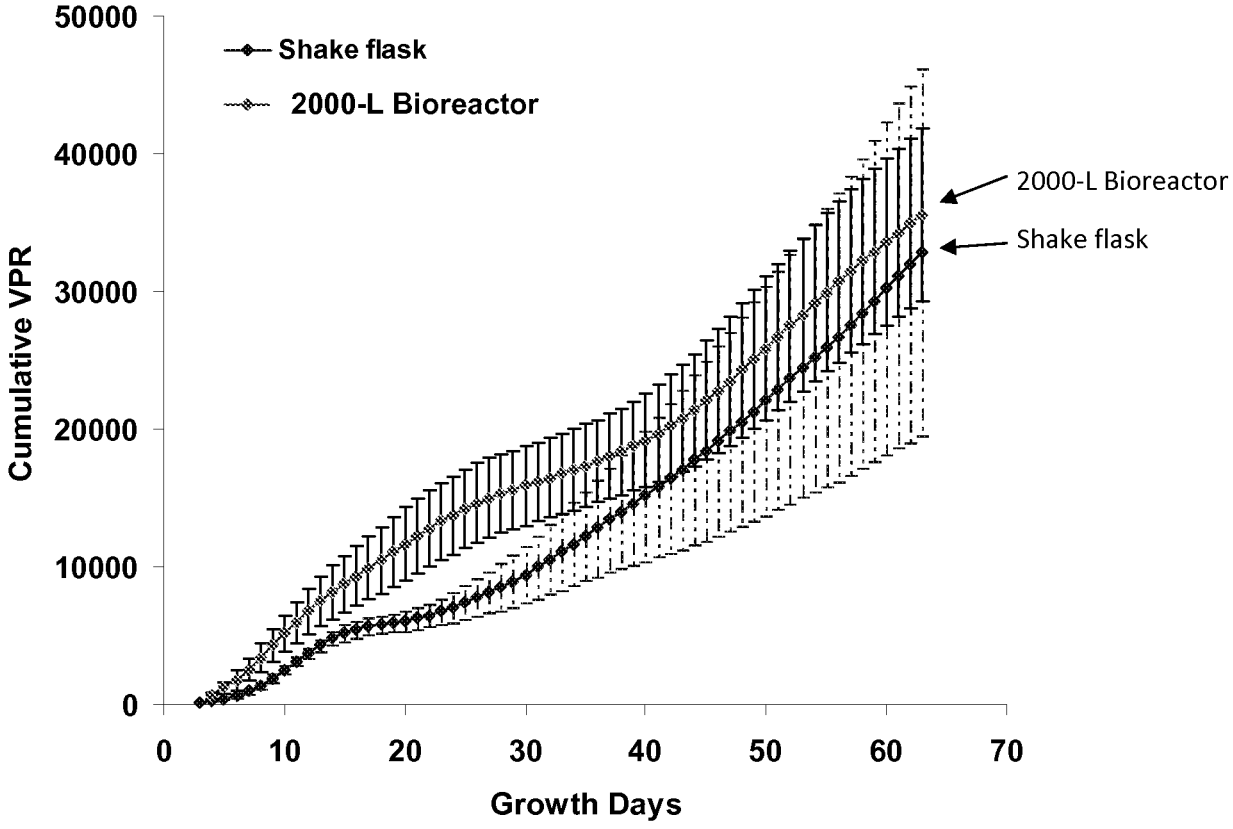

50000
40000
30000
20000
10000
0
Cumulative VPR
0
10
20
30
40
50
60
70
Growth Days
Shake flask
2000-L Bioreactor
2000-L Bioreactor
Shake flask

