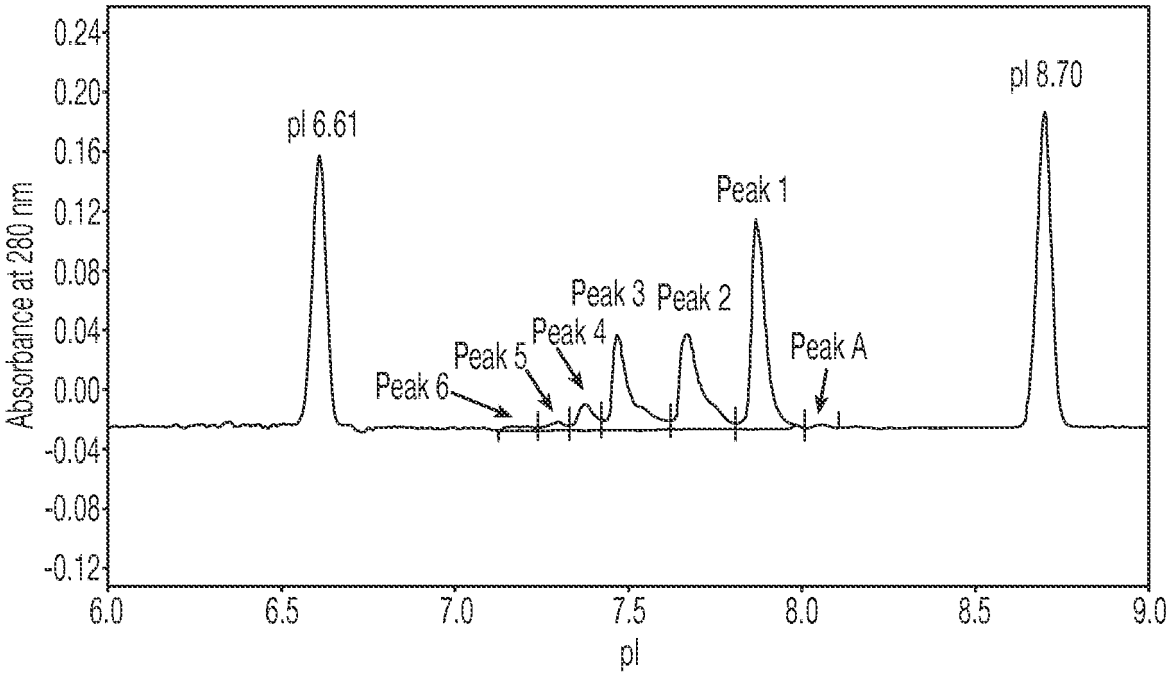

0.24
0.20
0.16
0.12
0.08
0.04
0.00
-0.04
-0.08
-0.12
Absorbance at 280 nm
pI 6.61
pI 8.70
Peak 1
Peak 3
Peak 2
Peak 4
Peak 5
Peak 6
Peak A
6.0
6.5
7.0
7.5
8.0
8.5
9.0
pI

FIG. 1

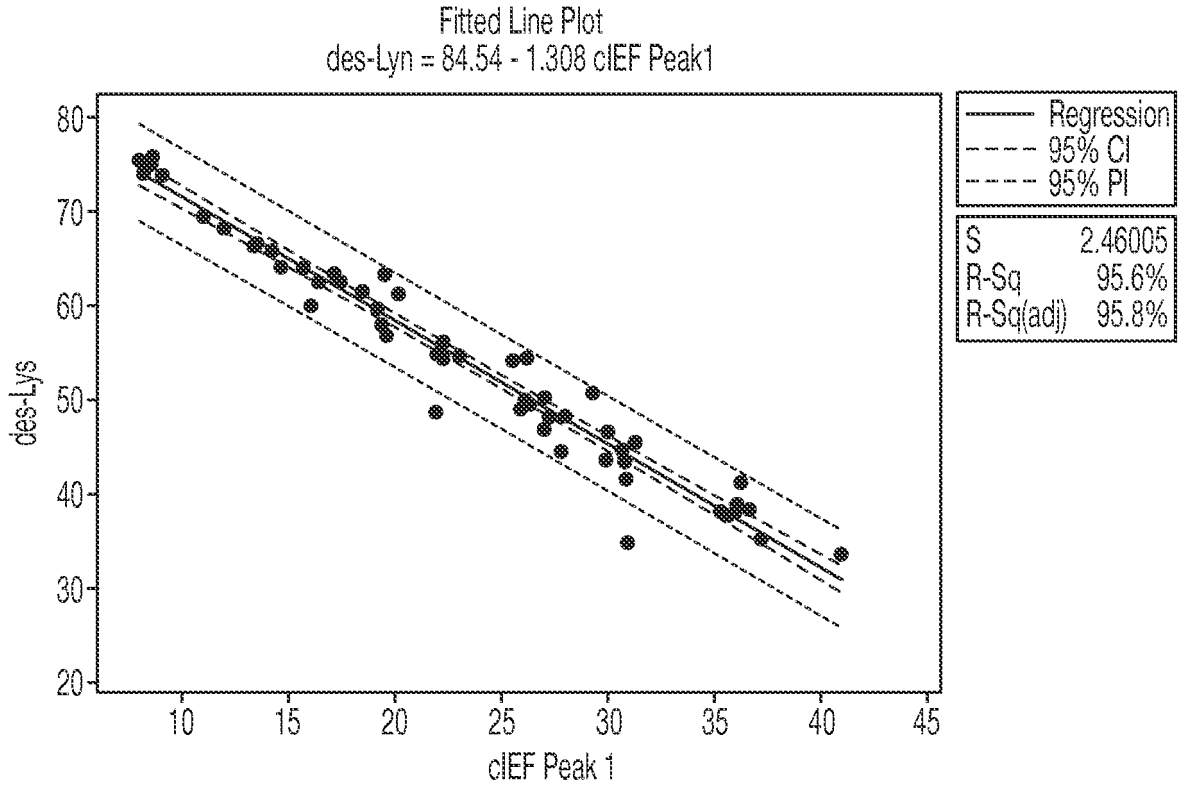

Fitted Line Plot
des-Lyn = 84.54 - 1.308 cIEF Peak1
Regression
95% CI
95% PI
S 2.46005
R-Sq 95.6%
R-Sq(adj) 95.8%
des-Lys
cIEF Peak 1
80
70
60
50
40
30
20
10
15
20
25
30
35
40
45

FIG. 2

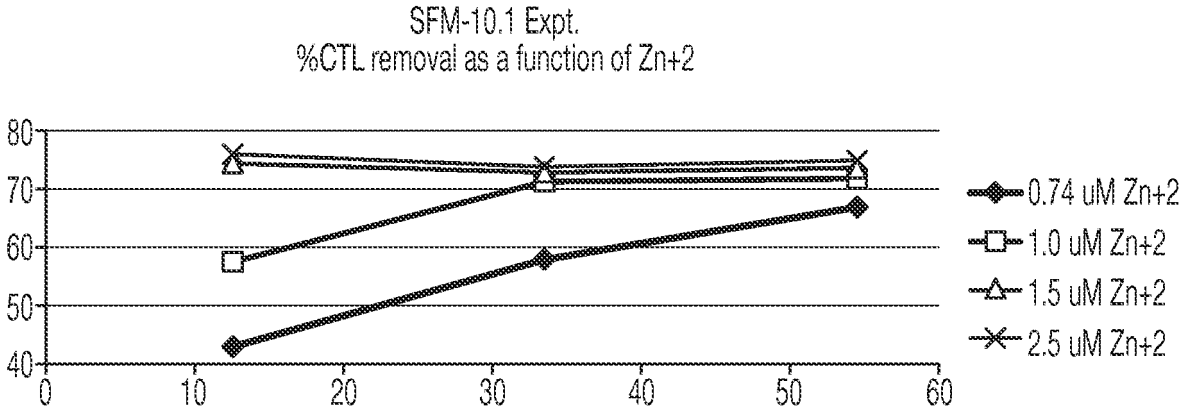

SFM-10.1 Expt.
%CTL removal as a function of Zn+2
80
70
60
50
40
0
10
20
30
40
50
60
0.74 uM Zn+2
1.0 uM Zn+2
1.5 uM Zn+2
2.5 uM Zn+2

FIG. 3

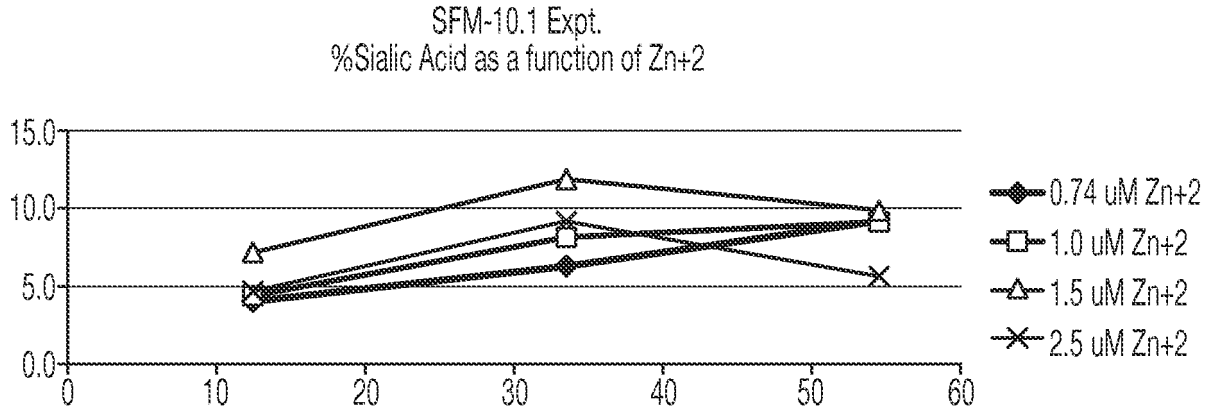

SFM-10.1 Expt.
%Sialic Acid as a function of Zn+2
15.0
10.0
5.0
0.0
0
10
20
30
40
50
60
0.74 uM Zn+2
1.0 uM Zn+2
1.5 uM Zn+2
2.5 uM Zn+2

FIG. 4

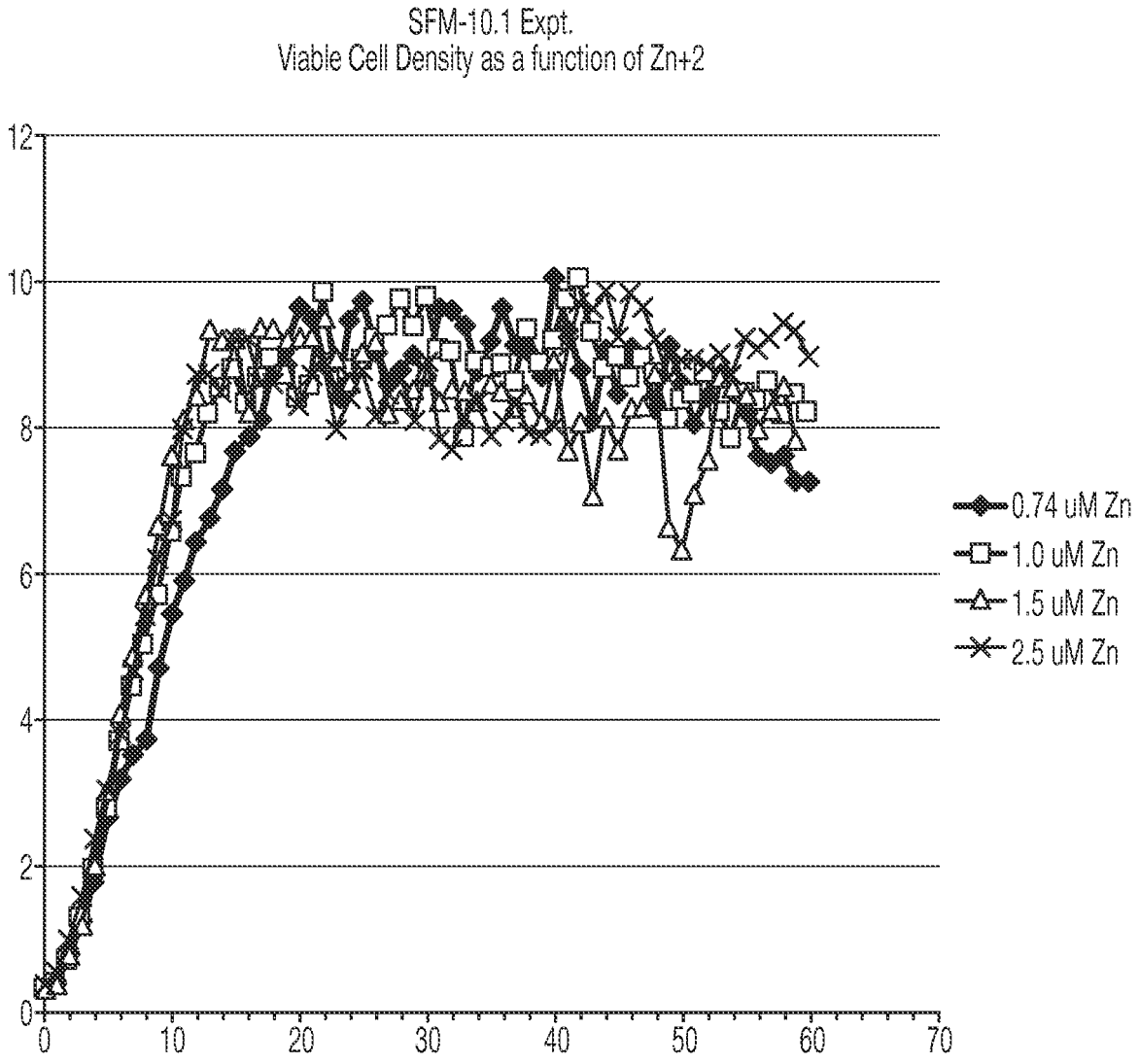

SFM-10.1 Expt.
Viable Cell Density as a function of Zn+2
12
10
8
6
4
2
0
0
10
20
30
40
50
60
70
0.74 uM Zn
1.0 uM Zn
1.5 uM Zn
2.5 uM Zn

FIG. 5

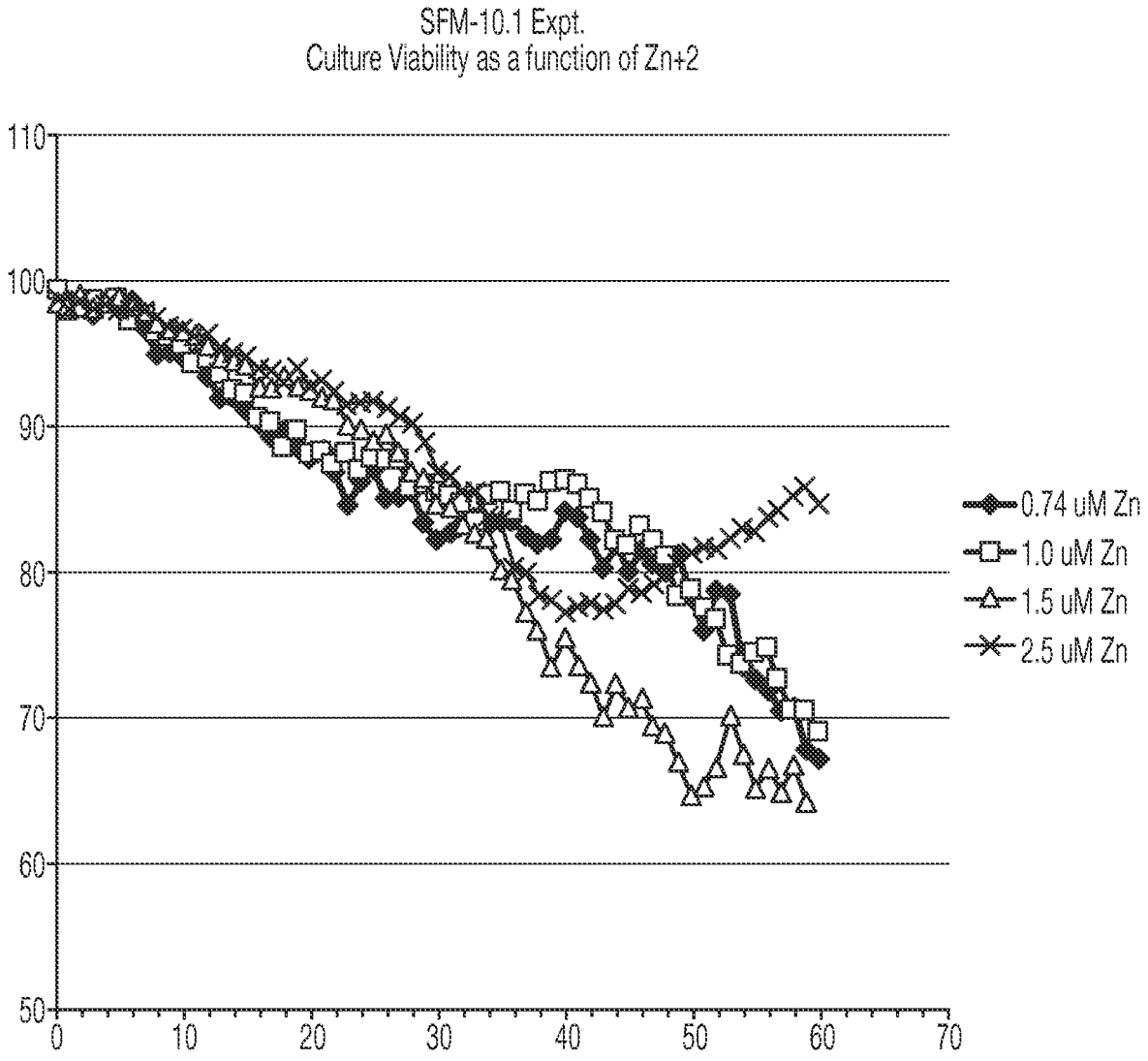

SFM-10.1 Expt.
Culture Viability as a function of Zn+2
110
100
90
80
70
60
50
0
10
20
30
40
50
60
70
0.74 uM Zn
1.0 uM Zn
1.5 uM Zn
2.5 uM Zn

