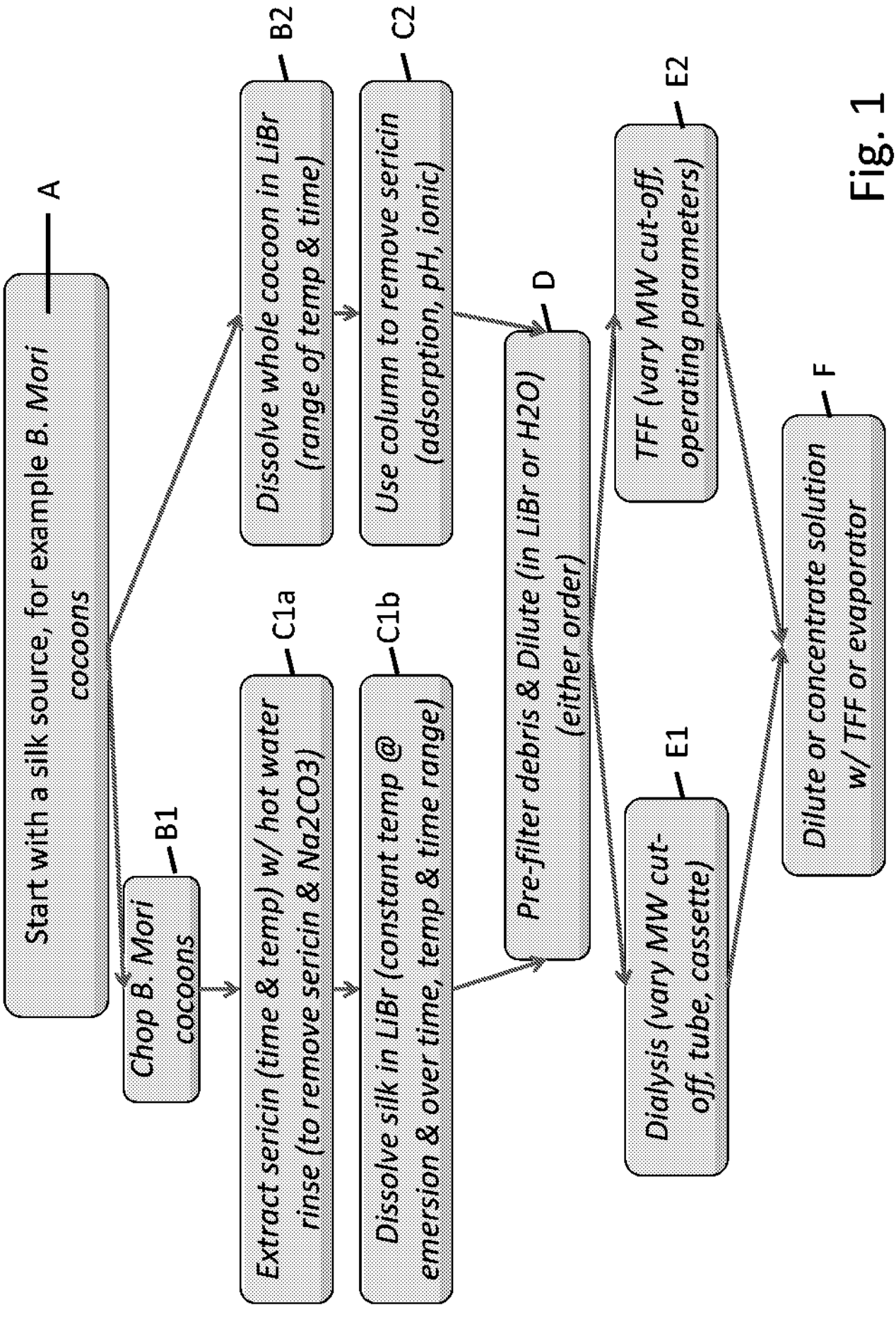

Start with a silk source, for example B. Mori cocoons
A
Chop B. Mori cocoons
B1
Dissolve whole cocoon in LiBr (range of temp & time)
B2
Extract sericin (time & temp) w/ hot water rinse (to remove sericin & Na2CO3)
C1a
Dissolve silk in LiBr (constant temp @ emersion & over time, temp & time range)
C1b
Use column to remove sericin (adsorption, pH, ionic)
C2
Pre-filter debris & Dilute (in LiBr or H2O) (either order)
D
Dialysis (vary MW cut-off, tube, cassette)
E1
TFF (vary MW cut-off, operating parameters)
E2
Dilute or concentrate solution w/ TFF or evaporator
F

Fig. 1

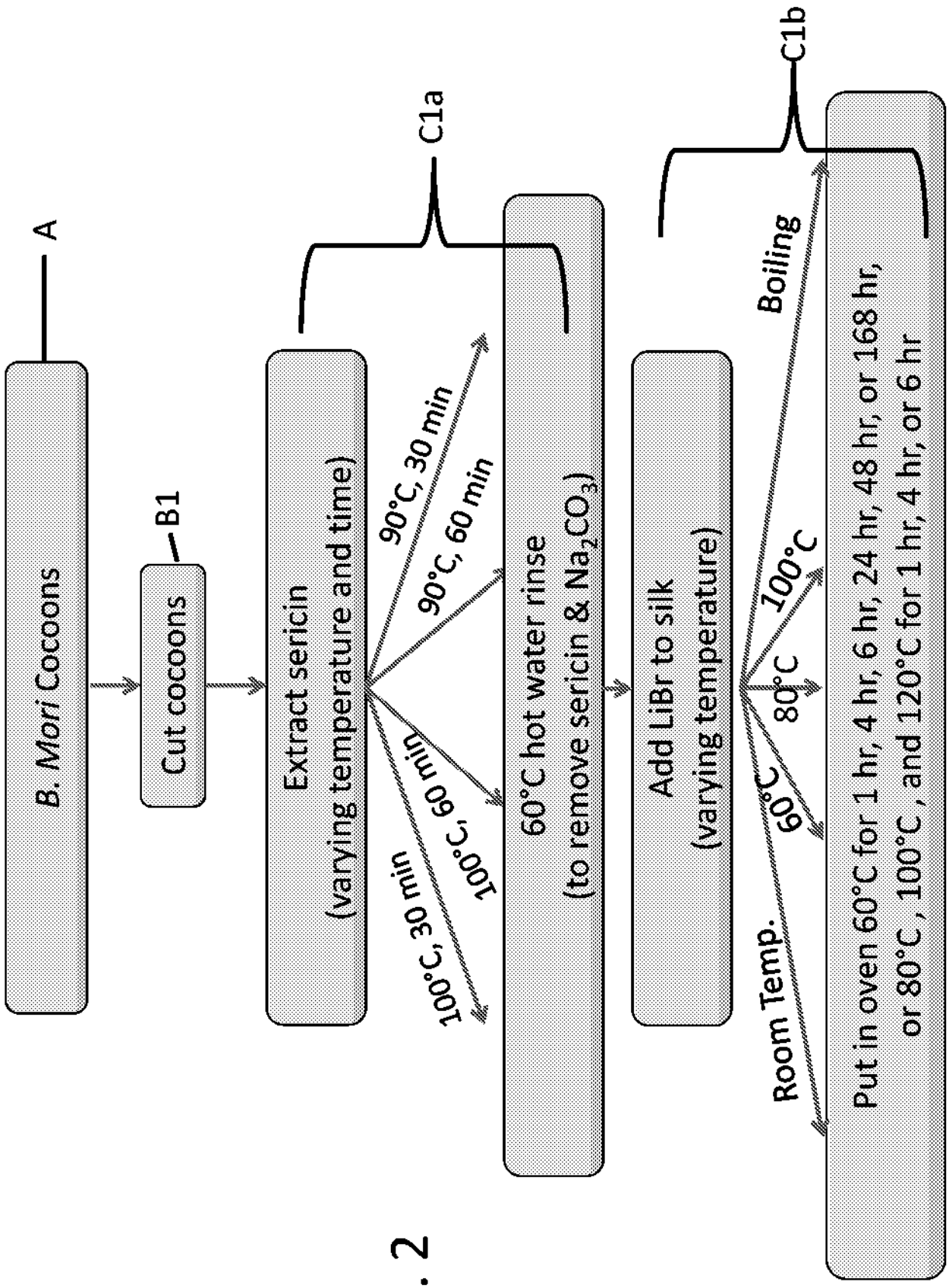

A
B. Mori Cocoons
B1
Cut cocoons
C1a
Extract sericin
(varying temperature and time)
90°C, 30 min
90°C, 60 min
100°C, 30 min
100°C, 60 min
60°C hot water rinse
(to remove sericin & Na_2CO_3)
Add LiBr to silk
(varying temperature)
C1b
Boiling
100°C
80°C
60°C
Room Temp.
Put in oven 60°C for 1 hr, 4 hr, 6 hr, 24 hr, 48 hr, or 168 hr,
or 80°C, 100°C, and 120°C for 1 hr, 4 hr, or 6 hr

Fig. 2

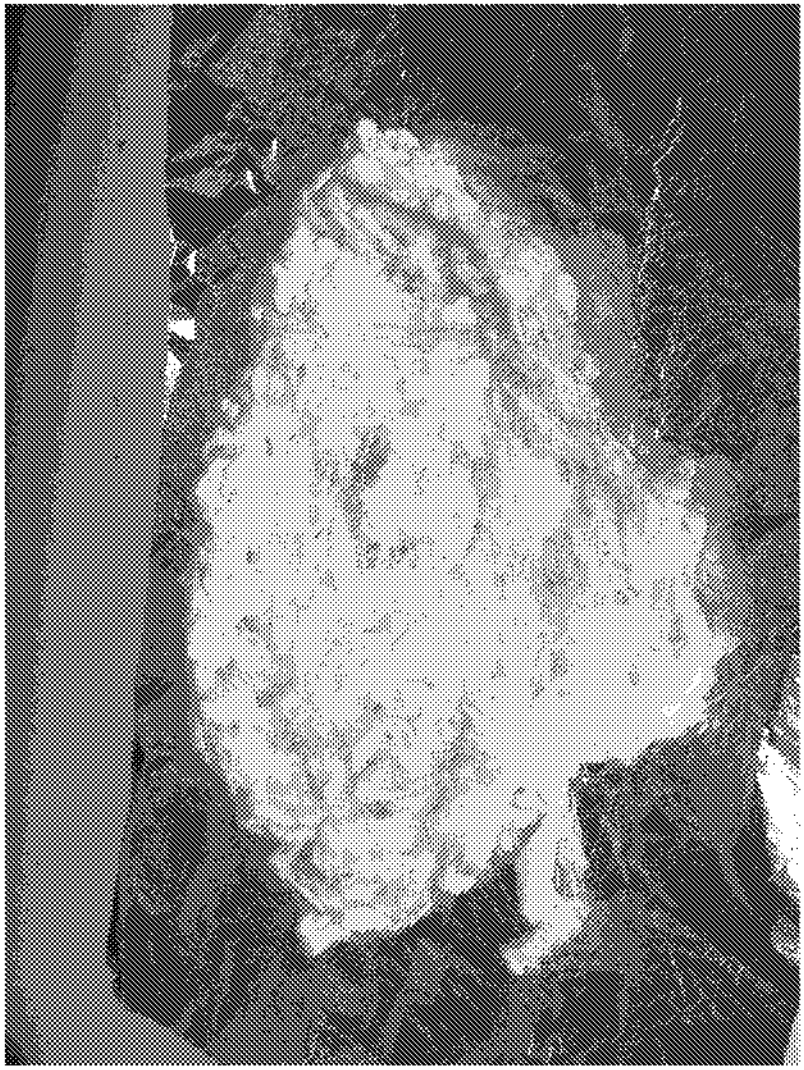


Fig. 3

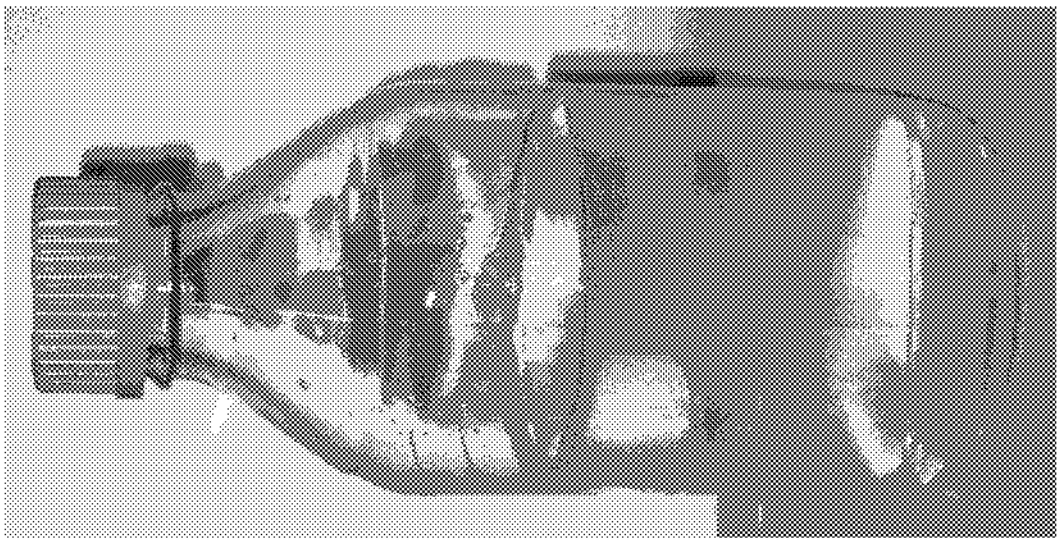


Fig. 4

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Some undissolved silk	Some undissolved silk	Significant amount of undissolved silk	Significant amount of undissolved silk

Fig. 5A Fig. 5B Fig. 5C Fig. 5D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Some undissolved silk	Small amount of undissolved silk	Significant amount of undissolved silk	Some undissolved silk

Fig. 6A Fig. 6B Fig. 6C Fig. 6D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
8 Hours	Small amount of undissolved silk	Little to no undissolved silk	Significant amount of undissolved silk	Some undissolved silk

Fig. 7A Fig. 7B Fig. 7C Fig. 7D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
12 Hours	Small amount of undissolved silk	Little to no undissolved silk	Some undissolved silk	All but small amount of silk undissolved

Fig. 8A Fig. 8B Fig. 8C Fig. 8D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
24 Hours	Small amount of undissolved silk	Little to no undissolved silk	Some undissolved silk	All but small amount of silk undissolved

Fig. 9A Fig. 9B Fig. 9C Fig. 9D

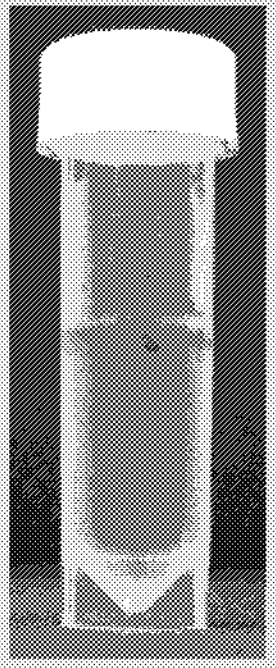
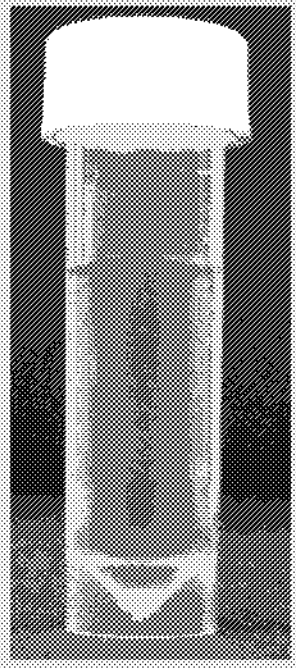
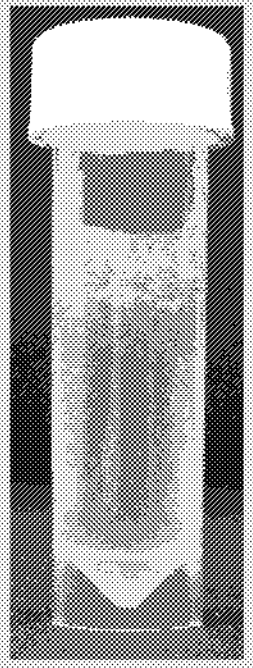
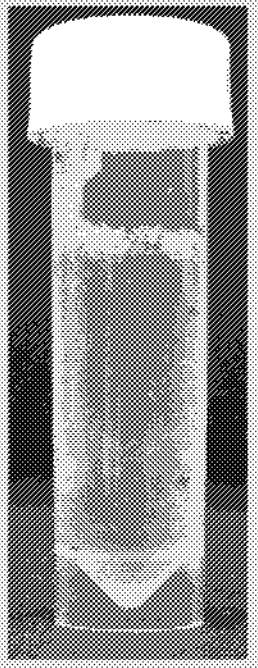
Time Point	1 Sericin was extracted at 100° C, 30 min	2 Sericin was extracted at 100° C, 60 min	3 Sericin was extracted at 90° C, 30 min	4 Sericin was extracted at 90° C, 60 min
168 Hours (1&2) 192 Hours (3&4)	No undissolved silk, only slightly cloudy 	No undissolved silk, completely clear 	Some undissolved silk 	Slight amount of undissolved silk 

Fig. 10A Fig. 10B Fig. 10C Fig. 10D

Fig. 11A

Fig. 11B

Fig. 11C

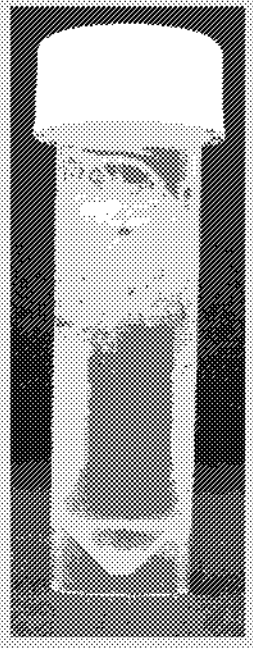
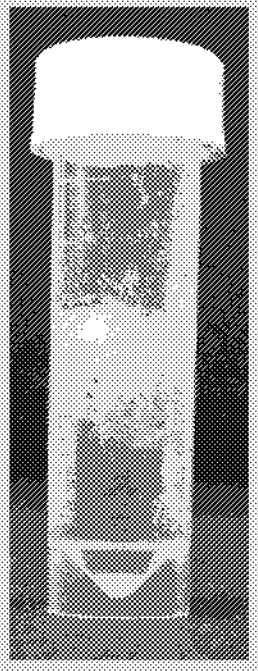
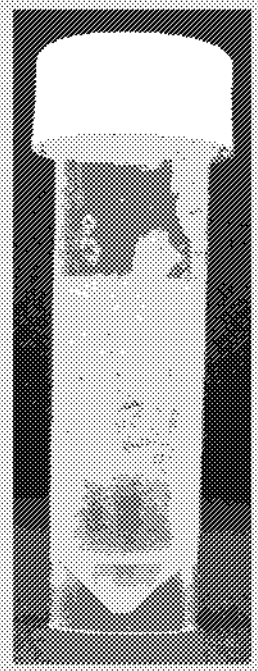
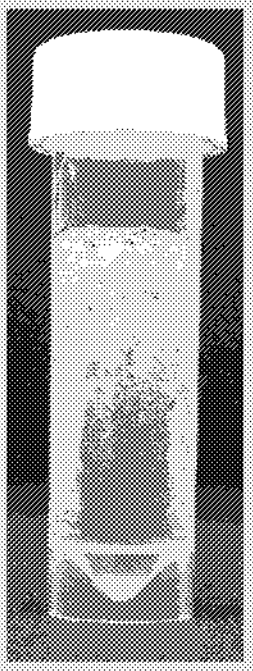
Time Point	Sericin was extracted at 100C°, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Significant amount of undissolved silk 	Significant amount of undissolved silk and debris 	Significant amount of undissolved silk, highly viscous 	Significant amount of undissolved silk 

Fig. 12A Fig. 12B Fig. 12C Fig. 12D

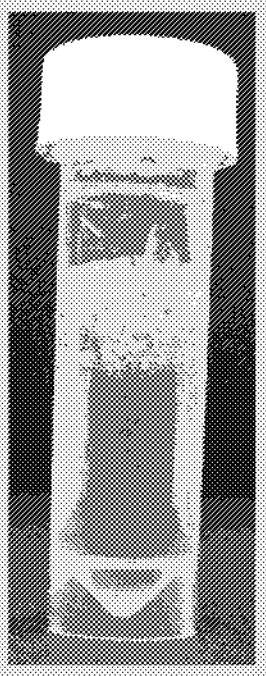
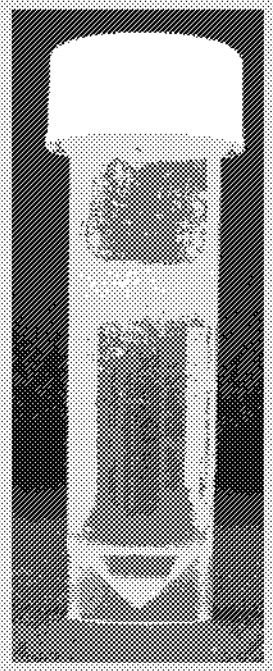
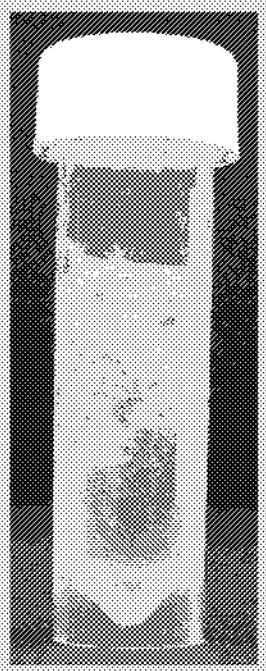
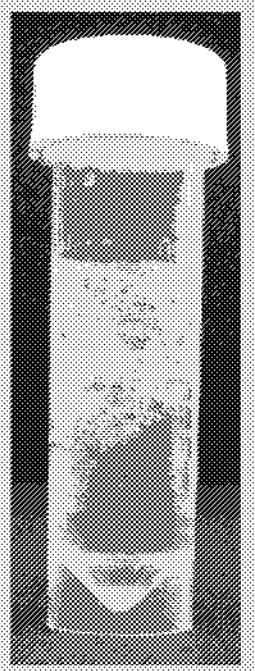
Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Some undissolved silk 	Some undissolved silk 	Significant amount of undissolved silk, highly viscous 	Some undissolved silk 

Fig. 13A Fig. 13B Fig. 13C Fig. 13D

Figure 14

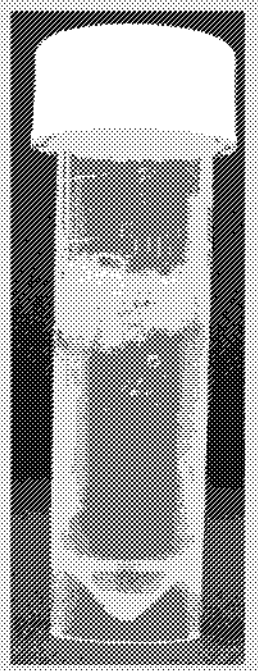
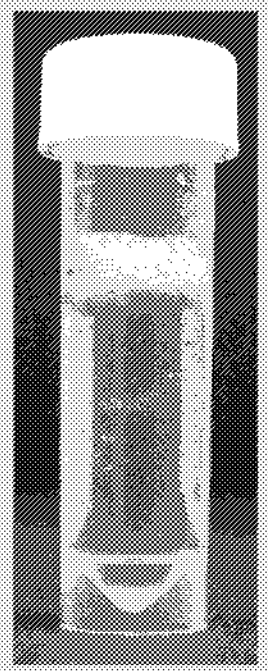
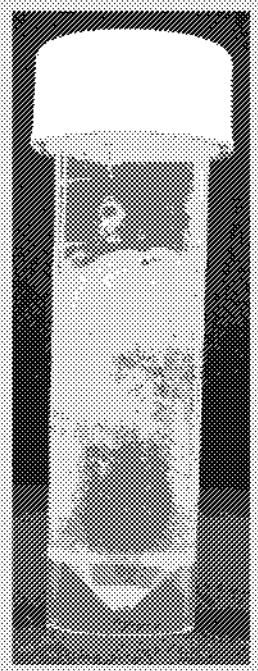
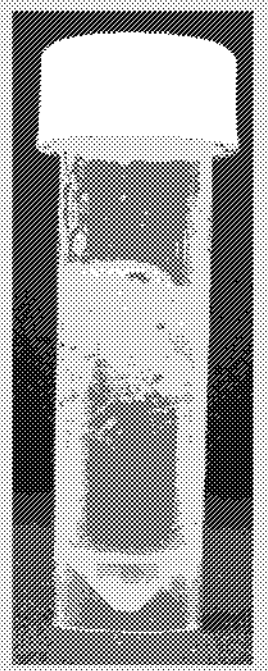
Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Small amount of undissolved silk 	Small amount of silk undissolved 	Some undissolved silk 	Some undissolved silk 