Figure 6

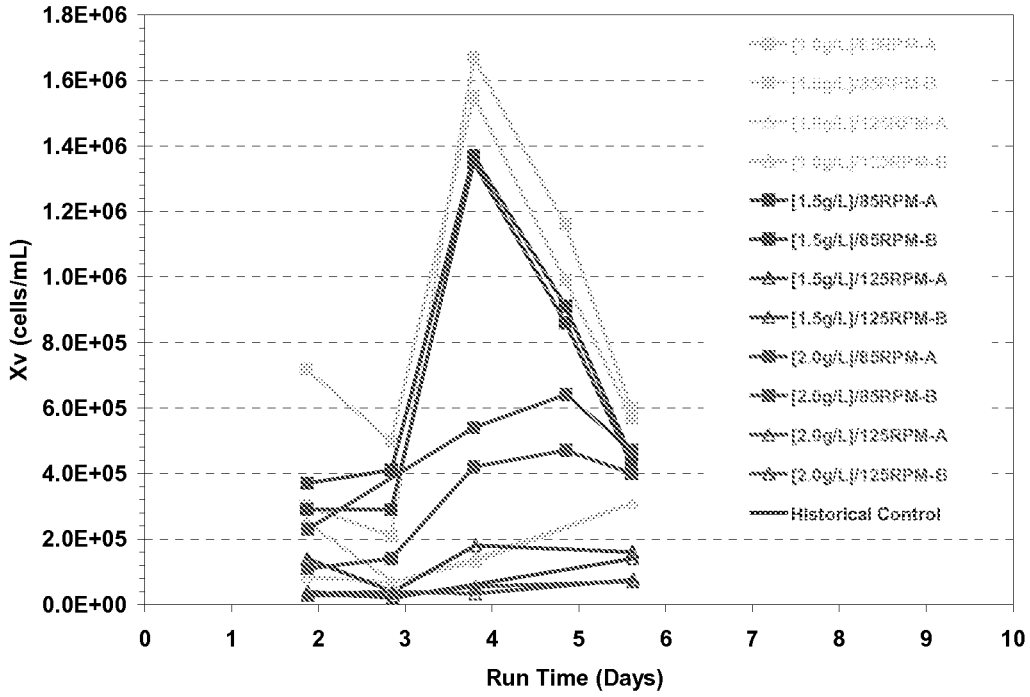


Figure 7

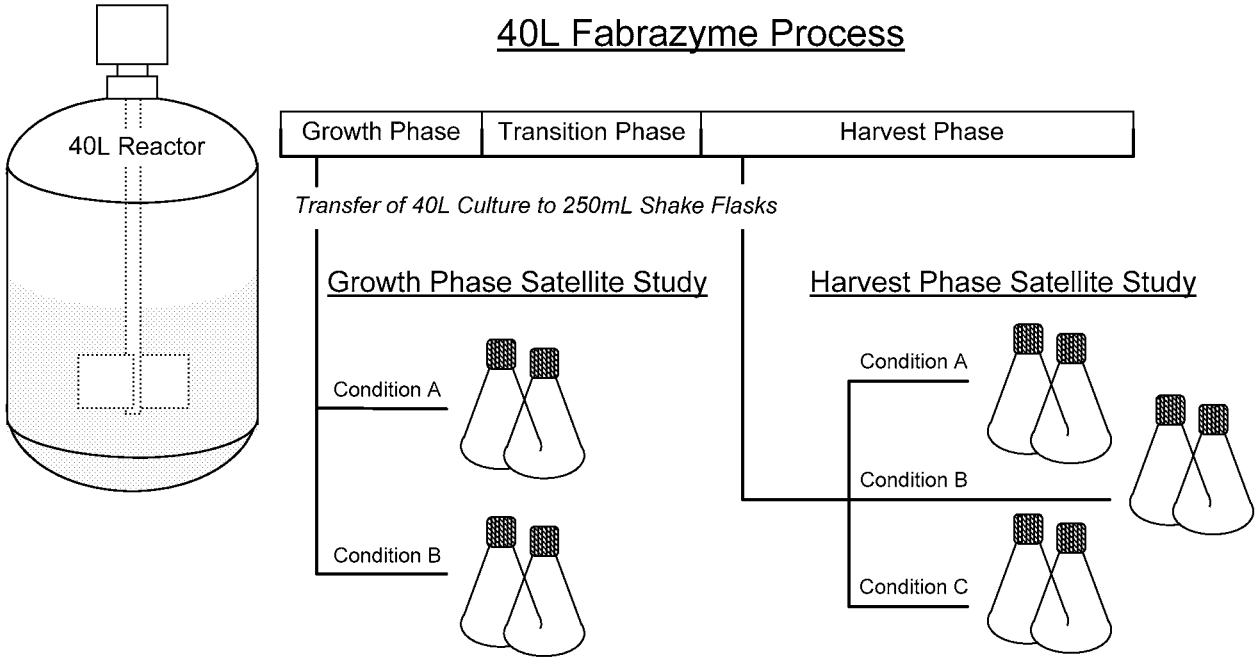


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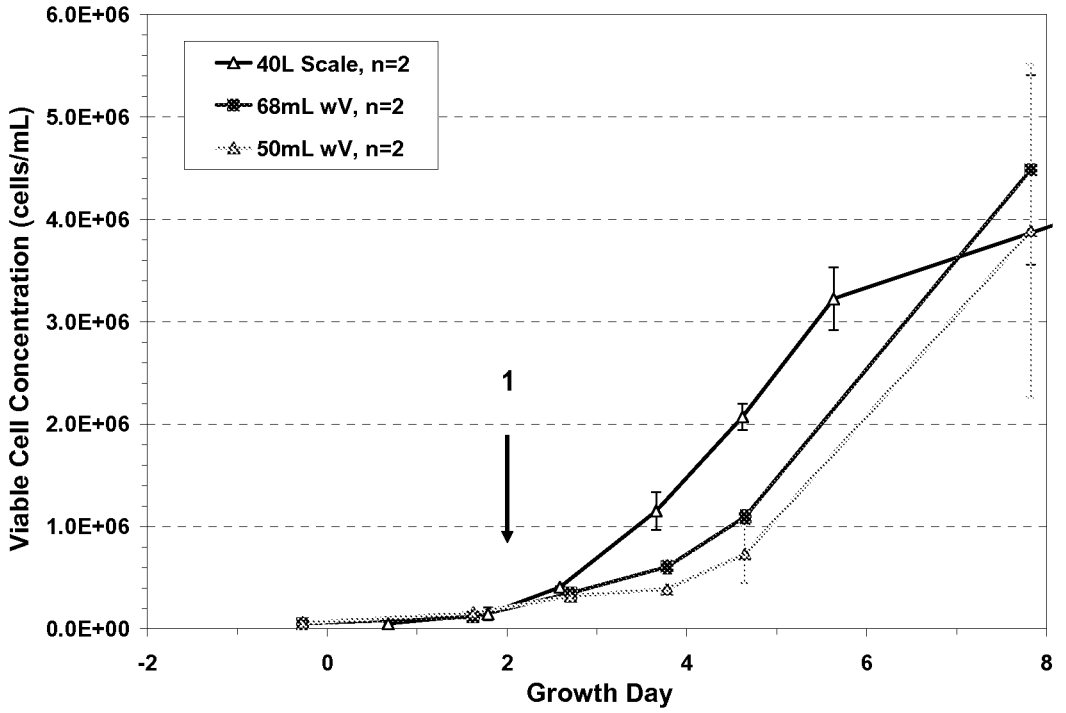