FIG. 6

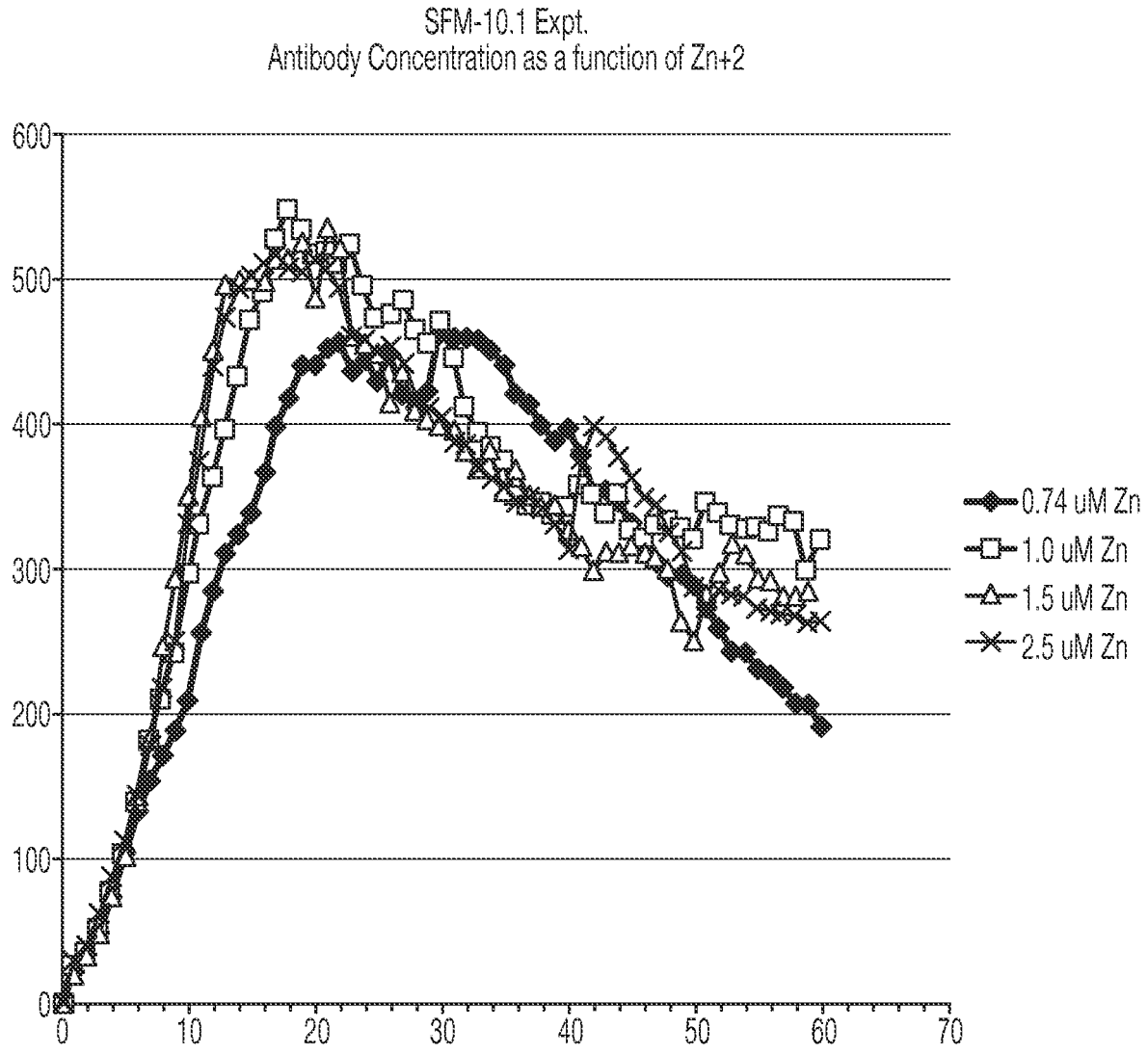

SFM-10.1 Expt.
Antibody Concentration as a function of Zn+2
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
0.74 uM Zn
1.0 uM Zn
1.5 uM Zn
2.5 uM Zn

FIG. 7

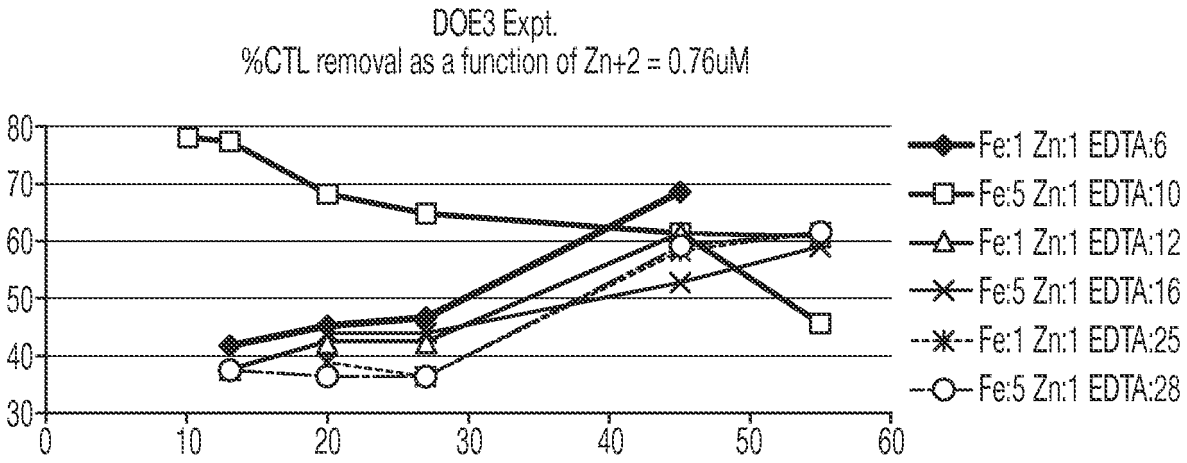

DOE3 Expt.
%CTL removal as a function of Zn+2 = 0.76uM
80
70
60
50
40
30
0
10
20
30
40
50
60
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:12
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:25
Fe:5 Zn:1 EDTA:28

FIG. 8A

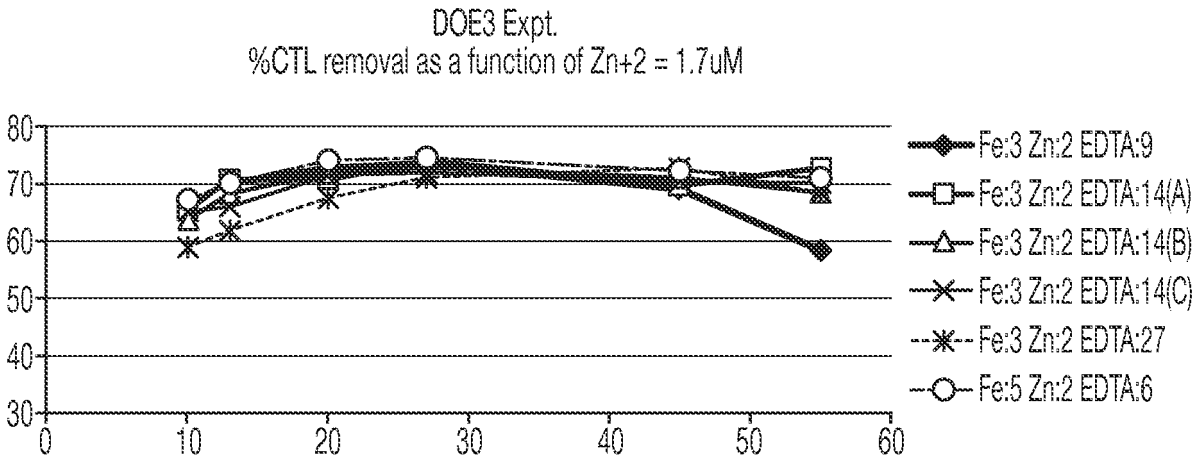

DOE3 Expt.
%CTL removal as a function of Zn+2 = 1.7uM
80
70
60
50
40
30
0
10
20
30
40
50
60
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 8B

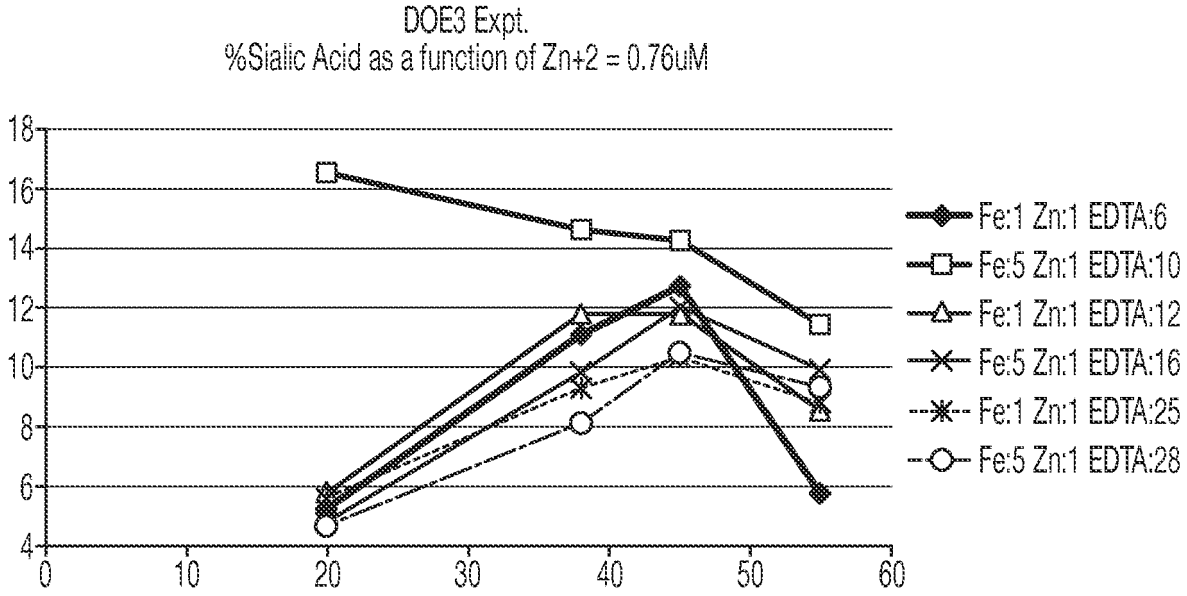

DOE3 Expt.
%Sialic Acid as a function of Zn+2 = 0.76uM
18
16
14
12
10
8
6
4
0
10
20
30
40
50
60
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:12
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:25
Fe:5 Zn:1 EDTA:28

FIG. 9A

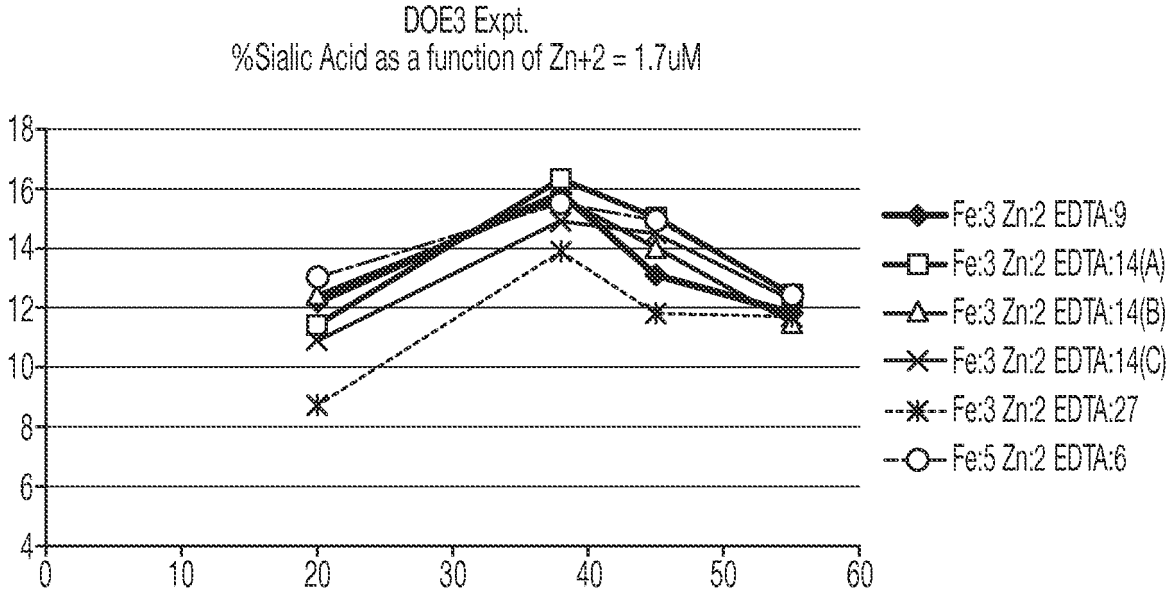

DOE3 Expt.
%Sialic Acid as a function of Zn+2 = 1.7uM
18
16
14
12
10
8
6
4
0
10
20
30
40
50
60
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 9B

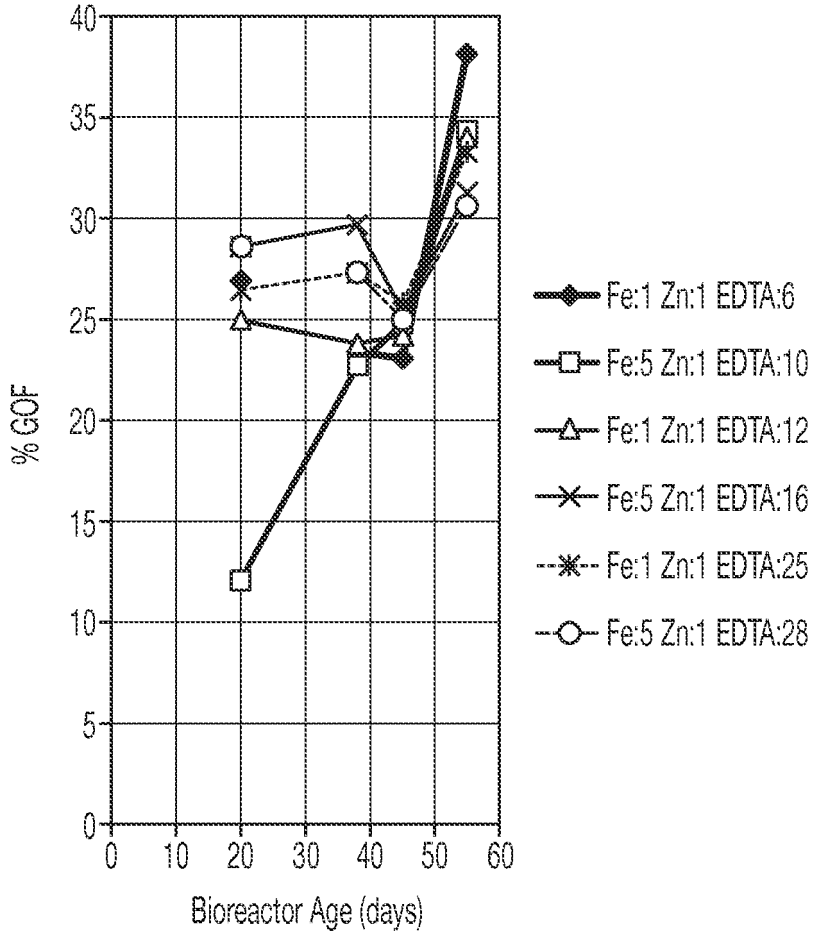

40
35
30
25
20
15
10
5
0
% GOF
0
10
20
30
40
50
60
Bioreactor Age (days)
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:12
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:25
Fe:5 Zn:1 EDTA:28

FIG. 9C

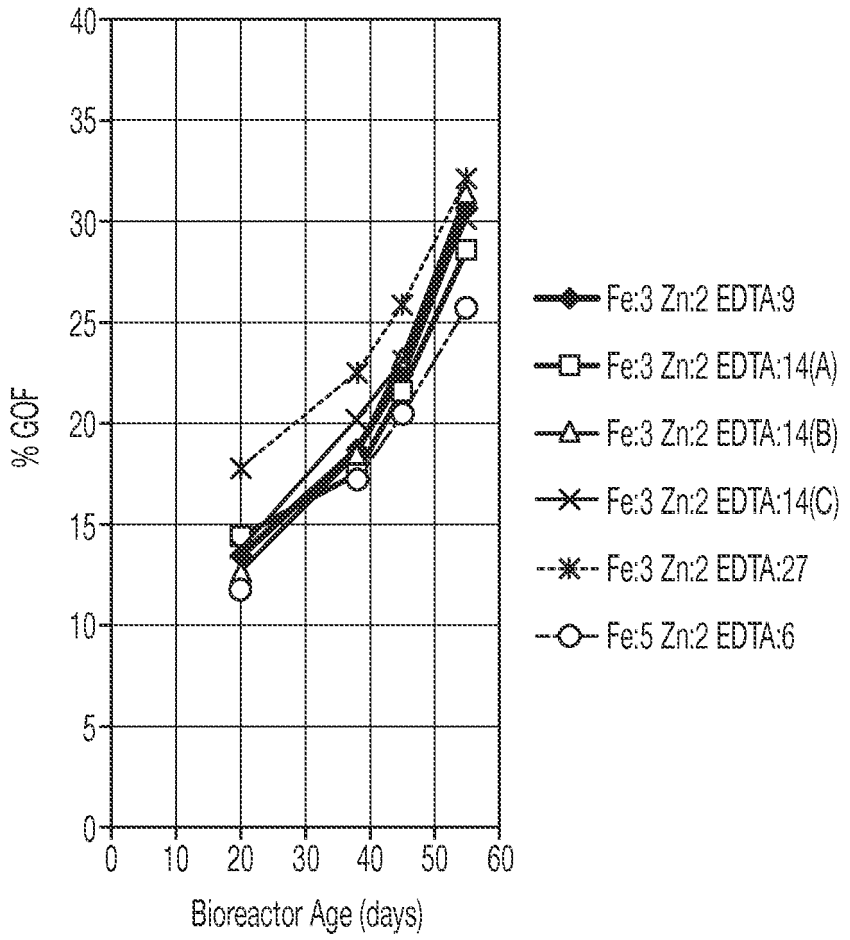

40
35
30
25
20
15
10
5
0
% GOF
0
10
20
30
40
50
60
Bioreactor Age (days)
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 9D