Fig. 14A Fig. 14B Fig. 14C Fig. 14D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Very small amount of undissolved silk, quite viscous, precipitate formed from bubbles	Less viscous than set 1, no undissolved silk	Highly viscous, some undissolved silk	Less viscous than set 3, some undissolved silk

Fig. 15A Fig. 15B Fig. 15C Fig. 15D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Extremely small amount of undissolved silk	No undissolved silk	Highly viscous, some undissolved silk	Some undissolved silk

Fig. 16A Fig. 16B Fig. 16C Fig. 16D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Extremely small amount of undissolved silk	No undissolved silk	Highly viscous, some undissolved silk	Almost no undissolved silk

Fig. 17A Fig. 17B Fig. 17C Fig. 17D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Small amount of undissolved silk, some precipitate from bubbles	All silk dissolved, some precipitate from bubbles	Some precipitate from bubbles and undissolved silk	Some precipitate from bubbles and undissolved silk

Fig. 18A Fig. 18B Fig. 18C Fig. 18D

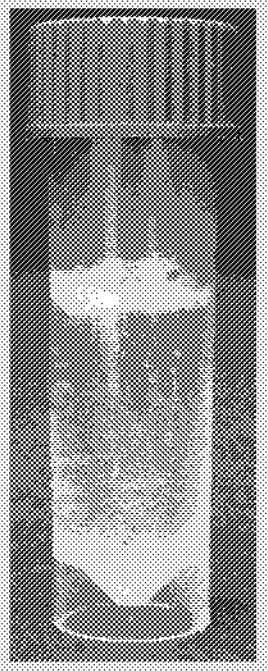
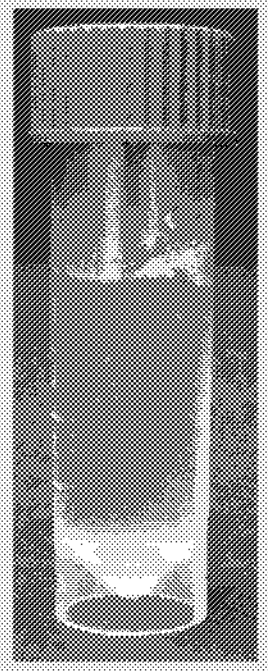
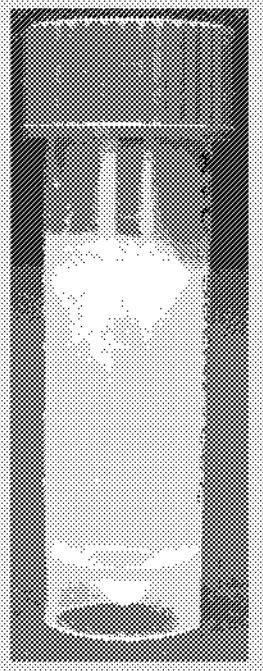
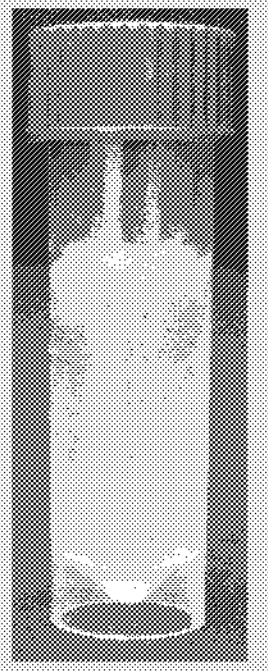
Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	All silk dissolved, some precipitate from bubbles 	Completely clear with no precipitate 	Some undissolved silk 	Some precipitate from bubbles, mostly clear solution 

Fig. 19A Fig. 19B Fig. 19C Fig. 19D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Some precipitate from bubbles, no undissolved silk	Clear with no precipitate or silk	Some undissolved silk	Clear and no undissolved silk

Fig. 20A Fig. 20B Fig. 20C Fig. 20D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Most silk dissolved, some precipitate from bubbles	Most silk dissolved, some slight precipitate from bubbles	Some precipitate from bubbles and significant amount of undissolved silk	Significant amount of undissolved silk

Fig. 21A Fig. 21B Fig. 21C Fig. 21D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Completely clear, no silk or precipitate	Some precipitate from bubbles	Cloudy with some undissolved silk	Very viscous with some undissolved silk

Fig. 22A Fig. 22B Fig. 22C Fig. 22D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Slightly cloudy with silk particles on top	Cloudy with precipitate from bubbles	Highly viscous, cloudy, almost solid	Highly viscous, cloudy, almost solid

Fig. 23A Fig. 23B Fig. 23C Fig. 23D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Some undissolved silk, viscosity slightly higher than set 2	Viscosity similar to water, nearly all silk completely dissolved and no precipitate, clear orange/yellow	Highly viscous, some undissolved silk and bubbles	Some undissolved silk but not too viscous

Fig. 24A Fig. 24B Fig. 24C Fig. 24D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Some undissolved silk, cloudy, slightly viscous	Very slight amount of silk undissolved, clear with darker color	Some undissolved silk, highly viscous	Small amount of undissolved silk, not too viscous

Fig. 25A Fig. 25B Fig. 25C Fig. 25D

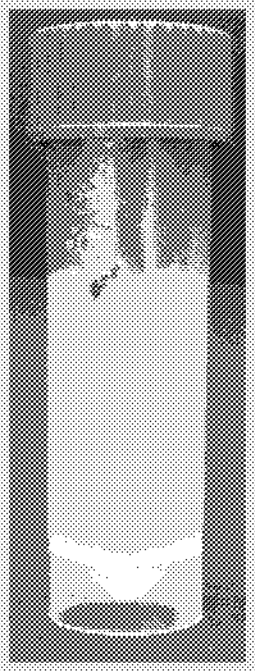
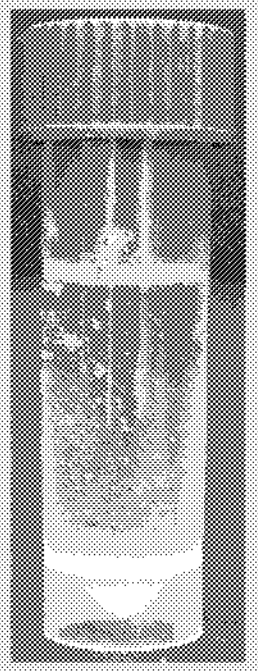
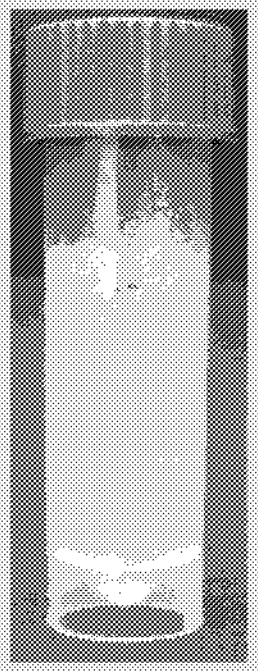
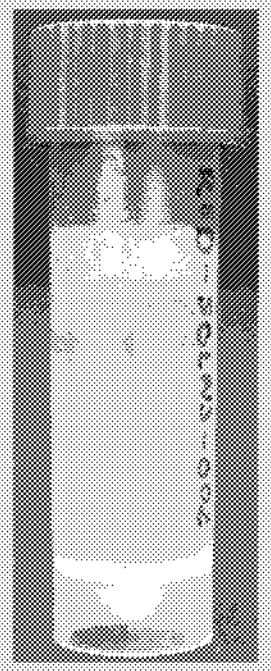
Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Slightly cloudy with some undissolved silk 	Clear with darker color 	Some undissolved silk, viscous 	Darker color, some undissolved silk, slightly cloudy 

Fig. 26A Fig. 26B Fig. 26C Fig. 26D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	Somewhat cloudy with darker color, some silk particles	Completely clear with dark color, slight amount of silk particles	Cloudy, some undissolved silk, highly viscous	Small amount of undissolved silk, partially cloudy, darker color

Fig. 27A Fig. 27B Fig. 27C Fig. 27D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	Small amount of undissolved silk, highly cloudy	Little to no undissolved silk, deep auburn color	Some undissolved silk, highly cloudy	Slight amount of silk particles, dark color, less viscous

Fig. 28A Fig. 28B Fig. 28C Fig. 28D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	Slightly cloudy, slight amount of undissolved silk	No undissolved silk, completely clear, dark auburn	Cloudy, viscous, some undissolved silk	Slight amount of undissolved silk, slightly cloudy

Fig. 29A Fig. 29B Fig. 29C Fig. 29D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
1 Hour	All silk dissolved, cloudy	All silk dissolved, clear	All silk dissolved, viscous, cloudy	All silk dissolved, viscous, cloudy

Fig. 30A Fig. 30B Fig. 30C Fig. 30D

Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
4 Hours	All silk dissolved, slightly cloudy but mostly clear	All silk dissolved, clear, dark	All silk dissolved, cloudy	All silk dissolved, cloudy

Fig. 31A Fig. 31B Fig. 31C Fig. 31D

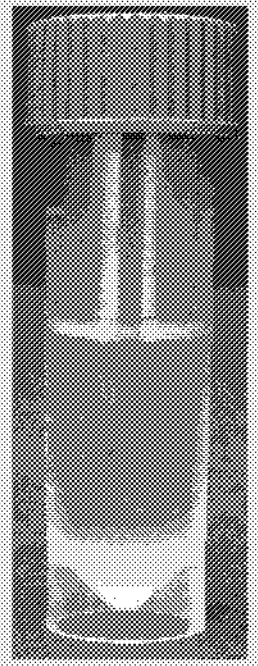
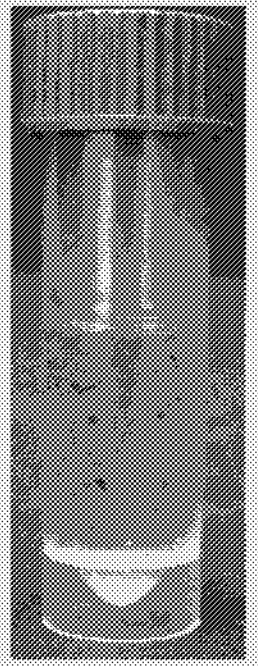
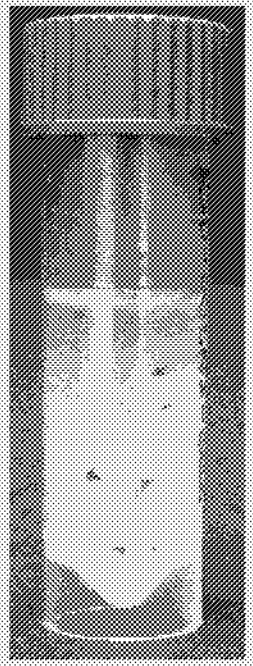
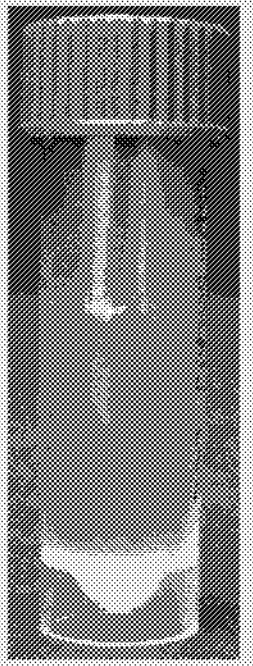
Time Point	Sericin was extracted at 100° C, 30 min	Sericin was extracted at 100° C, 60 min	Sericin was extracted at 90° C, 30 min	Sericin was extracted at 90° C, 60 min
6 Hours	All silk dissolved, cloudy 	All silk dissolved, clear 	All silk dissolved, cloudy 	All silk dissolved, only slightly cloudy 

Fig. 32A Fig. 32B Fig. 32C Fig. 32D

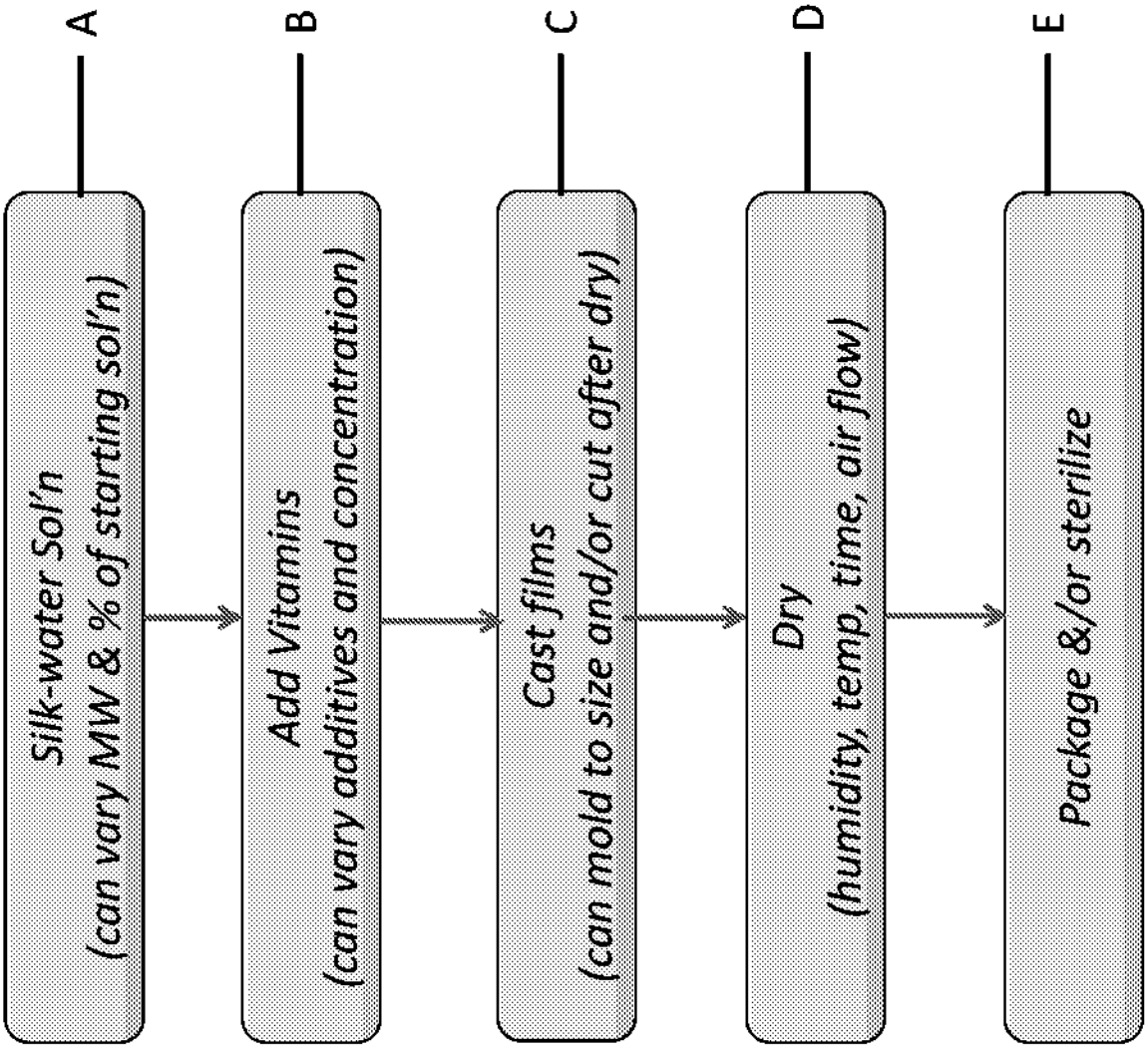

A
Silk-water Sol'n
(can vary MW & % of starting sol'n)
B
Add Vitamins
(can vary additives and concentration)
C
Cast films
(can mold to size and/or cut after dry)
D
Dry
(humidity, temp, time, air flow)
E
Package &/or sterilize

Fig. 33

Methods for Silk Film Drying Study

- Diluted silk solution to 2% (m/v%) silk concentration
- Vitamin C added in 5:1 silk:vitC ratio

Film Casting

- Cast 15 samples for each set with 1.85 mL of solution pipetted onto a 1" diameter silicone mold
- Films were cast in drying location and were not moved until testing

Observations and Testing

- Films were observed and massed at 1, 2, 3, 4, 5, 6, 7, 8, 12, 24, and 48 hours after casting
- Tested 5 films from each set at 1, 8, and 48 hours after casting
- Testing procedure consisted of massing, photographing and dissolution of films

Fig. 34

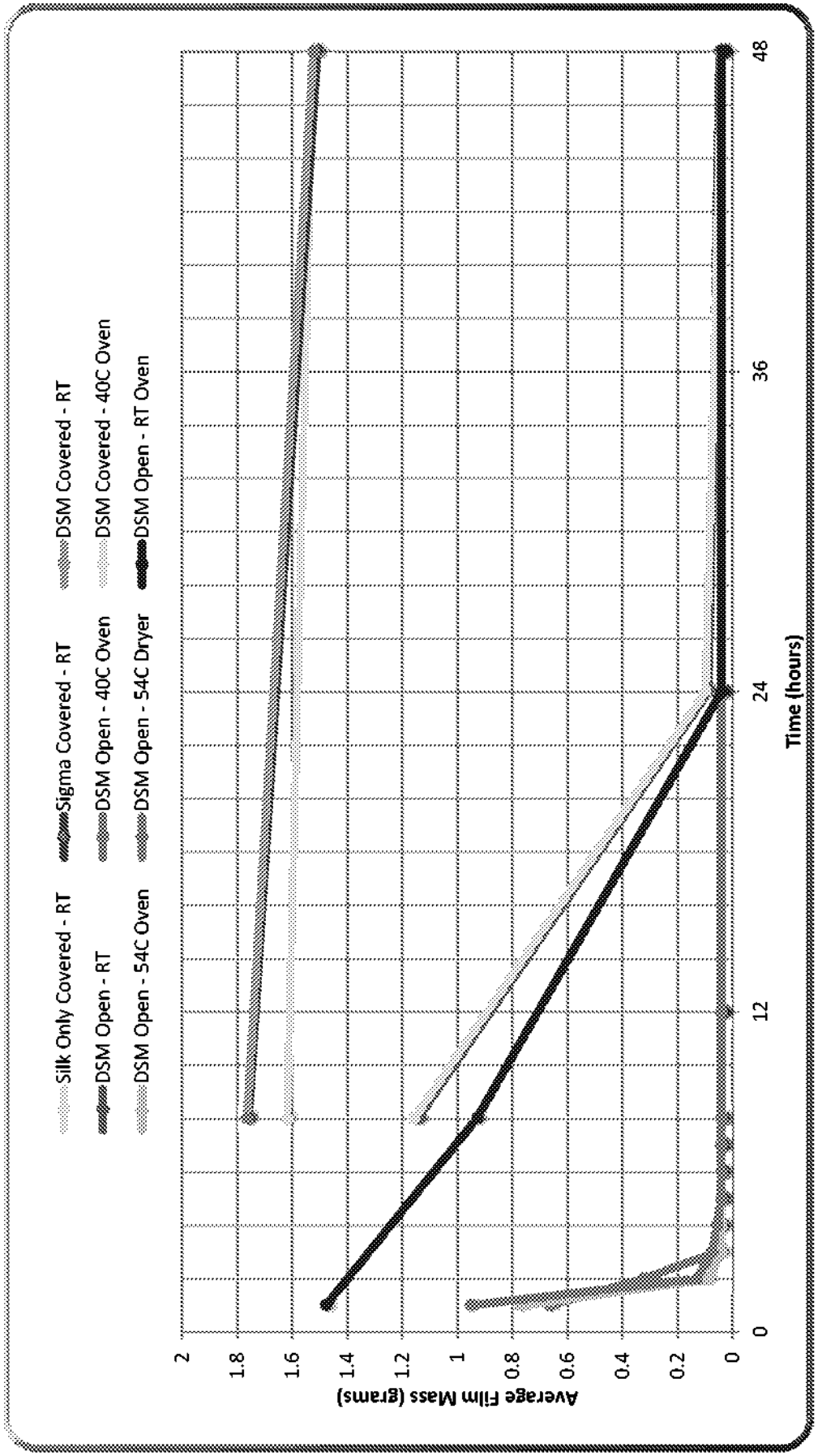

Silk Only Covered - RT
Sigma Covered - RT
DSM Covered - RT
DSM Open - RT
DSM Open - 40C Oven
DSM Covered - 40C Oven
DSM Open - 54C Oven
DSM Open - 54C Dryer
DSM Open - RT Oven
Average Film Mass (grams)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Time (hours)
0
12
24
36
48