Figure 9

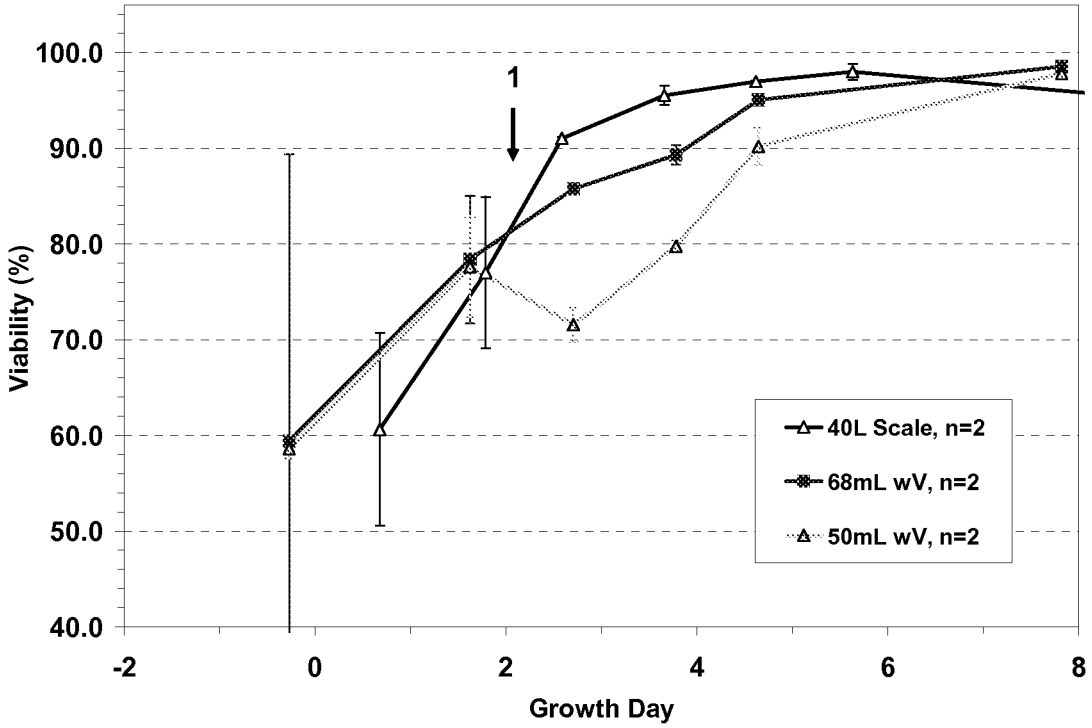


Figure 10

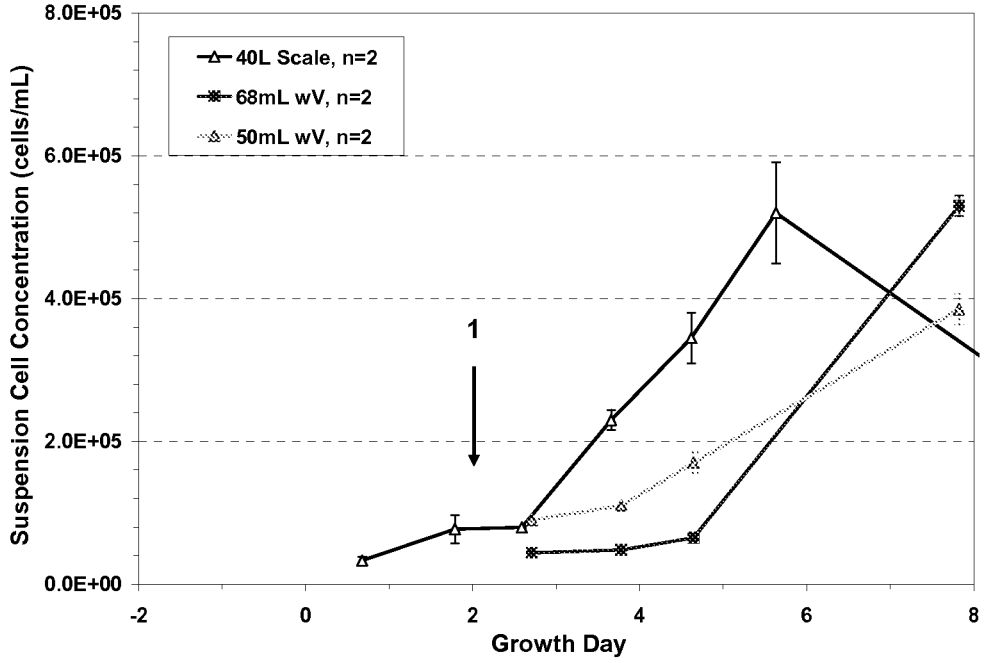


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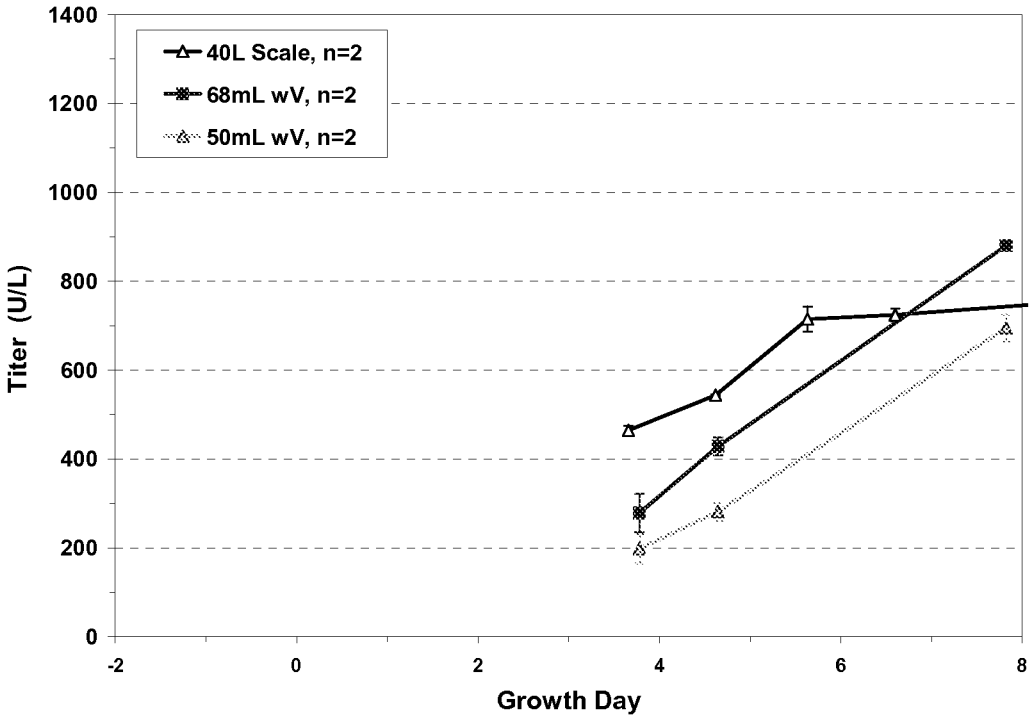


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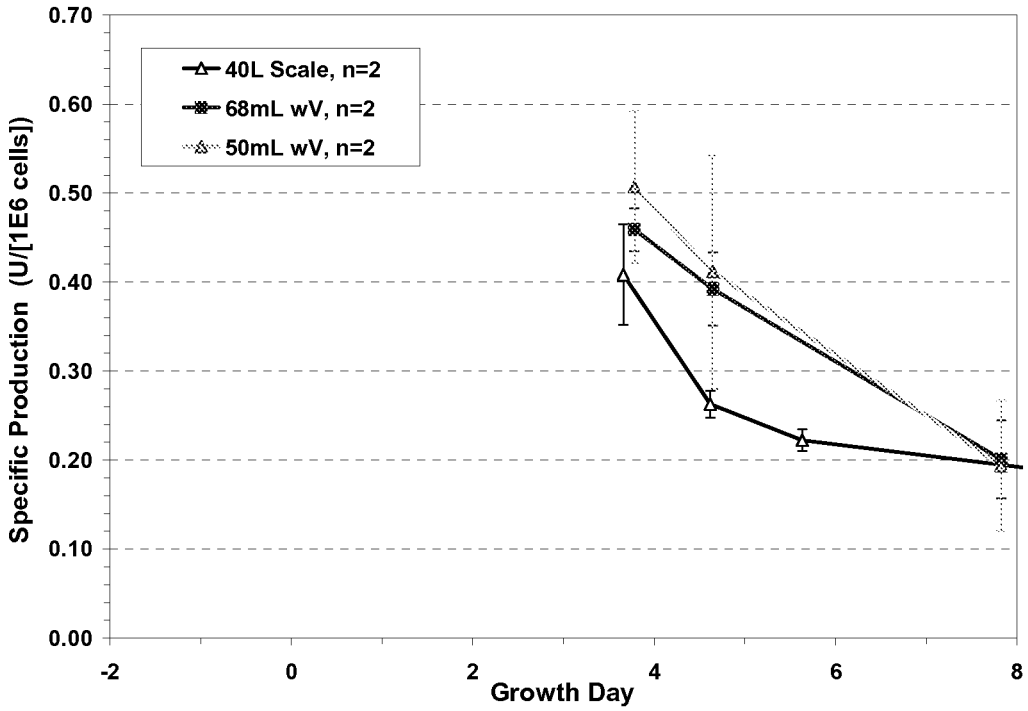


Figure 13

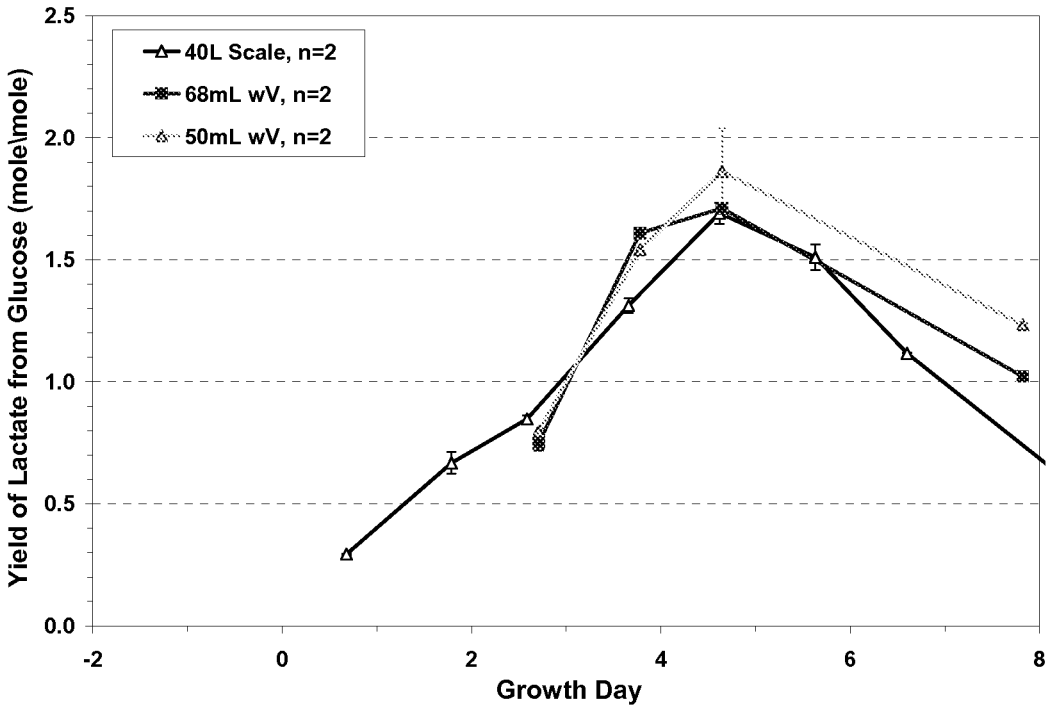


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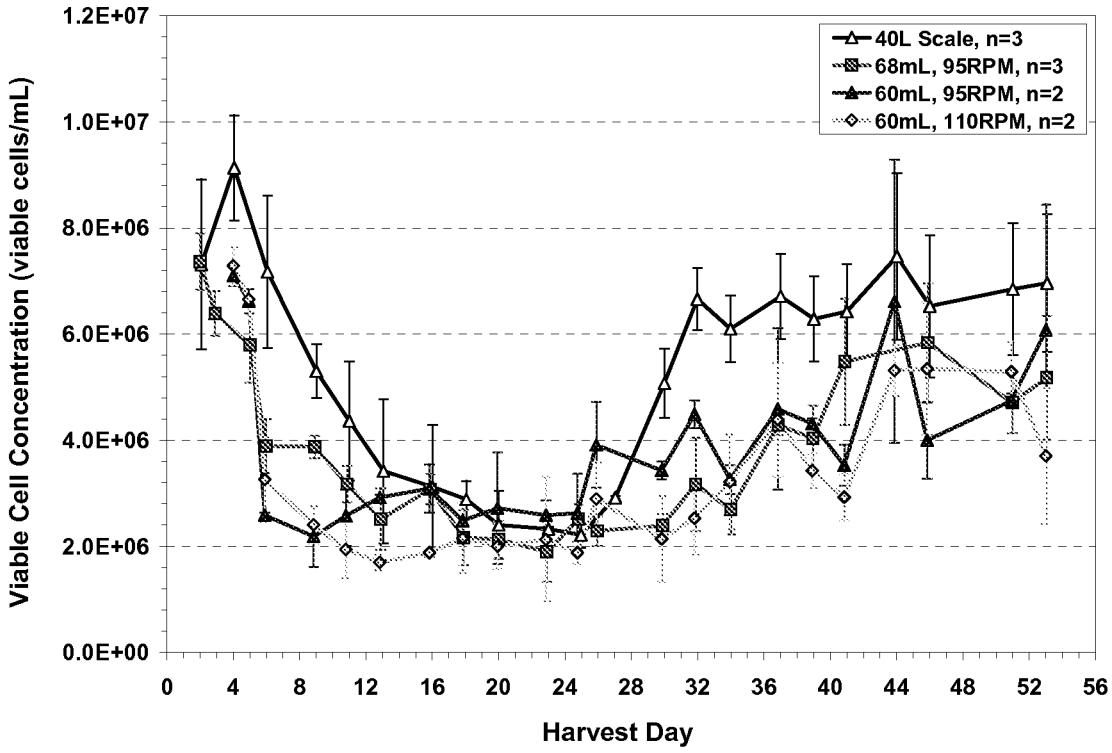