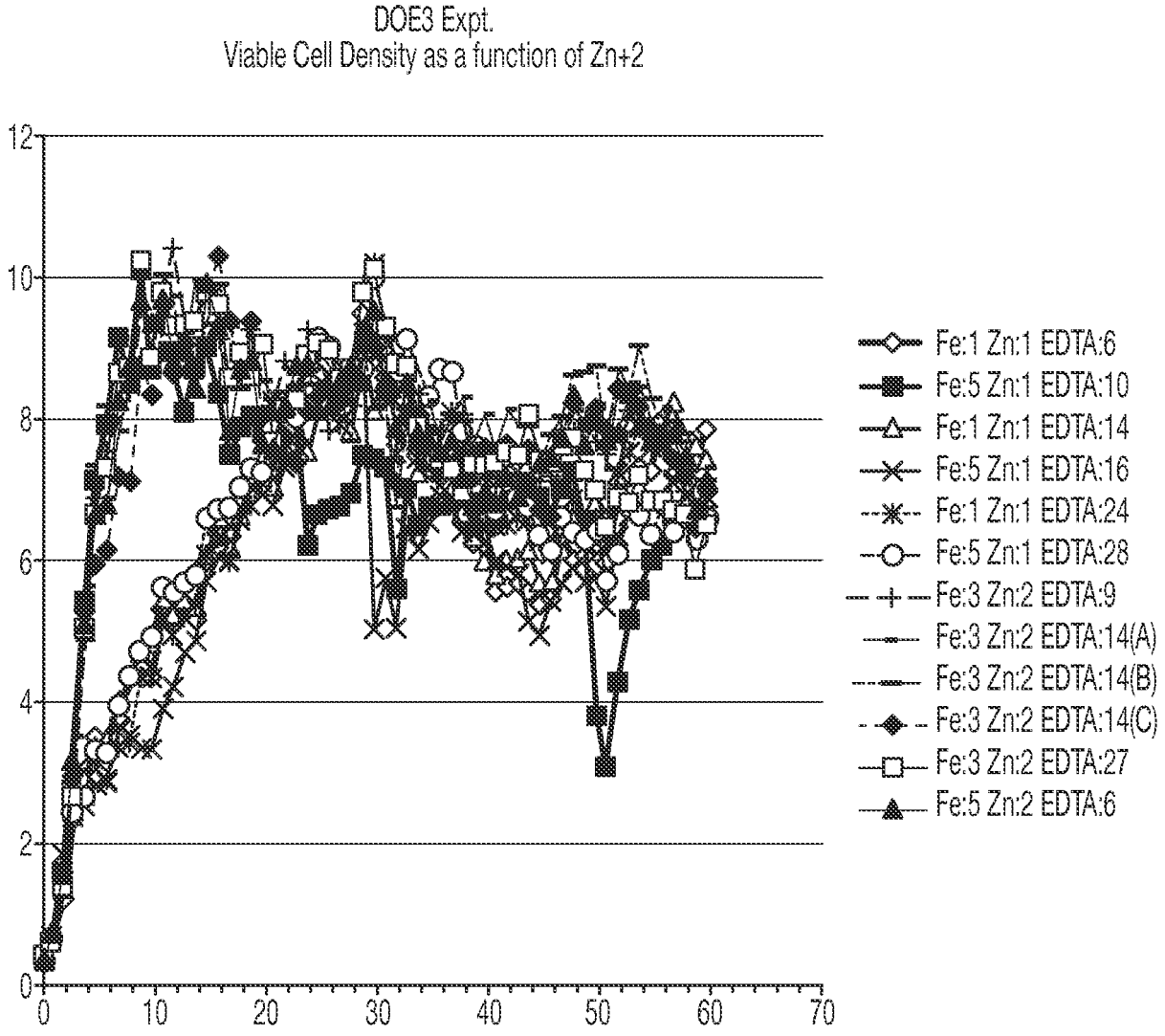

DOE3 Expt.
Viable Cell Density as a function of Zn+2
12
10
8
6
4
2
0
0
10
20
30
40
50
60
70
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:14
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:24
Fe:5 Zn:1 EDTA:28
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 10

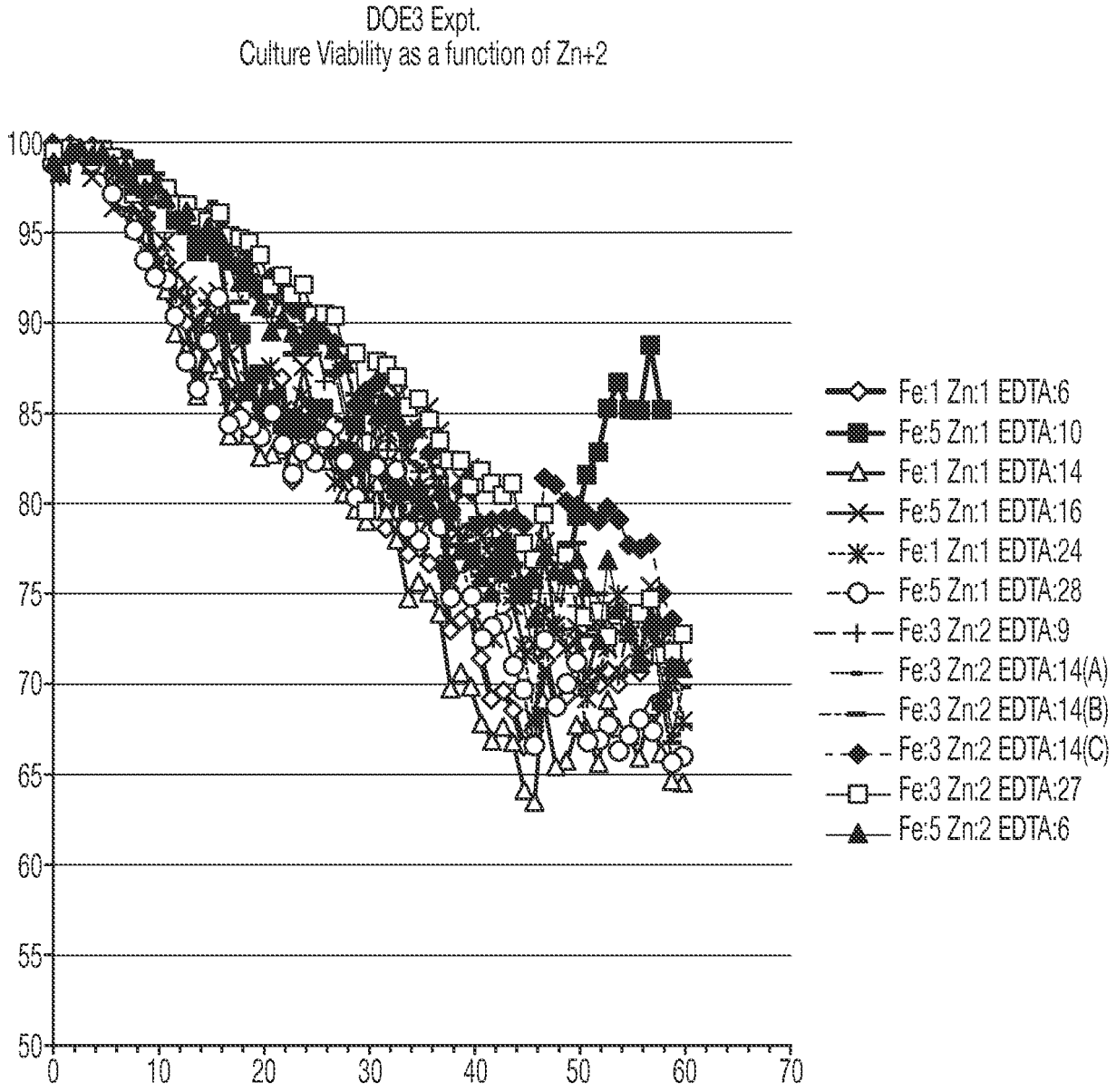

DOE3 Expt.
Culture Viability as a function of Zn+2
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
40
50
60
70
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:14
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:24
Fe:5 Zn:1 EDTA:28
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 11A

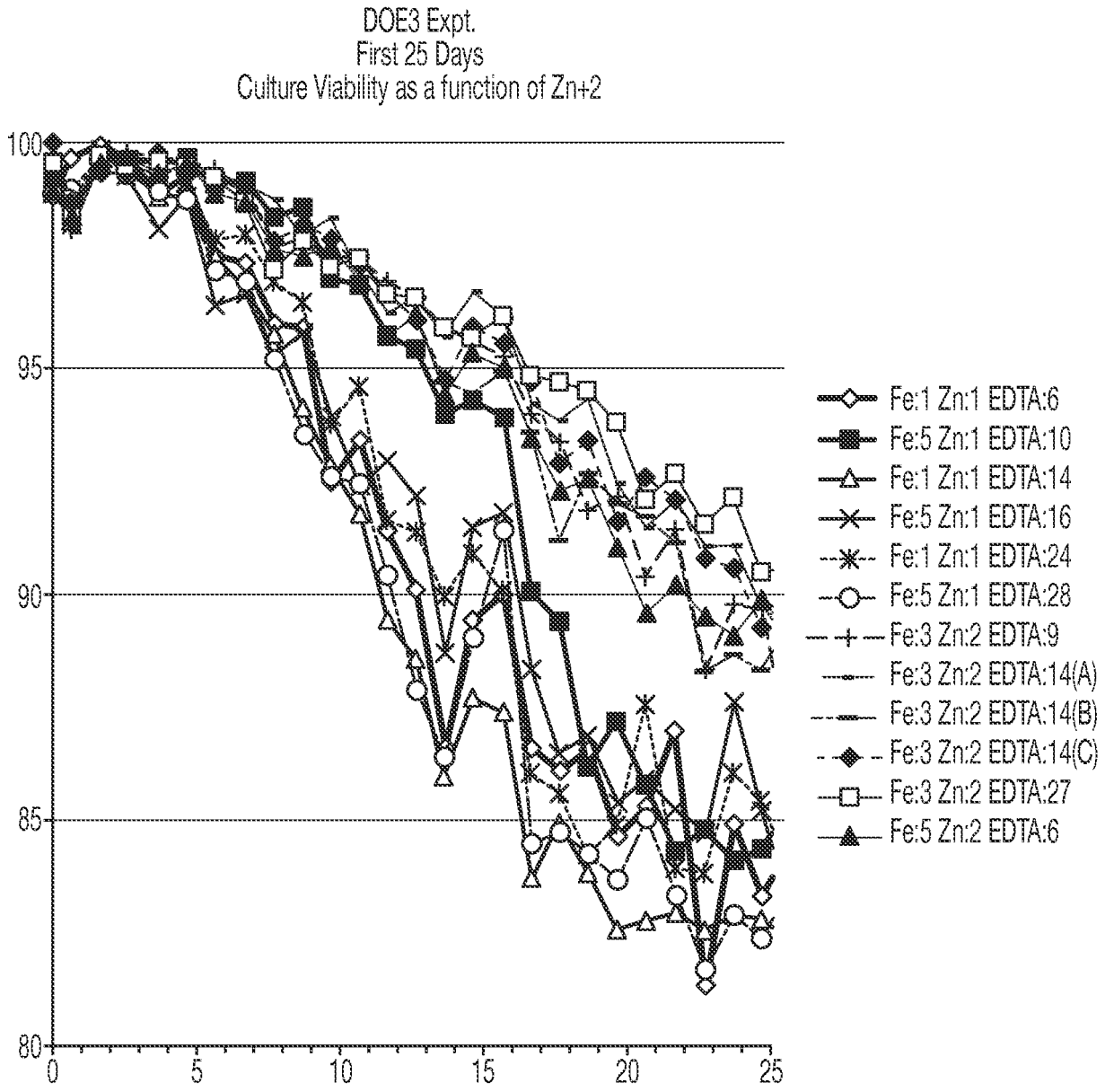

DOE3 Expt.
First 25 Days
Culture Viability as a function of Zn+2
100
95
90
85
80
0
5
10
15
20
25
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:14
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:24
Fe:5 Zn:1 EDTA:28
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 11B

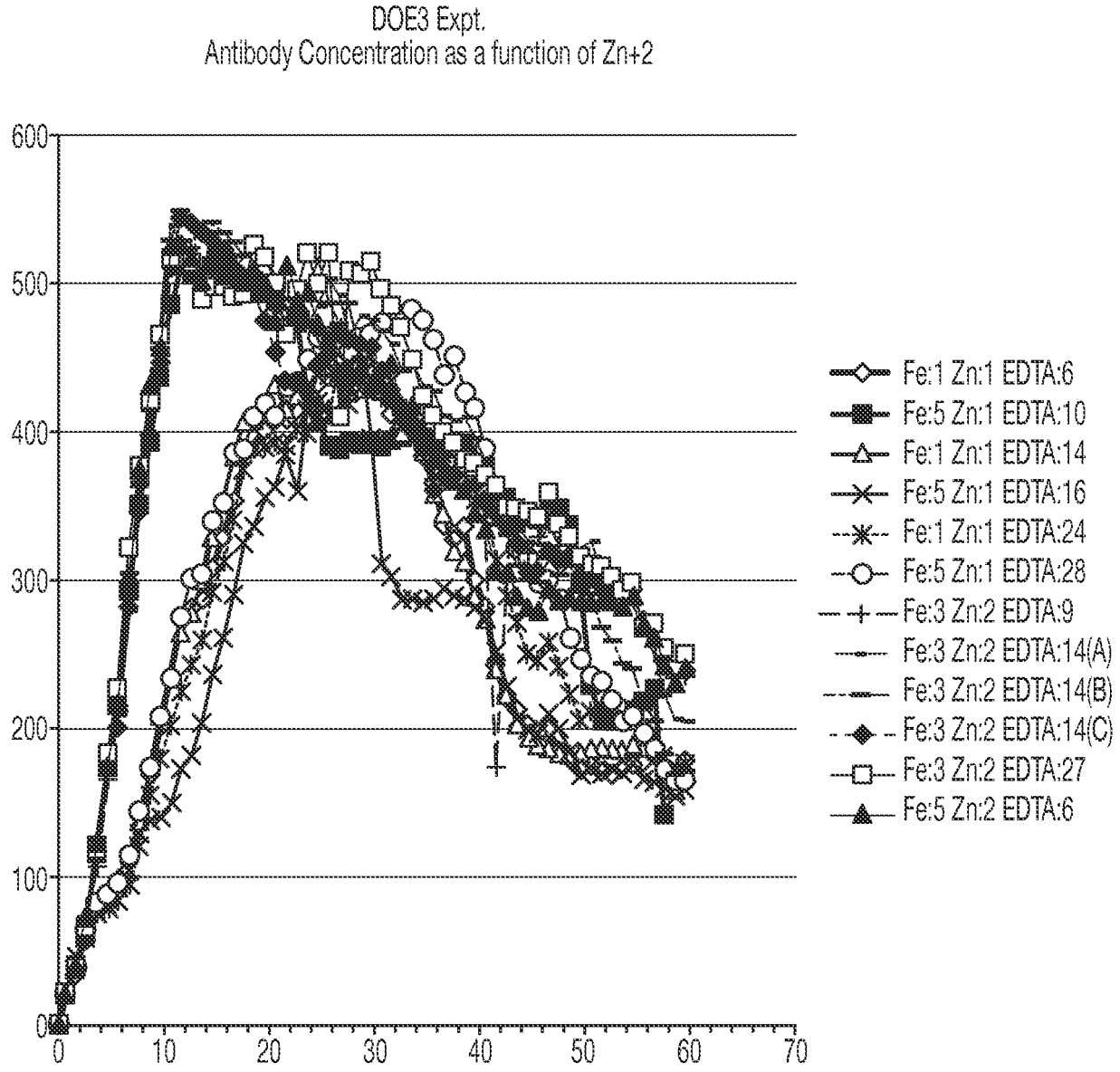

DOE3 Expt.
Antibody Concentration as a function of Zn+2
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:14
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:24
Fe:5 Zn:1 EDTA:28
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 12A