Fig. 35

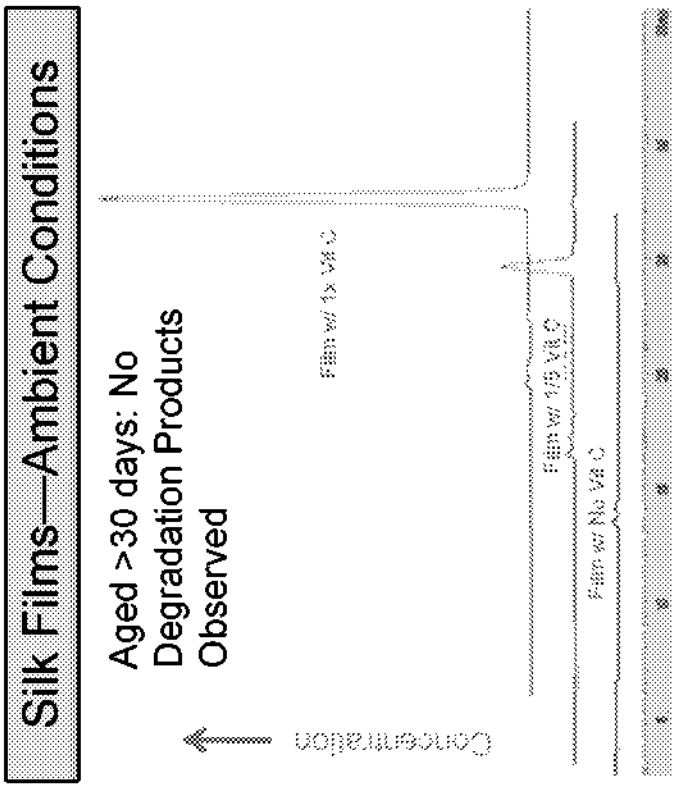


Fig. 36B

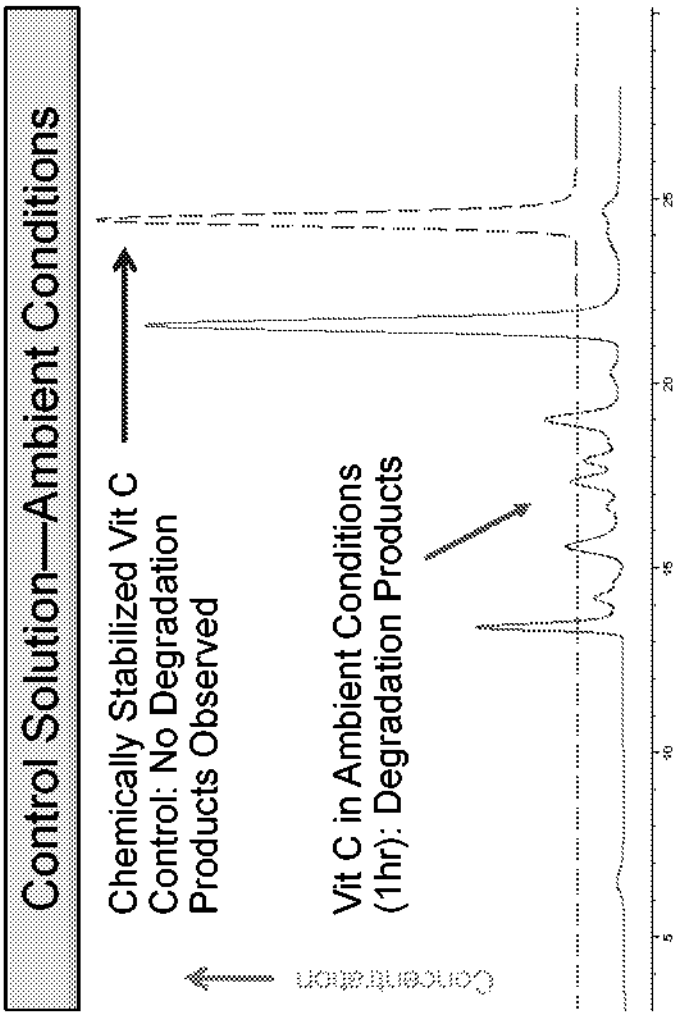
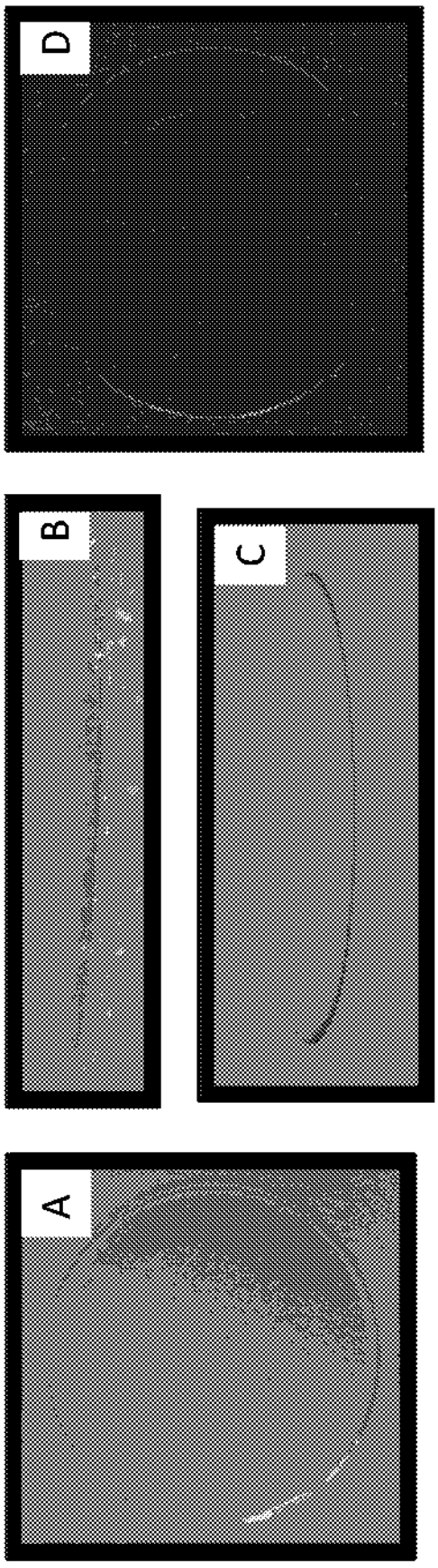
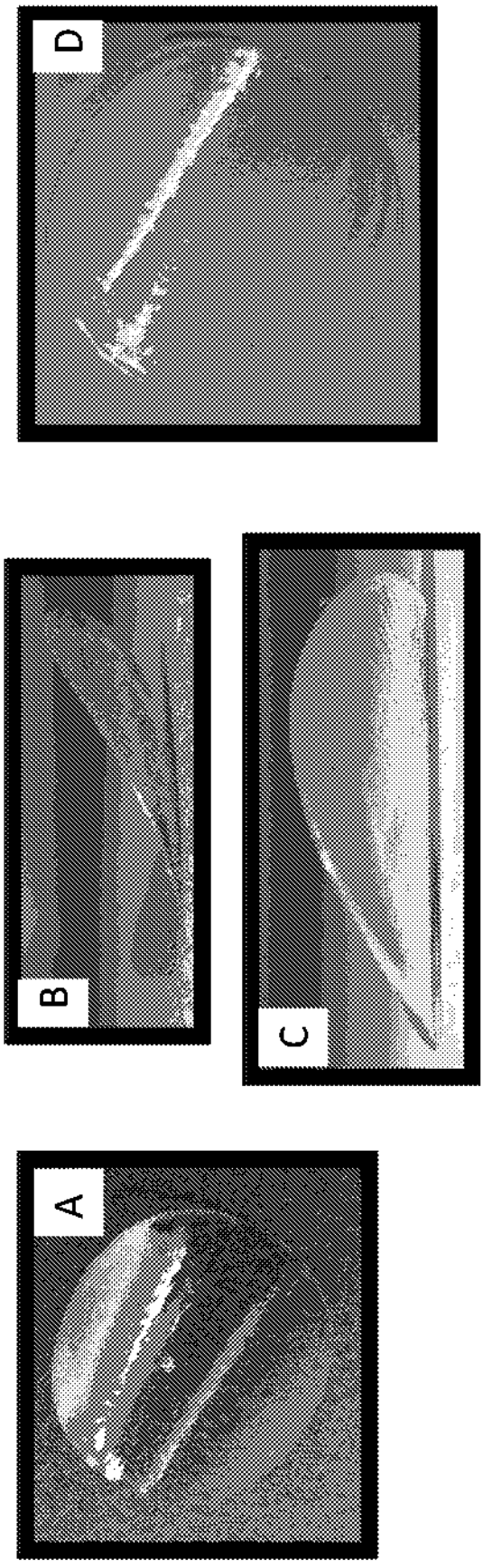