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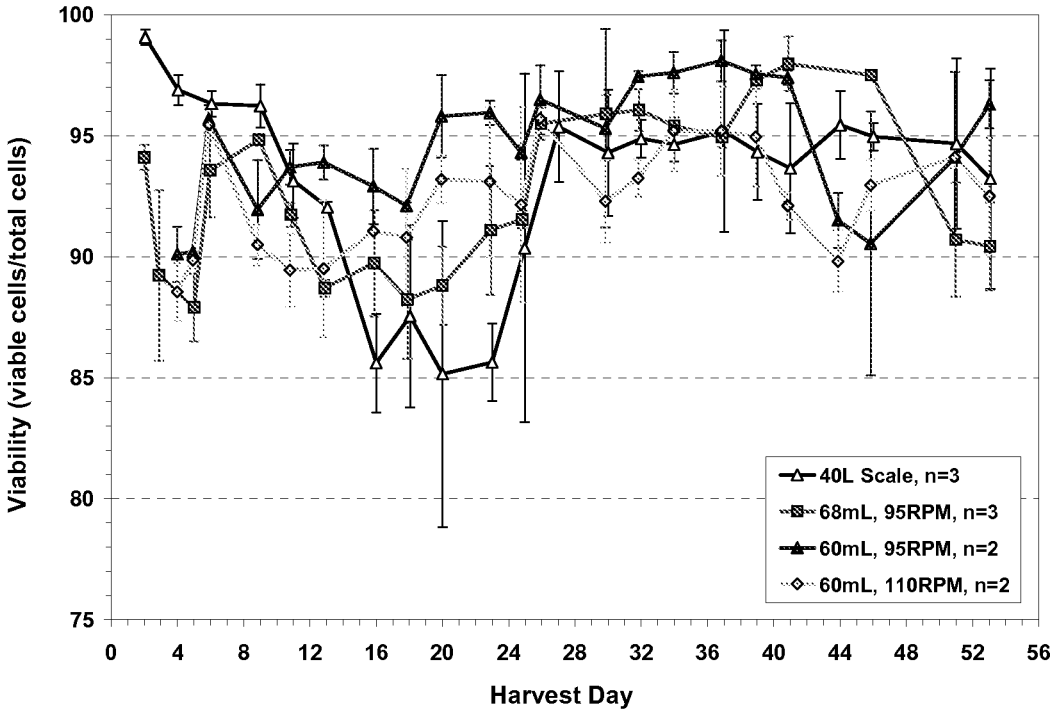


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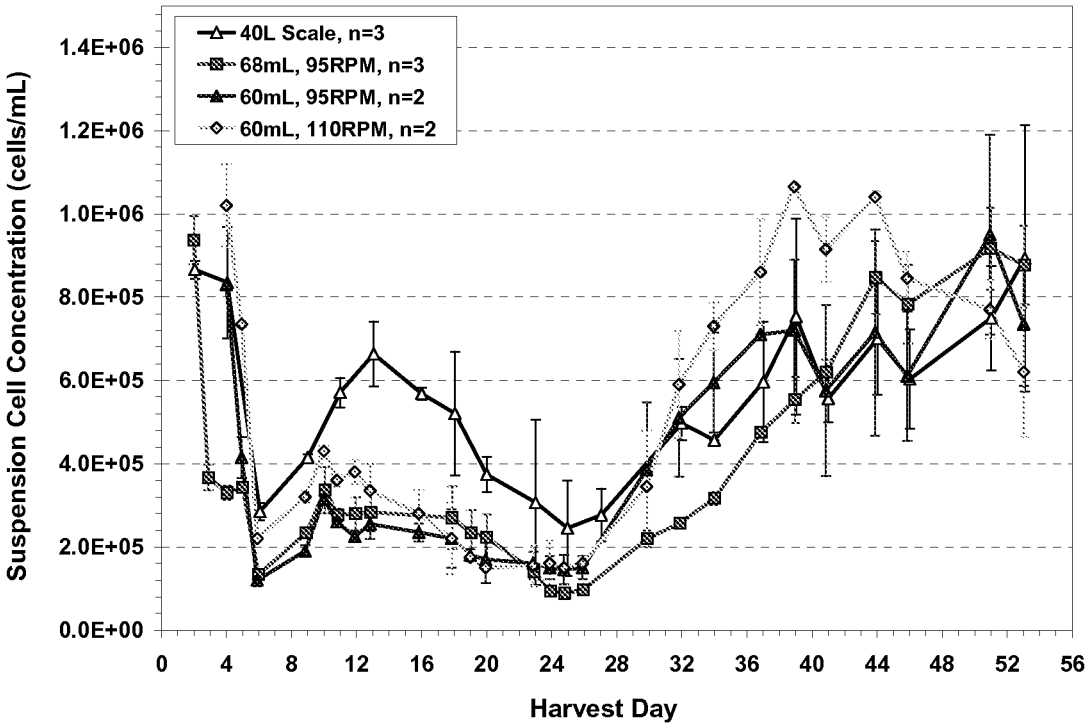


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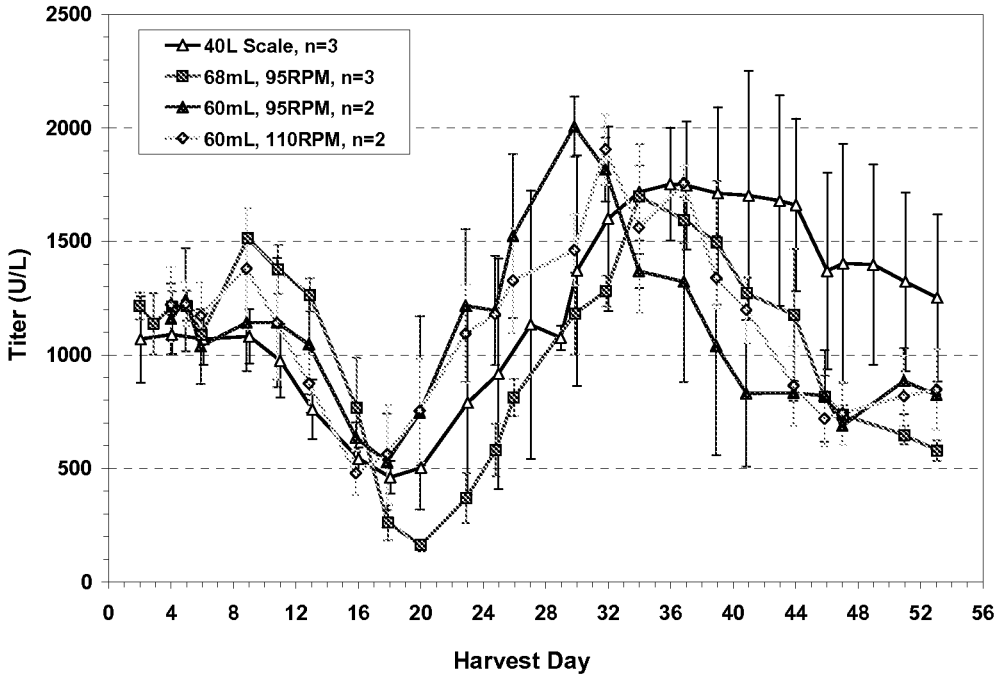