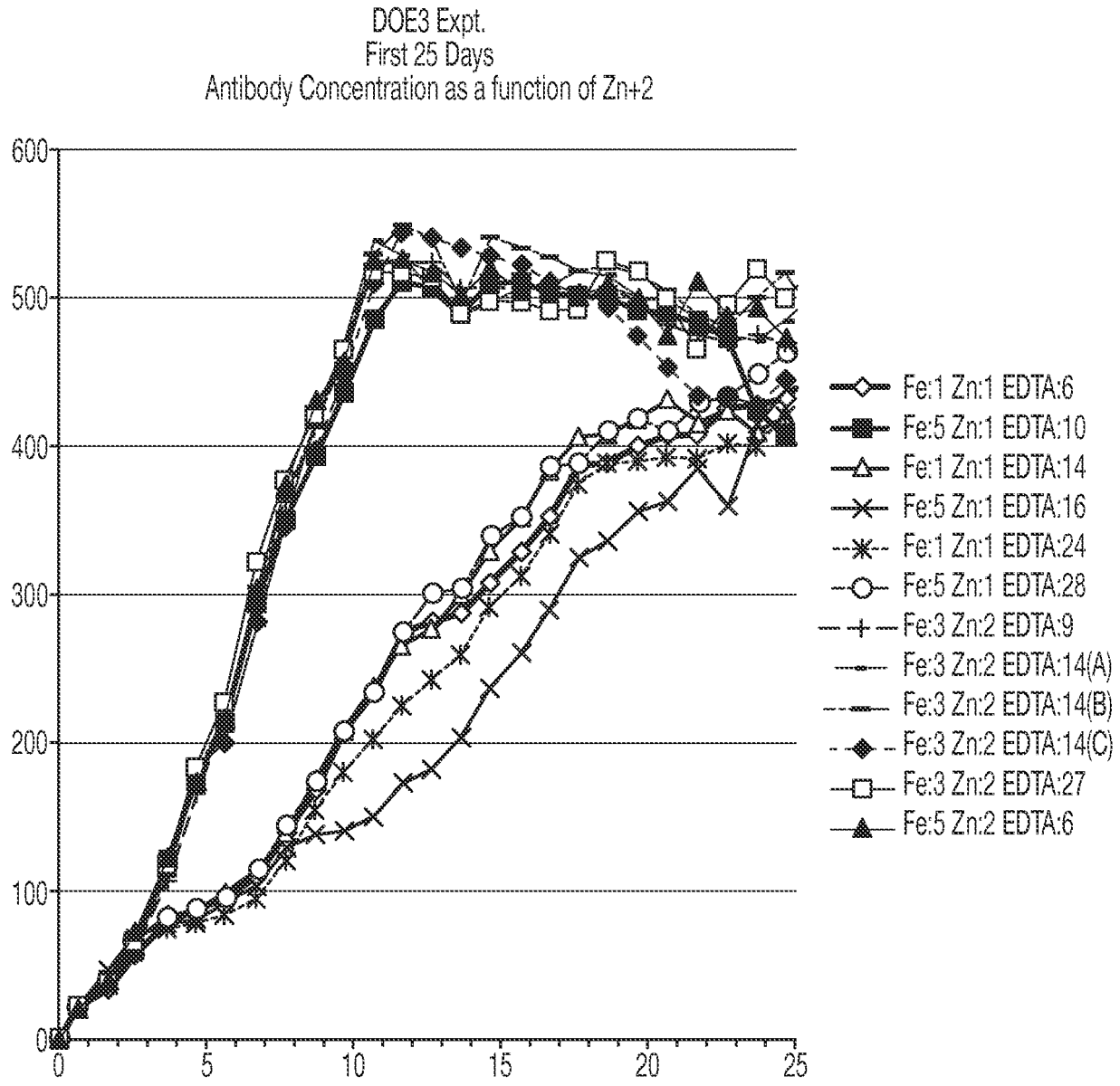

DOE3 Expt.
First 25 Days
Antibody Concentration as a function of Zn+2
600
500
400
300
200
100
0
0
5
10
15
20
25
Fe:1 Zn:1 EDTA:6
Fe:5 Zn:1 EDTA:10
Fe:1 Zn:1 EDTA:14
Fe:5 Zn:1 EDTA:16
Fe:1 Zn:1 EDTA:24
Fe:5 Zn:1 EDTA:28
Fe:3 Zn:2 EDTA:9
Fe:3 Zn:2 EDTA:14(A)
Fe:3 Zn:2 EDTA:14(B)
Fe:3 Zn:2 EDTA:14(C)
Fe:3 Zn:2 EDTA:27
Fe:5 Zn:2 EDTA:6

FIG. 12B

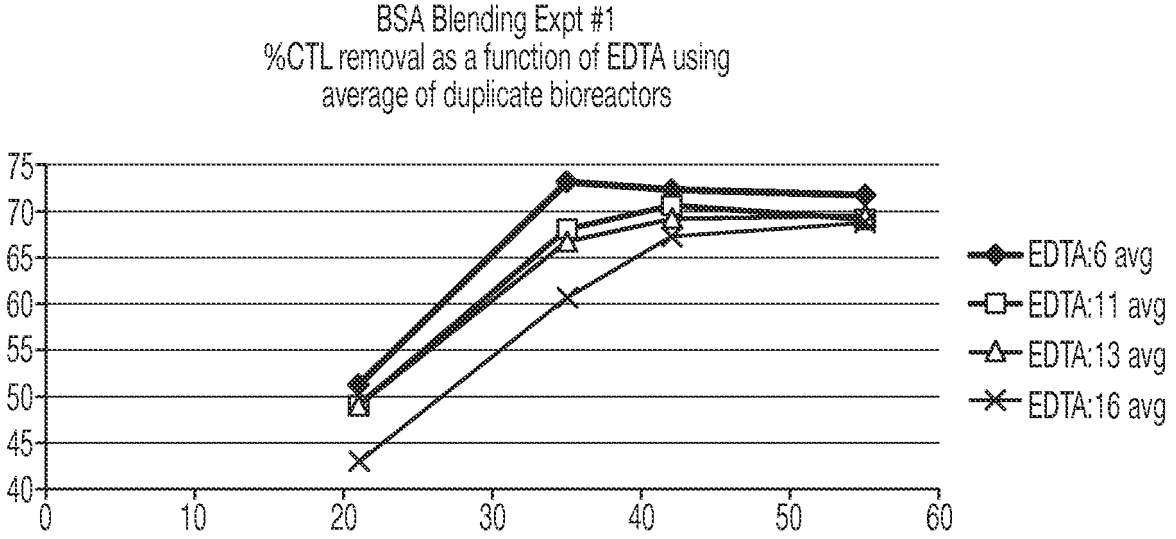

BSA Blending Expt #1
%CTL removal as a function of EDTA using
average of duplicate bioreactors
75
70
65
60
55
50
45
40
0
10
20
30
40
50
60
EDTA:6 avg
EDTA:11 avg
EDTA:13 avg
EDTA:16 avg

FIG. 13A

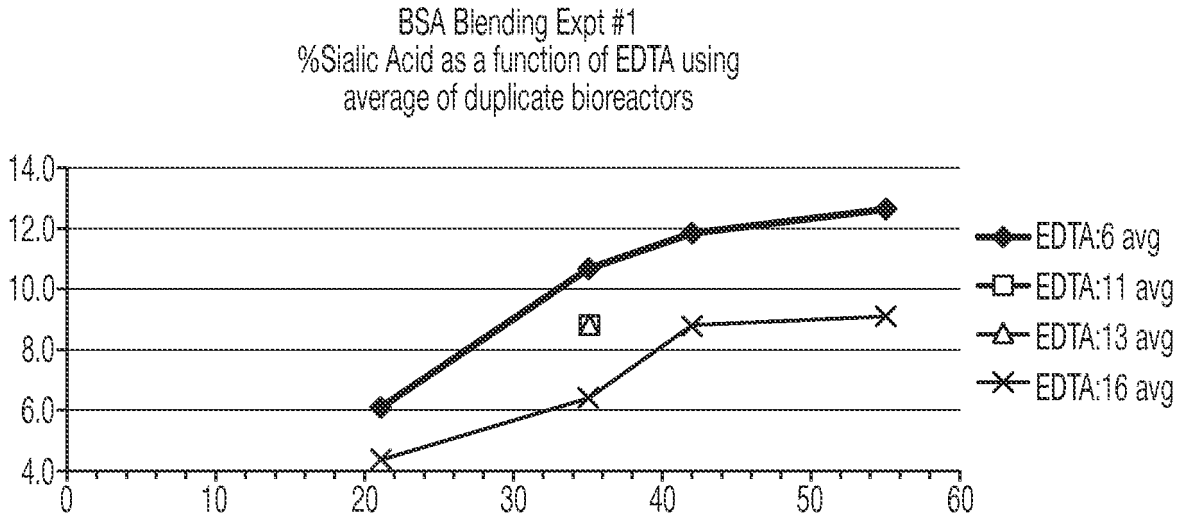

BSA Blending Expt #1
%Sialic Acid as a function of EDTA using
average of duplicate bioreactors
14.0
12.0
10.0
8.0
6.0
4.0
0
10
20
30
40
50
60
EDTA:6 avg
EDTA:11 avg
EDTA:13 avg
EDTA:16 avg

FIG. 13B

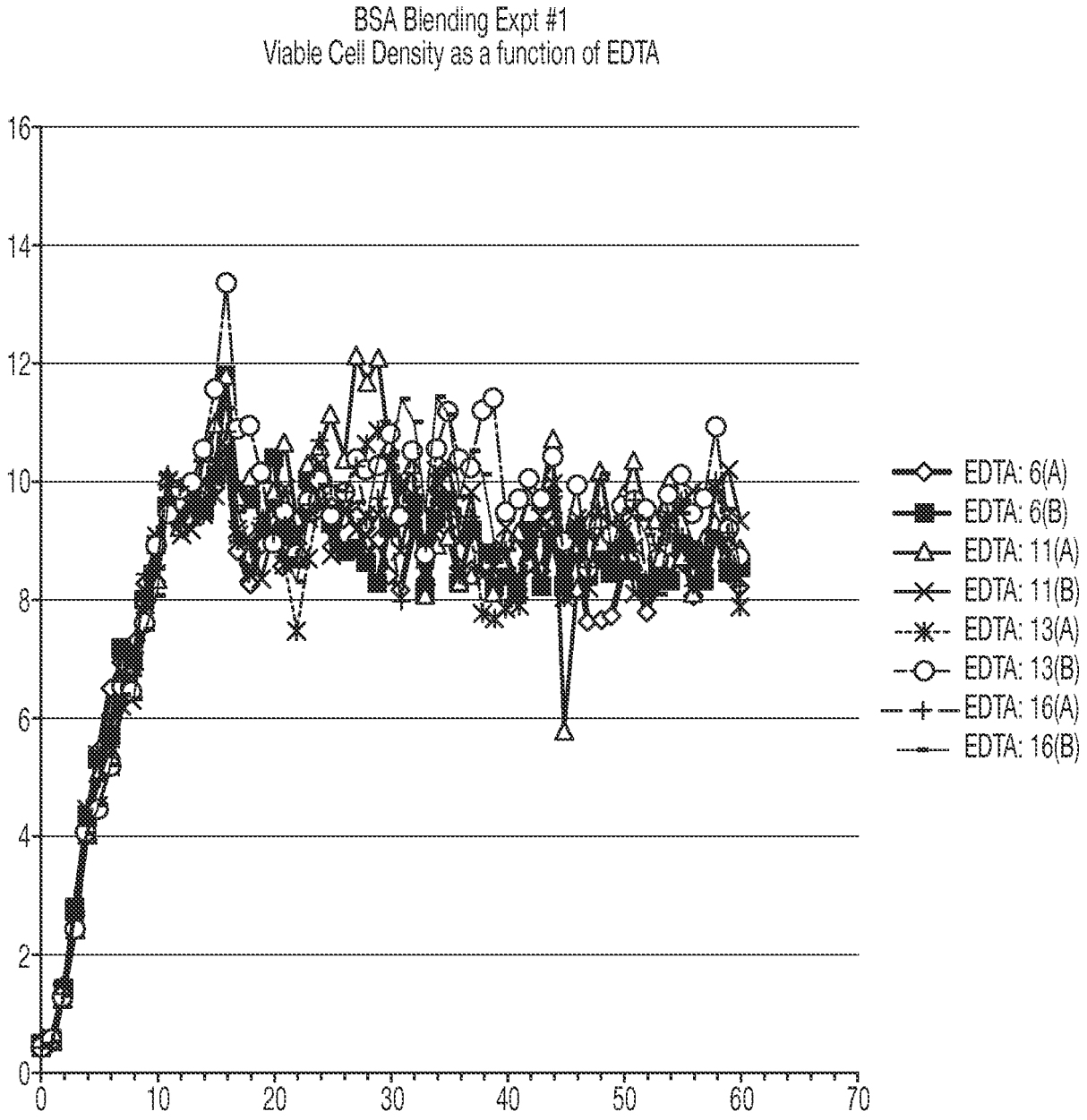

BSA Blending Expt #1
Viable Cell Density as a function of EDTA
16
14
12
10
8
6
4
2
0
0
10
20
30
40
50
60
70
EDTA: 6(A)
EDTA: 6(B)
EDTA: 11(A)
EDTA: 11(B)
EDTA: 13(A)
EDTA: 13(B)
EDTA: 16(A)
EDTA: 16(B)

FIG. 13C

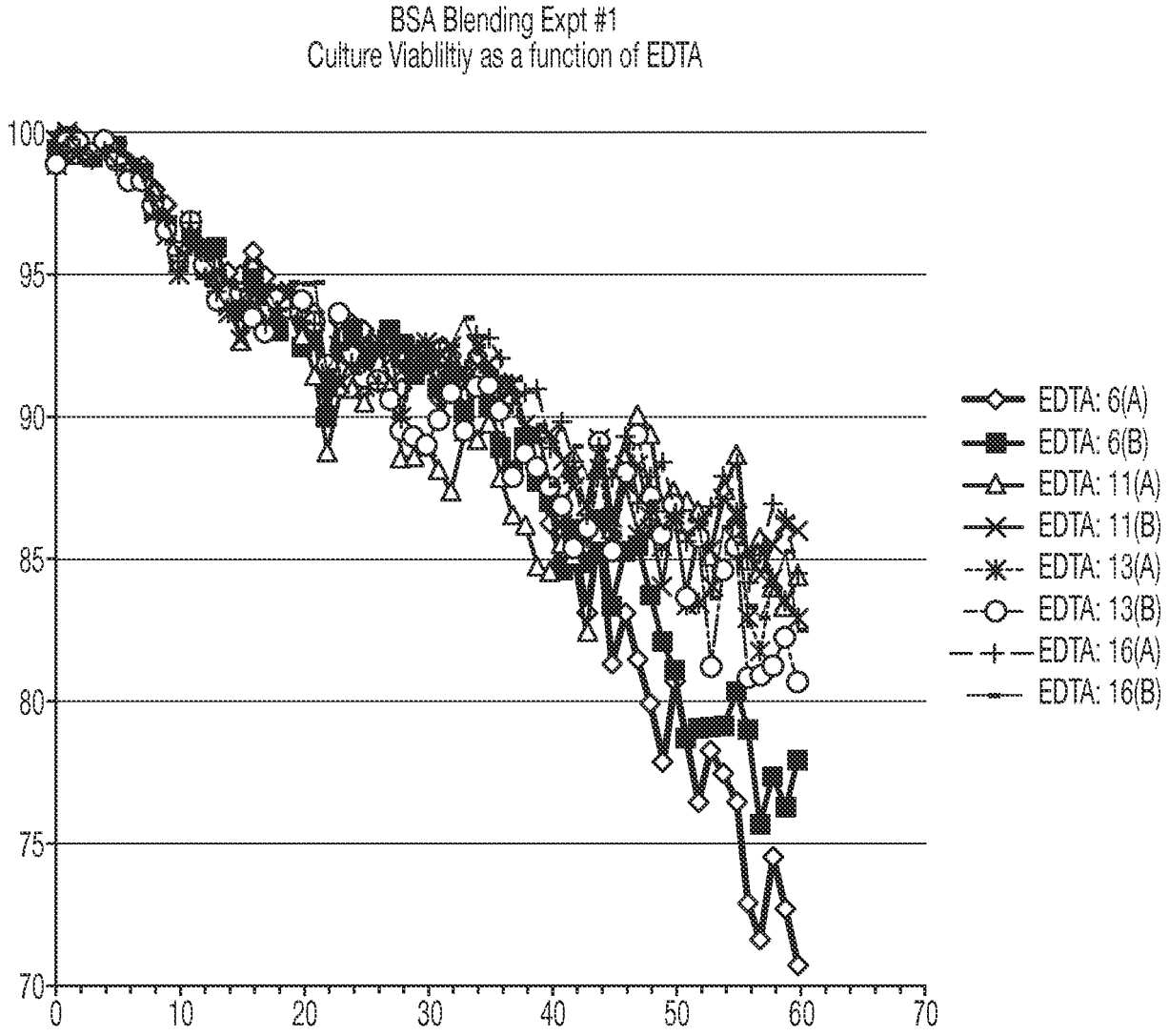

BSA Blending Expt #1
Culture Viablilitiy as a function of EDTA
100
95
90
85
80
75
70
0
10
20
30
40
50
60
70
EDTA: 6(A)
EDTA: 6(B)
EDTA: 11(A)
EDTA: 11(B)
EDTA: 13(A)
EDTA: 13(B)
EDTA: 16(A)
EDTA: 16(B)