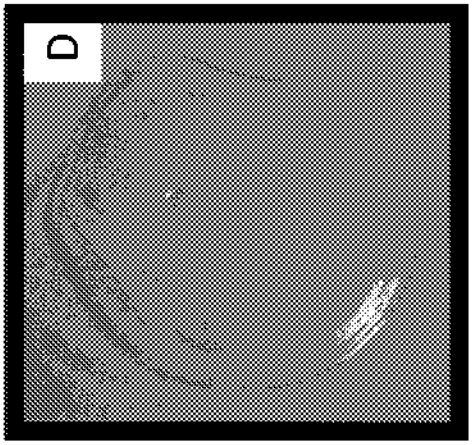
Fig. 36A



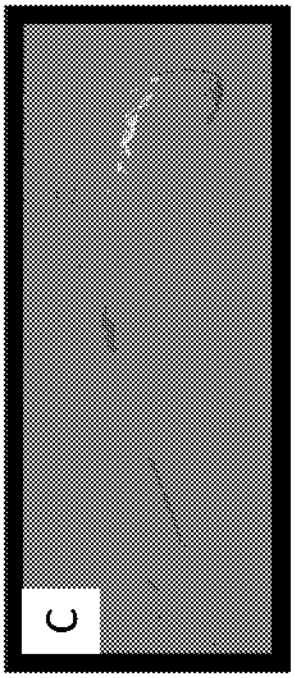
Figs. 37A-37D

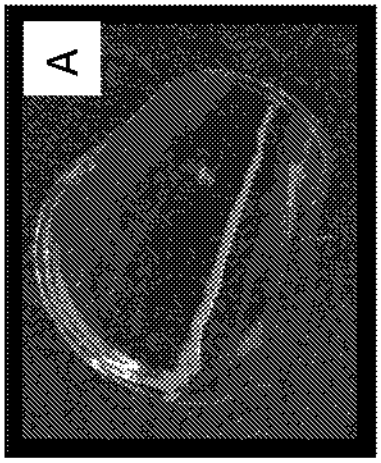


Figs. 38A-38D



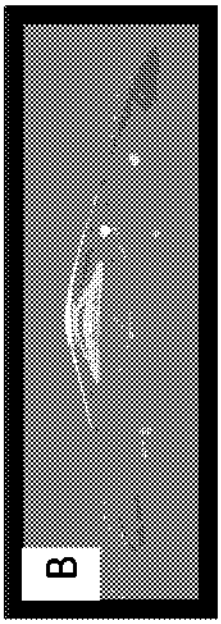


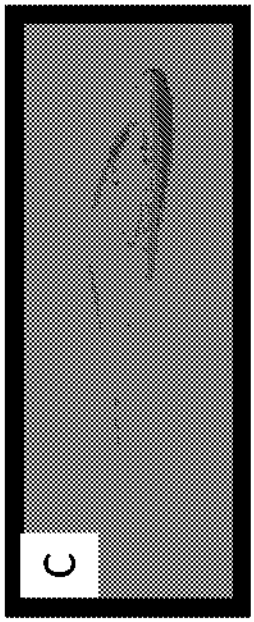


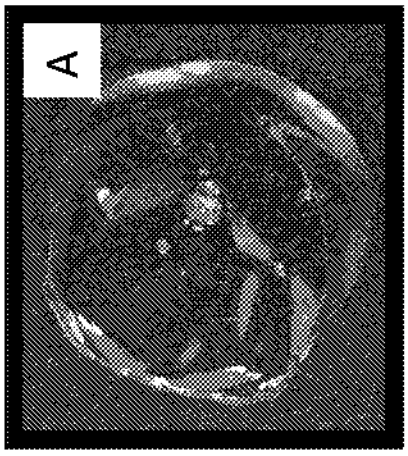


Figs. 39A-39D

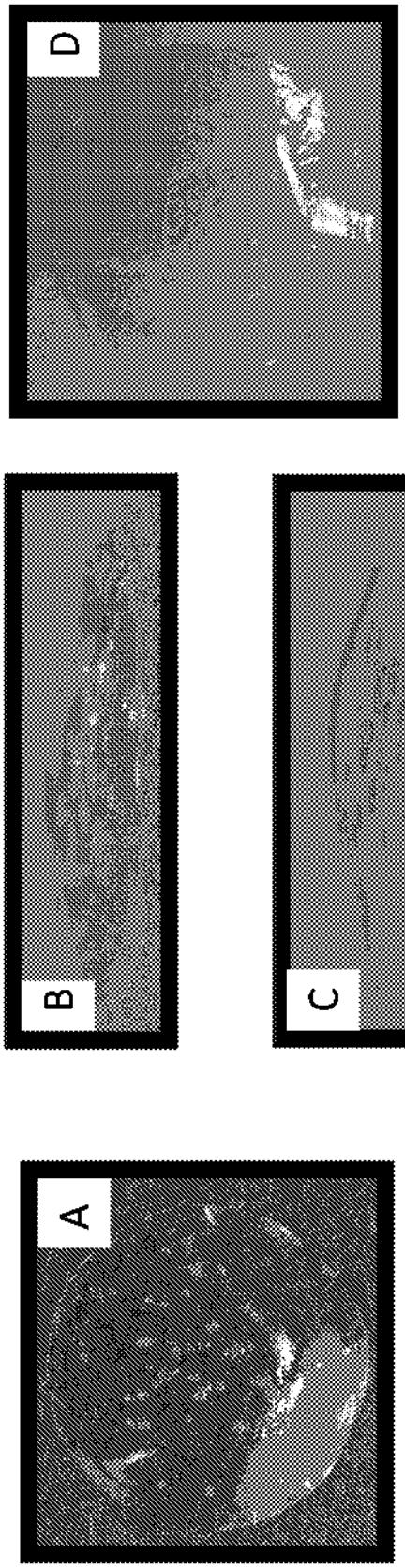




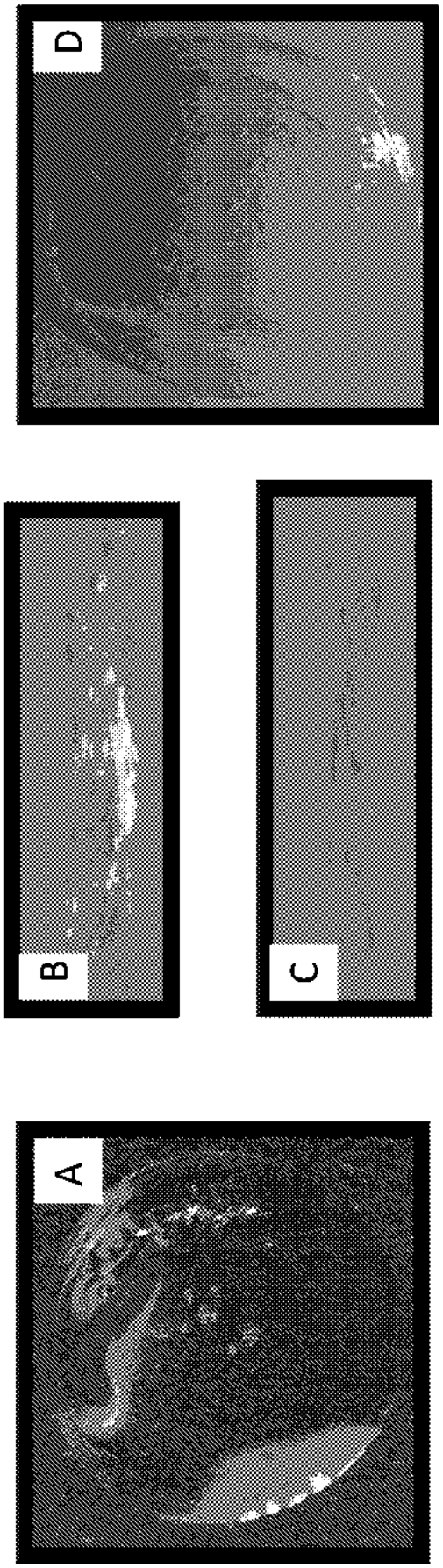




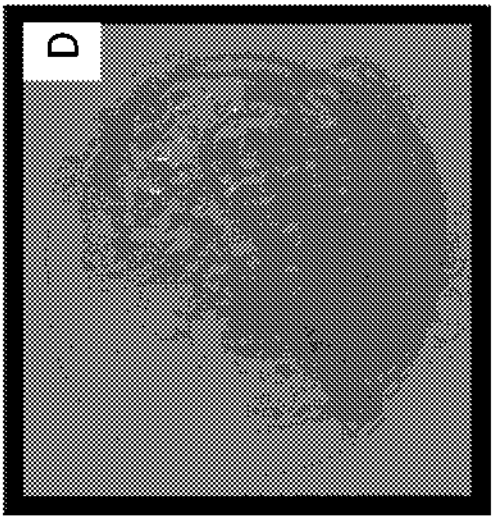
Figs. 40A-40D

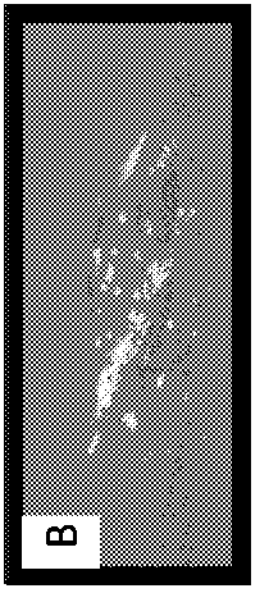


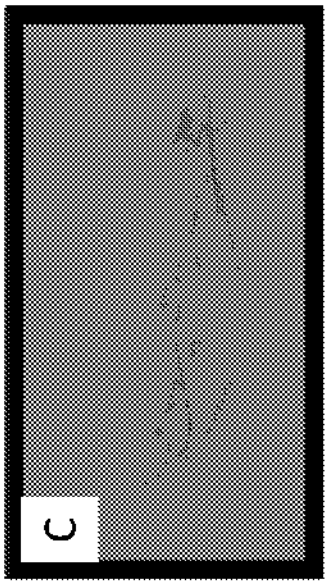
Figs. 41A-41D

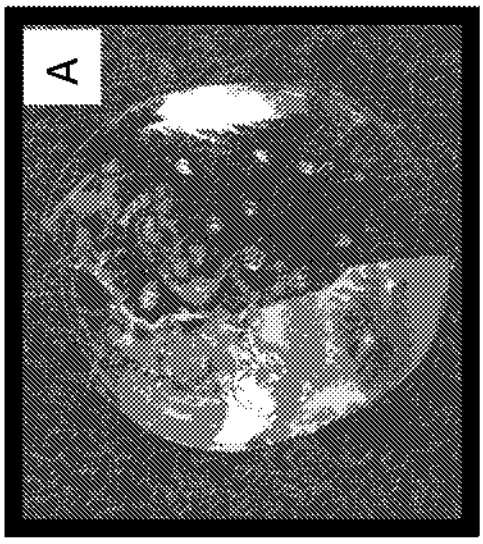


Figs. 42A-42D

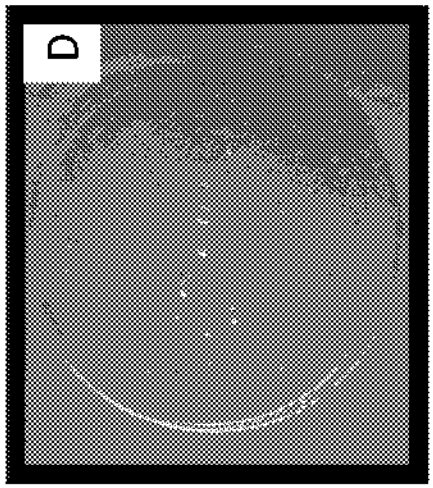


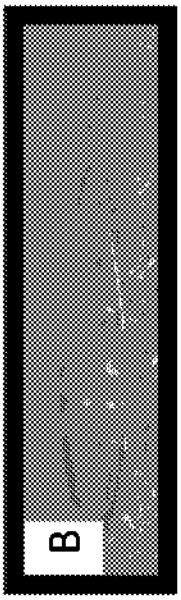


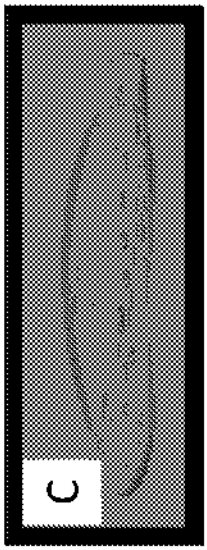


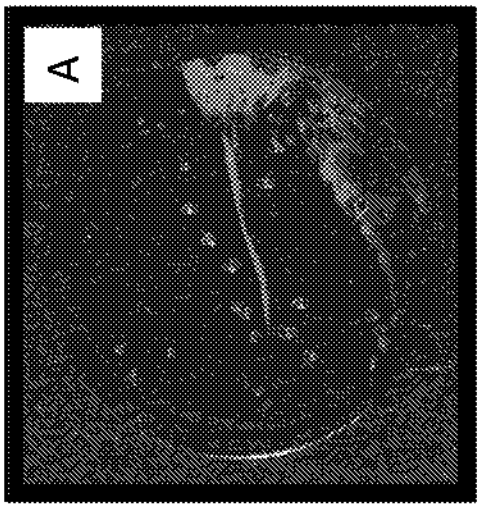


Figs. 43A-43D

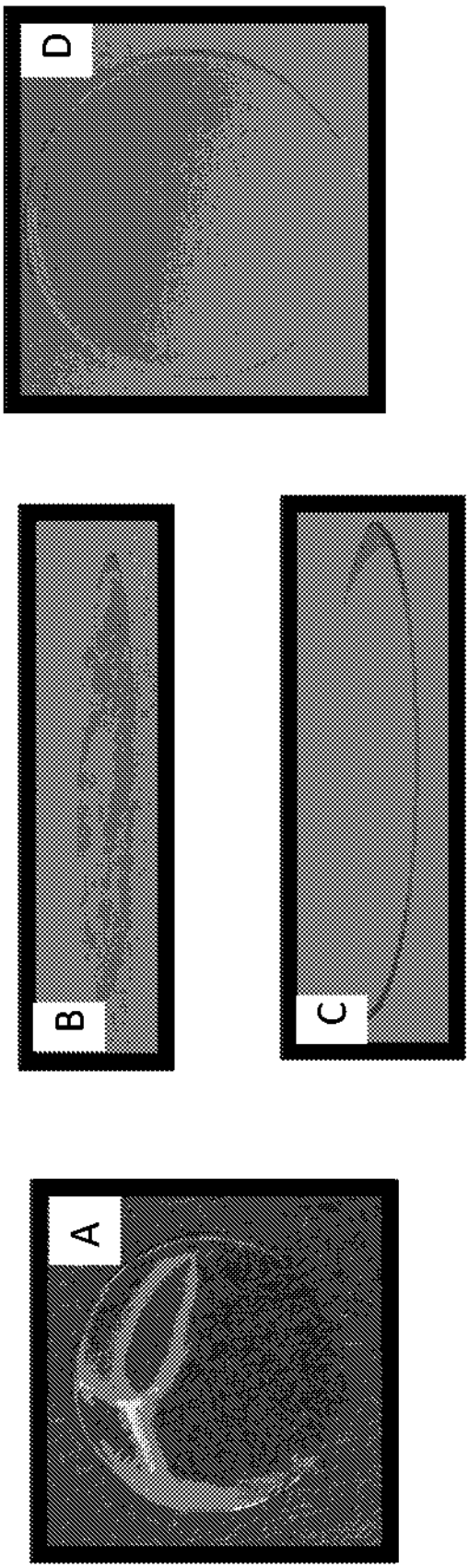




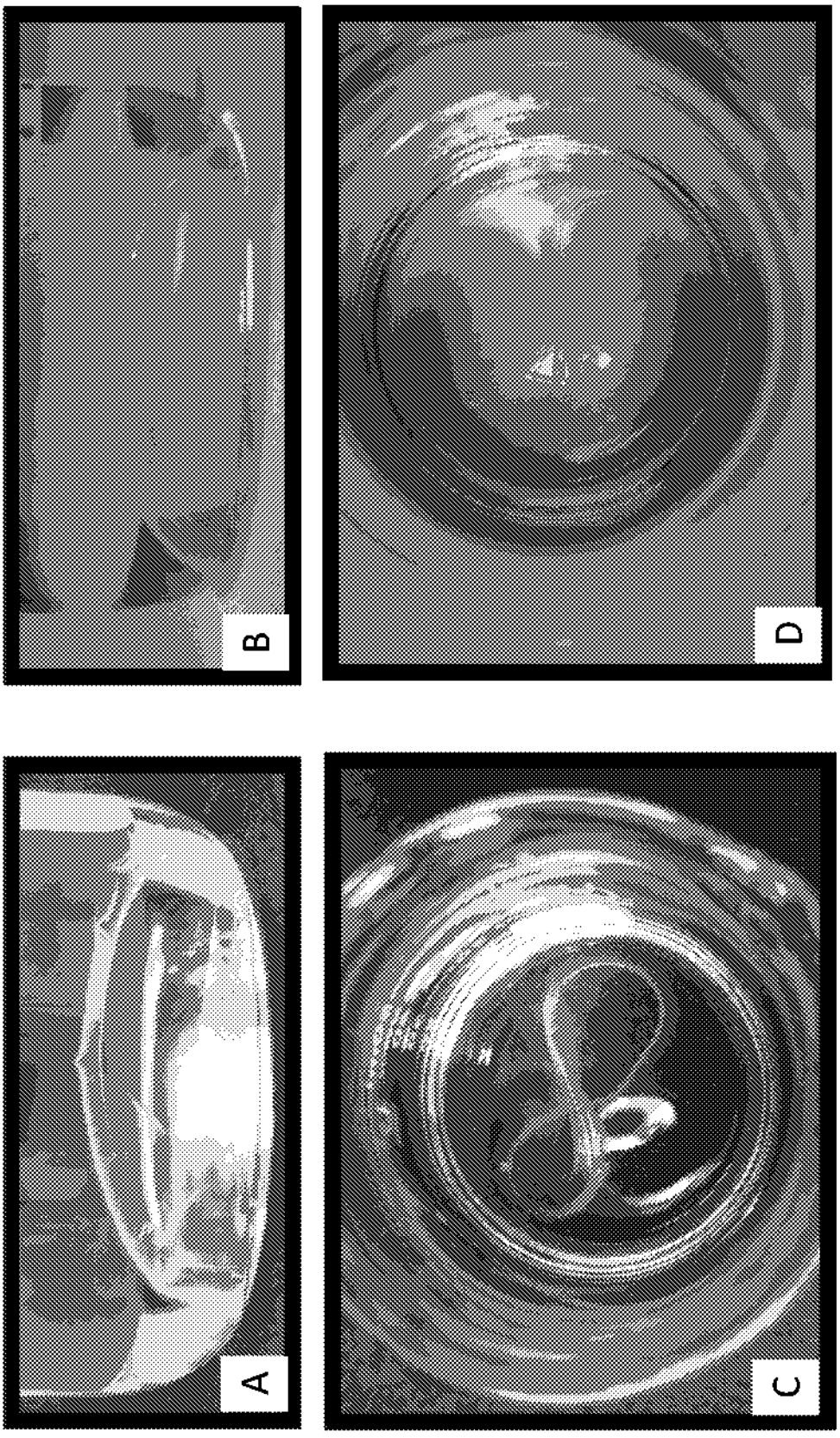




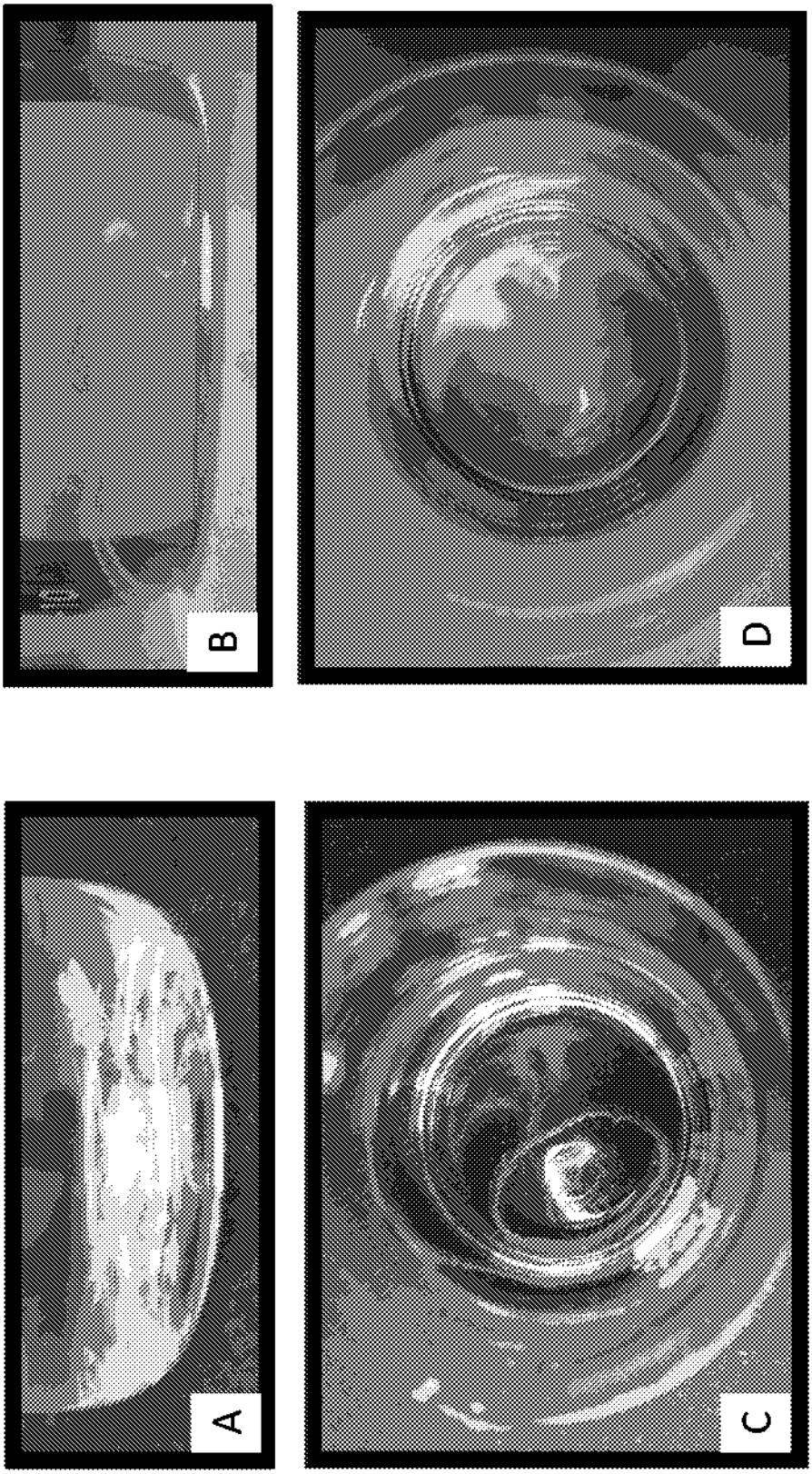
Figs. 44A-44D



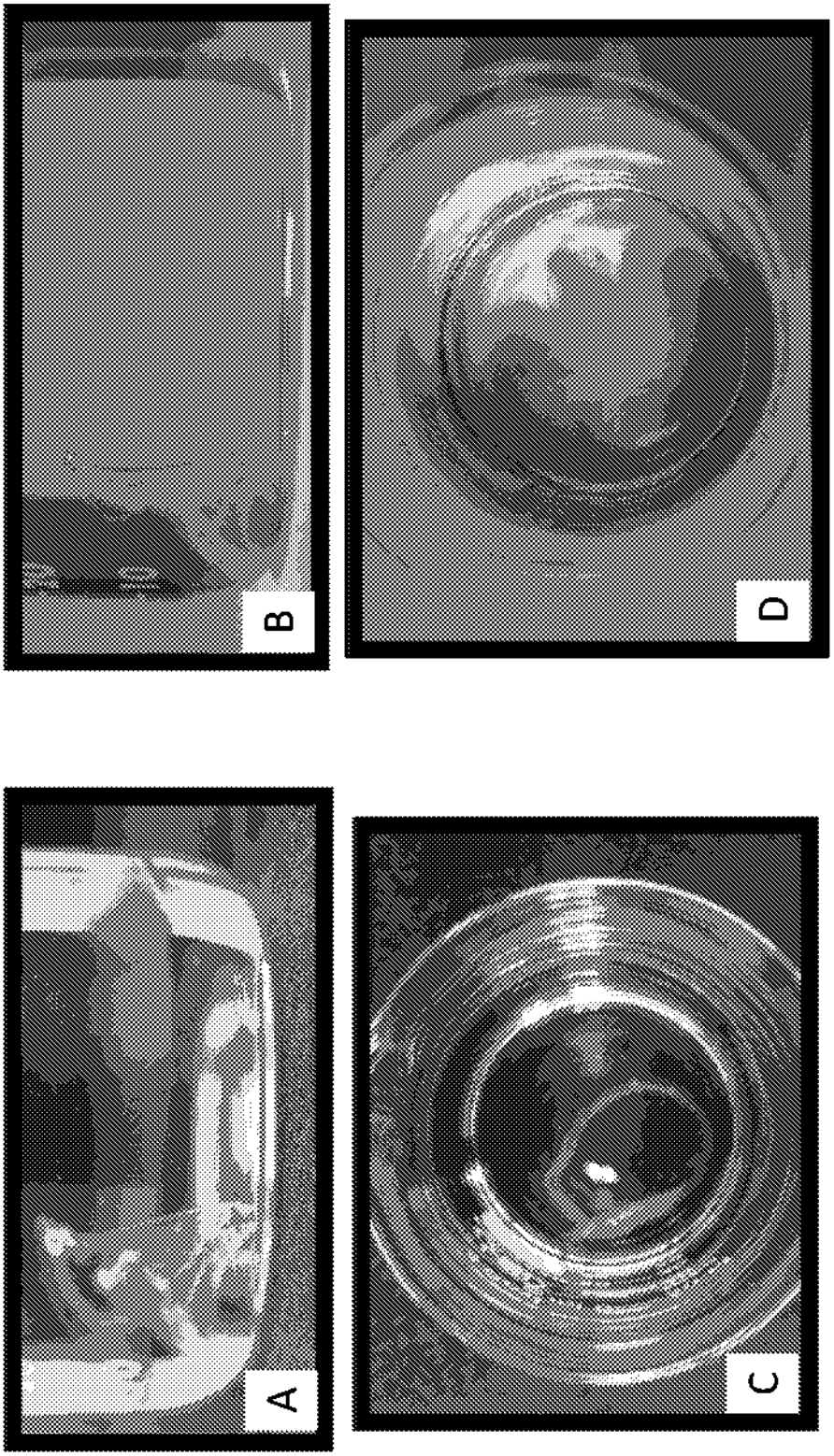
Figs. 45A-45D



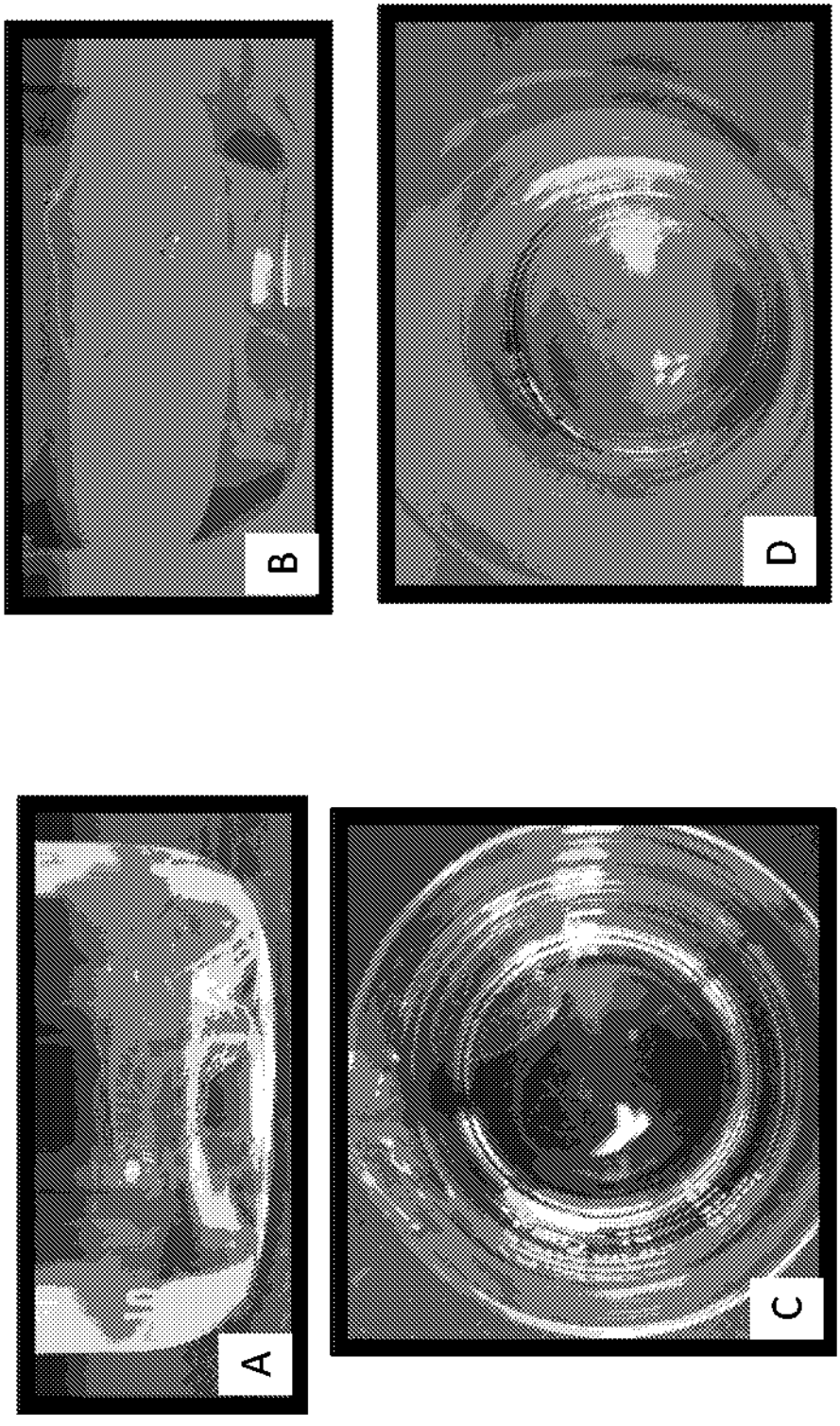
Figs. 46A-46D



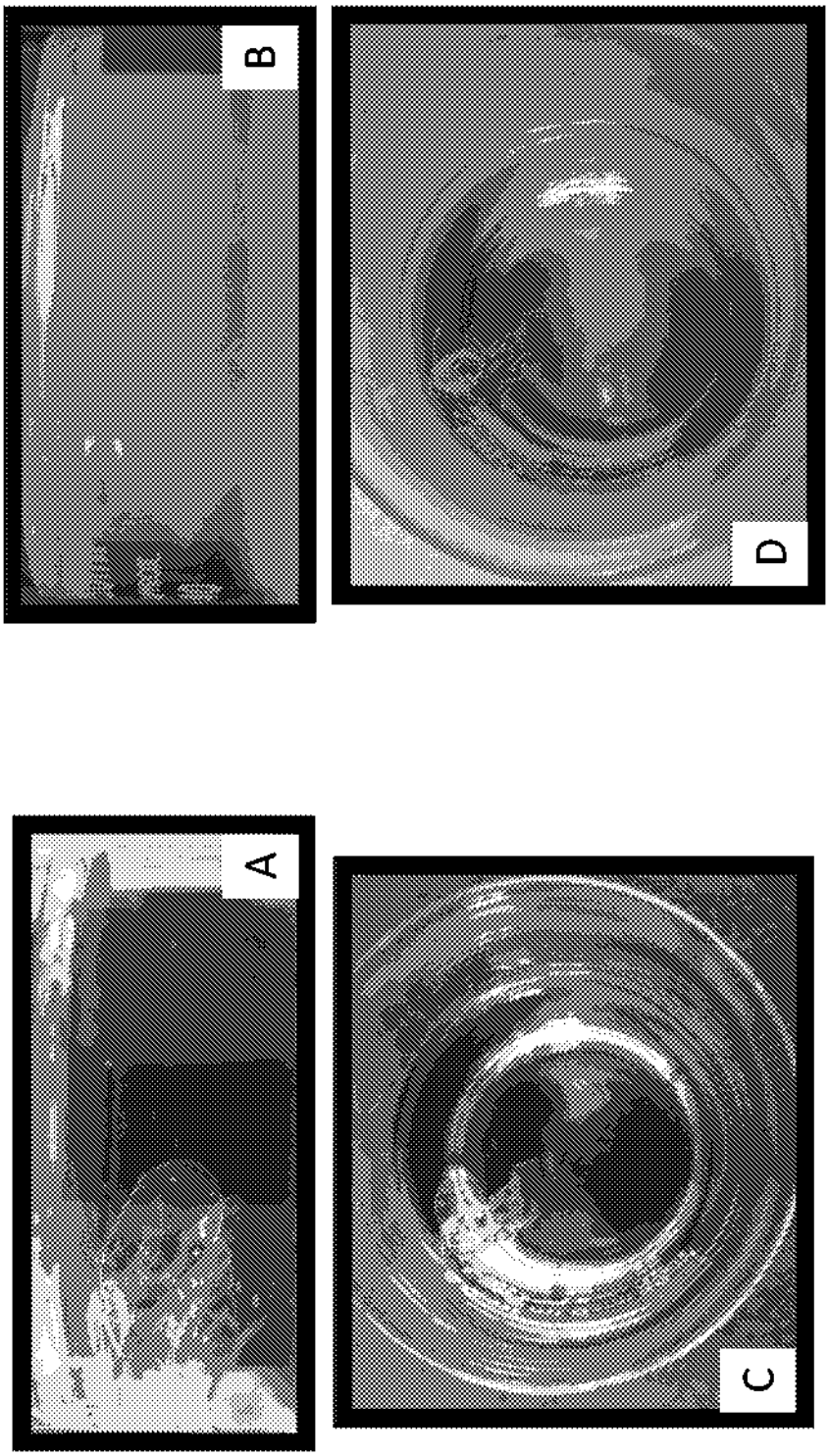
Figs. 47A-47D



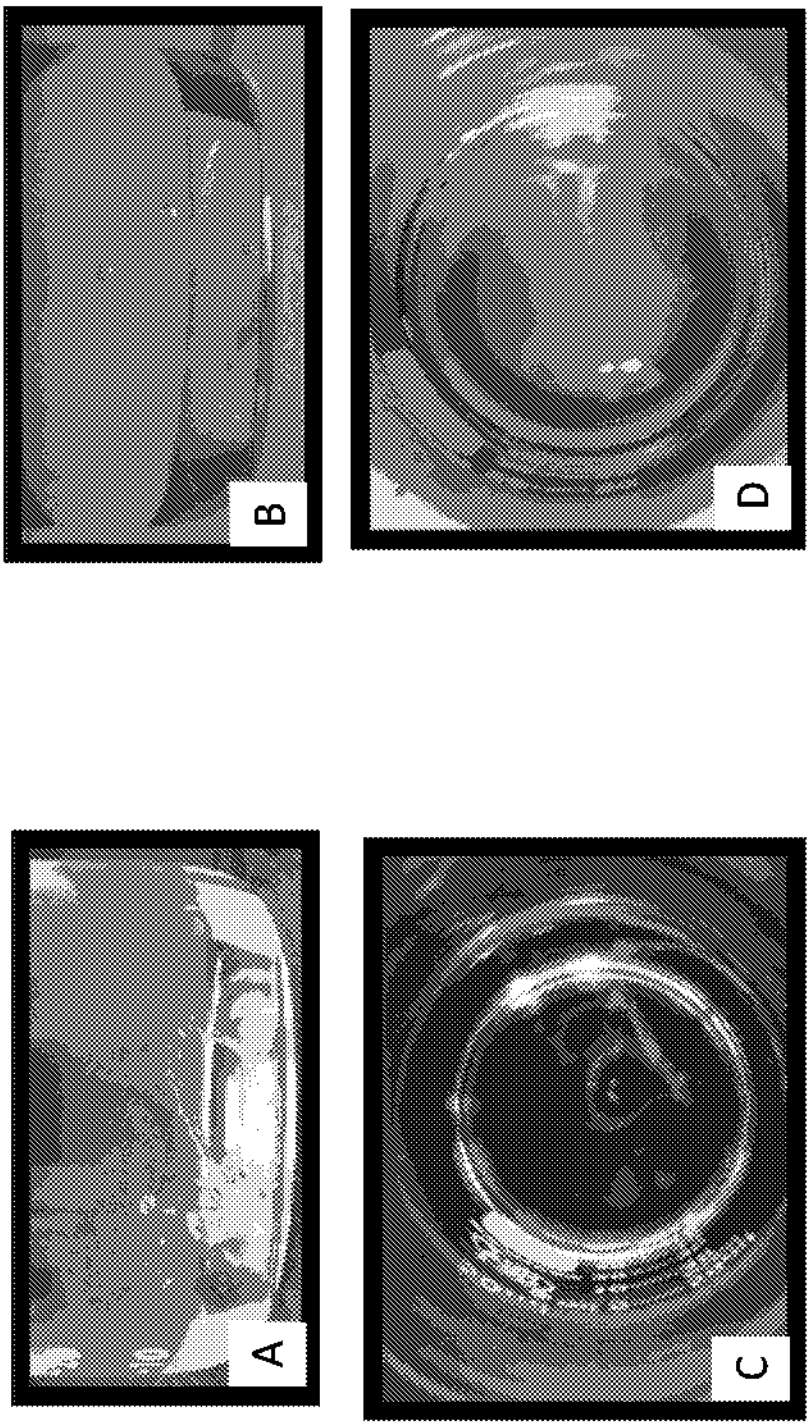
Figs. 48A-48D



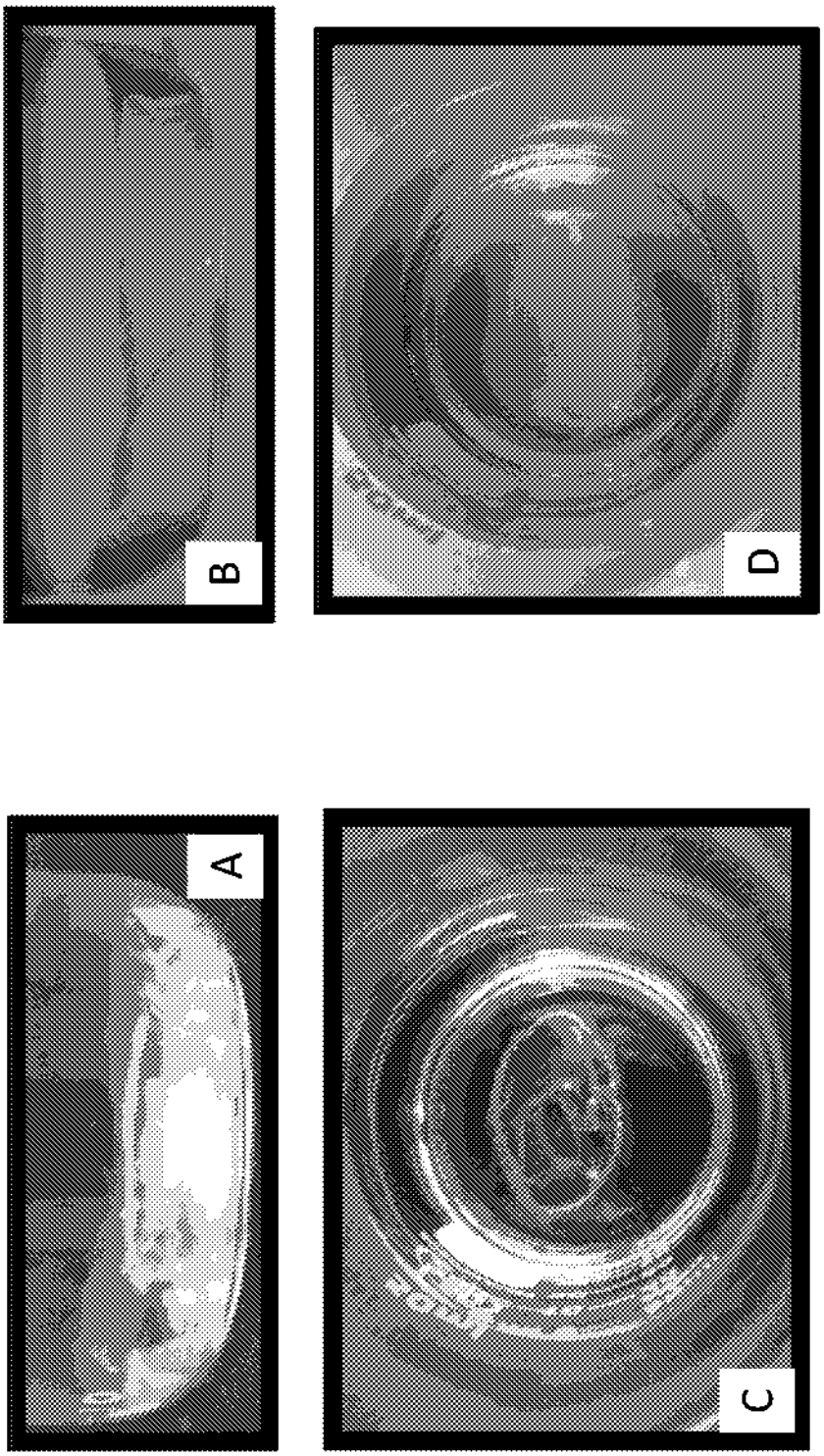
Figs. 49A-49D



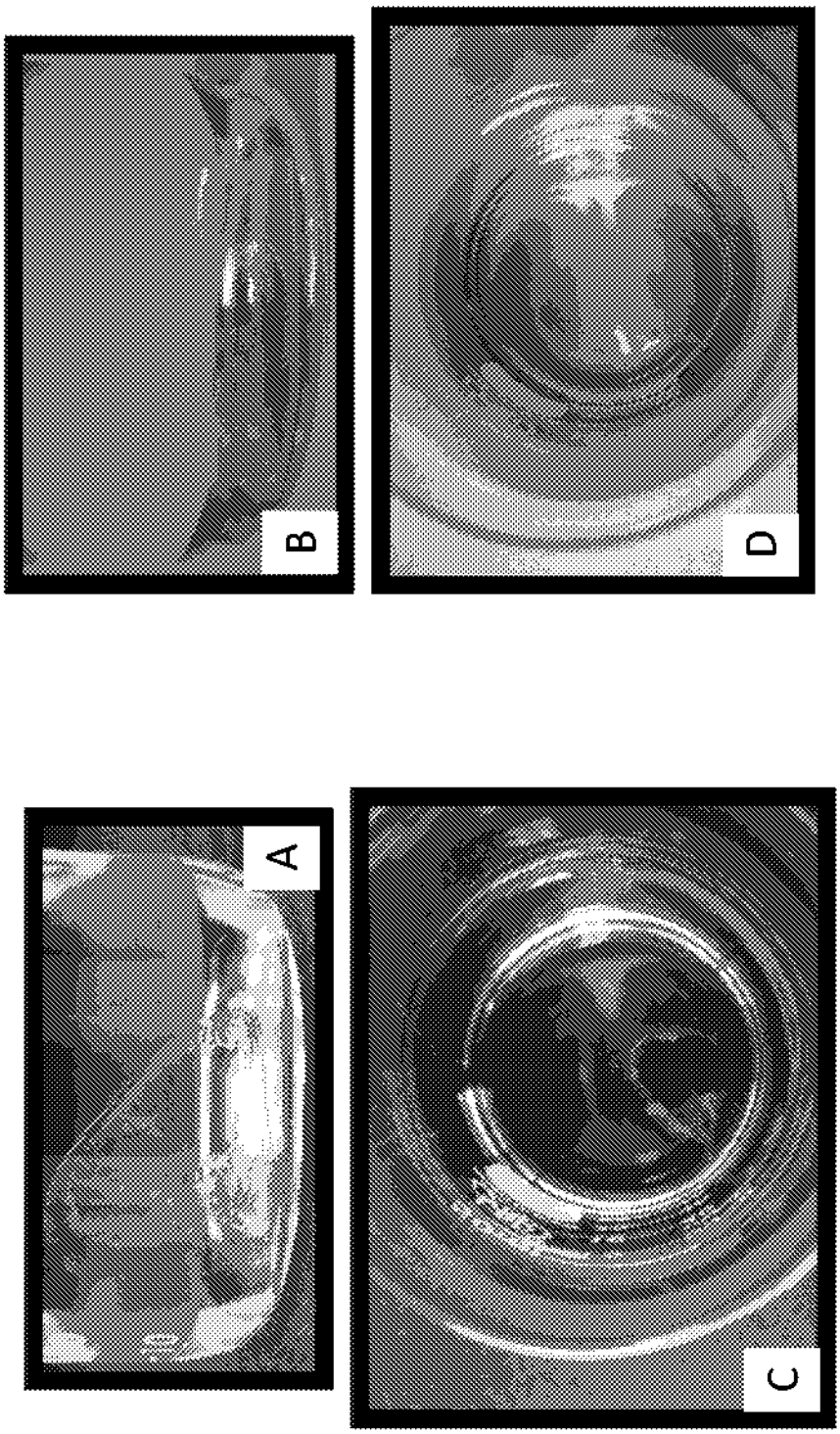
Figs. 50A-50D



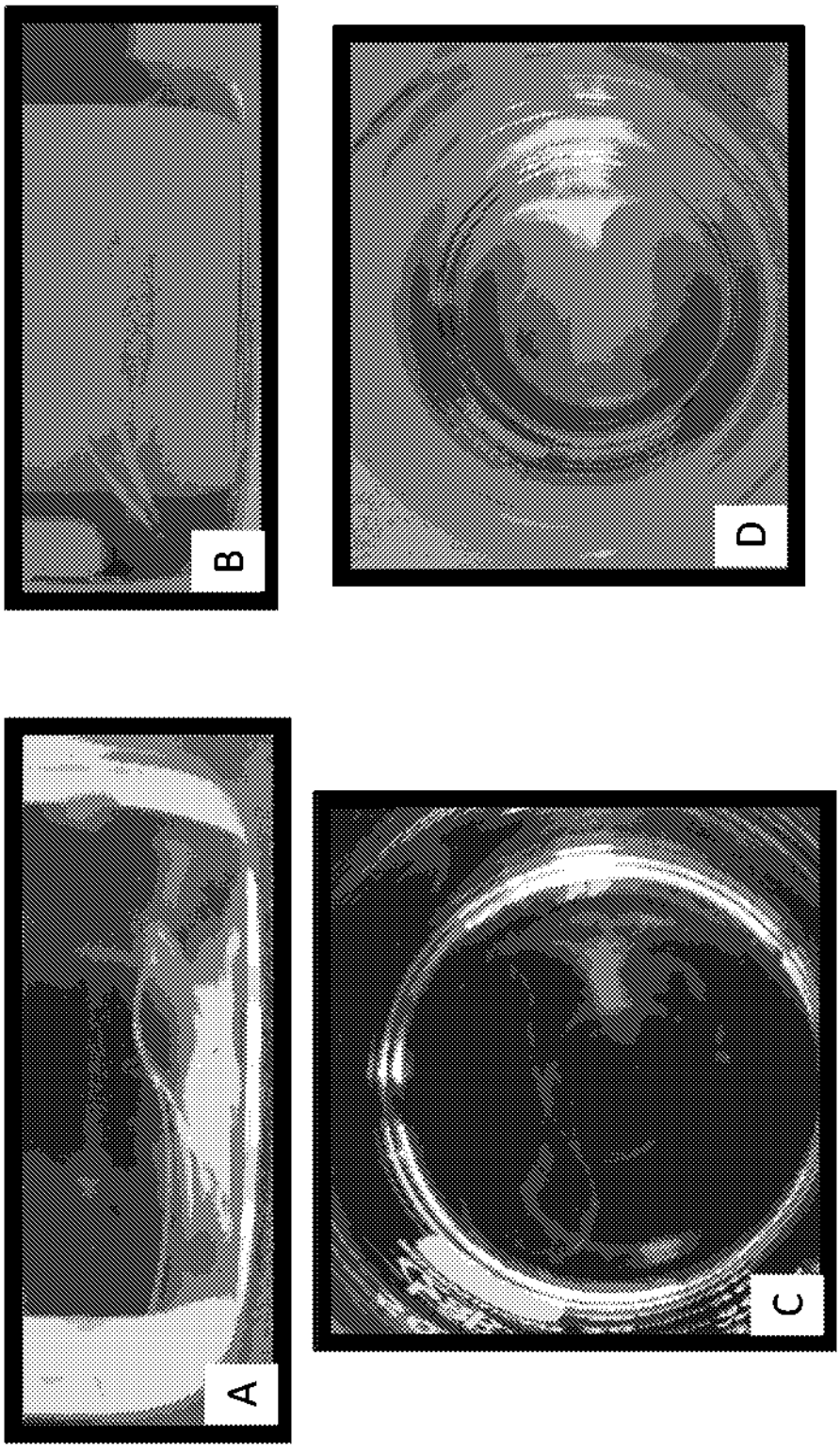
Figs. 51A-51D



Figs. 52A-52D



Figs. 53A-53D



Figs. 54A-54D

Lithium Bromide and Sodium Carbonate Concentration in Silk Protein Solution

Sample ID	Sample Description	Average Concentration of Na2CO3 (ppm)	Average Concentration of LiBr (ppm)
A	TFF 5kDa	32.13	90.85
B	TFF 10 kDa	42.91	107
C	TFF 10 kDa	49.06	78.55
D	STI 1(TFF-10-0019)	2.17	129.07
E	STI 2(TFF-10-0033)	2.63	196.2
F	STI 3(TFF-10-0034)	4.18	248.93

Method: 100C extraction for 60 min, 60C rinse, 100C LiBr in 100C oven for 60 min. Note that TFF could be run for longer and/or at different flow rates (as varied between A-C and D-F) to alter ppm of Na2CO3 and LiBr.

Fig. 55

Sodium Carbonate in Silk Protein Formulations

Sample ID	Details	Sample Weight (mg)	Conc. of Na_2CO_3 in Original Film Average (mg/Film)	Std. Dev	Error %
A	Blank Film	ND	NA	NA	NA
B	1:1 film	30.1	0.0141	0.0008	5.55%
C	5:1 film	17.3	0.0127	0.0006	4.69%

Method: 100C extraction for 20 min, RT rinse, LiBr in 60C oven for 4-6 hours.
2% silk films air dried at RT

Fig. 56

Lithium Bromide in Silk Protein Formulations

Sample ID	Details	Sample Weight (mg)	Conc. of LiBr in Original Film	Std. Dev	Error %
			Average (mg/Film)		
A	Blank Film	ND	NA	NA	NA
B	1:1 film	30.1	0.0363	0.0042	11.47%
C	5:1 film	17.3	0.0259	0.0005	1.82%

Method: 100C extraction for 20 min, RT rinse, LiBr in 60C oven for 4-6 hours.
2% silk films air dried at RT

Fig. 57