Figure 18

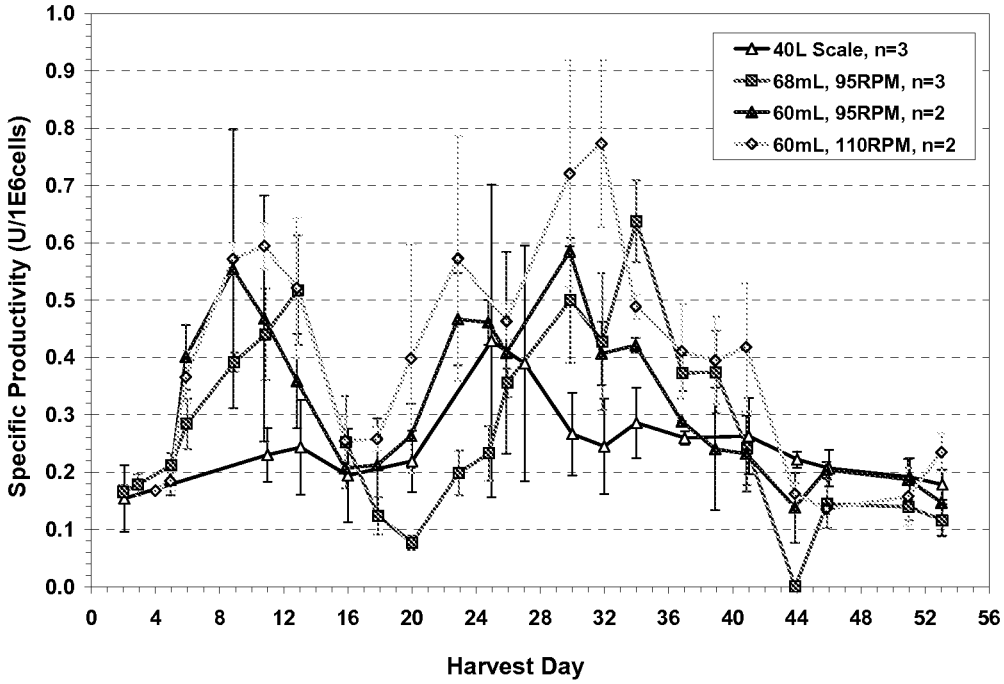


Figure 19

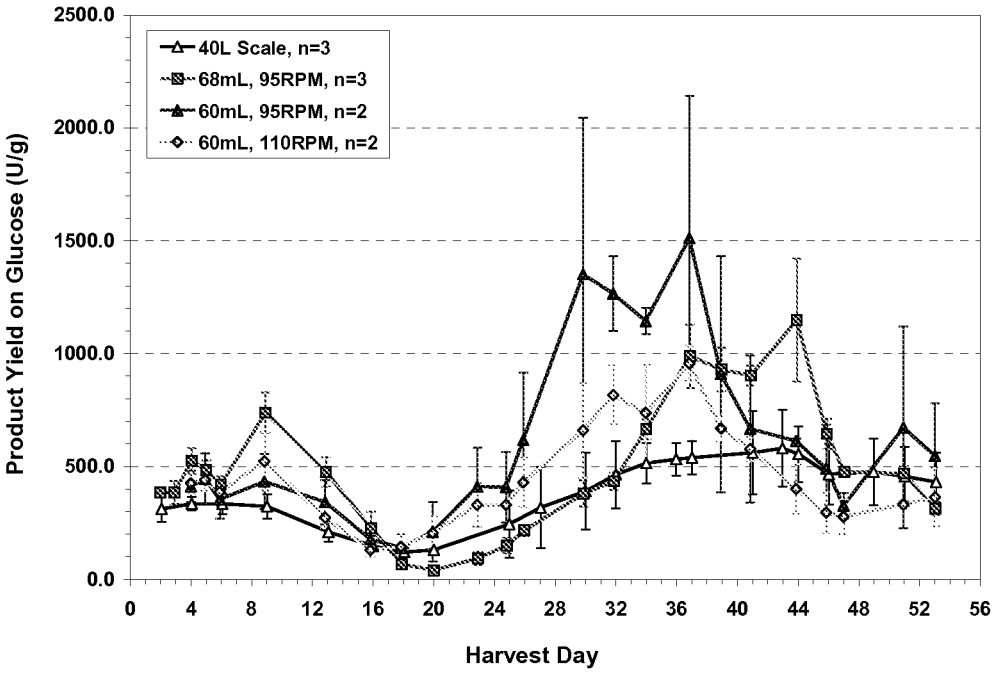


Figure 20

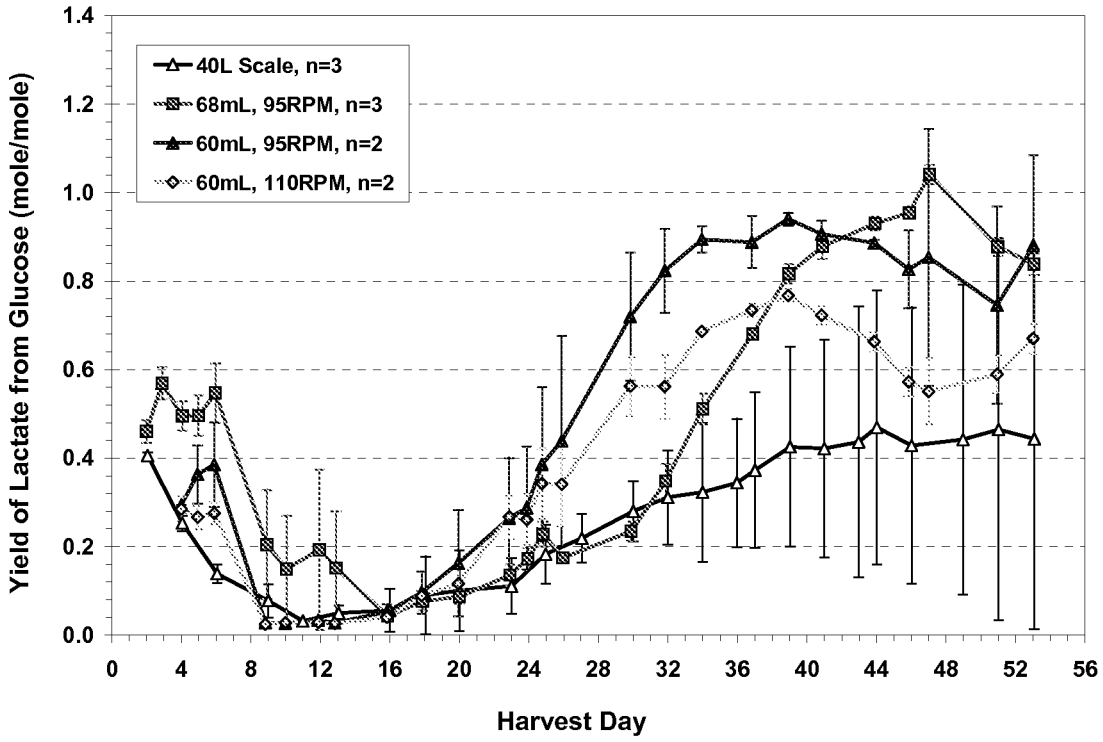


Figure 21

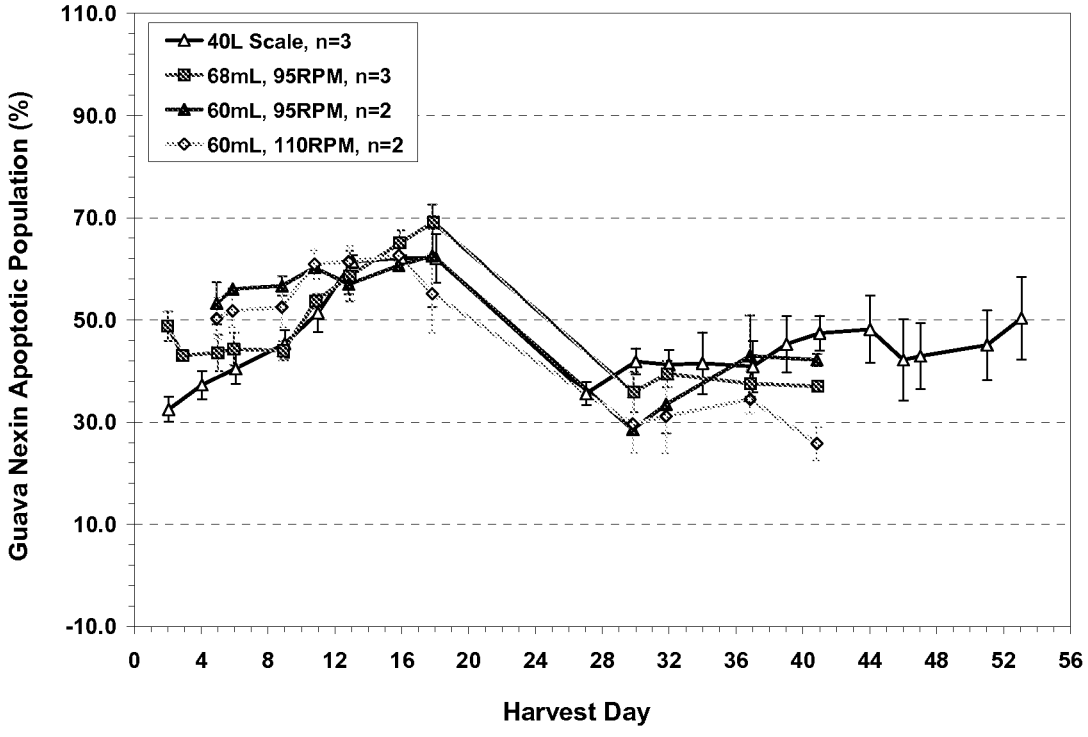


Figure 22

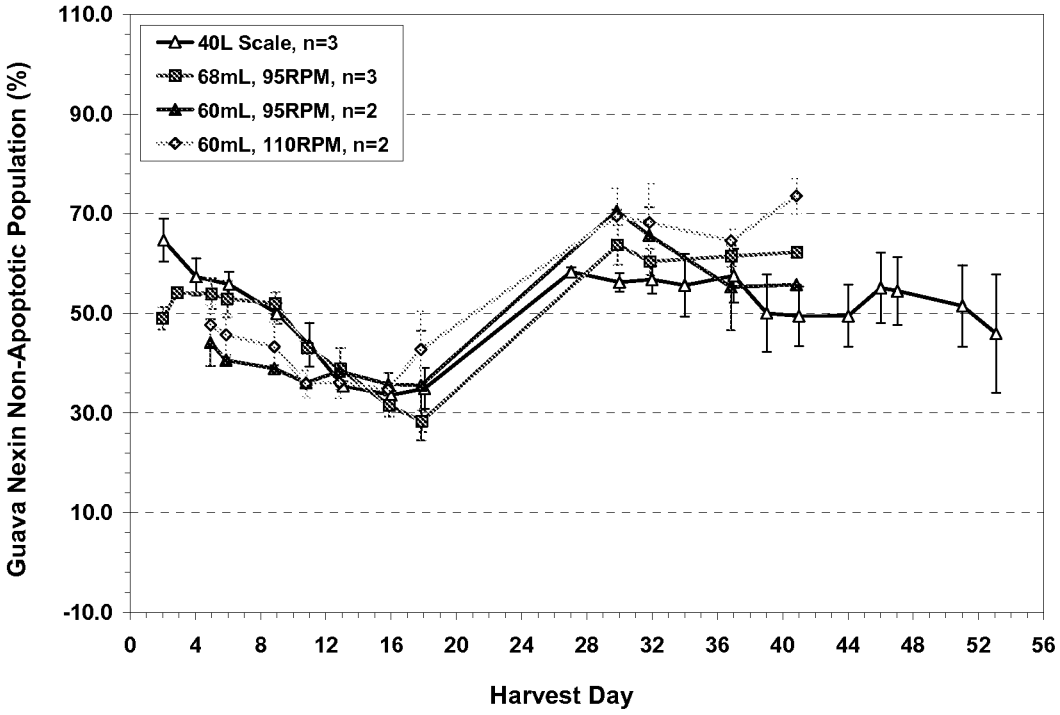


Figure 23

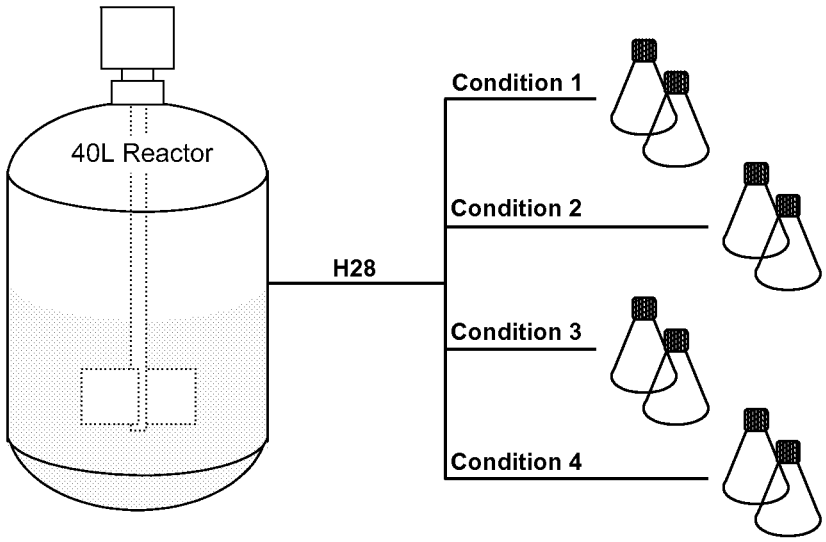