FIG. 13D

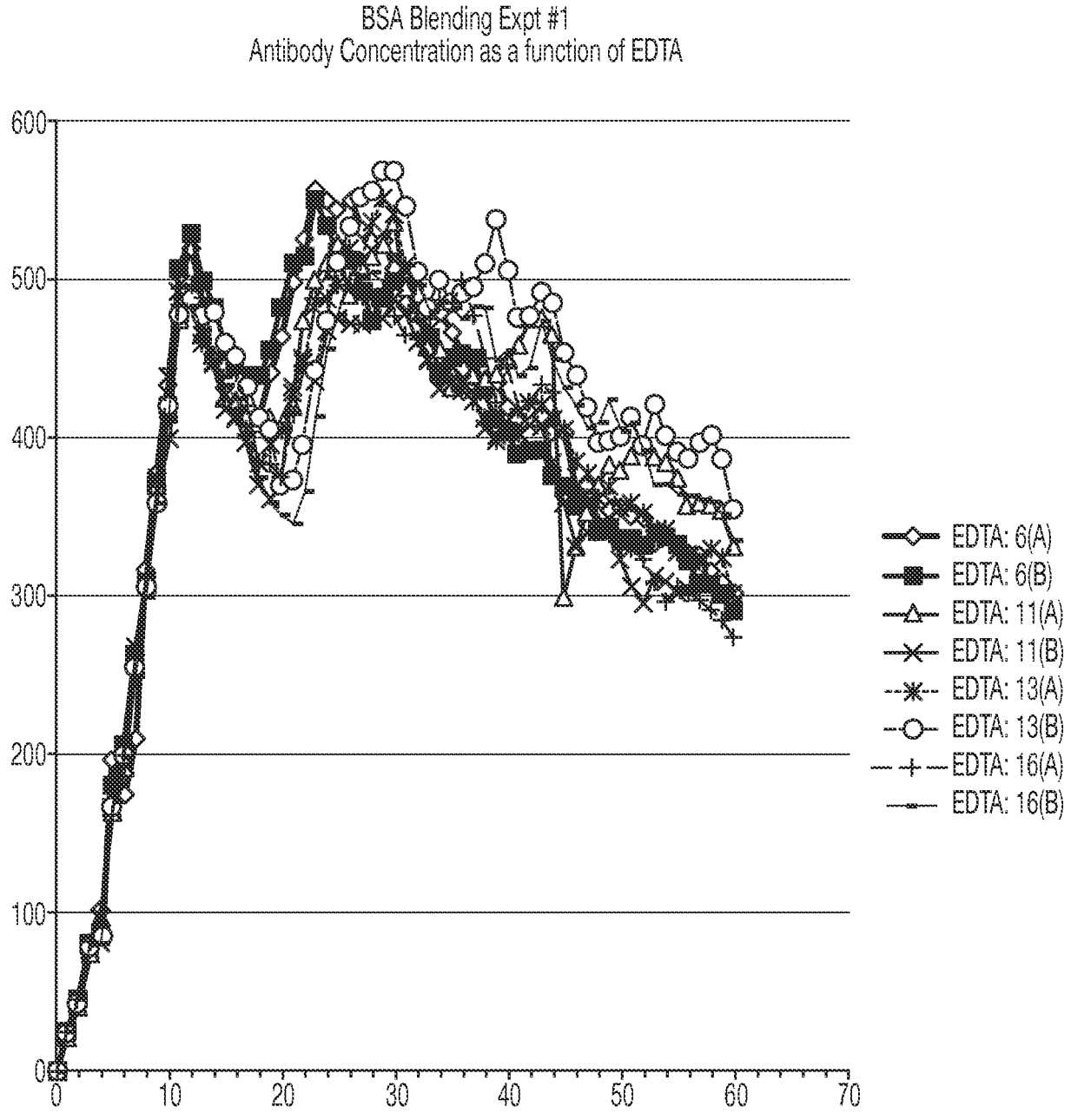

BSA Blending Expt #1
Antibody Concentration as a function of EDTA
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
EDTA: 6(A)
EDTA: 6(B)
EDTA: 11(A)
EDTA: 11(B)
EDTA: 13(A)
EDTA: 13(B)
EDTA: 16(A)
EDTA: 16(B)

FIG. 13E

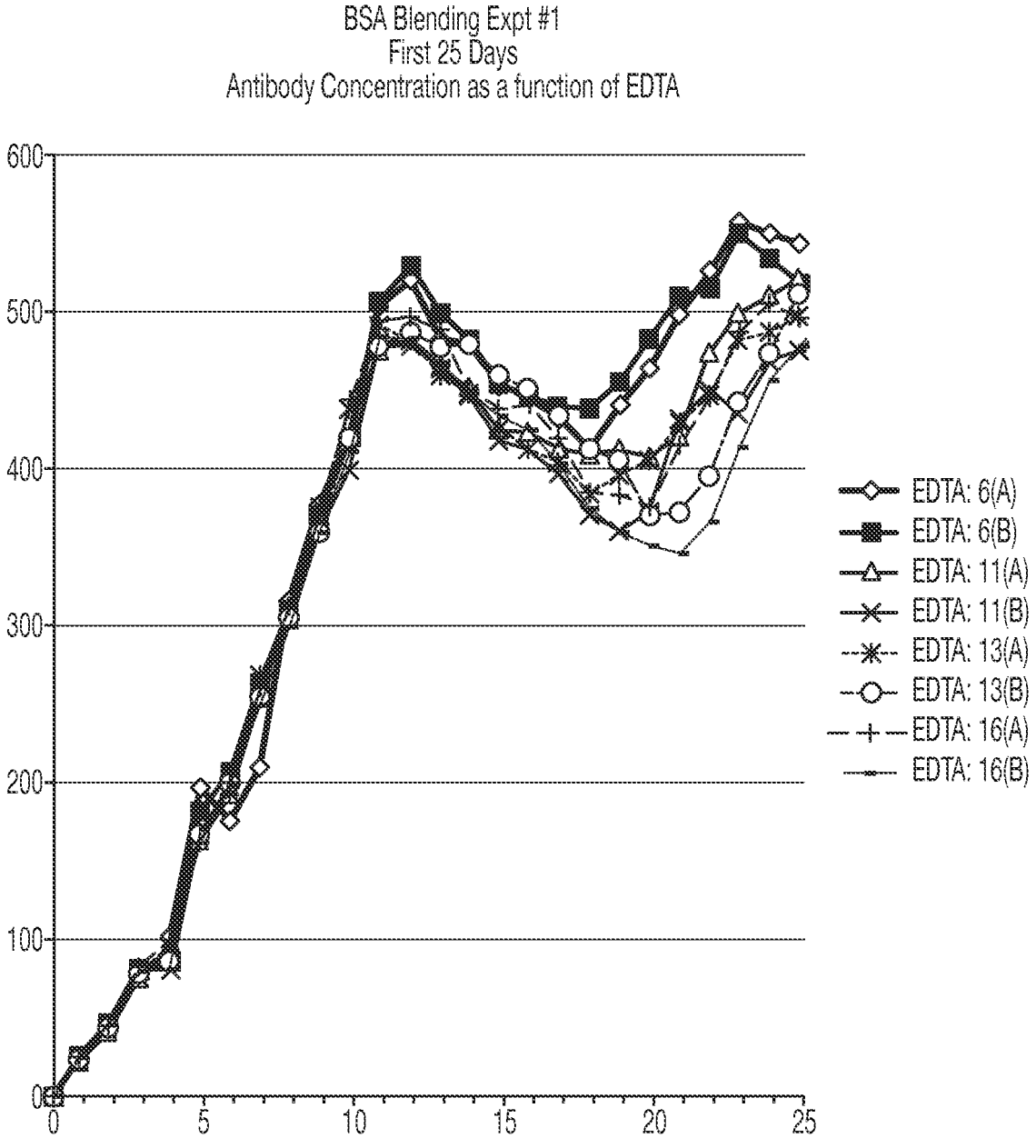

BSA Blending Expt #1
First 25 Days
Antibody Concentration as a function of EDTA
600
500
400
300
200
100
0
0
5
10
15
20
25
EDTA: 6(A)
EDTA: 6(B)
EDTA: 11(A)
EDTA: 11(B)
EDTA: 13(A)
EDTA: 13(B)
EDTA: 16(A)
EDTA: 16(B)

FIG. 13F

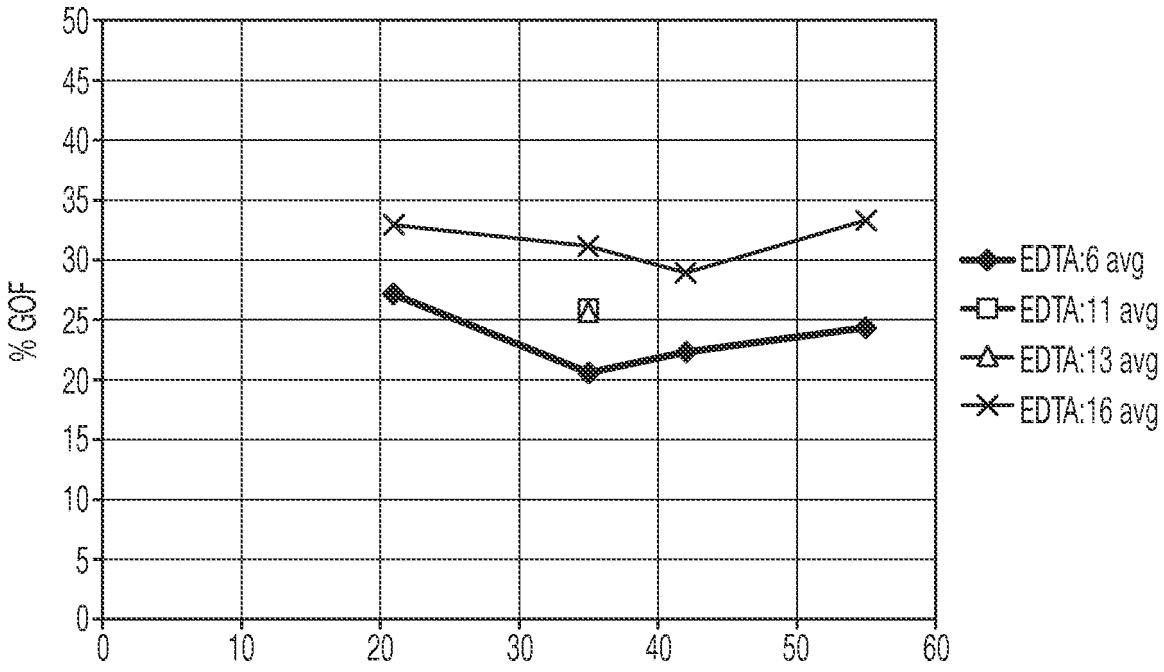

% GOF
50
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
50
60
EDTA:6 avg
EDTA:11 avg
EDTA:13 avg
EDTA:16 avg

FIG. 13G

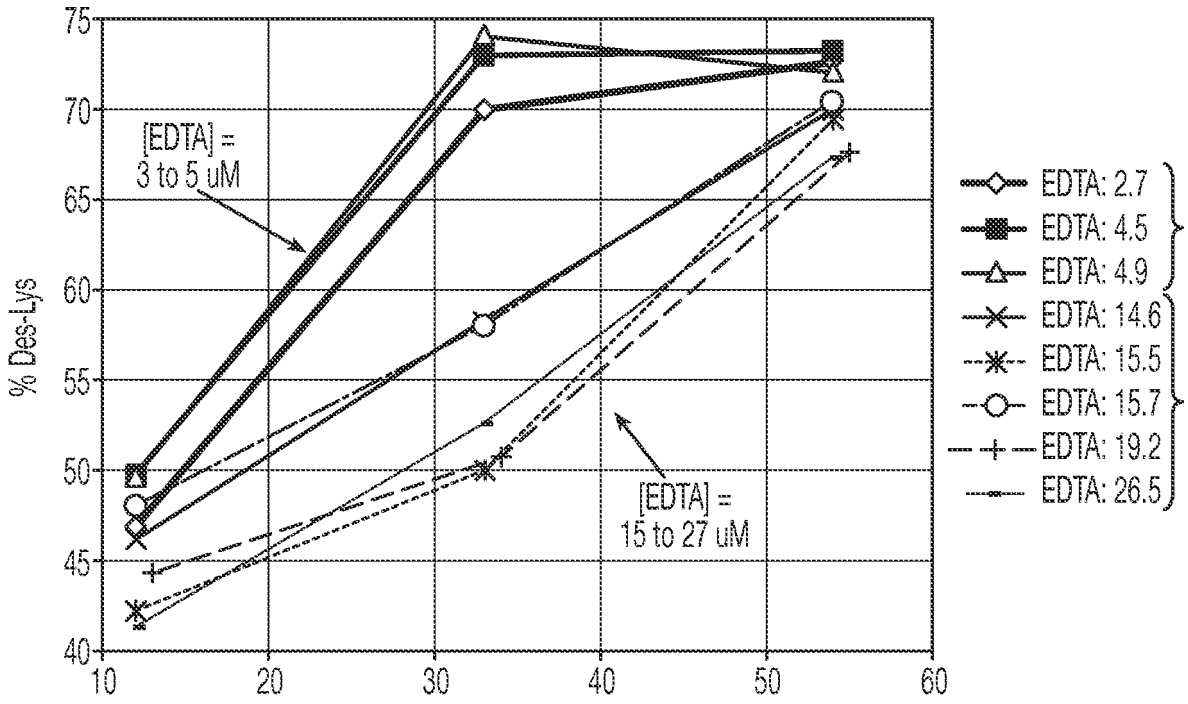

% Des-Lys
75
70
65
60
55
50
45
40
10
20
30
40
50
60
[EDTA] =
3 to 5 uM
[EDTA] =
15 to 27 uM
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14A

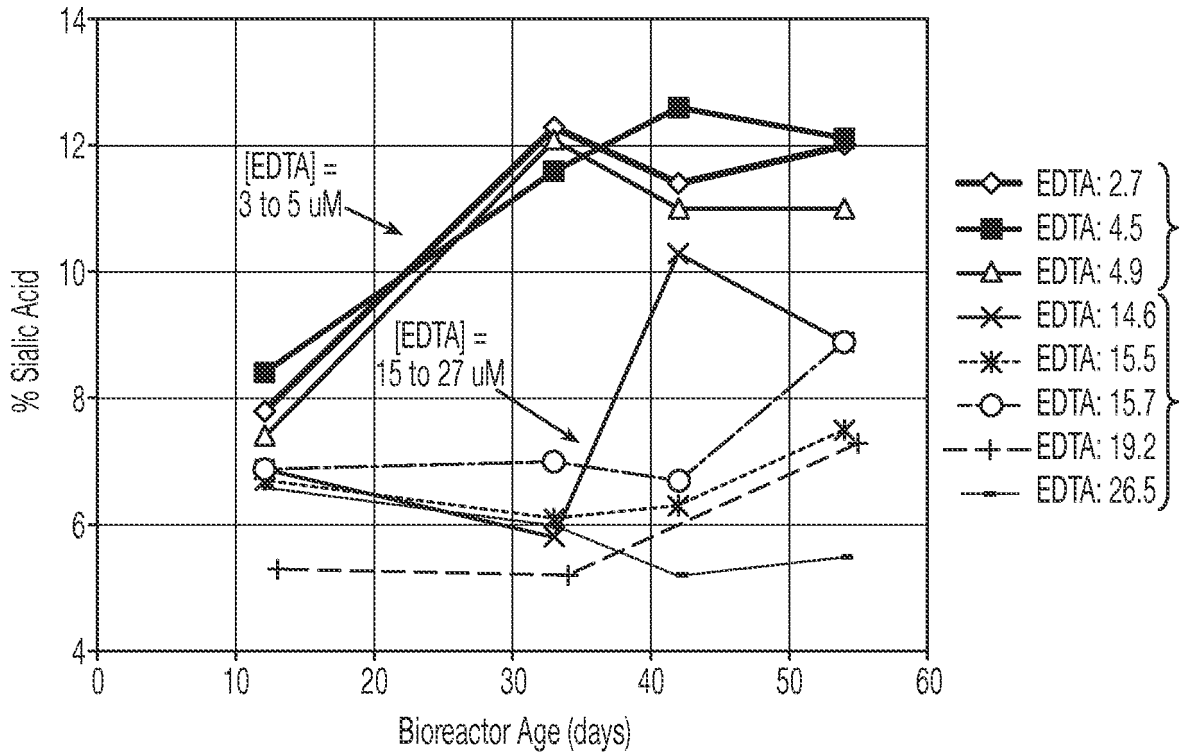

14
12
10
8
6
4
0
10
20
30
40
50
60
% Sialic Acid
Bioreactor Age (days)
[EDTA] = 3 to 5 uM
[EDTA] = 15 to 27 uM
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14B

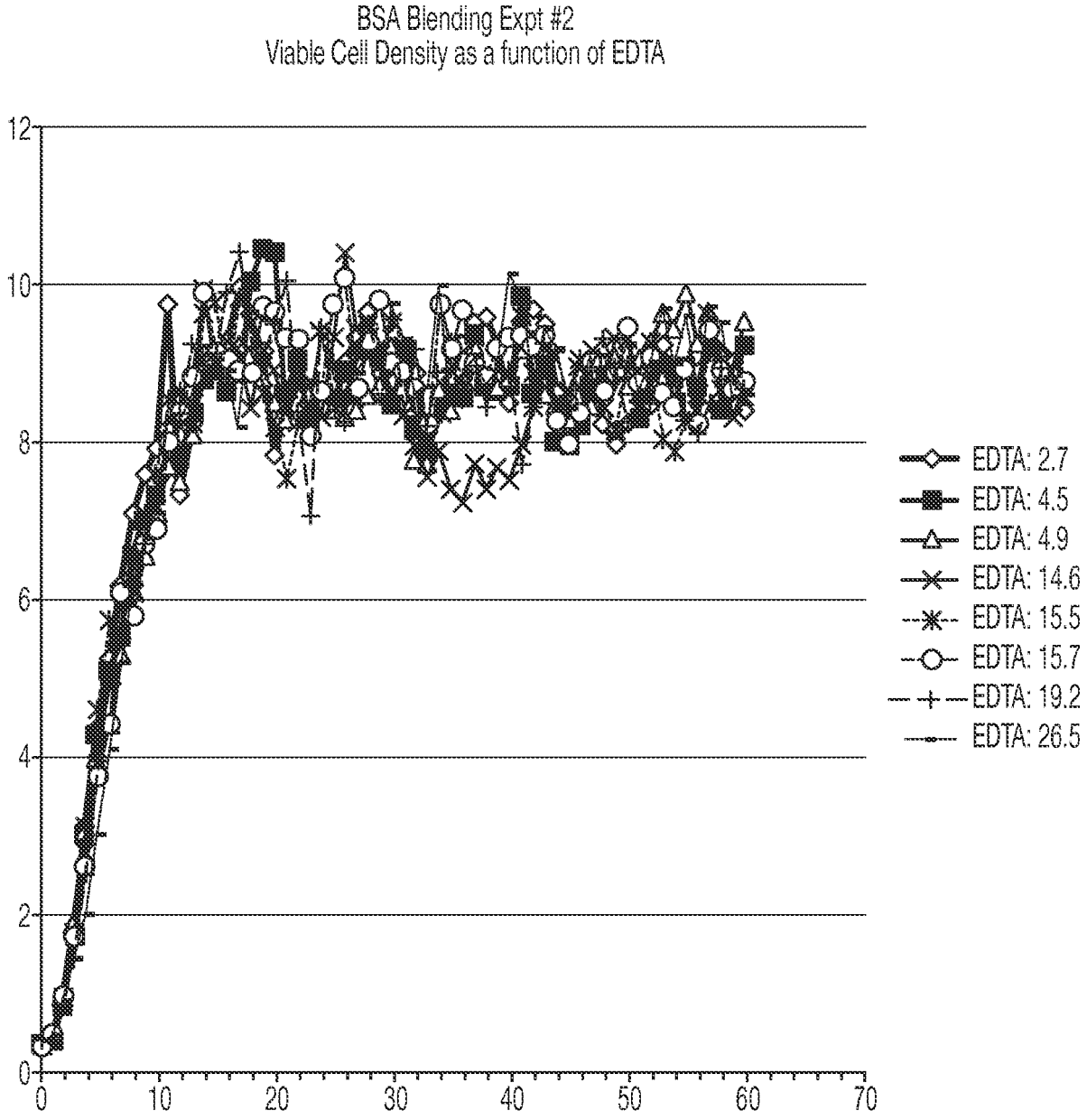

BSA Blending Expt #2
Viable Cell Density as a function of EDTA
12
10
8
6
4
2
0
0
10
20
30
40
50
60
70
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14C