Lithium Bromide and Sodium Carbonate content in Silk Protein Solution

Sample ID	Solution Volume Equivalent to (X) Films	Sample Weight (mg)	Concentration	
			Na2CO3	LiBr
1	6	0.171	ND	ND
2	8	0.228	ND	ND
3	10	0.285	ND	ND
4	12	0.342	ND	ND
5	Neat	-	ND	ND

*ND=None Detected

Method: 100C boil for 60 min, 60C rinse, LiBr in 60C oven for 4-6 hours

Fig. 58

Vitamin C in Silk Protein Formulations

Sample ID	Description (Silk:Vit C)	Sample Weight (mg)	Conc. of Vitamin C Average (mg/Film)	Std. Dev	Error %
A	Blank Film	4.2	0	0	0.00%
B1	1:1 film	7.8	3.0974	0.0538	1.74%
B2	1:1 film	7.7	3.2534	0.0312	0.96%
C1	5:1 film	4.9	0.6194	0.0096	1.54%
C2	5:1 film	4.9	0.6454	0.0061	0.94%

Method: 100C extraction for 20 min, RT rinse, LiBr in 60C oven for 4-6 hours.
2% silk films air dried at RT

Fig. 59

Stability of Vitamin C in Solution

Sample ID	Time (hour)	Actual Conc. (µg /mL)	Area	Concentration Vit C (µg /mL)	Recovered (%)	Stability (%) After 24 hrs.
A	0	82.4	4277.9	80.53	97.73	
B	26	82.4	4088.94	77.62	94.2	
Average =			4183.42	79.07	95.96	96.39
Std. Dev. =			133.62	2.06	2.49	
% Error			3%	3%	3%	

Method: Vitamin C solution (no silk)

Fig. 60

Molecular Weights of Silk Protein Solutions

Sample ID	Sample Description	Mn	Mw	Polydispersity (PD) (Mw/Mn)
A	TFF 5kDa	14,497	33,874	2.3366
B	TFF 10 kDa	14,542	33,455	2.3006
C	TFF 10 kDa	14,972	34,026	2.2726
D	Silk protein solution in water	12,055	26,531	2.2008

Method:
TFF: 100C extraction for 60 min, 60C rinse, 100C LiBr in 100C oven for 60 min.
Silk Protein: 100C extraction for 20 min, RT rinse, LiBr in 60C oven for 4-6 hours

Fig. 61

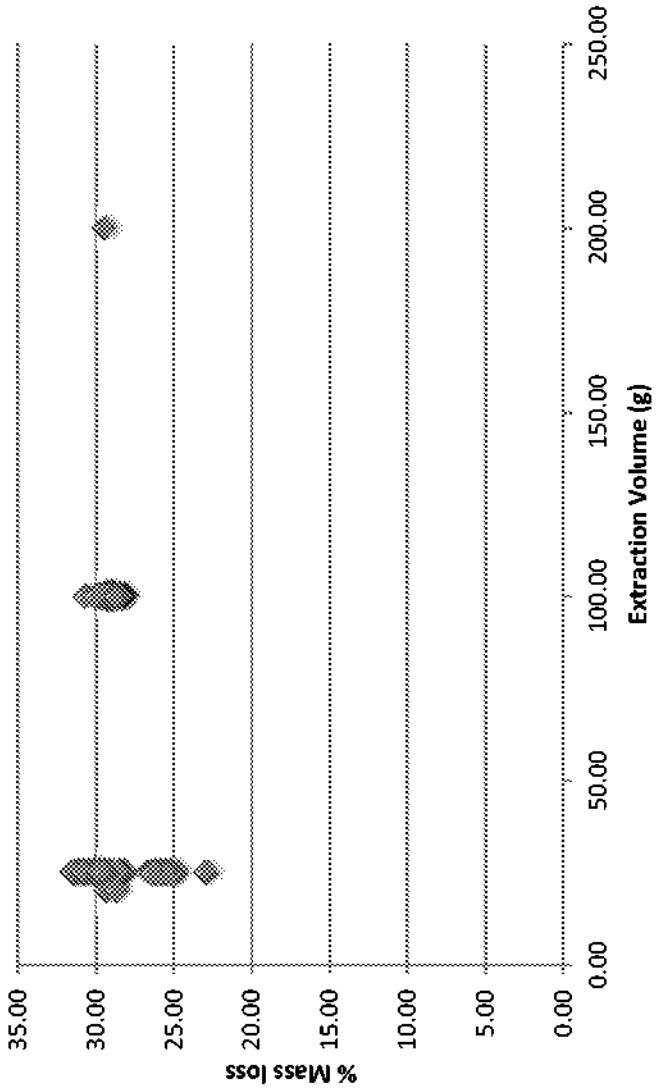


Fig. 62A

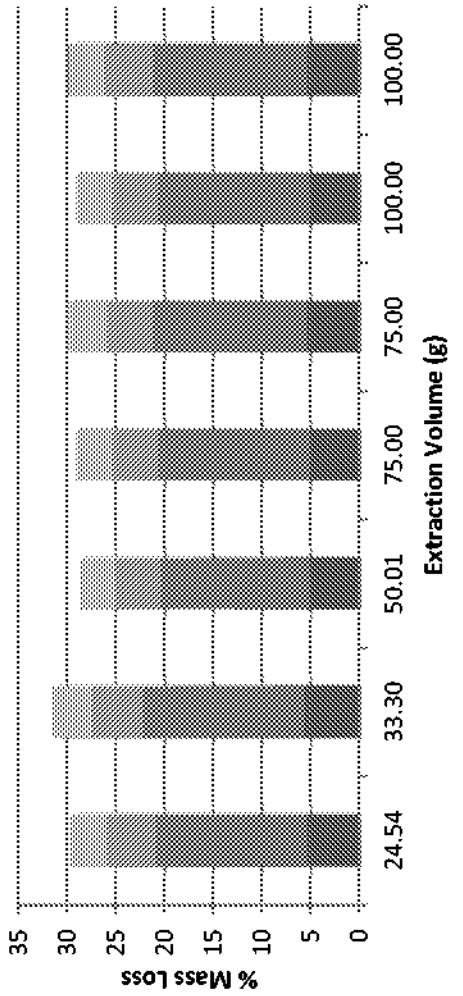


Fig. 62B

Sample	LiBr (M)	Avg MW	PD
STI 1(TFF-10-0019)	9.3	15727	2.033
STI 2(TFF-10-0033)	9.3	24587	2.3669
STI 3(TFF-10-0034)	9.3	25273	2.338
STI 9.3 M avg		21862	2.25
STI 1(TFF-10-0031)	~7.5	29645	3.0868
STI 2(TFF-10-0030)	~7.5	26856	2.9748
STI 7.5M avg		28250.5	3.0308

* TFF-10-0019 from 2 25g extraction/35g dissolution
* TFF-10-0034 from 100g extraction/ 17-35 g dissolution
* TFF-10-0033 from 100g extraction/ 100 g dissolution

Fig. 63

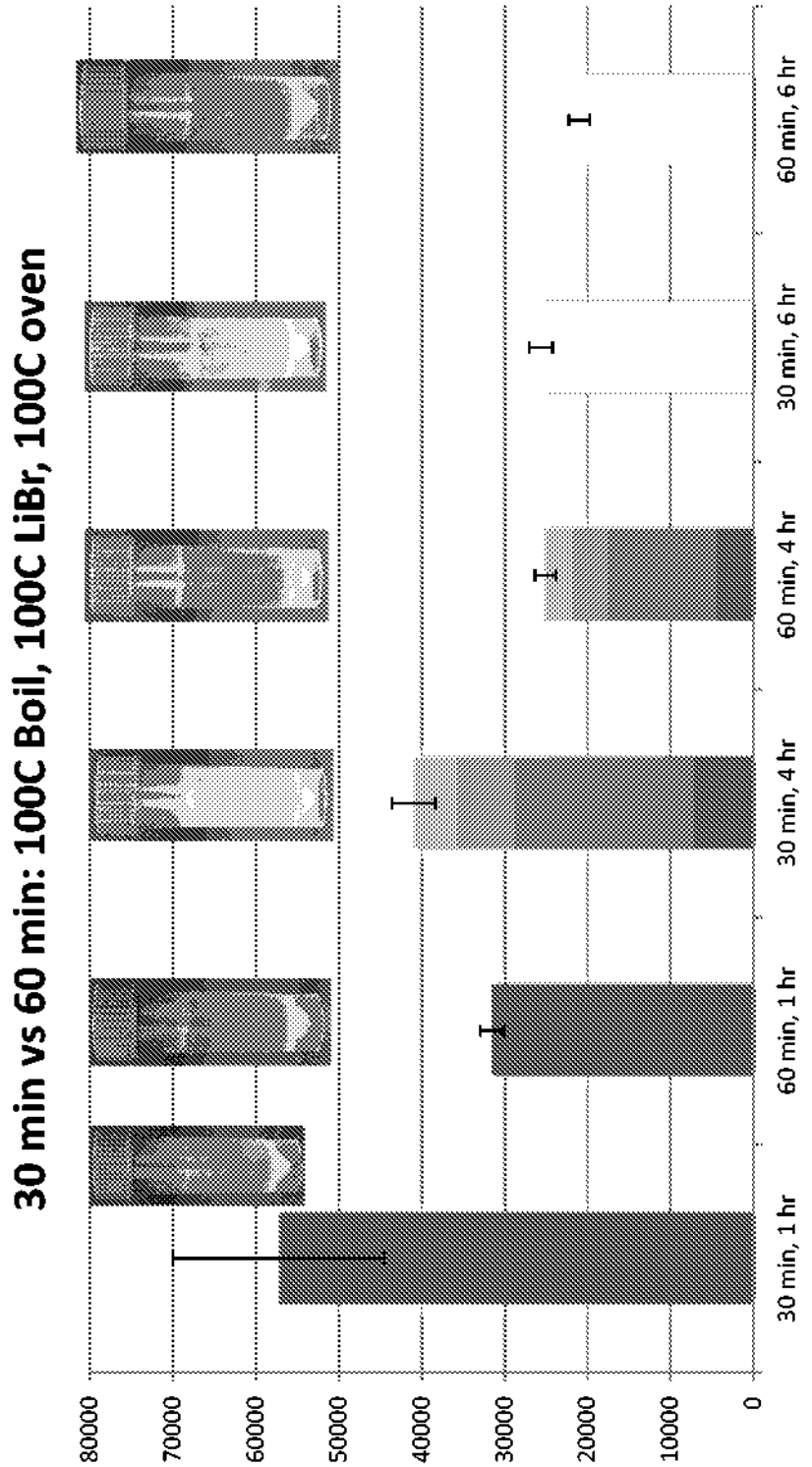

30 min vs 60 min: 100C Boil, 100C LiBr, 100C oven
80000
70000
60000
50000
40000
30000
20000
10000
0
30 min, 1 hr
60 min, 1 hr
30 min, 4 hr
60 min, 4 hr
30 min, 6 hr
60 min, 6 hr

Fig. 64

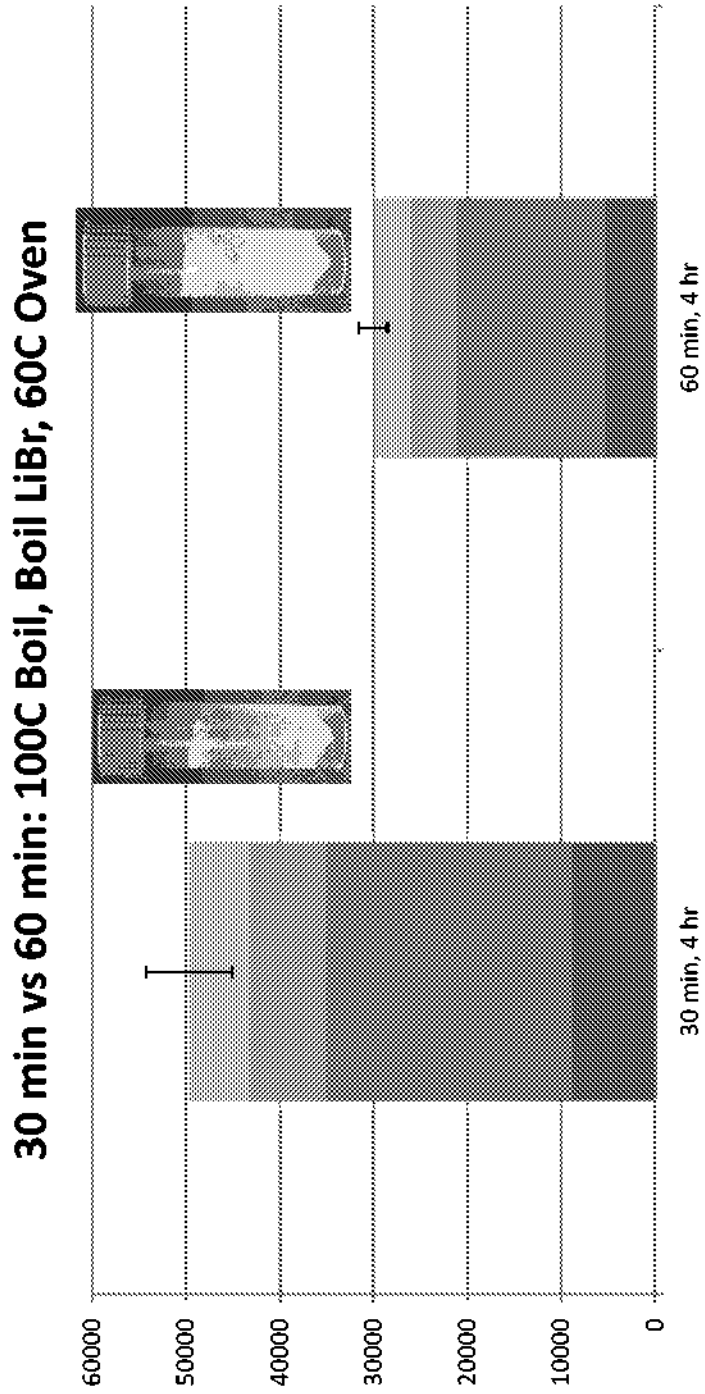

30 min vs 60 min: 100C Boil, Boil LiBr, 60C Oven
60000
50000
40000
30000
20000
10000
0
30 min, 4 hr
60 min, 4 hr

Fig. 65

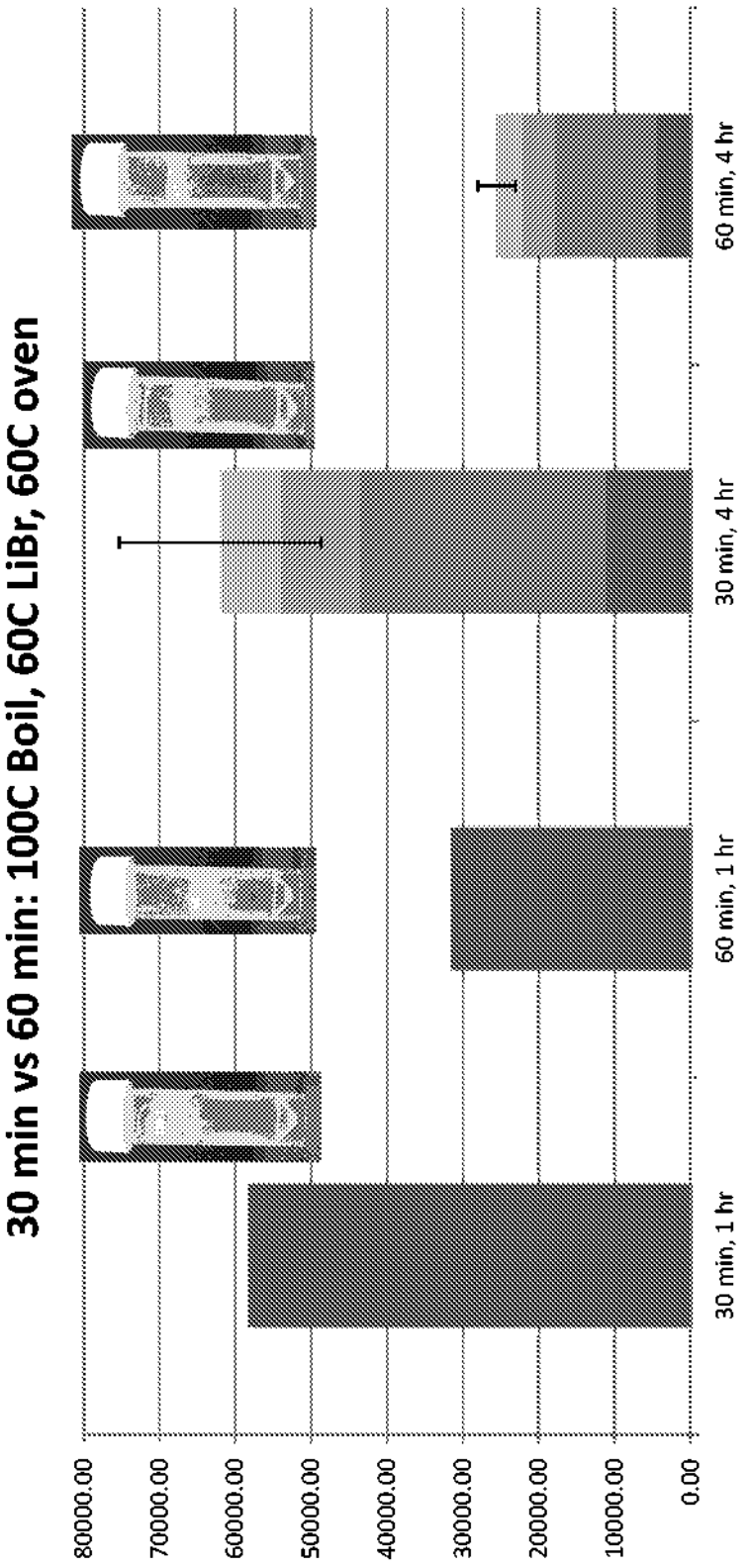

30 min vs 60 min: 100C Boil, 60C LiBr, 60C oven
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
30 min, 1 hr
60 min, 1 hr
30 min, 4 hr
60 min, 4 hr