Figure 24

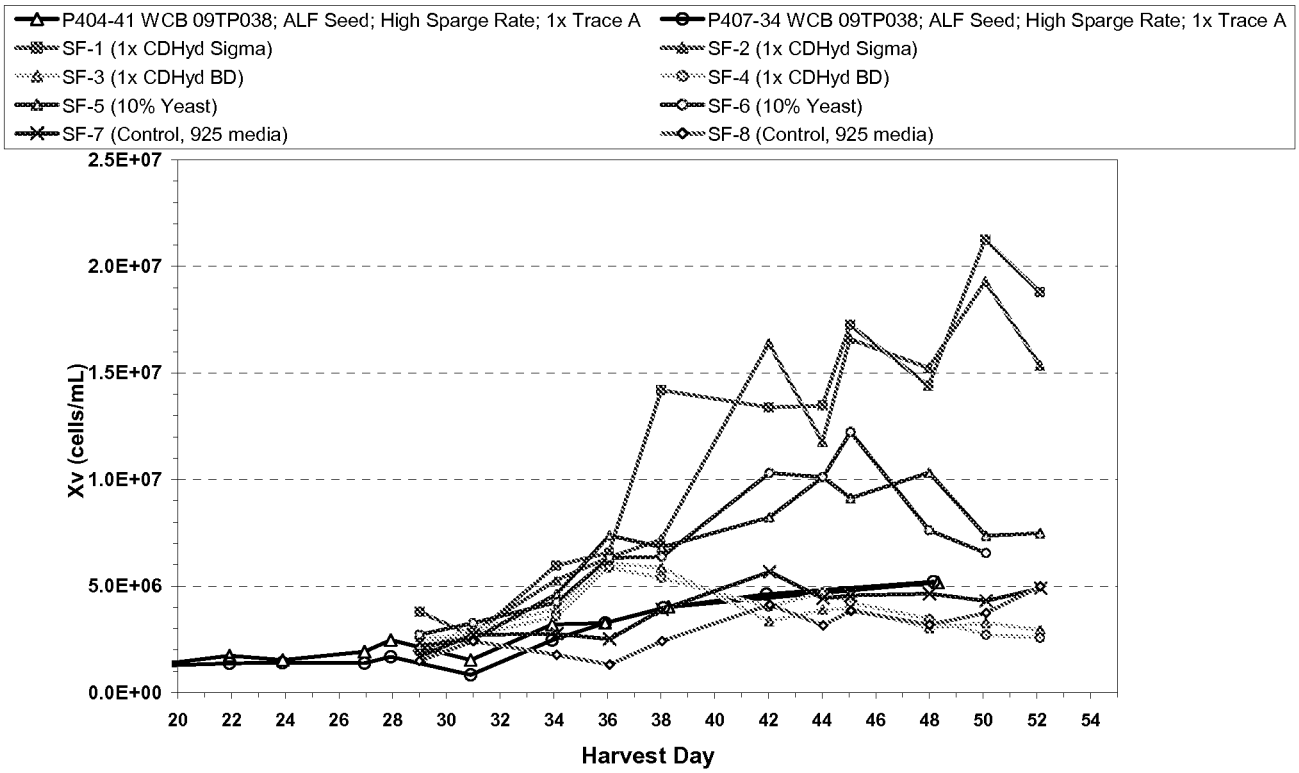


Figure 25

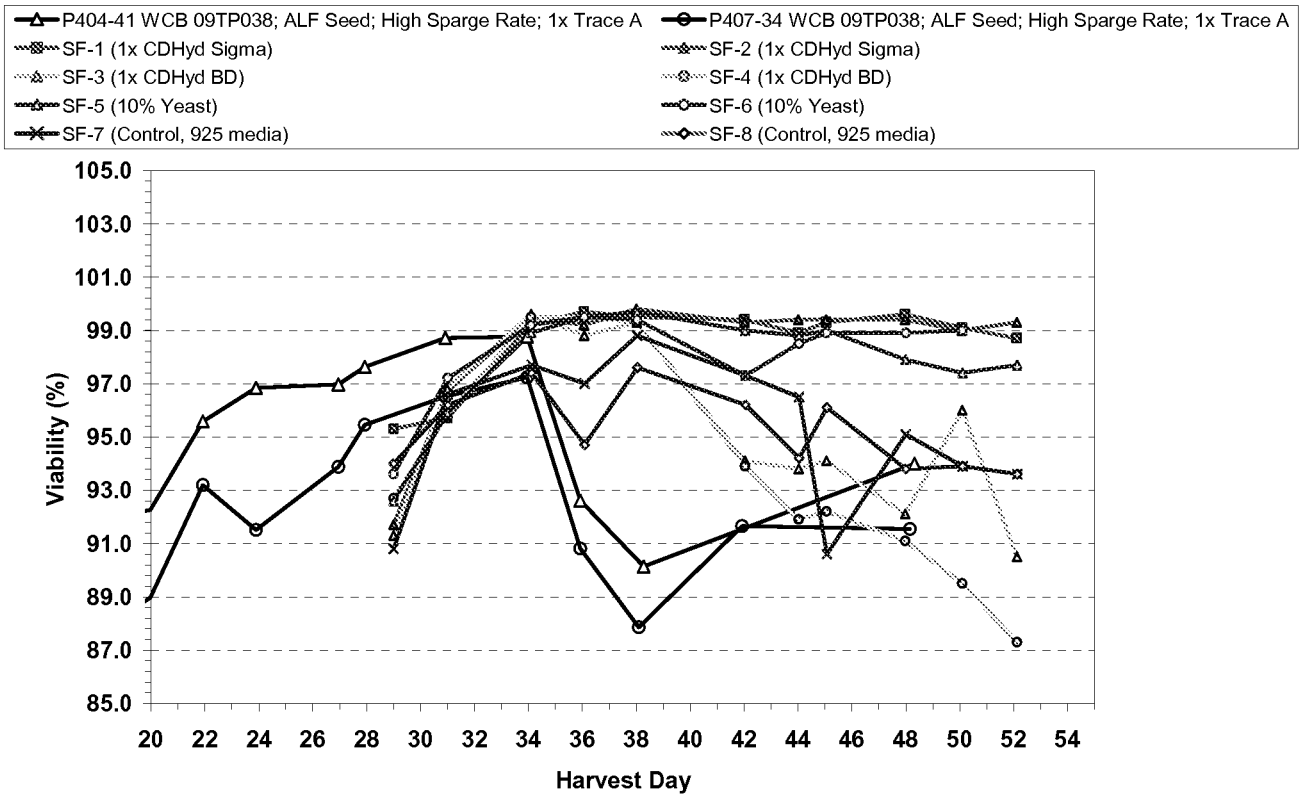


Figure 26

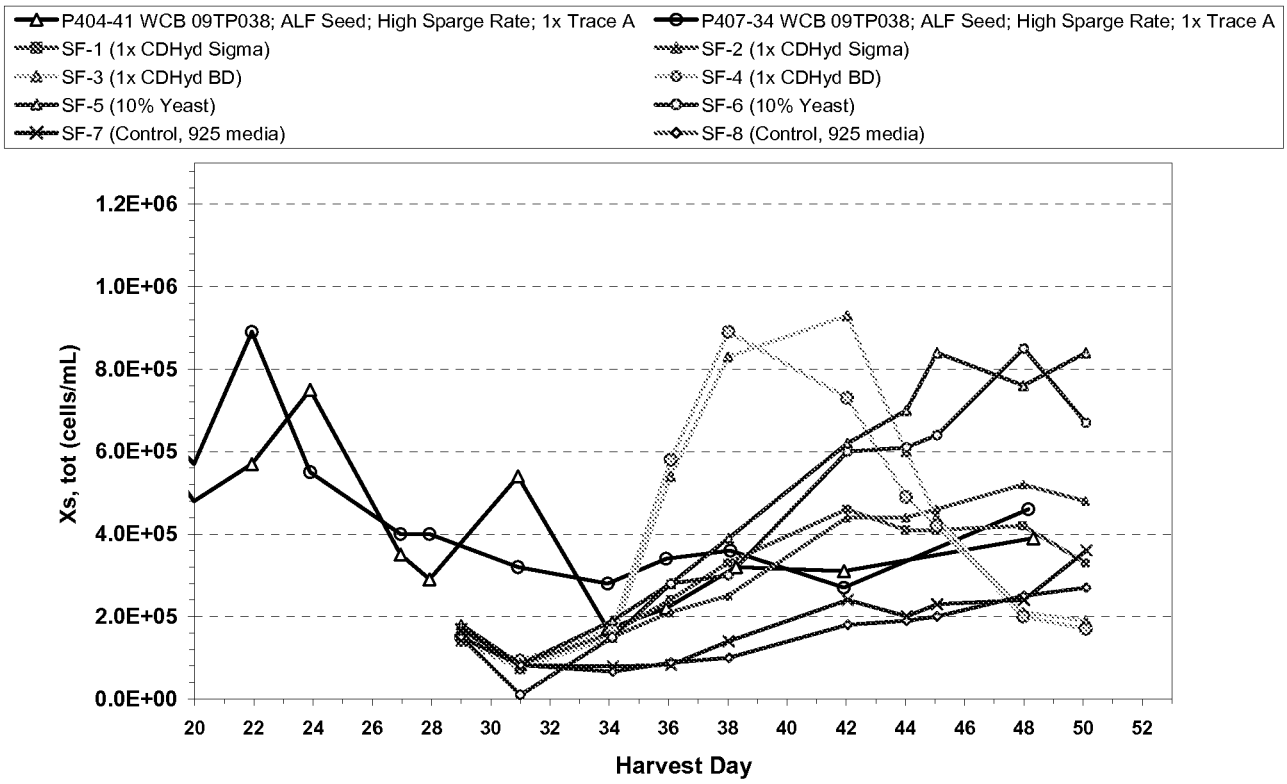

P404-41 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
P407-34 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
SF-1 (1x CDHyd Sigma)
SF-2 (1x CDHyd Sigma)
SF-3 (1x CDHyd BD)
SF-4 (1x CDHyd BD)
SF-5 (10% Yeast)
SF-6 (10% Yeast)
SF-7 (Control, 925 media)
SF-8 (Control, 925 media)
Xs, tot (cells/mL)
1.2E+06
1.0E+06
8.0E+05
6.0E+05
4.0E+05
2.0E+05
0.0E+00
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
Harvest Day