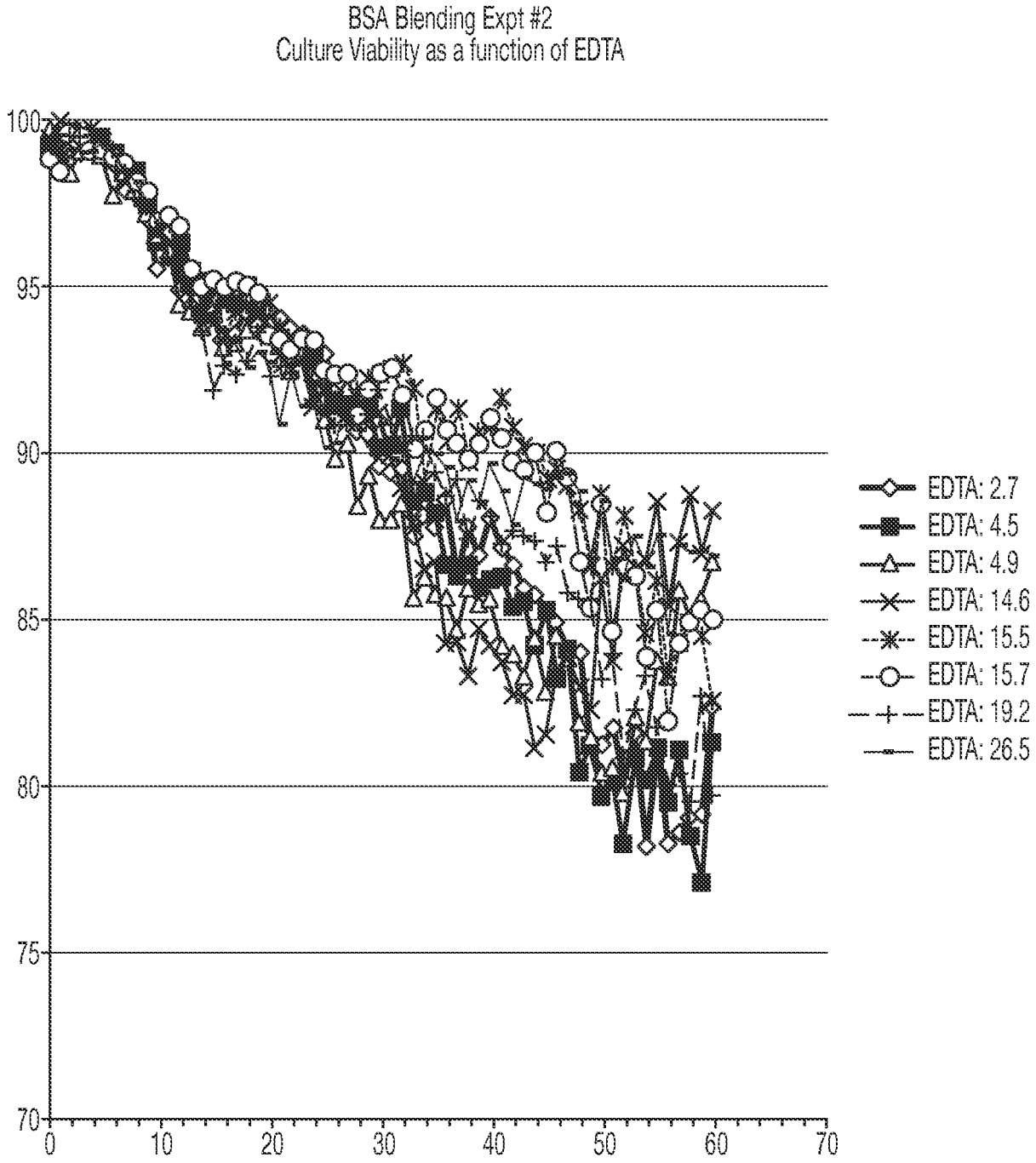

BSA Blending Expt #2
Culture Viability as a function of EDTA
100
95
90
85
80
75
70
0
10
20
30
40
50
60
70
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14D

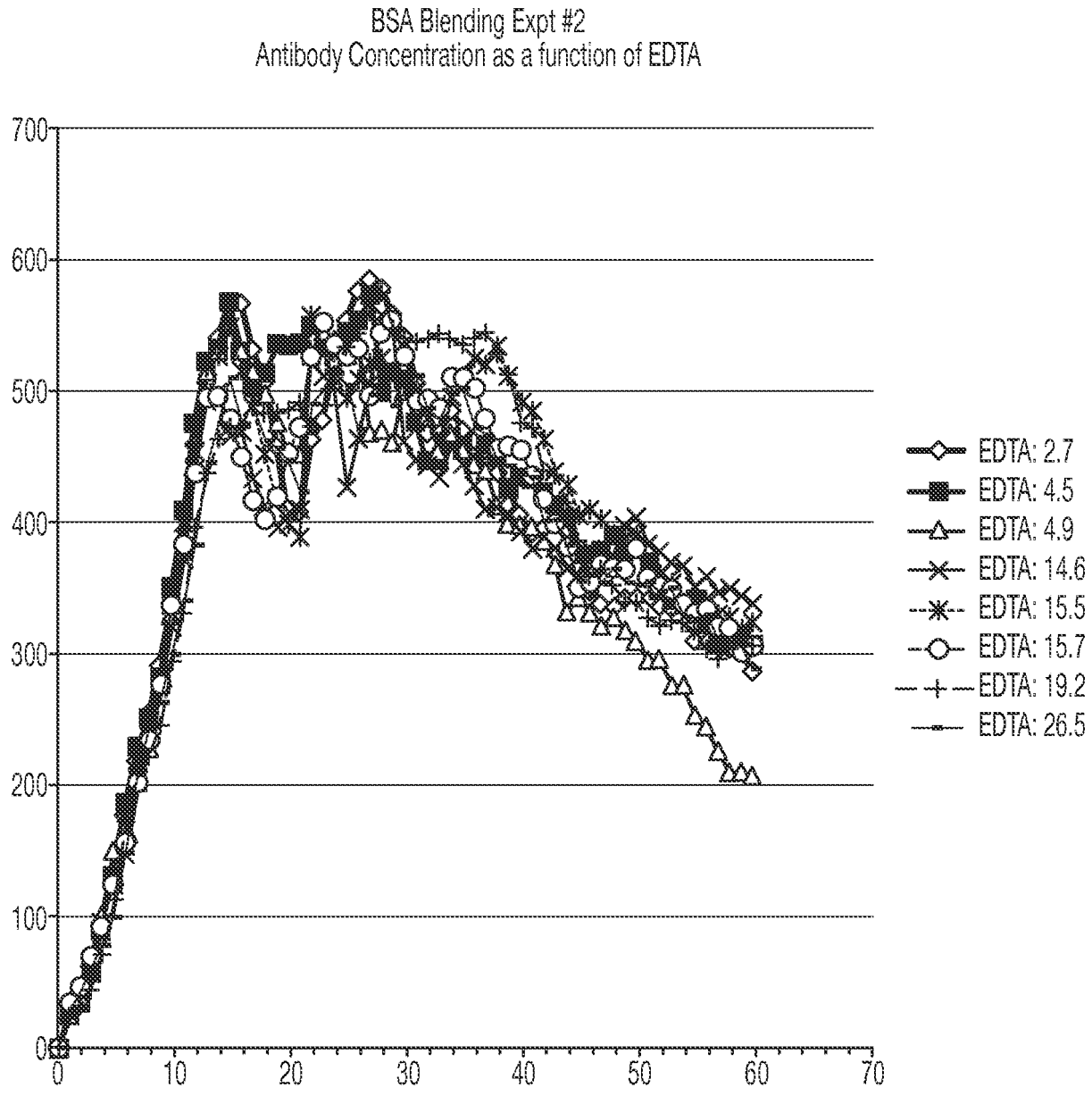

BSA Blending Expt #2
Antibody Concentration as a function of EDTA
700
600
500
400
300
200
100
0
0
10
20
30
40
50
60
70
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14E

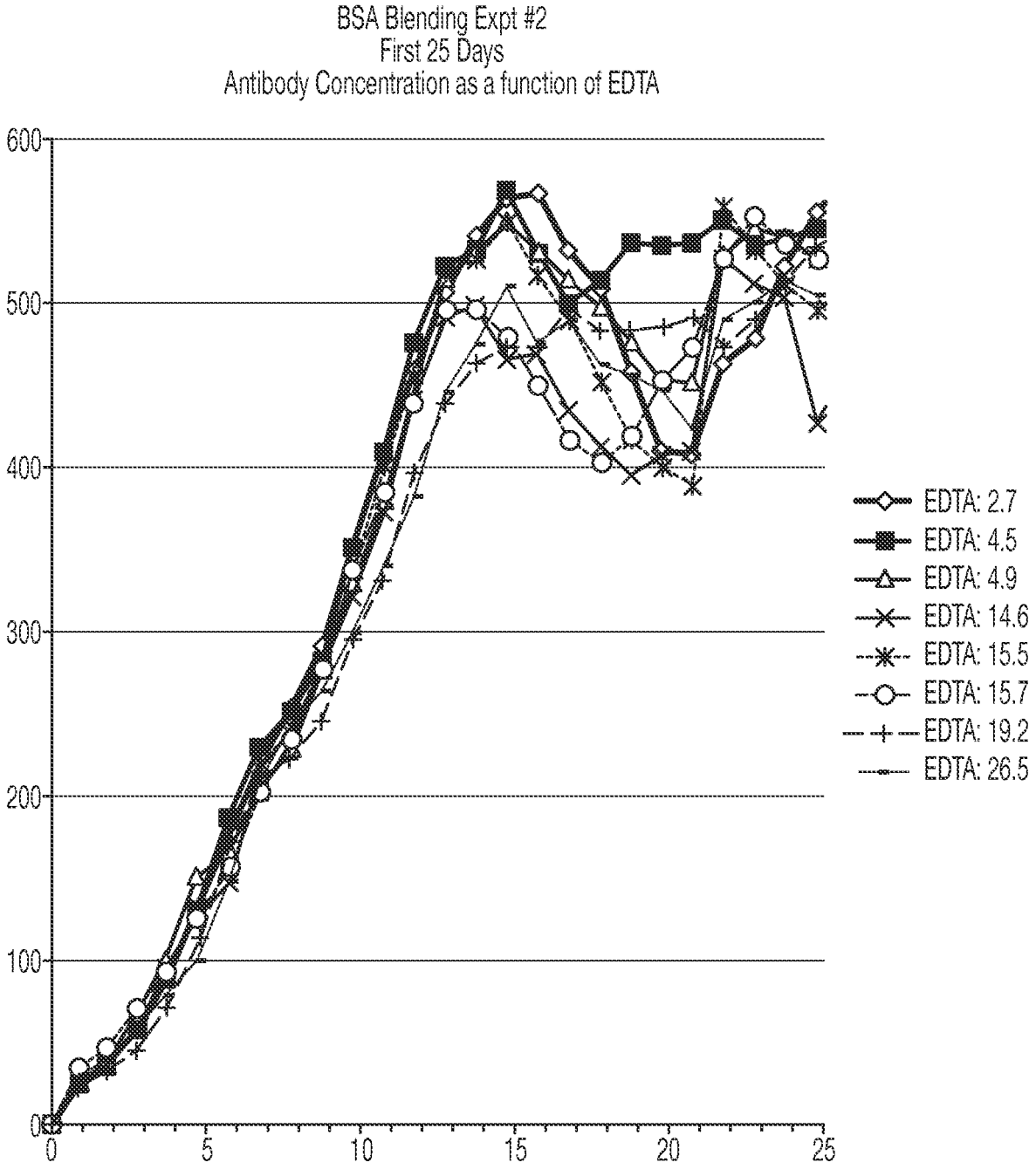

BSA Blending Expt #2
First 25 Days
Antibody Concentration as a function of EDTA
600
500
400
300
200
100
0
0
5
10
15
20
25
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 14F

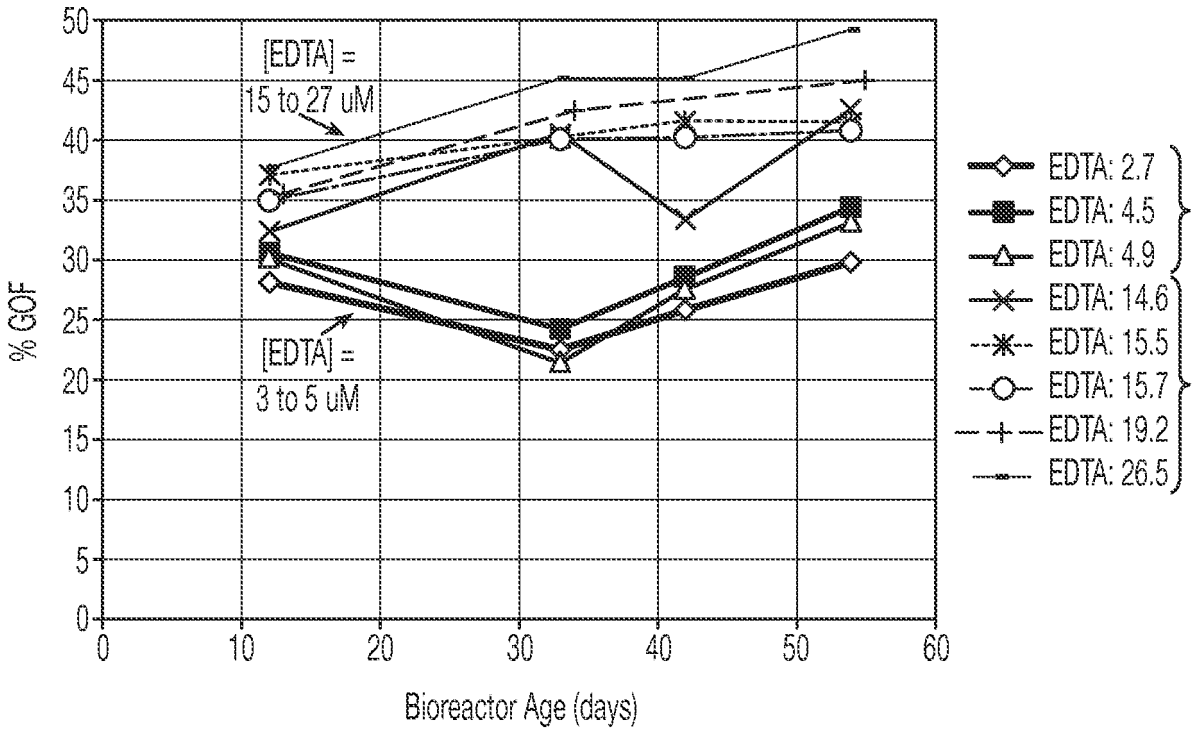

50
45
40
35
30
25
20
15
10
5
0
% GOF
0
10
20
30
40
50
60
Bioreactor Age (days)
[EDTA] = 15 to 27 uM
[EDTA] = 3 to 5 uM
EDTA: 2.7
EDTA: 4.5
EDTA: 4.9
EDTA: 14.6
EDTA: 15.5
EDTA: 15.7
EDTA: 19.2
EDTA: 26.5

FIG. 15

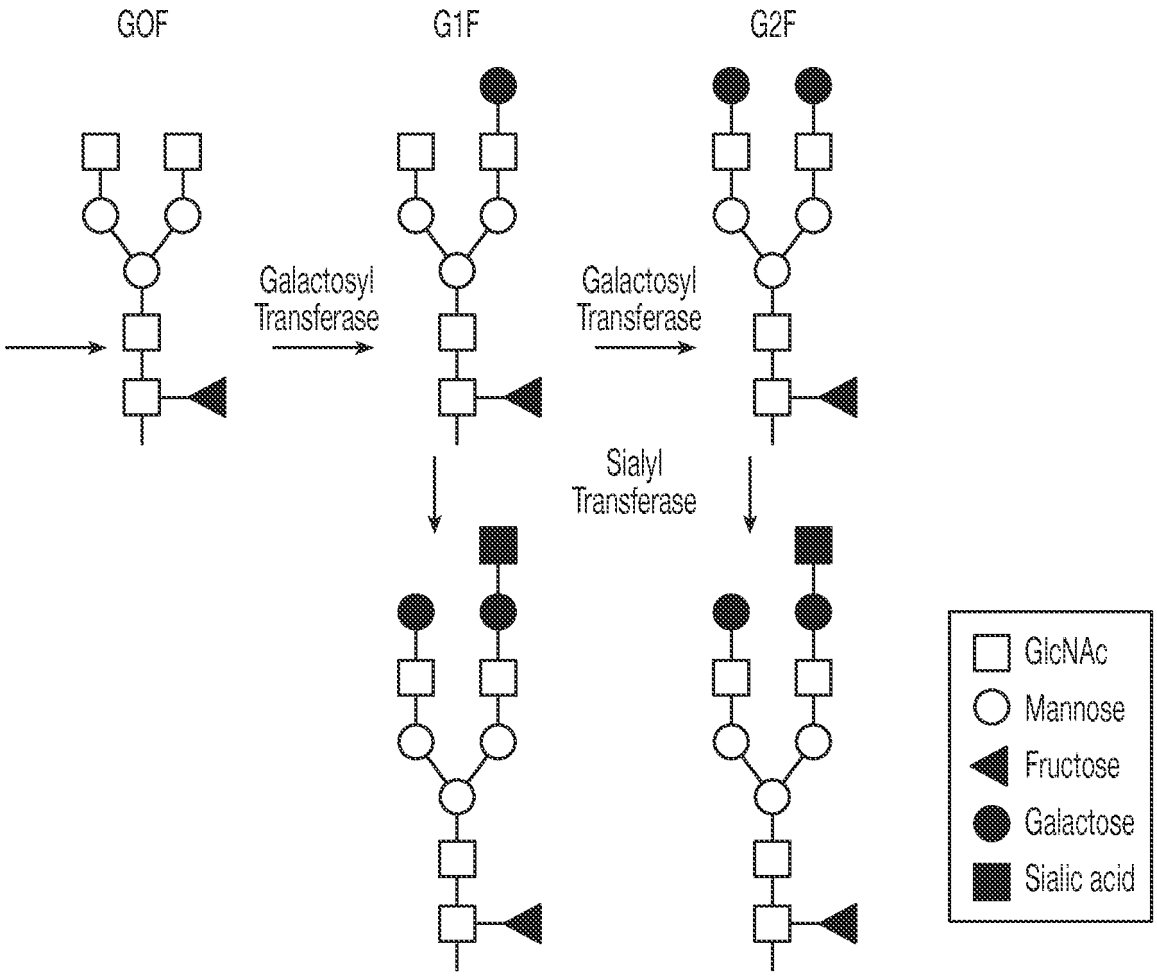

G0F
G1F
G2F
Galactosyl Transferase
Galactosyl Transferase
Sialyl Transferase
GlcNAc
Mannose
Fructose
Galactose
Sialic acid