Fig. 66

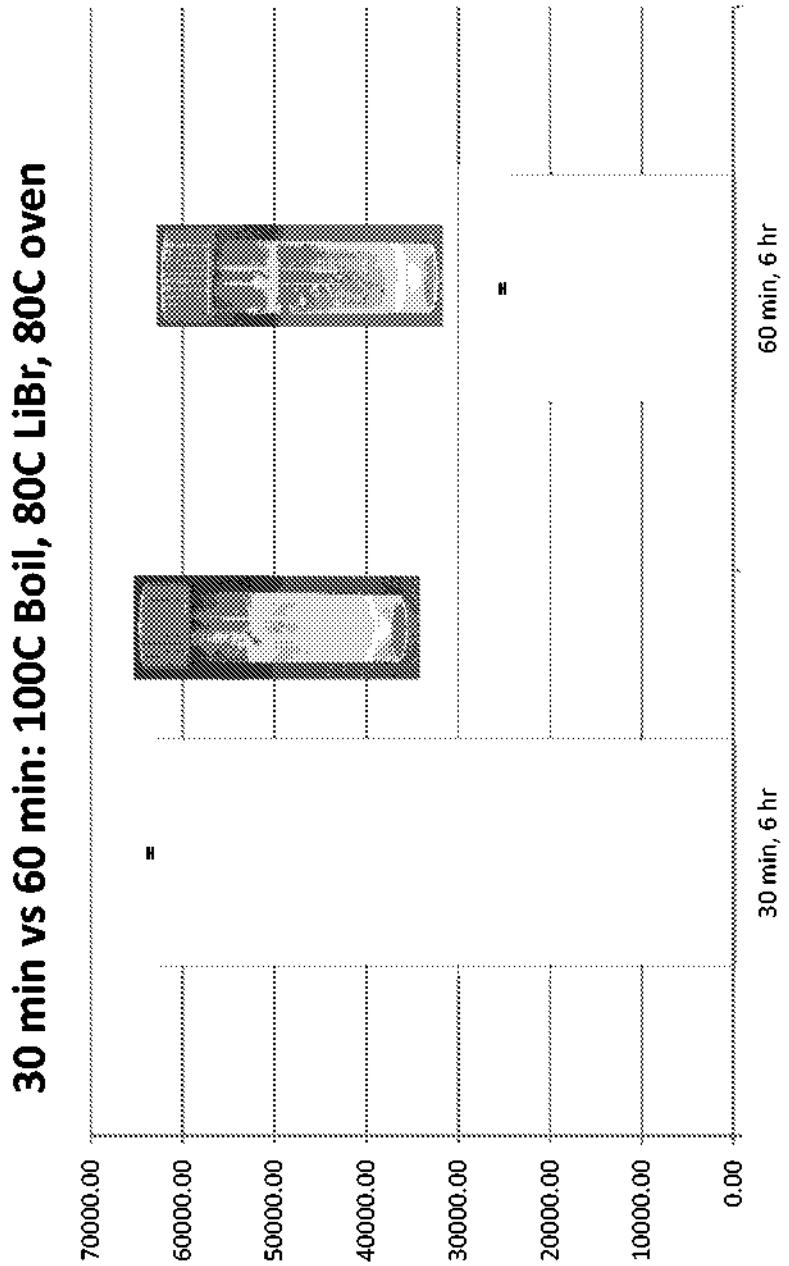

30 min vs 60 min: 100C Boil, 80C LiBr, 80C oven
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
30 min, 6 hr
60 min, 6 hr

Fig. 67

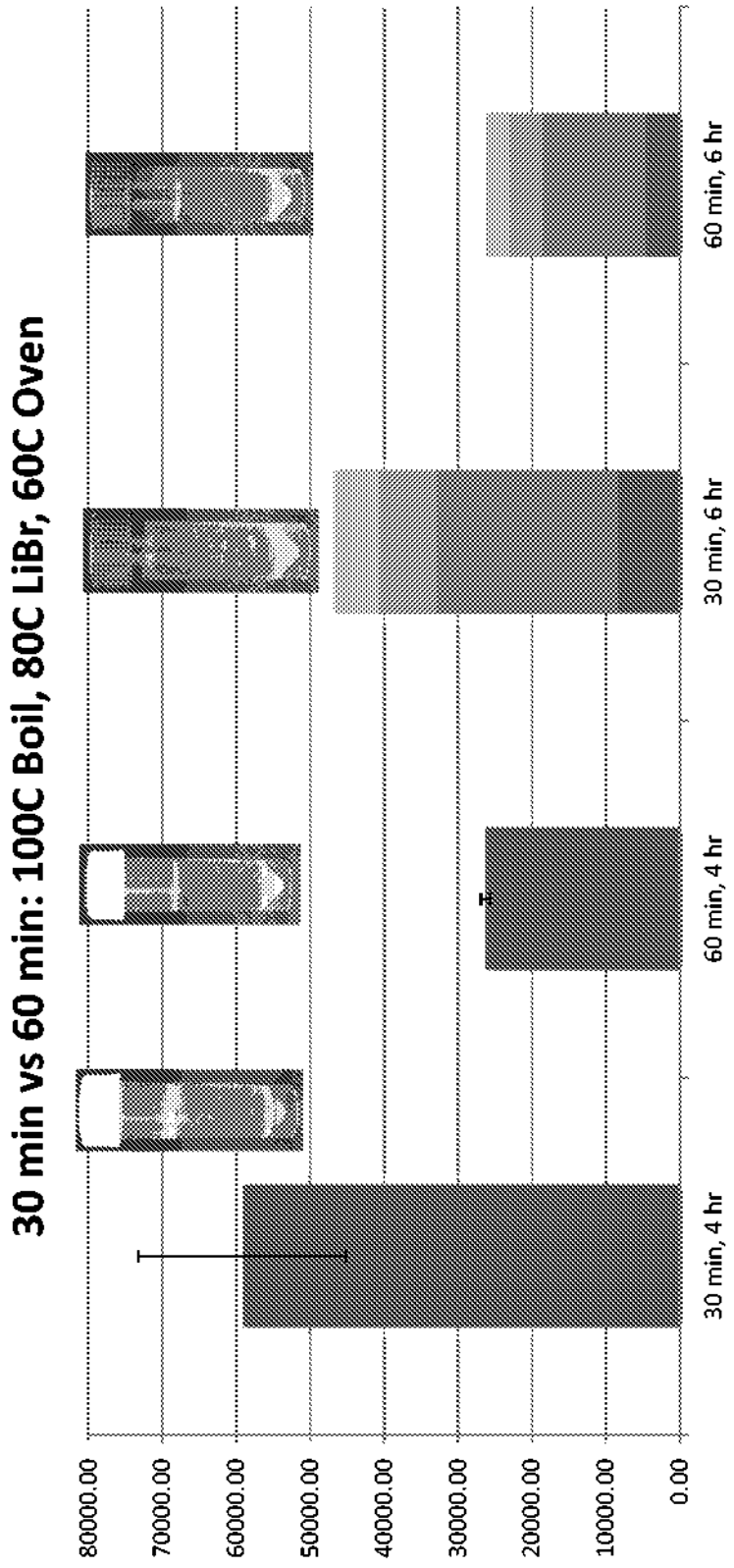

30 min vs 60 min: 100C Boil, 80C LiBr, 60C Oven
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
30 min, 4 hr
60 min, 4 hr
30 min, 6 hr
60 min, 6 hr

Fig. 68

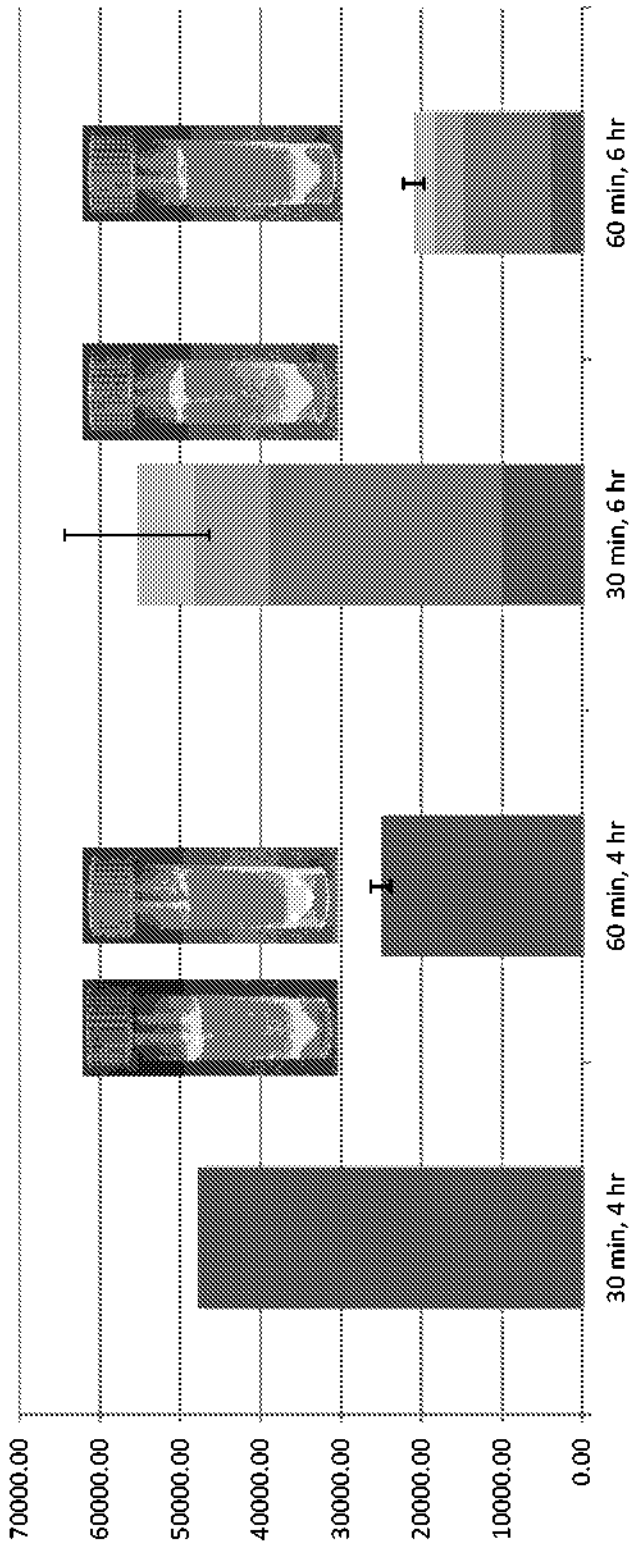

30 min vs 60 min: 100C Boil, 100C LiBr, 60C Oven
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
30 min, 4 hr
60 min, 4 hr
30 min, 6 hr
60 min, 6 hr

Fig. 69

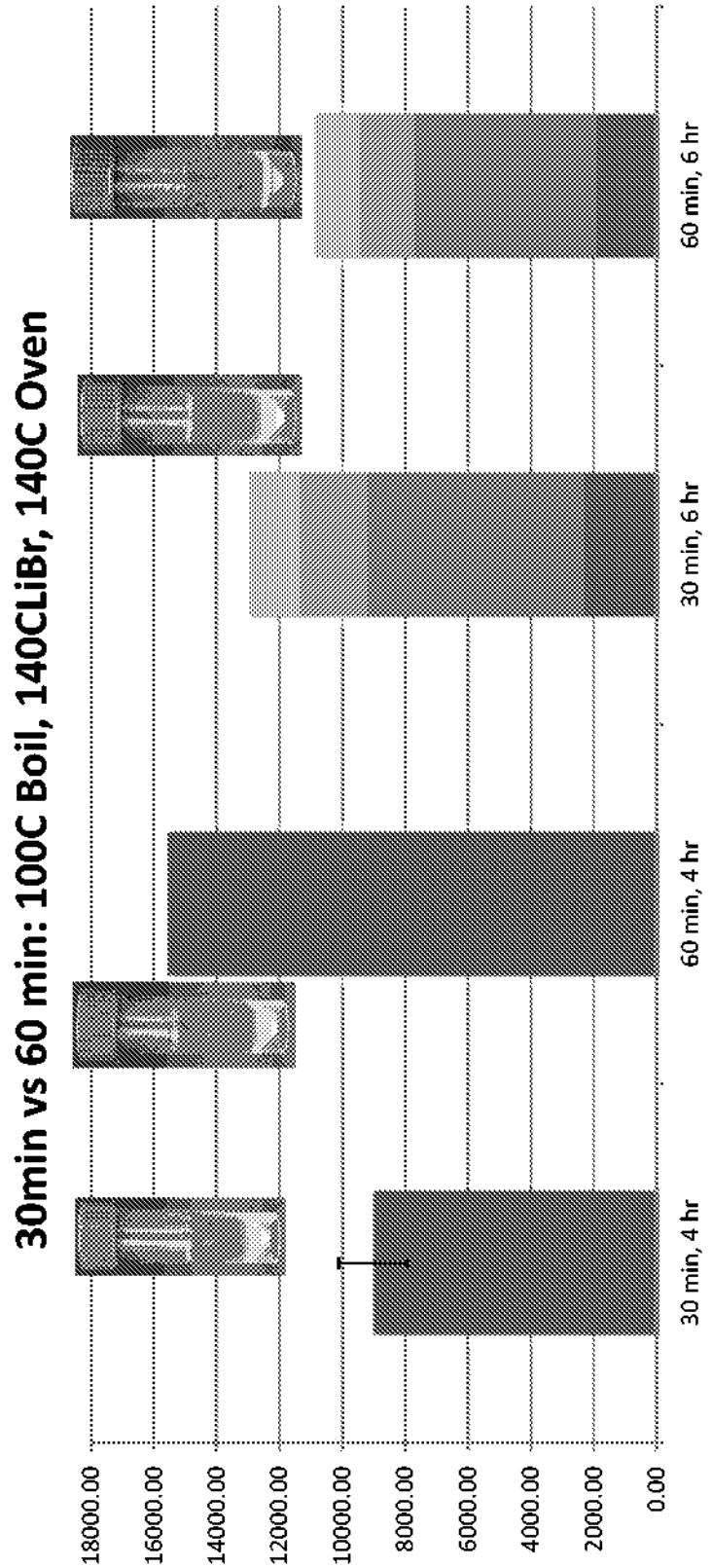

30min vs 60 min: 100C Boil, 140CLiBr, 140C Oven
18000.00
16000.00
14000.00
12000.00
10000.00
8000.00
6000.00
4000.00
2000.00
0.00
30 min, 4 hr
60 min, 4 hr
30 min, 6 hr
60 min, 6 hr

Fig. 70

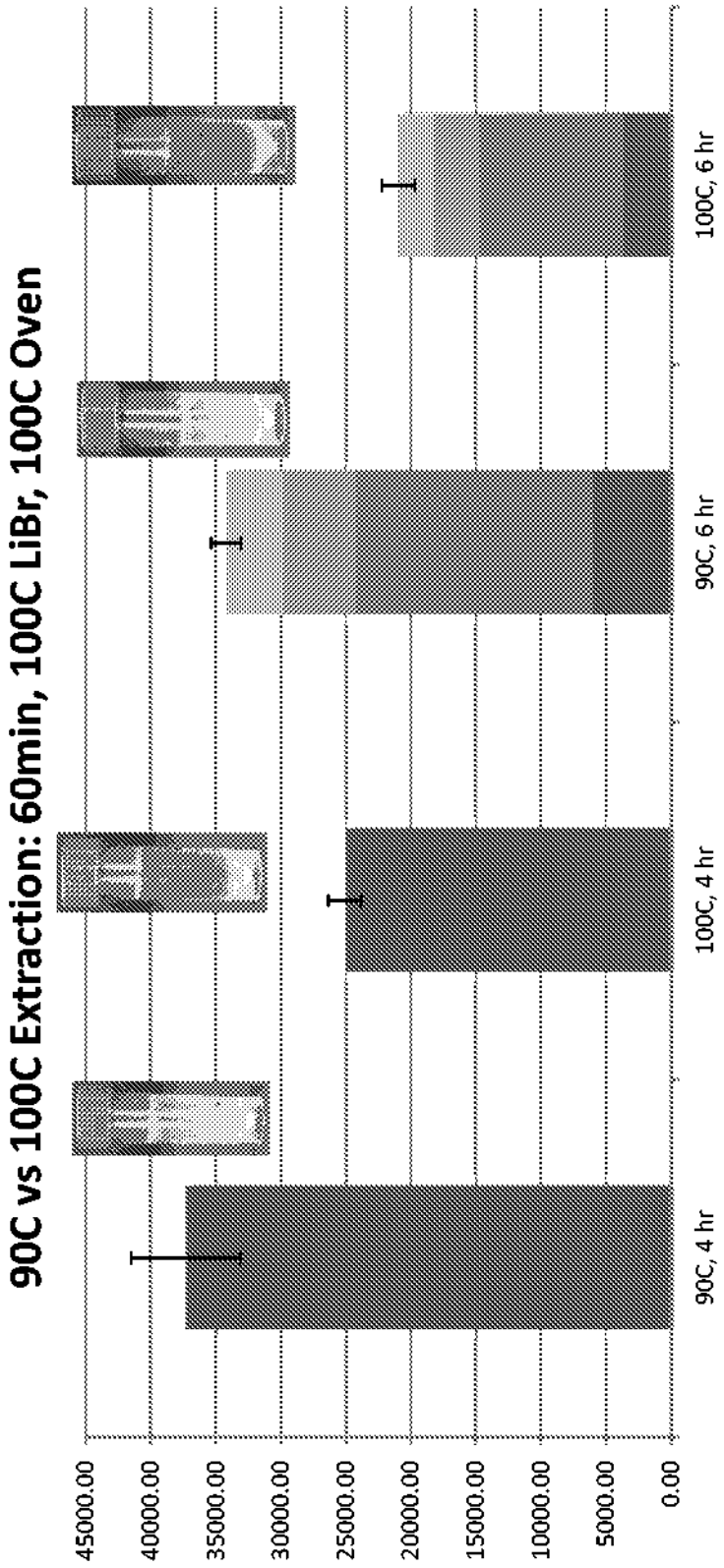

90C vs 100C Extraction: 60min, 100C LiBr, 100C Oven
45000.00
40000.00
35000.00
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
90C, 4 hr
100C, 4 hr
90C, 6 hr
100C, 6 hr

Fig. 71

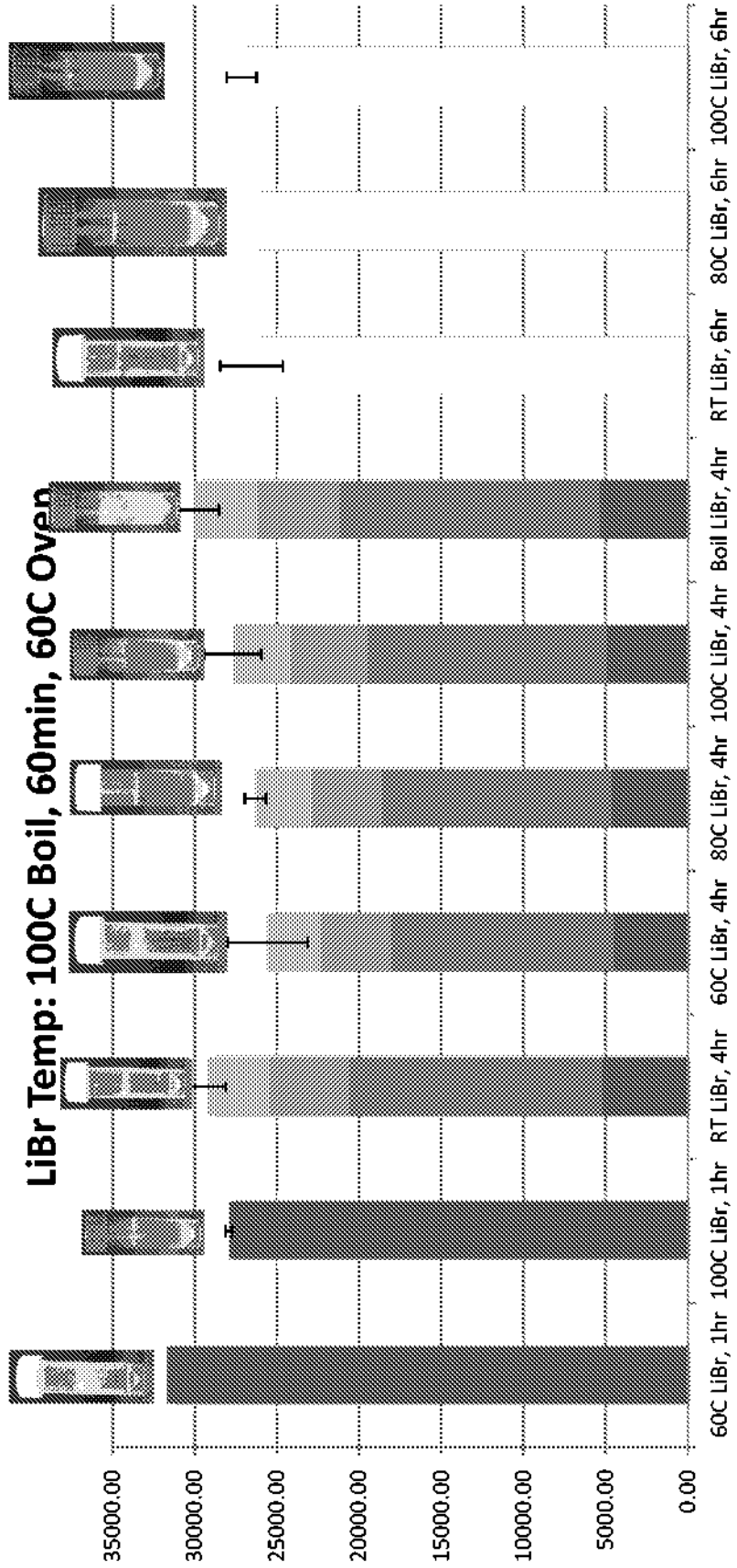

LiBr Temp: 100C Boil, 60min, 60C Oven
35000.00
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
60C LiBr, 1hr
100C LiBr, 1hr
RT LiBr, 4hr
60C LiBr, 4hr
80C LiBr, 4hr
100C LiBr, 4hr
Boil LiBr, 4hr
RT LiBr, 6hr
80C LiBr, 6hr
100C LiBr, 6hr

Fig. 72

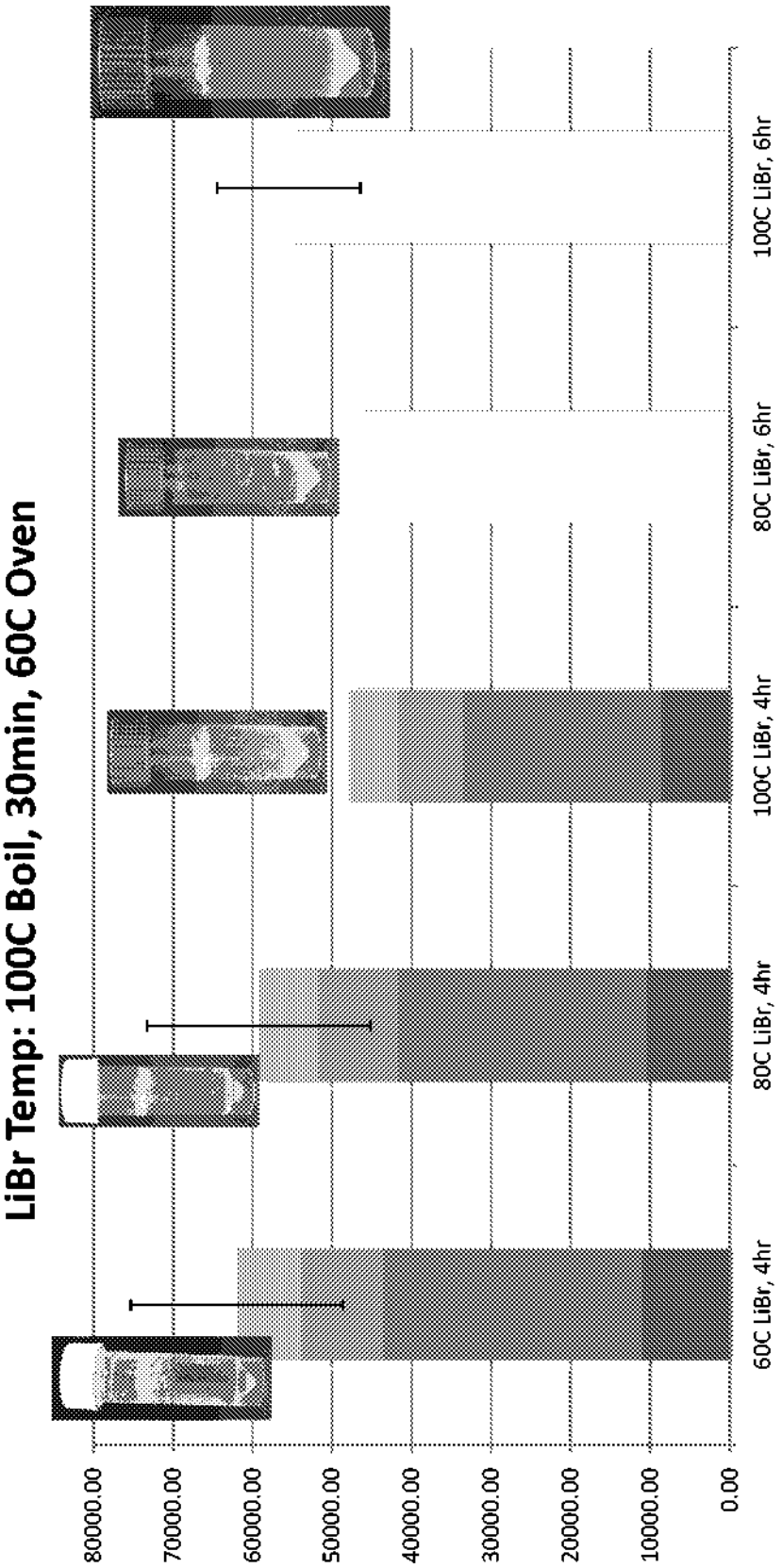

LiBr Temp: 100C Boil, 30min, 60C Oven
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
60C LiBr, 4hr
80C LiBr, 4hr
100C LiBr, 4hr
80C LiBr, 6hr
100C LiBr, 6hr