Figure 27

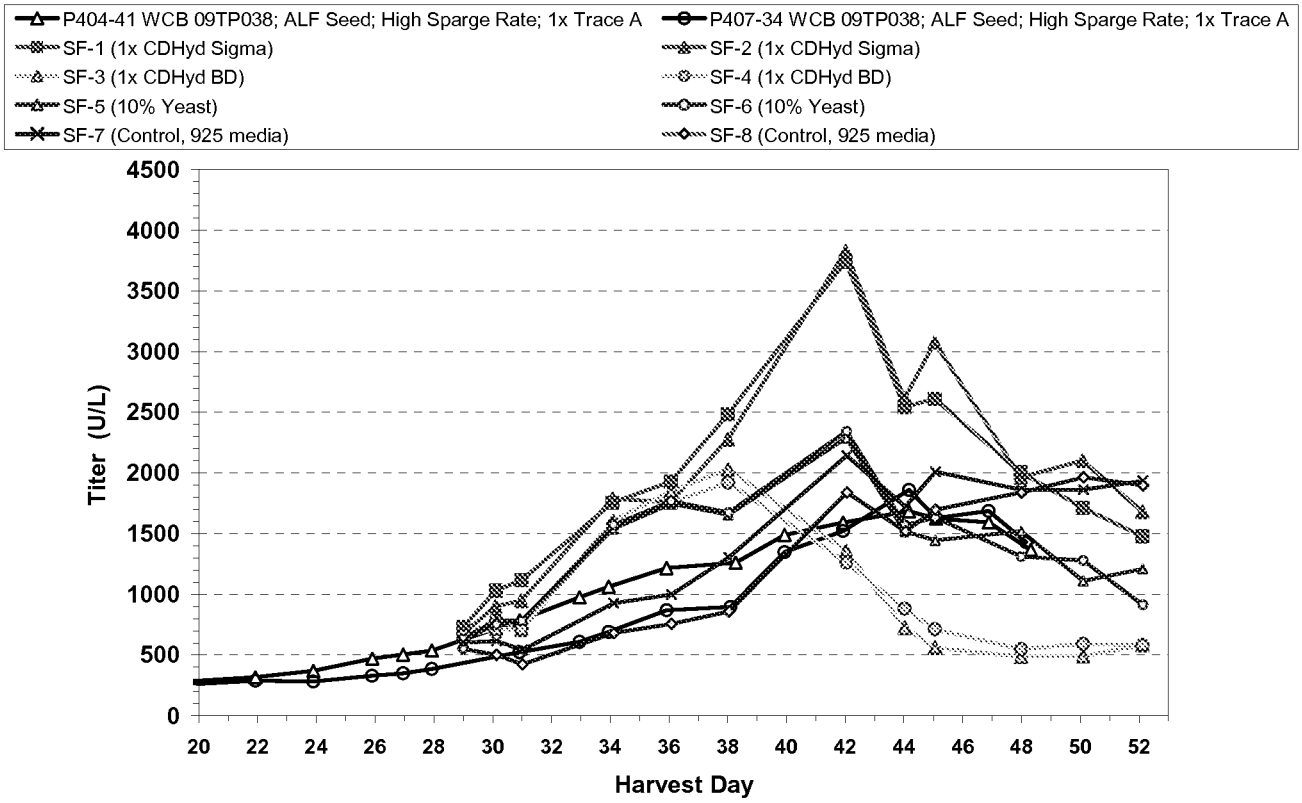

P404-41 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
P407-34 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
SF-1 (1x CDHyd Sigma)
SF-2 (1x CDHyd Sigma)
SF-3 (1x CDHyd BD)
SF-4 (1x CDHyd BD)
SF-5 (10% Yeast)
SF-6 (10% Yeast)
SF-7 (Control, 925 media)
SF-8 (Control, 925 media)
Titer (U/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
Harvest Day

Figure 28

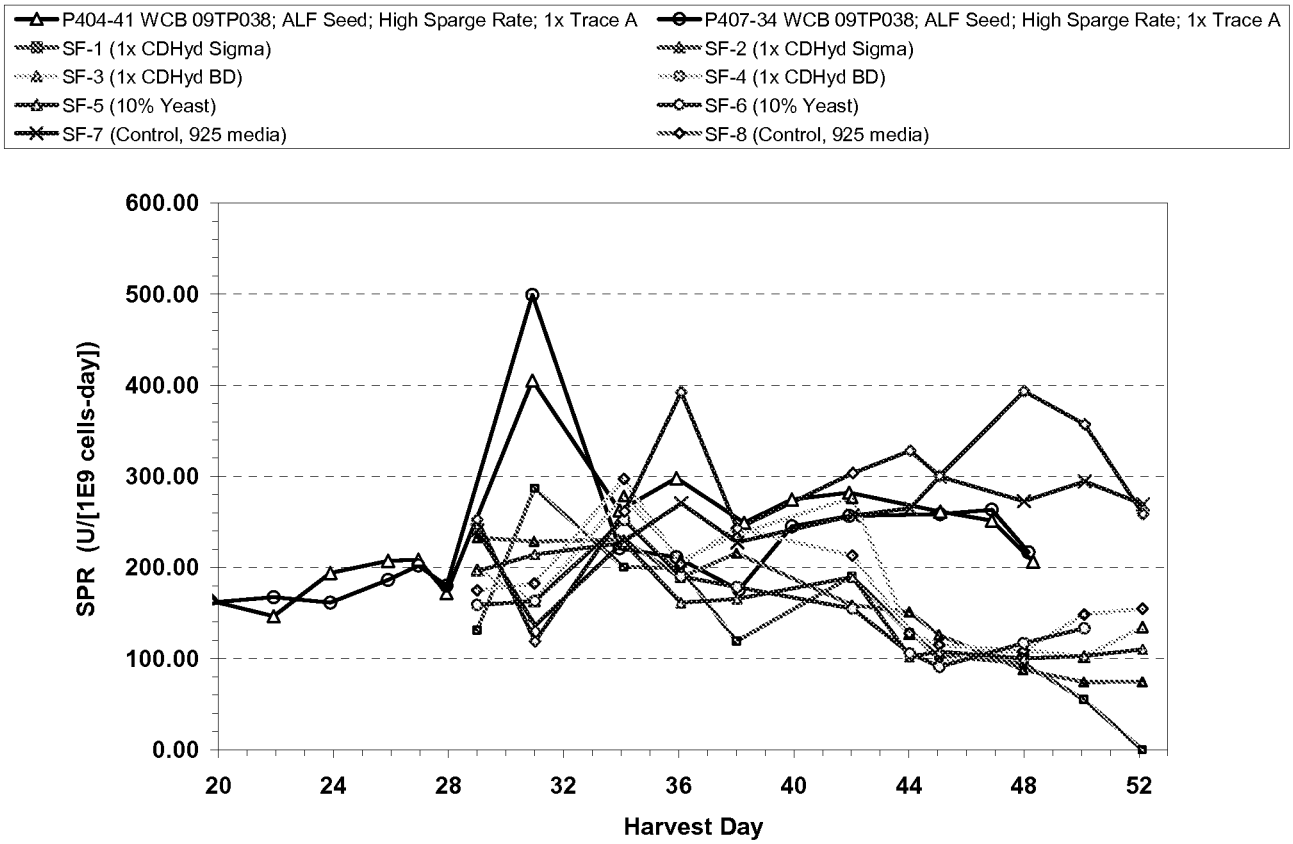

P404-41 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
P407-34 WCB 09TP038; ALF Seed; High Sparge Rate; 1x Trace A
SF-1 (1x CDHyd Sigma)
SF-2 (1x CDHyd Sigma)
SF-3 (1x CDHyd BD)
SF-4 (1x CDHyd BD)
SF-5 (10% Yeast)
SF-6 (10% Yeast)
SF-7 (Control, 925 media)
SF-8 (Control, 925 media)
600.00
500.00
400.00
300.00
200.00
100.00
0.00
SPR (U/[1E9 cells-day])
20
24
28
32
36
40
44
48
52
Harvest Day

Figure 29