FIG. 16

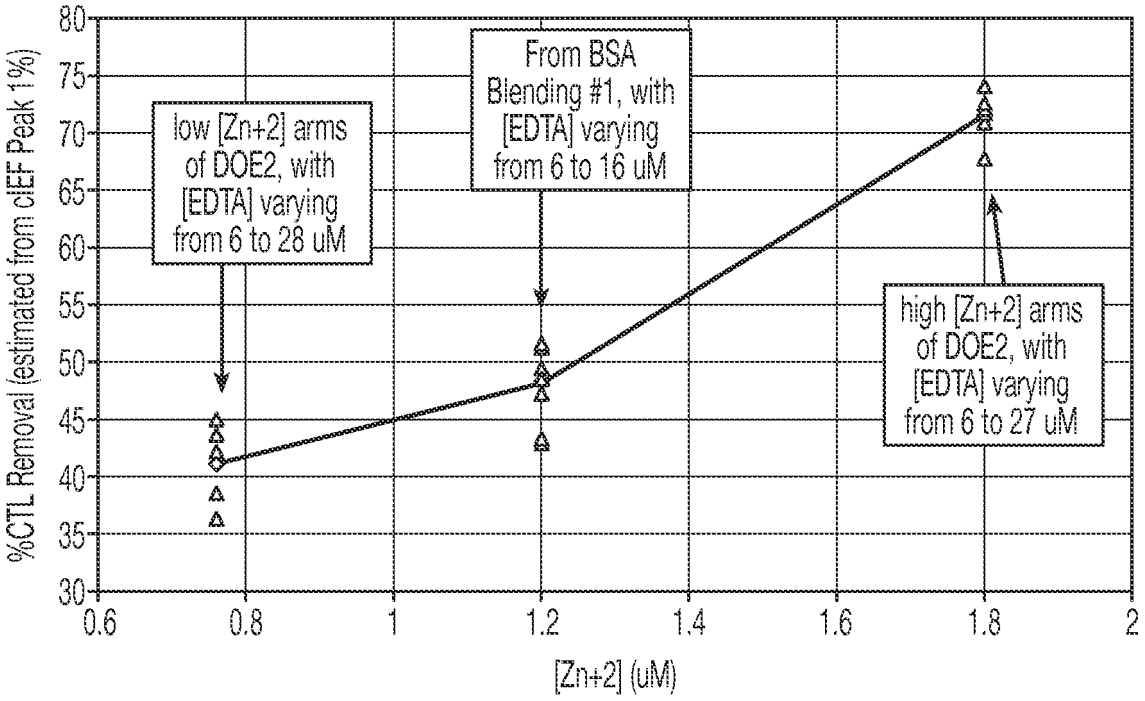

%CTL Removal (estimated from cIEF Peak 1%)
[Zn+2] (uM)
low [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 28 uM
From BSA Blending #1, with [EDTA] varying from 6 to 16 uM
high [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 27 uM
80
75
70
65
60
55
50
45
40
35
30
0.6
0.8
1
1.2
1.4
1.6
1.8
2

FIG. 17

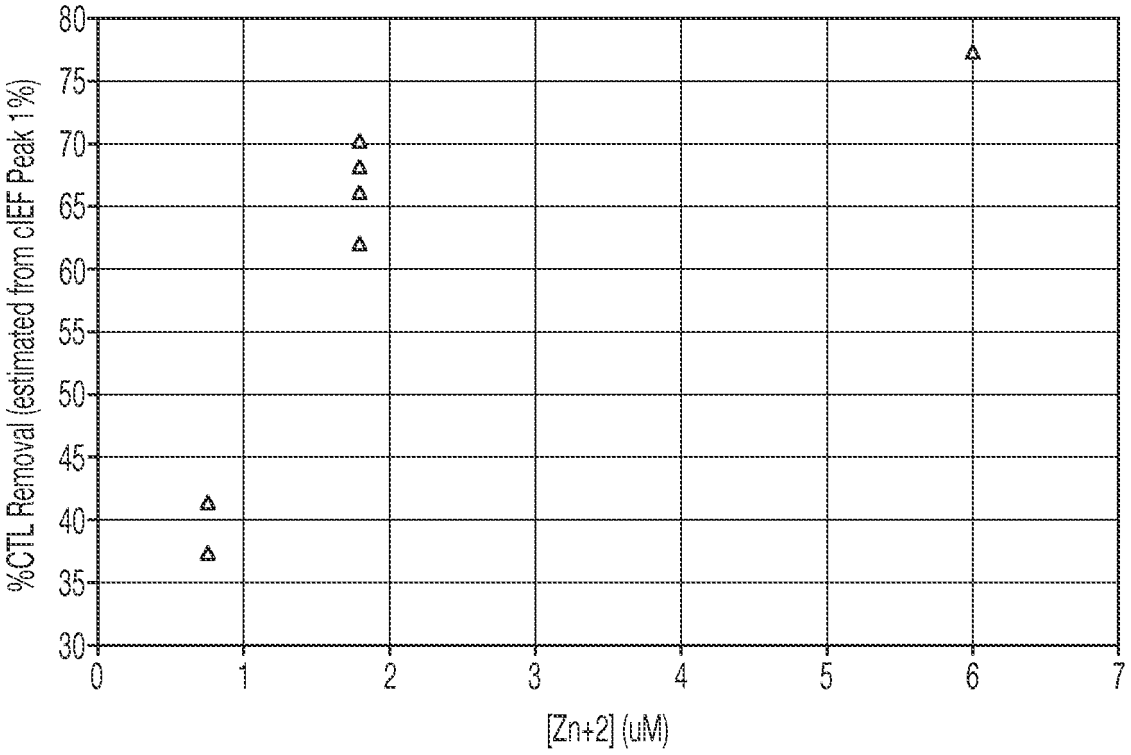

%CTL Removal (estimated from cIEF Peak 1%)
80
75
70
65
60
55
50
45
40
35
30
0
1
2
3
4
5
6
7
[Zn+2] (uM)

FIG. 18

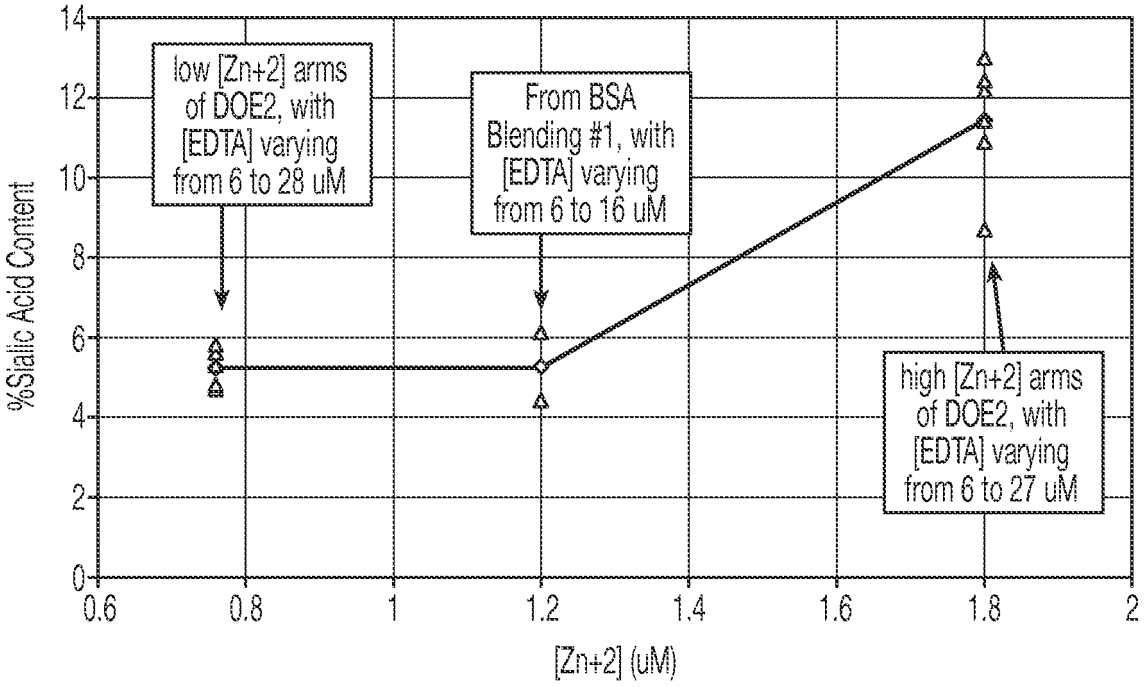

14
12
10
8
6
4
2
0
%Sialic Acid Content
0.6
0.8
1
1.2
1.4
1.6
1.8
2
[Zn+2] (uM)
low [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 28 uM
From BSA Blending #1, with [EDTA] varying from 6 to 16 uM
high [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 27 uM

FIG. 19

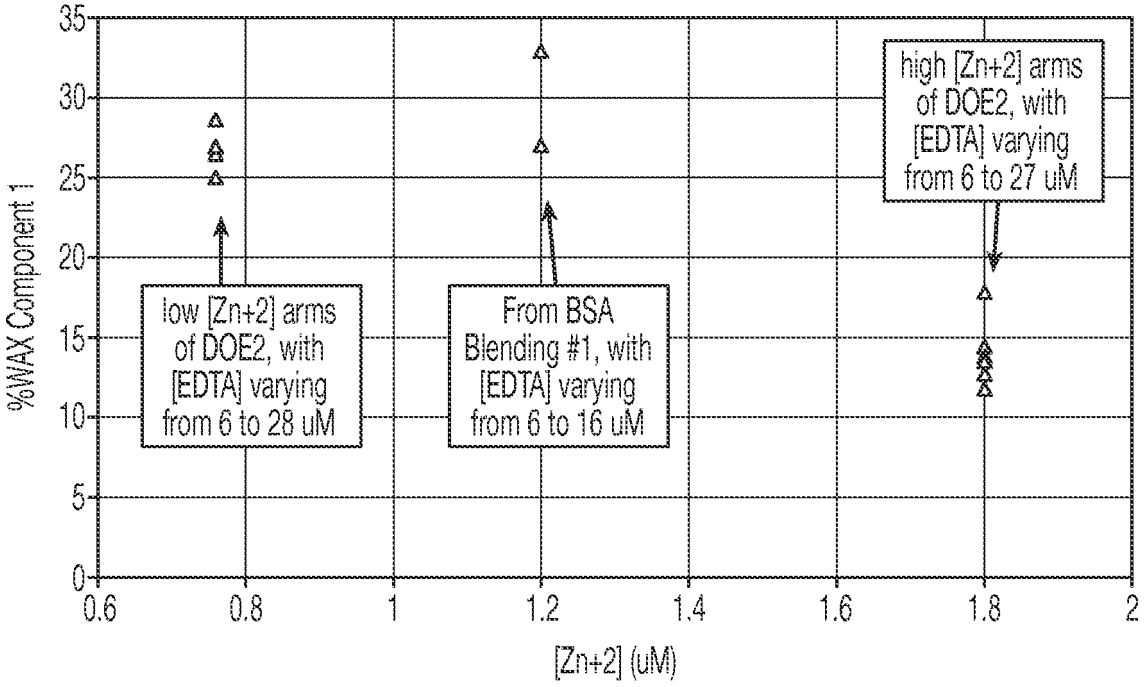

35
30
25
20
15
10
5
0
%WAX Component 1
0.6
0.8
1
1.2
1.4
1.6
1.8
2
[Zn+2] (uM)
low [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 28 uM
From BSA Blending #1, with [EDTA] varying from 6 to 16 uM
high [Zn+2] arms of DOE2, with [EDTA] varying from 6 to 27 uM

FIG. 20

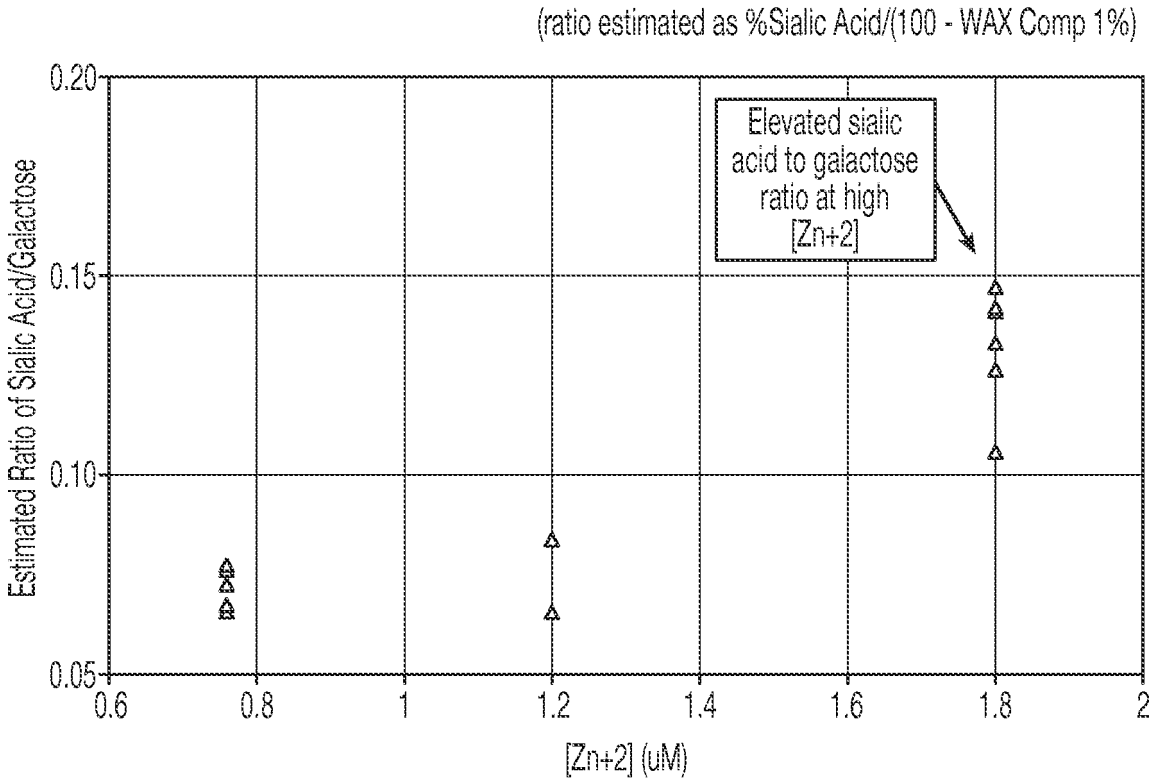

(ratio estimated as %Sialic Acid/(100 - WAX Comp 1%)
Elevated sialic acid to galactose ratio at high [Zn+2]
Estimated Ratio of Sialic Acid/Galactose
0.20
0.15
0.10
0.05
0.6
0.8
1
1.2
1.4
1.6
1.8
2
[Zn+2] (uM)

FIG. 21

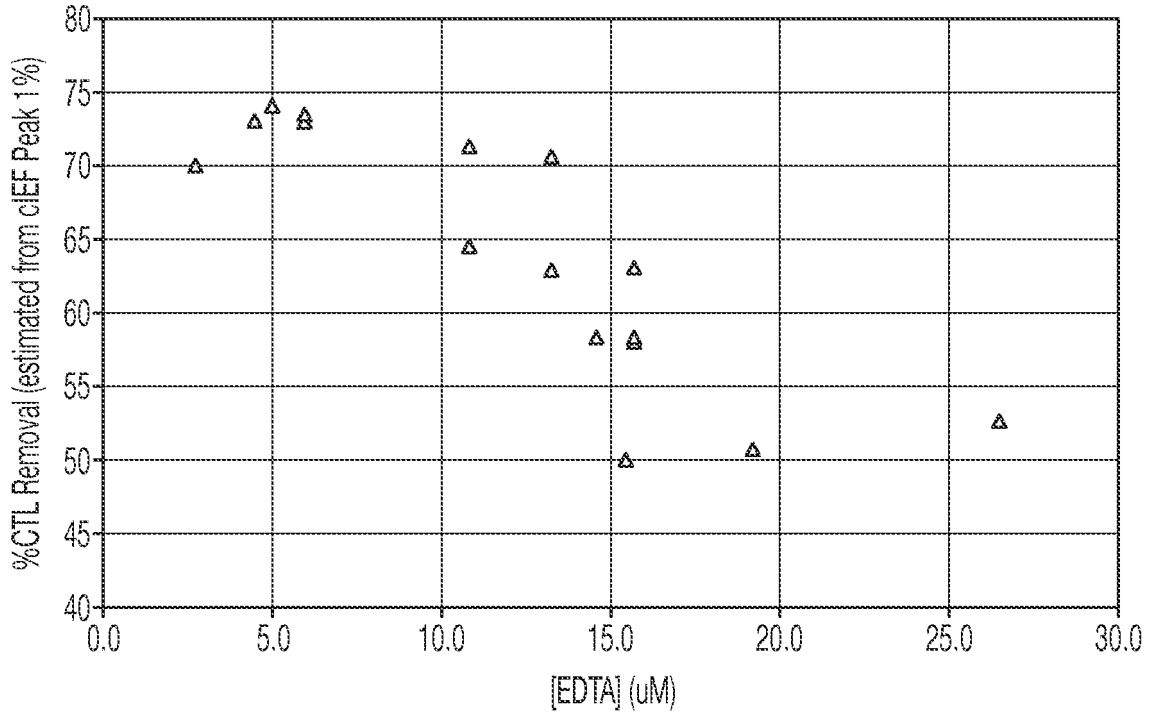

%CTL Removal (estimated from cIEF Peak 1%)
80
75
70
65
60
55
50
45
40
0.0
5.0
10.0
15.0
20.0
25.0
30.0
[EDTA] (uM)