Fig. 73

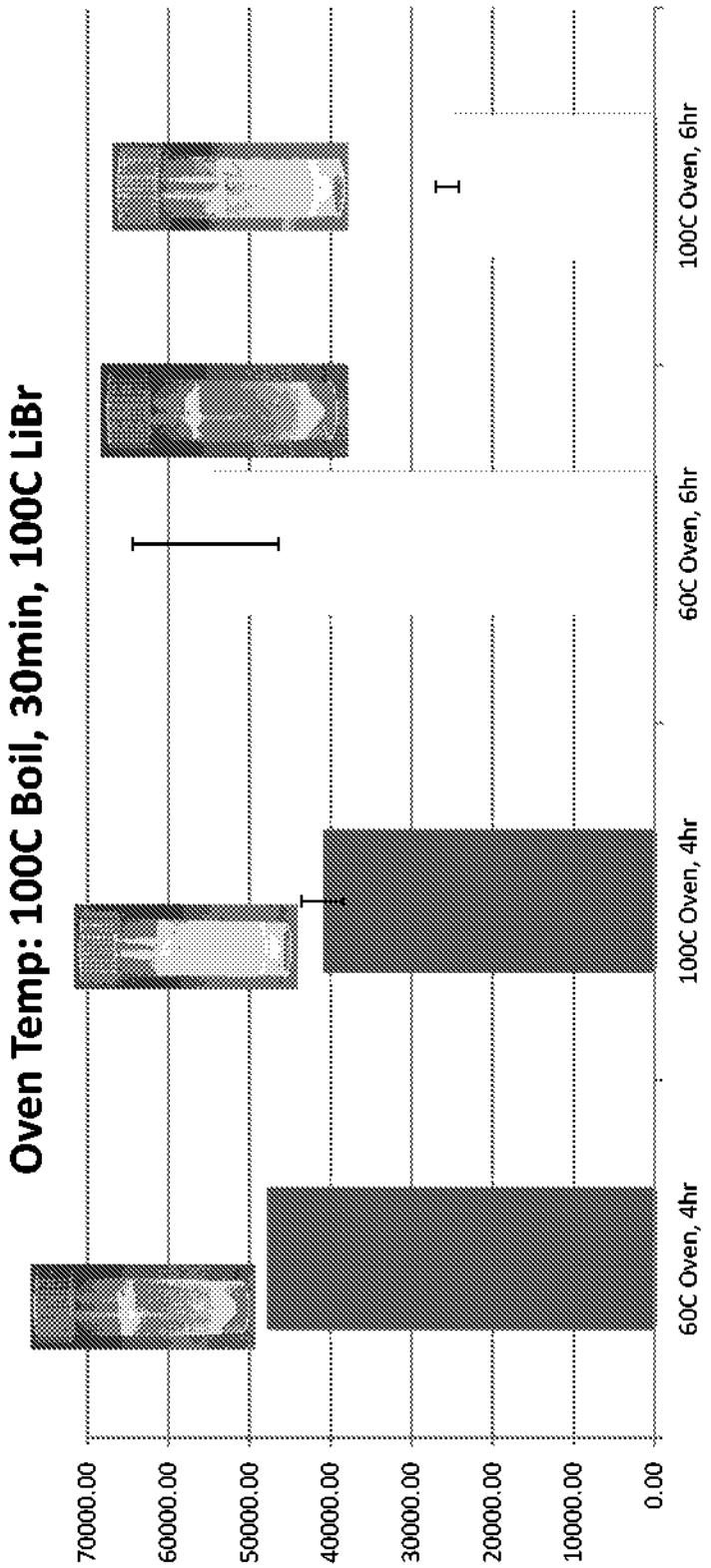

Oven Temp: 100C Boil, 30min, 100C LiBr
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
60C Oven, 4hr
100C Oven, 4hr
60C Oven, 6hr
100C Oven, 6hr

Fig. 74

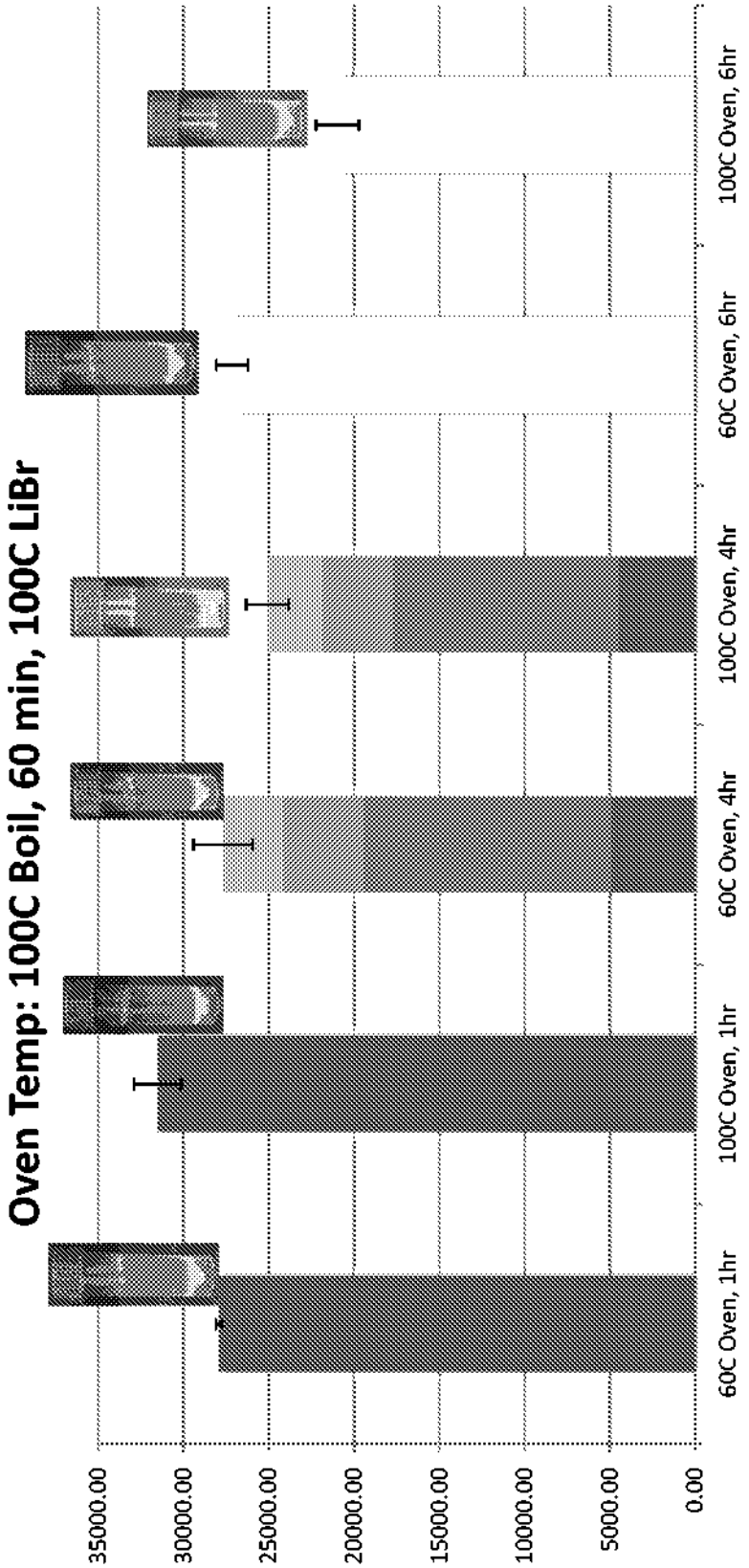

Oven Temp: 100C Boil, 60 min, 100C LiBr
35000.00
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
60C Oven, 1hr
100C Oven, 1hr
60C Oven, 4hr
100C Oven, 4hr
60C Oven, 6hr
100C Oven, 6hr

Fig. 75

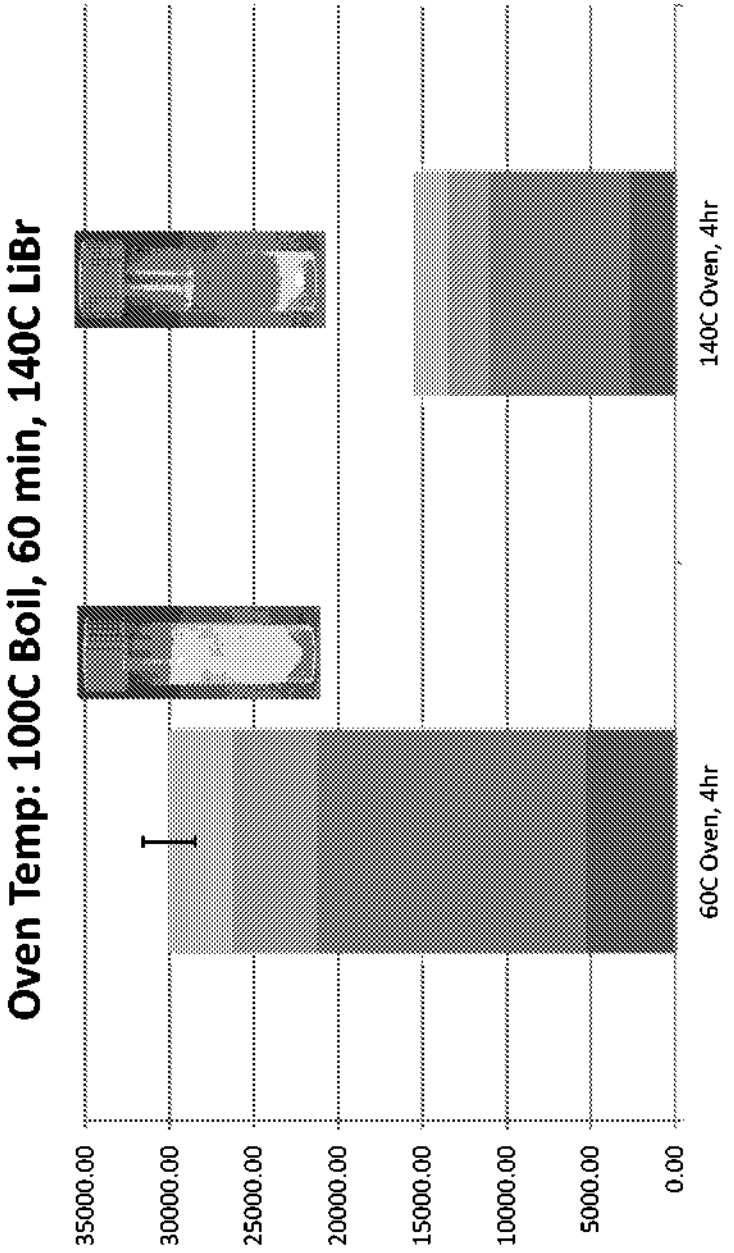

Oven Temp: 100C Boil, 60 min, 140C LiBr
35000.00
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
60C Oven, 4hr
140C Oven, 4hr

Fig. 76

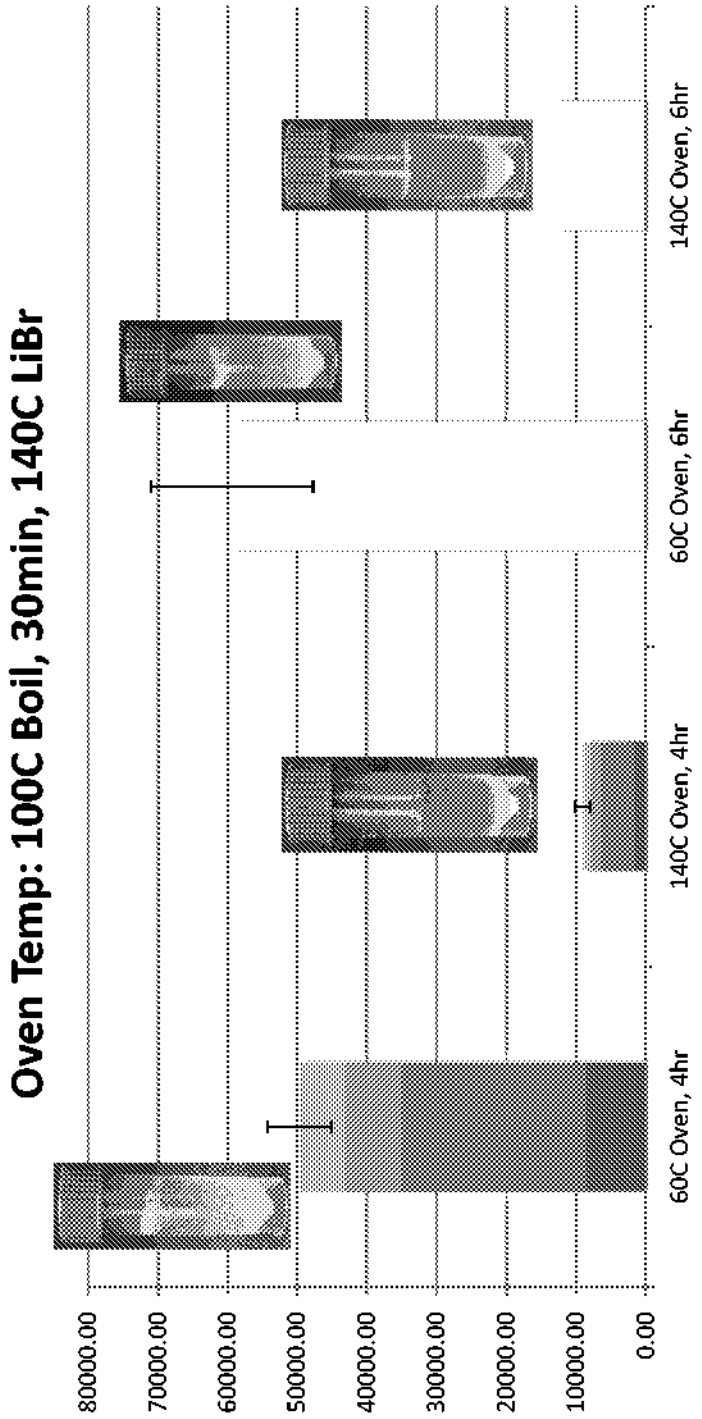

Oven Temp: 100C Boil, 30min, 140C LiBr
80000.00
70000.00
60000.00
50000.00
40000.00
30000.00
20000.00
10000.00
0.00
60C Oven, 4hr
140C Oven, 4hr
60C Oven, 6hr
140C Oven, 6hr

Fig. 77

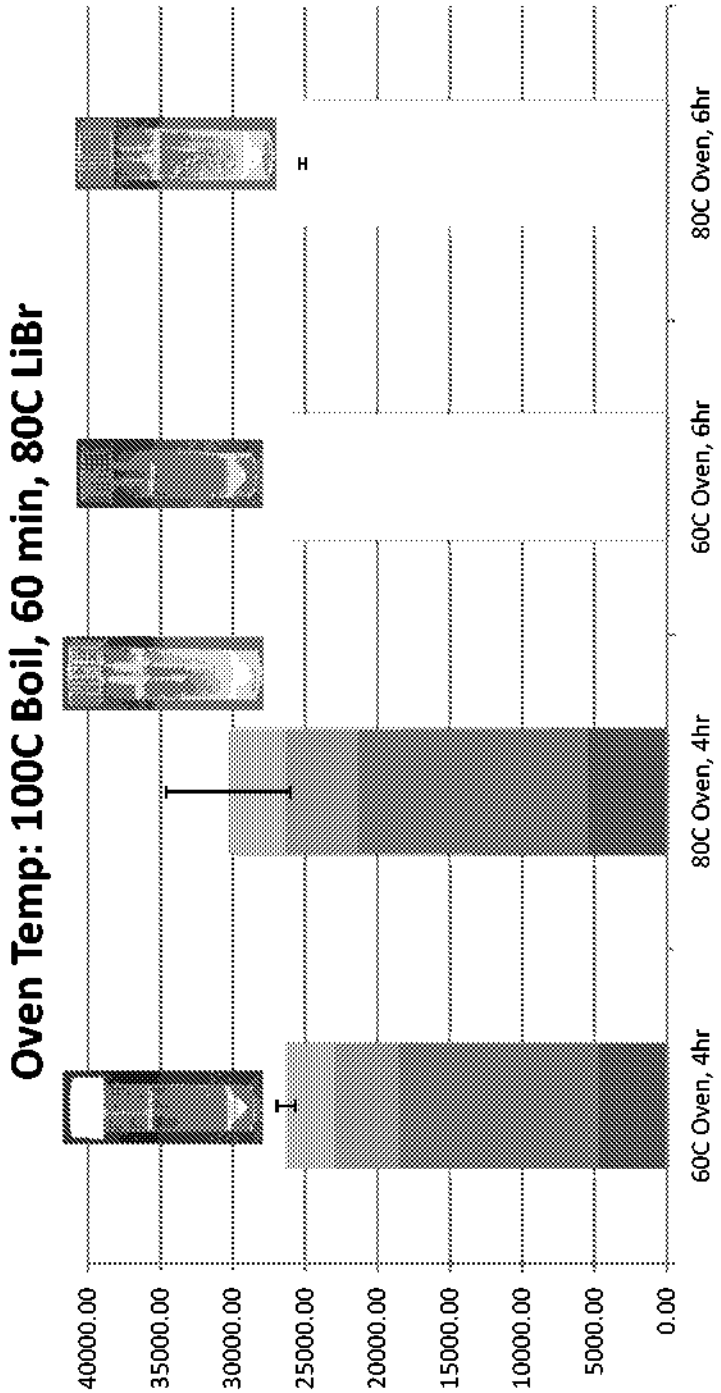

Oven Temp: 100C Boil, 60 min, 80C LiBr
40000.00
35000.00
30000.00
25000.00
20000.00
15000.00
10000.00
5000.00
0.00
60C Oven, 4hr
80C Oven, 4hr
60C Oven, 6hr
80C Oven, 6hr

Fig. 78

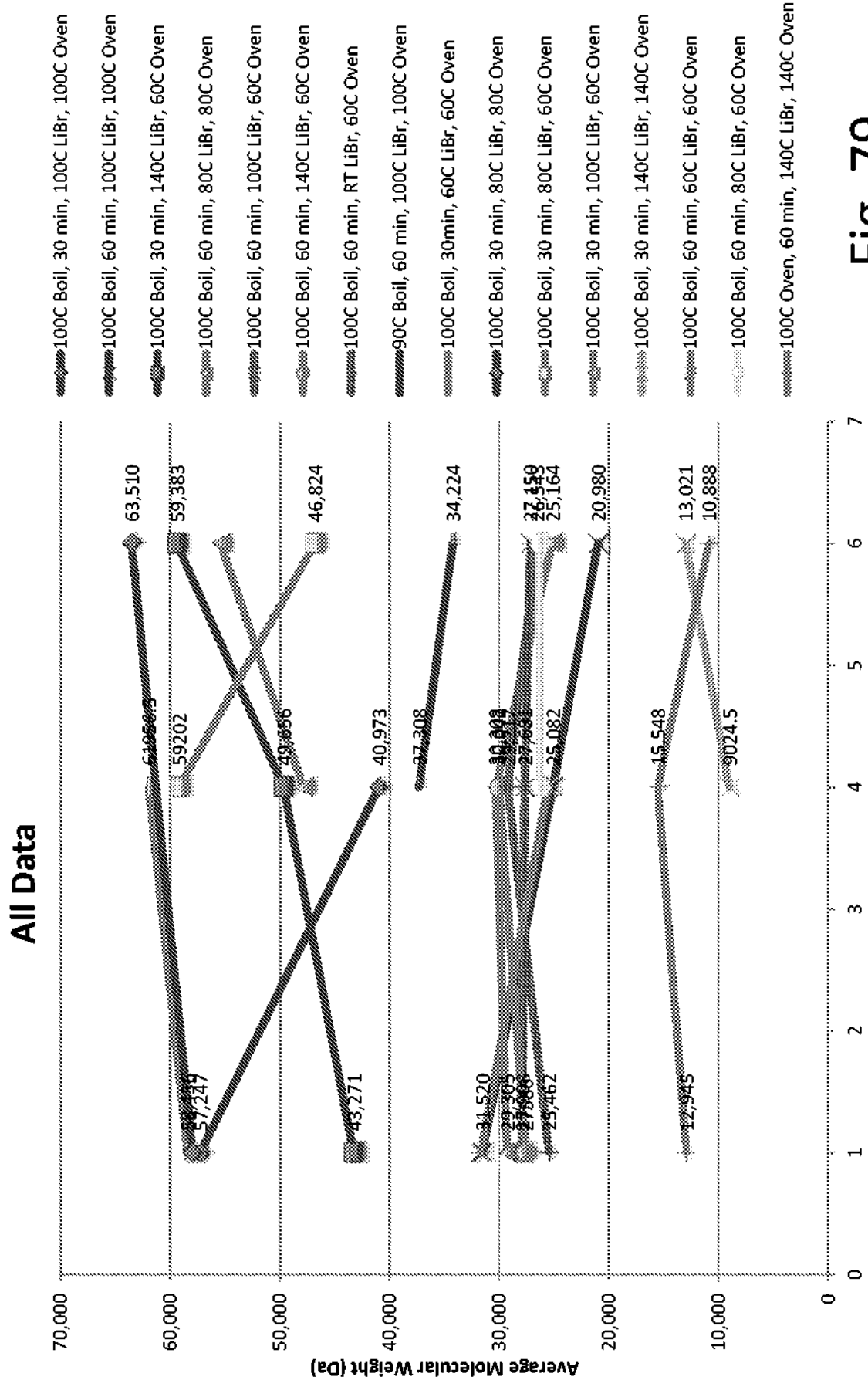

All Data
Average Molecular Weight (Da)
Time in Oven (hrs)
100C Boil, 30 min, 100C LiBr, 100C Oven
100C Boil, 60 min, 100C LiBr, 100C Oven
100C Boil, 30 min, 140C LiBr, 60C Oven
100C Boil, 60 min, 80C LiBr, 80C Oven
100C Boil, 60 min, 100C LiBr, 60C Oven
100C Boil, 60 min, 140C LiBr, 60C Oven
100C Boil, 60 min, RT LiBr, 60C Oven
90C Boil, 60 min, 100C LiBr, 100C Oven
100C Boil, 30min, 60C LiBr, 60C Oven
100C Boil, 30 min, 80C LiBr, 80C Oven
100C Boil, 30 min, 80C LiBr, 60C Oven
100C Boil, 30 min, 100C LiBr, 60C Oven
100C Boil, 30 min, 140C LiBr, 140C Oven
100C Boil, 60 min, 60C LiBr, 60C Oven
100C Boil, 60 min, 80C LiBr, 60C Oven
100C Oven, 60 min, 140C LiBr, 140C Oven
63,510
59,383
46,824
40,973
34,224
25,164
20,980
13,021
10,888
15,548
12,945
9024.5
25,462
25,082
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1
2
3
4
5
6
7