FIG. 22

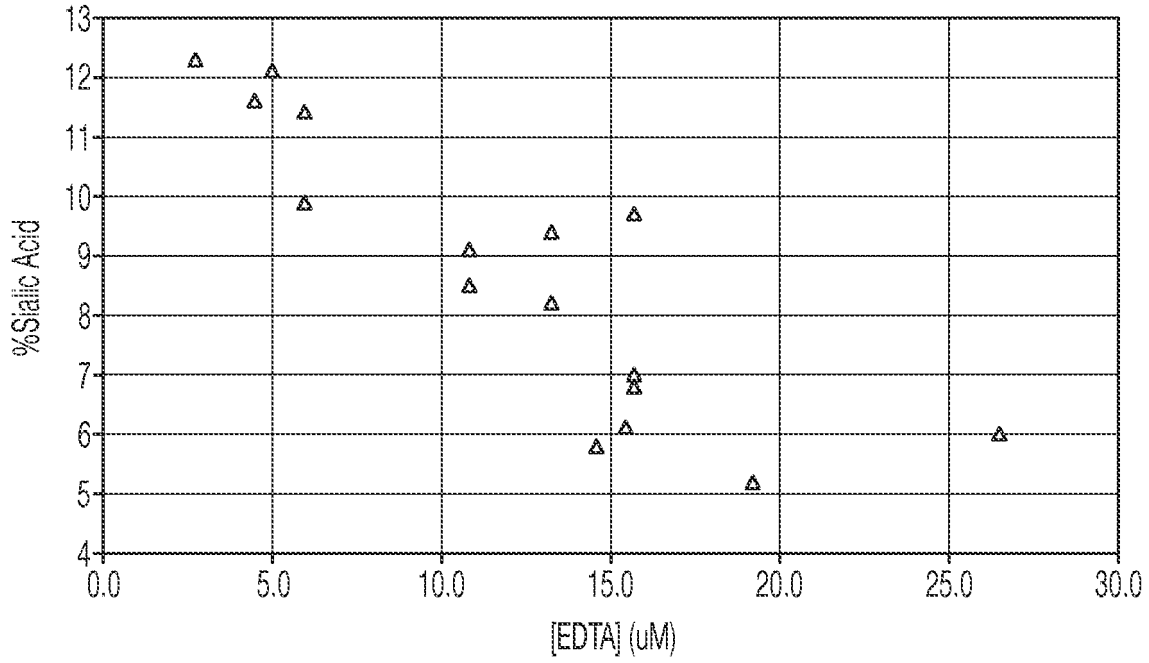


FIG. 23

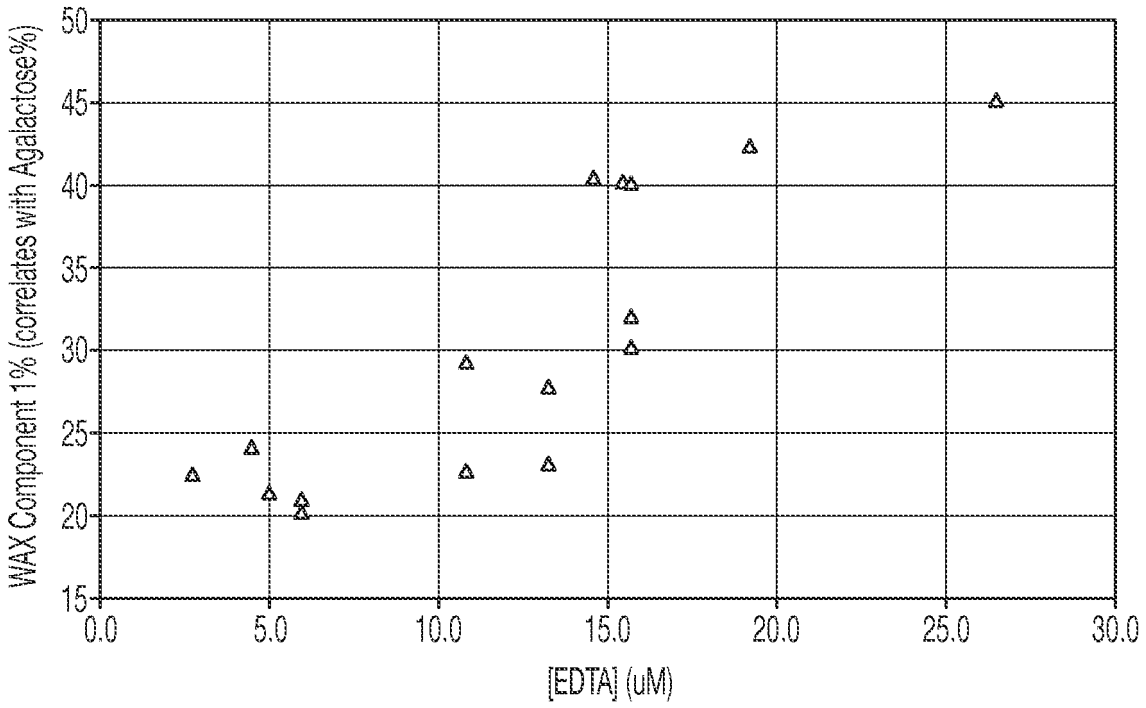

WAX Component 1% (correlates with Agalactose%)
50
45
40
35
30
25
20
15
0.0
5.0
10.0
15.0
20.0
25.0
30.0
[EDTA] (uM)

FIG. 24

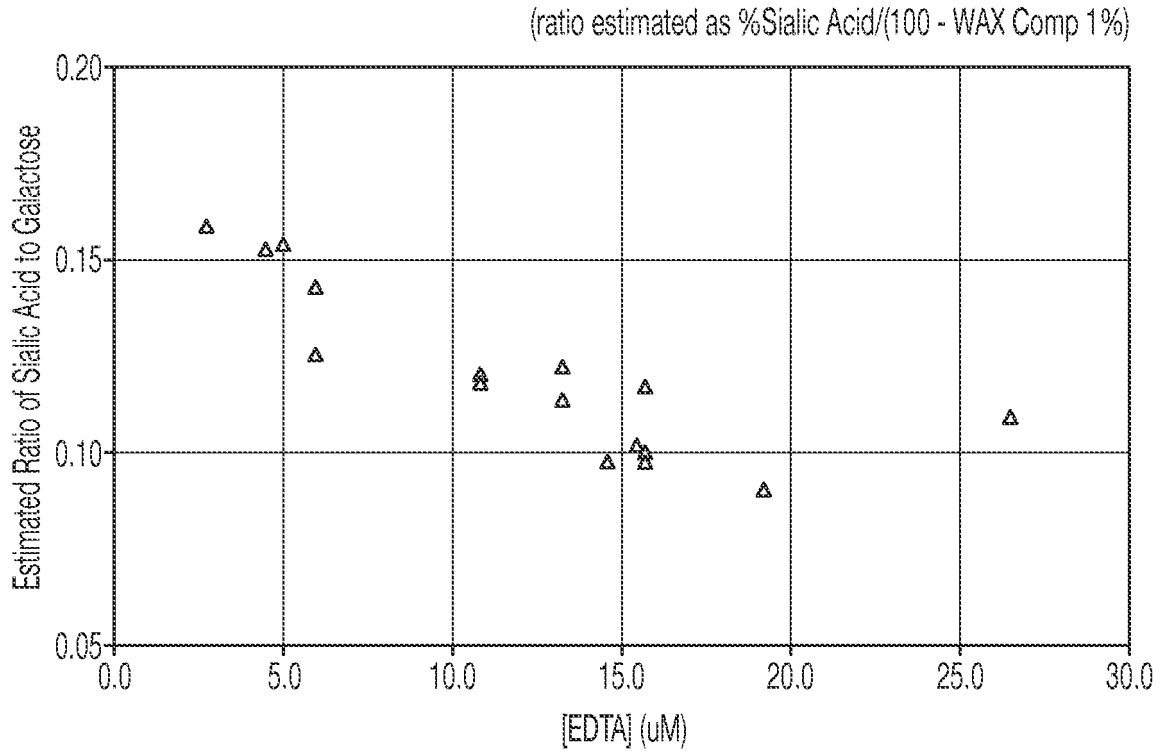

(ratio estimated as %Sialic Acid/(100 - WAX Comp 1%)
Estimated Ratio of Sialic Acid to Galactose
0.20
0.15
0.10
0.05
0.0
5.0
10.0
15.0
20.0
25.0
30.0
[EDTA] (uM)

FIG. 25

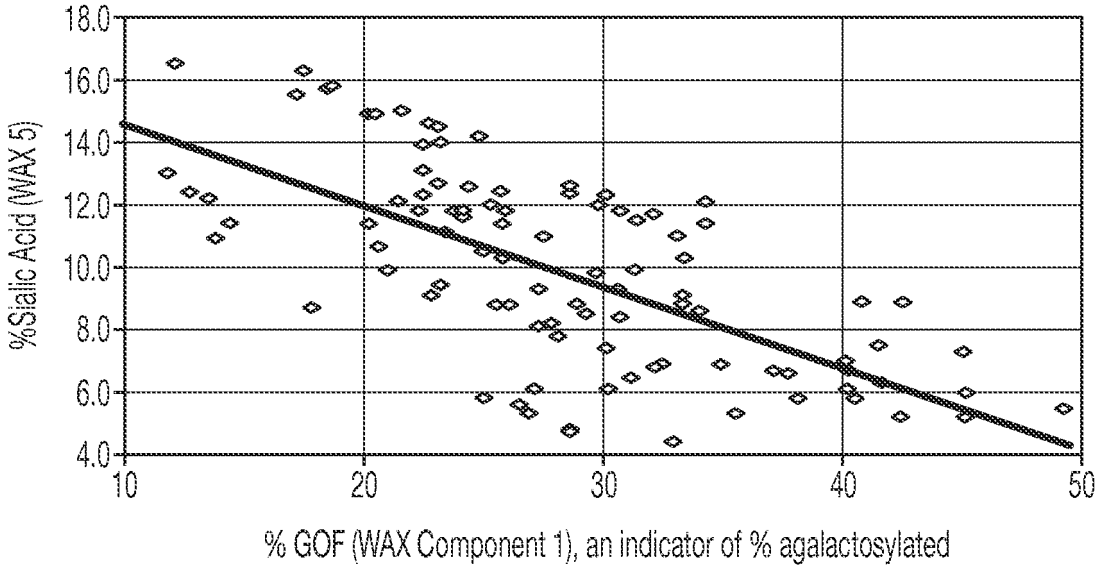
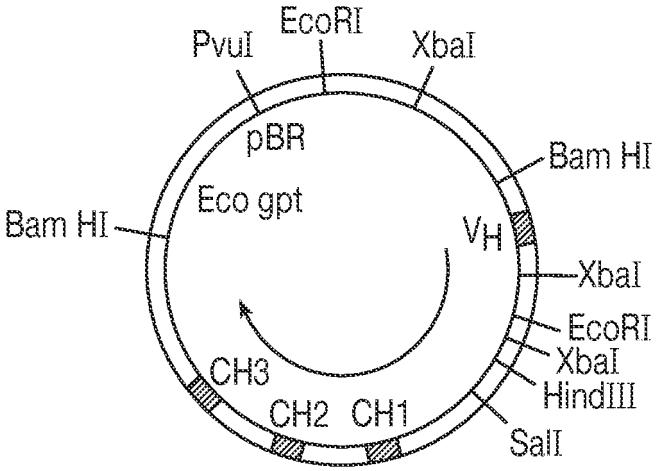
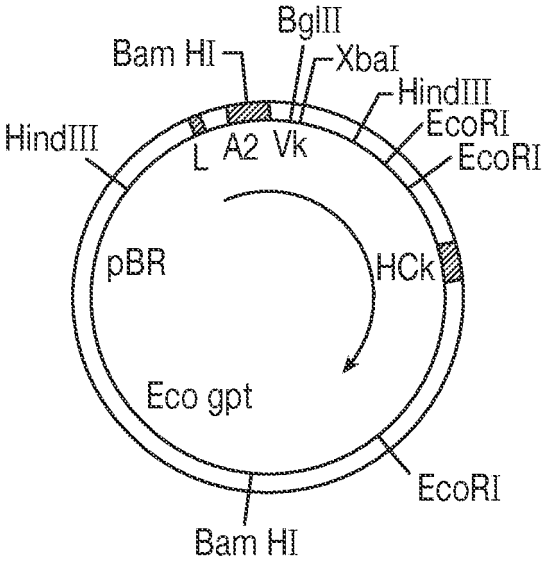

18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
%Sialic Acid (WAX 5)
10
20
30
40
50
% GOF (WAX Component 1), an indicator of % agalactosylated

FIG. 26



pA2HGlapgpt

FIG. 27A



pA2HuKapgpt

FIG. 27B

```
1                                                  10
Val Arg Ser Ser Ser Arg Thr Pro Ser Asp Lys Pro Val Ala His Val Val Ala Asn Pro

21                 30
Gln Ala Glu Gly Gln Leu Gln Trp Leu Asn Arg Arg Ala Asn Ala Leu Leu Ala Asn Gly

41                                                 50
Val Glu Leu Arg Asp Asn Gln Leu Val Val Pro Ser Glu Gly Leu Tyr Leu Ile Tyr Ser

61                                                 70
Gln Val Leu Phe Lys Gly Gln Gly Cys Pro Ser Thr His Val Leu Leu Thr His Thr Ile

81                                                 90
Ser Arg Ile Ala Val Ser Tyr Gln Thr Lys Val Asn Leu Leu Ser Ala Ile Lys Ser Pro

101                                               110
Cys Gln Arg Glu Thr Pro Glu Gly Ala Glu Ala Lys Pro Trp Tyr Glu Pro Ile Tyr Leu

121                                               130
Gly Gly Val Phe Gln Leu Glu Lys Gly Asp Arg Leu Ser Ala Glu Ile Asn Arg Pro Asp

141                                               150
Tyr Leu Asp Phe Ala Glu Ser Gly Gln Val Tyr Phe Gly Ile Ile Ala Leu
```

FIG. 28

GACATCTTGCTGACTCAGTCTCCAGCCATCCTGTCTGTGAGTCCAGGAGAAAGAGTCAGT
AspIleLeuLeuThrGlnSerProAlaIleLeuSerValSerProGlyGluArgValSer

TTCTCCTGCAGGGCCAGTCAGTTCGTTGGCTCAAGCATCCACTGGTATCAGCAAAGAACA
PheSerCysArgAlaSerGlnPheValGlySerSerIleHisTrpTyrGlnGlnArgThr

AATGGTTCTCCAAGGCTTCTCATAAAGTATGCTTCTGAGTCTATGTCTGGGATCCCTTCC
AsnGlySerProArgLeuLeuIleLysTyrAlaSerGluSerMetSerGlyIleProSer

AGGTTTAGTGGCAGTGGATCAGGGACAGATTTTACTCTTAGCATCAACACTGTGGAGTCT
ArgPheSerGlySerGlySerGlyThrAspPheThrLeuSerIleAsnThrValGluSer

GAAGATATTGCAGATTATTACTGTCAAGAAAGTCATAGCTGGCCATTCACGTTCGGCTCG
GluAspIleAlaAspTyrTyrCysGlnGluSerHisSerTrpProPheThrPheGlySer

GGGACAAATTTGGAAGTAAAA
GlyThrAsnLeuGluValLys

FIG. 29A

GAAGTGAAGCTTGAGGAGTCTGGAGGAGGCTTGGTGCAACCTGGAGGATCCATGAAACTC
GluValLysLeuGluGluSerGlyGlyGlyLeuValGlnProGlyGlySerMetLysLeu

TCCTGTGTTGCCTCTGGATTCATTTTCAGTAACCACTGGATGAACTGGGTCCGCCAGTCT
SerCysValAlaSerGlyPheIlePheSerAsnHisTrpMetAsnTrpValArgGlnSer

CCAGAGAAGGGGCTTGAGTGGCTTGCTGAAATTAGATCAAAATCTAATTAATTCTGCAACA
ProGluLysGlyLeuGluTrpValAlaGluIleArgSerLysSerIleAsnSerAlaThr

CATTATGCGGAGTCTGTGAAAGGGAGGTTCACCATCTCAAGAGATGATTCCAAAAGTGCT
HisTyrAlaGluSerValLysGlyArgPheThrIleSerArgAspAspSerLysSerAla

GTGTACCTGCAAATGACCGACTTAAGAACTGAAGACACTGGCGTTTATTACTGTTCCAGG
ValTyrLeuGlnMetThrAspLeuArgThrGluAspThrGlyValTyrTyrCysSerArg

AATTACTACGGTAGTACCTACTACTGGGGCCAAGGCACCACTCTCACAGTGTCC
AsnTyrTyrGlySerThrTyrTyrTrpGlyGlnGlyThrThrLeuThrValSer

FIG. 29B