Fig. 79

Oven Temp=LiBr Temp Data: Round 2

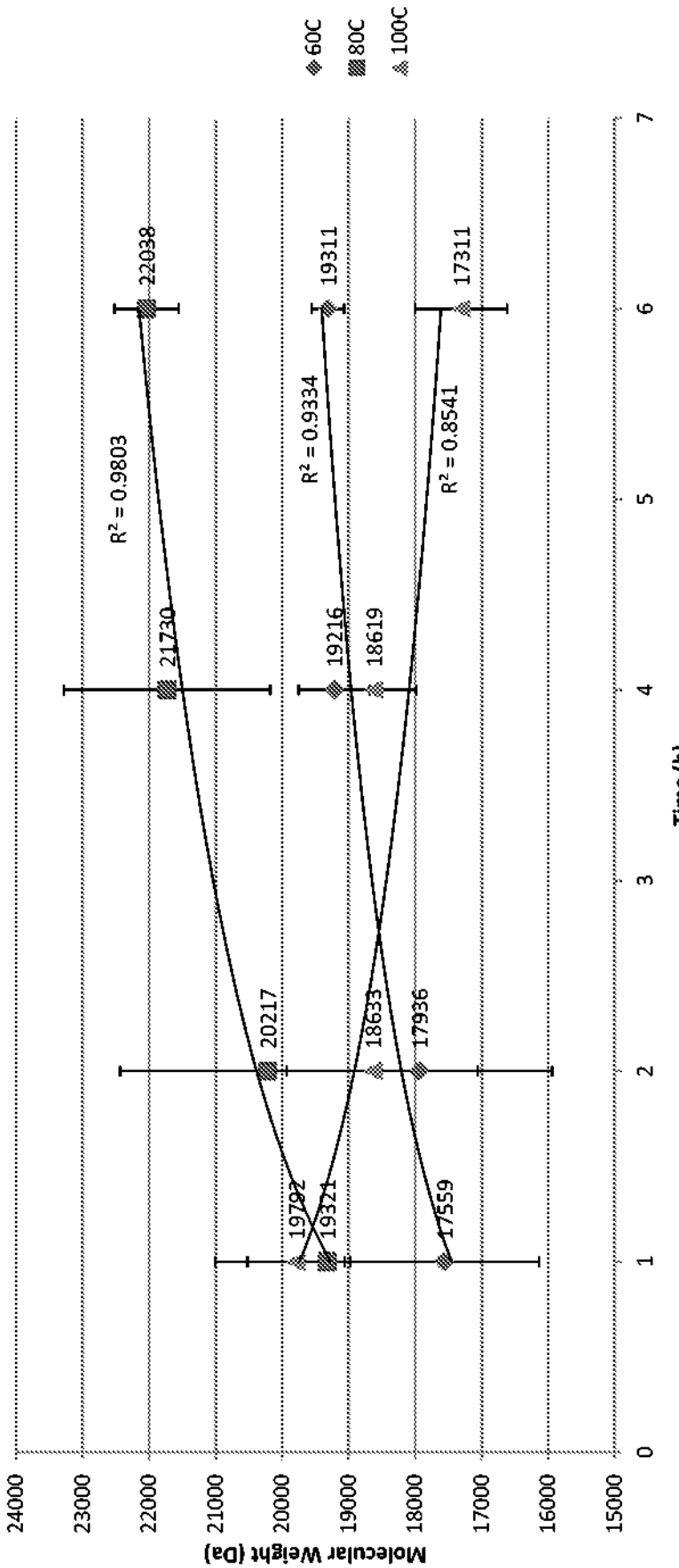


Fig. 80

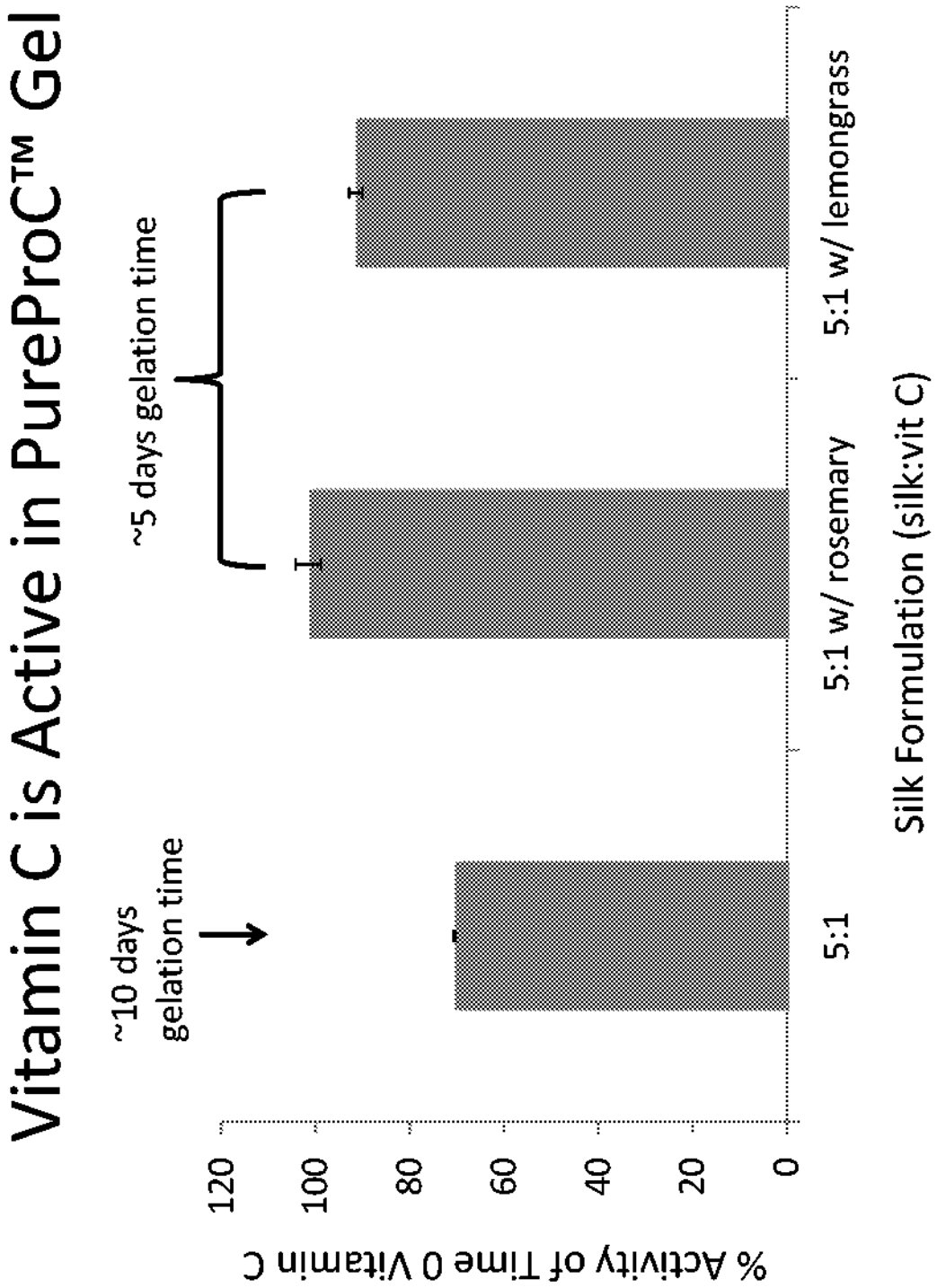
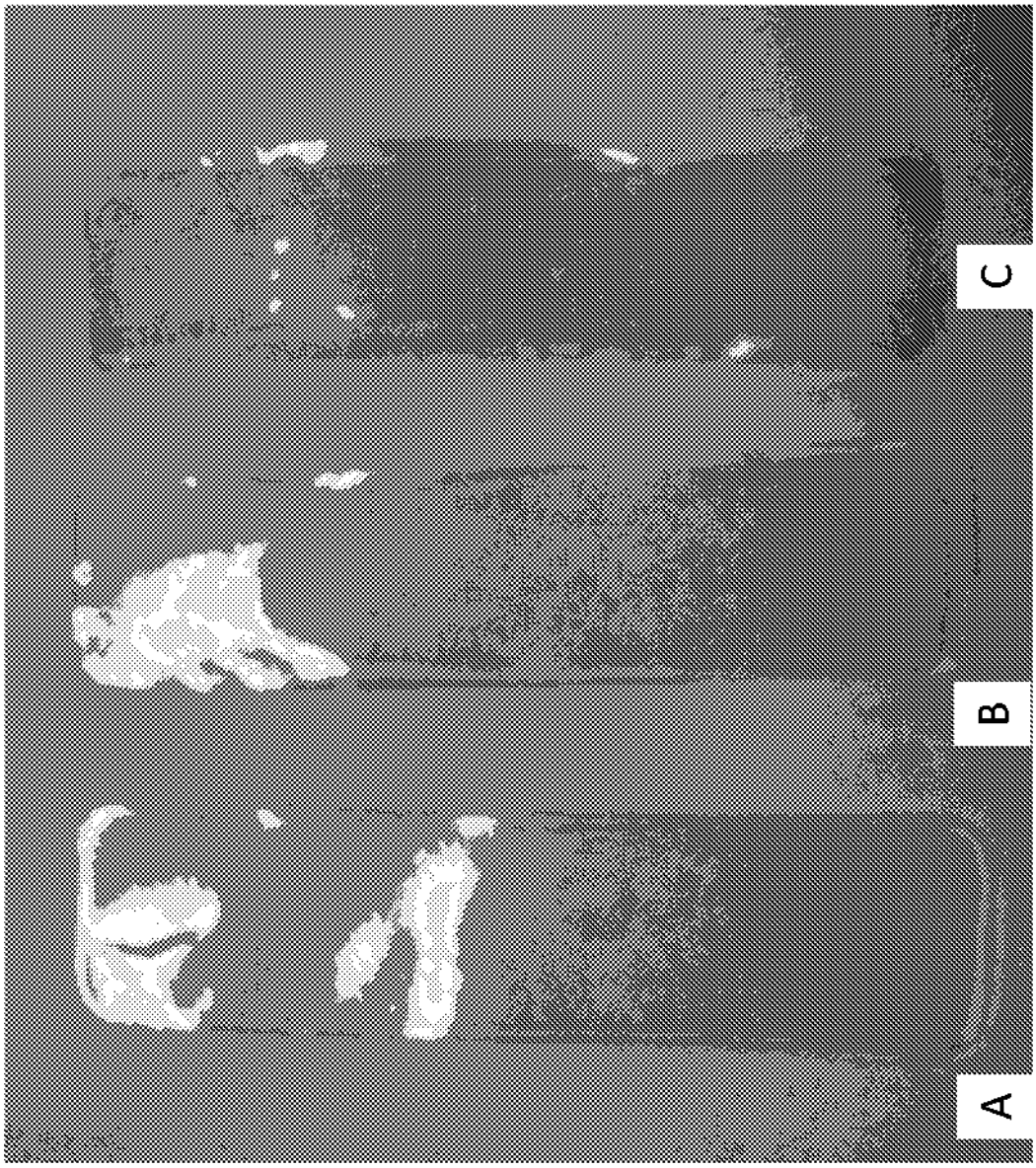

Vitamin C is Active in PureProC™ Gel
~10 days gelation time
~5 days gelation time
% Activity of Time 0 Vitamin C
120
100
80
60
40
20
0
5:1
5:1 w/ rosemary
5:1 w/ lemongrass
Silk Formulation (silk:vit C)

Fig. 81



Figs. 82A-82C

Laser Cutting for Efficiency and Shapes

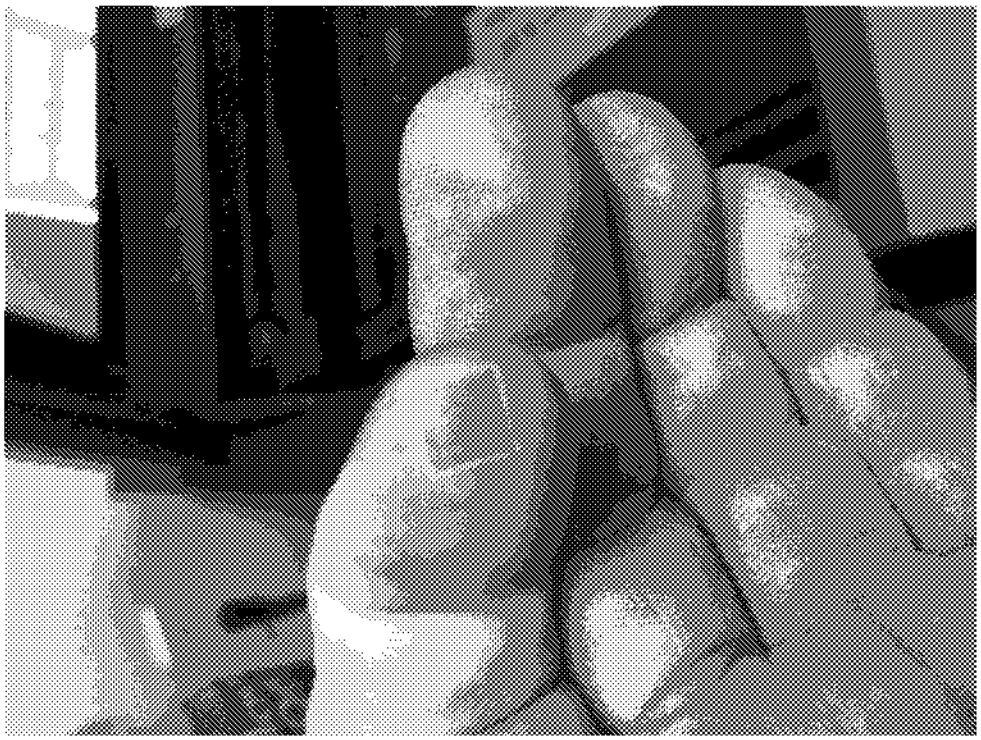


Fig. 83B



Fig. 83A

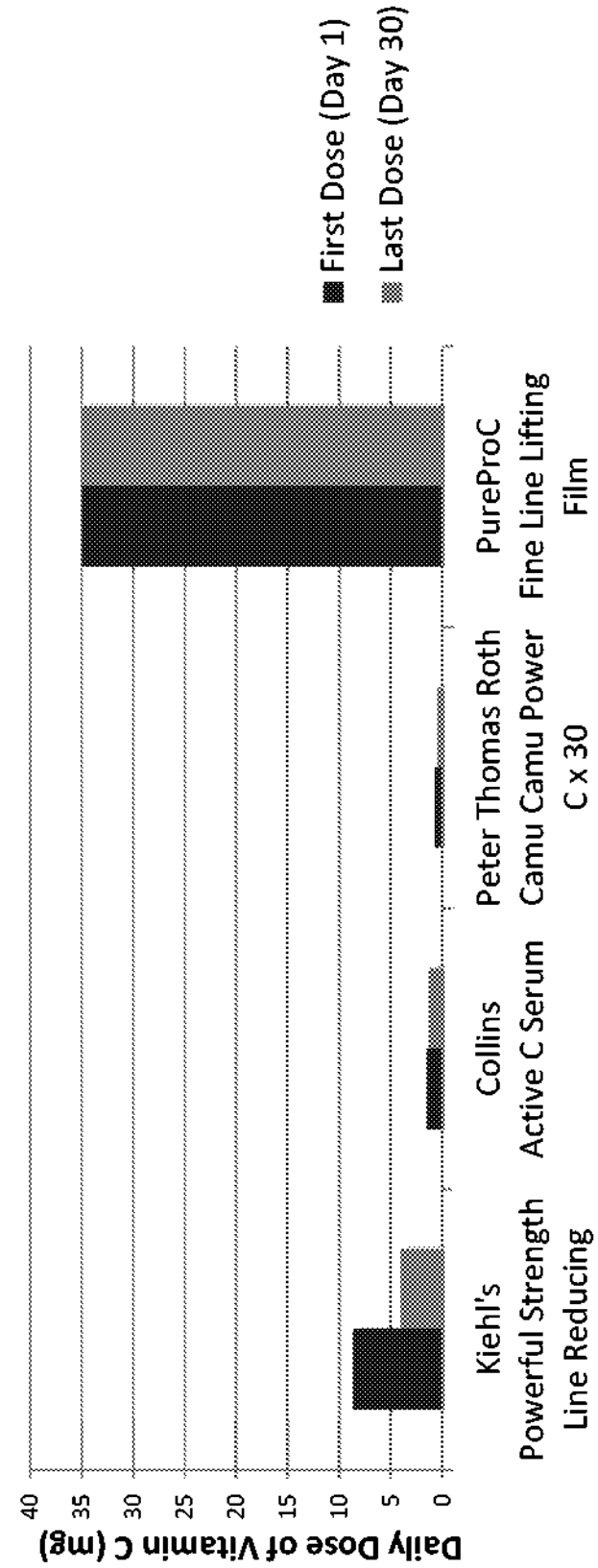

Daily Doses of Vitamin C in Cosmetic Products
First Dose (Day 1)
Last Dose (Day 30)
Daily Dose of Vitamin C (mg)
0
5
10
15
20
25
30
35
40
Kiehl's Powerful Strength Line Reducing Concentrate
Collins Active C Serum
Peter Thomas Roth Camu Camu Power C x 30
PureProC Fine Line Lifting Film
Vitamin C Cosmetic Product

Fig. 84

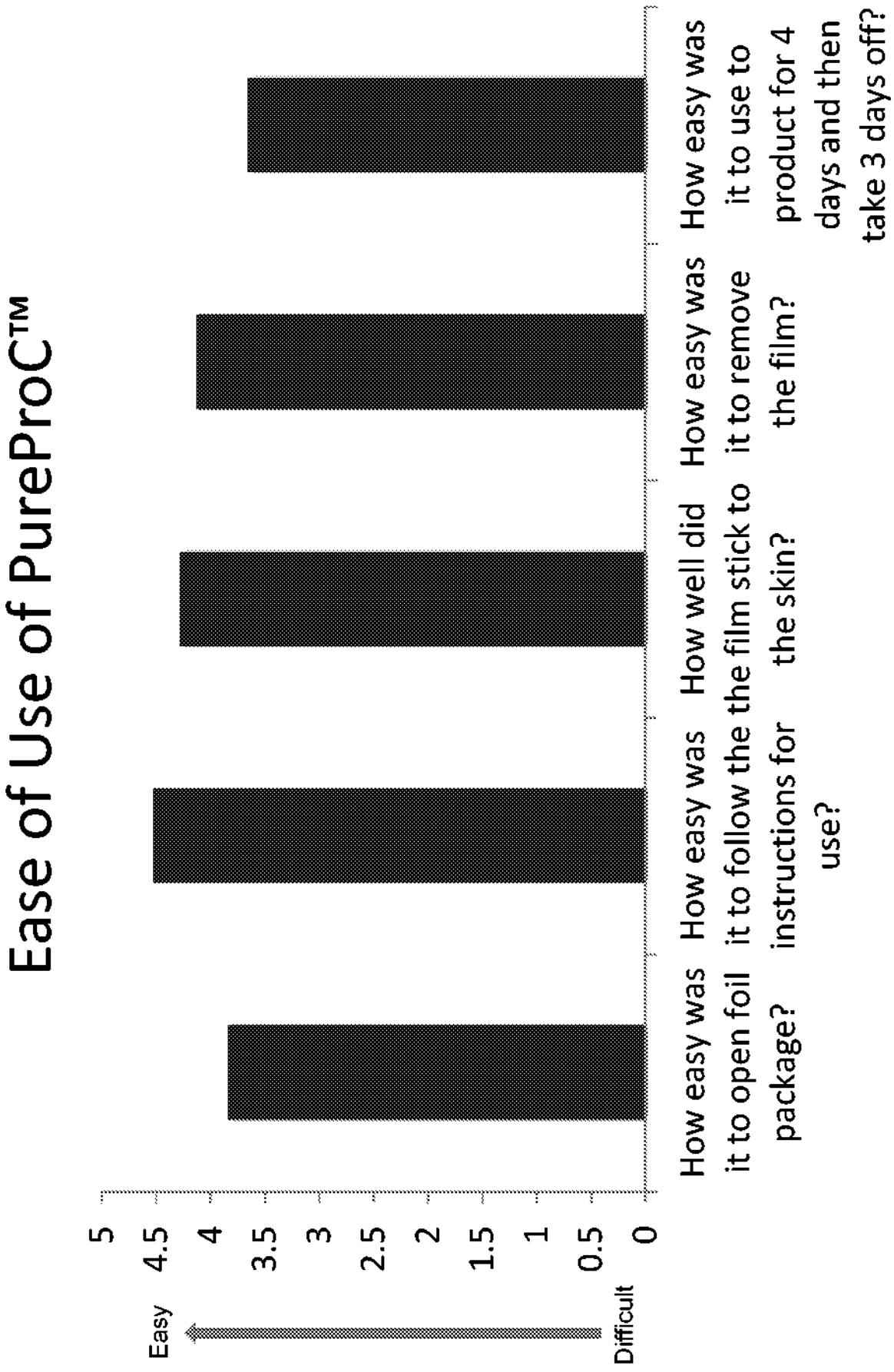

Ease of Use of PureProC™
Easy
Difficult
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
How easy was it to open foil package?
How easy was it to follow instructions for use?
How well did the film stick to the skin?
How easy was it to remove the film?
How easy was it to use to product for 4 days and then take 3 days off?

Fig. 85

- Visible benefits from vitamin C use on the skin are most prevalent after 3-6 months continued use
  - The cells on the skin's surface are replaced by those deep in the dermis approximately once every 28 days
  - Clinical literature has shown vitamin C benefits to be additive with each additional month used as the skin is continually exposed to vitamin C and the cells repeatedly replaced, allowing new collagen to develop and gradually fill fine lines
- Some users saw the initial benefits of their skin feeling better with one month use – longer use will further increase seeing benefits
- User comments:

After 1 Month Use:	Agree	Not Sure	Disagree
My skin feels better	63%	21%	16%
My skin feels firmer	53%	34%	13%
My skin looks brighter	25%	53%	22%
My skin looks more even	25%	47%	28%

Fig. 86

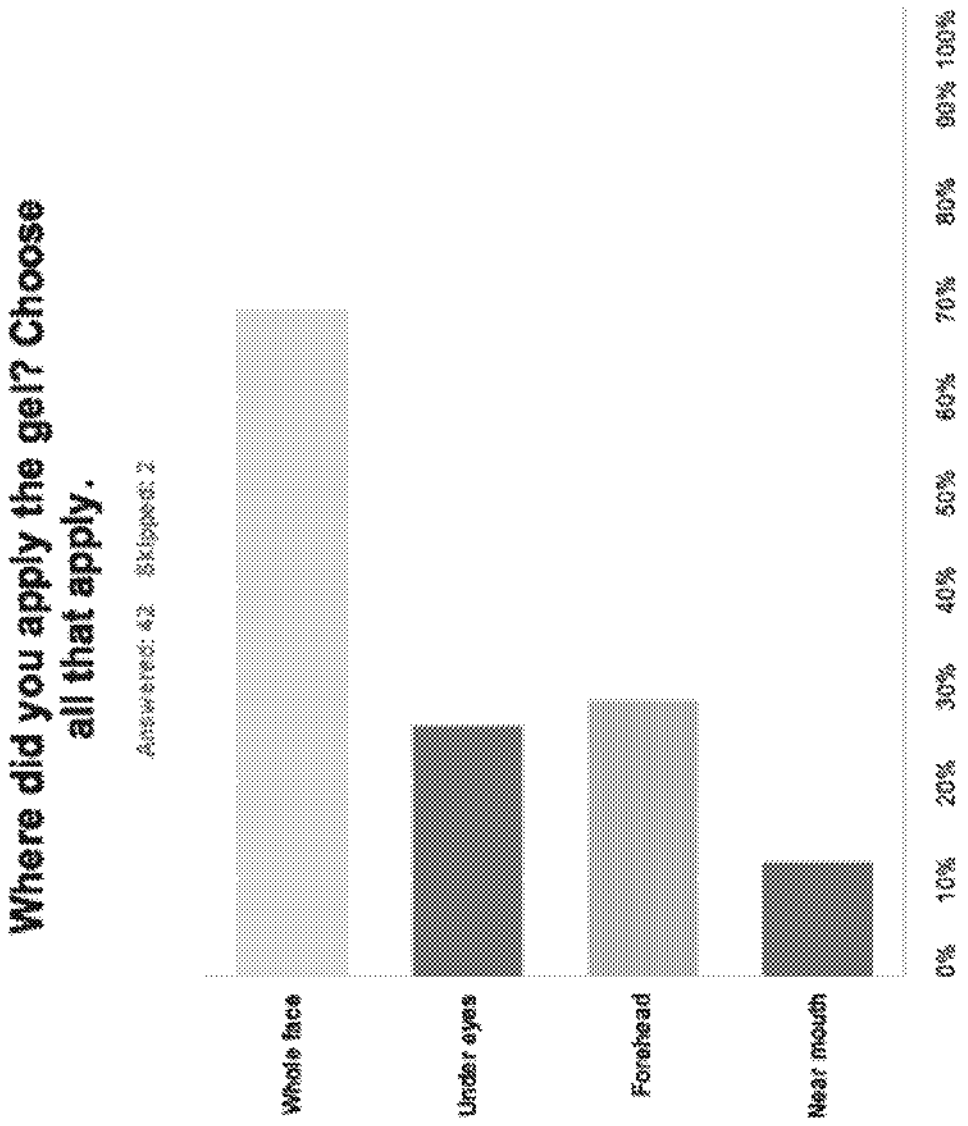

Where did you apply the gel? Choose all that apply.
Answered: 42 Skipped: 2
Whole face
Under eyes
Forehead
Near mouth
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Fig. 87

Thinking only about the lemongrass gel indicate whether you agree with the following statements about your skin after using it.

Answered: 44 Skipped: 0

	Agree	Disagree	Not Sure	Total
My skin looks brighter.	25.00% 11	13.64% 6	61.36% 27	44
My skin tone is better.	34.09% 15	15.91% 7	50.00% 22	44
My skin feels smoother.	56.82% 25	13.64% 6	29.55% 13	44
My skin feels softer.	52.27% 23	9.09% 4	38.64% 17	44
My skin feels better.	50.00% 22	13.64% 6	36.36% 16	44
My skin has improved texture.	43.18% 19	16.91% 7	40.91% 18	44

Fig. 88

Vitamin C Type	% silk in solution	Solution volume per gel (mL)	Mass of Vitamin C per gel (mg)	% Vitamin C	Other Additive Name	Other Additive Quantity	Notes
Sodium Ascorbyl Phosphate (Aromantic)	2	15	100 mg	0.67%	Lemongrass oil	20 uL	No gelation occurred
Sodium Ascorbyl Phosphate (DSM)	2	15	100 mg	0.67%	Lemongrass oil	20 uL	Gelation at ~28days, normal gel appearance
Ascorbyl Tetrapalmitate	2	15	100 mg	0.67%	Lemongrass oil	20 uL	Ascorbyl Tetrapalmitate is a viscous liquid that did not dissolve, solutions were discarded
Ascorbic Acid-2-Glucoside	2	15	100 mg	0.67%	Lemongrass oil	20 uL	Gelation at 3 days, normal gel appearance
l-ascorbic acid and sodium ascorbyl phosphate(DSM)	2	5	25 mg l-ascorbic acid, 25 mg sodium ascorbyl phosphate	1%	Lemongrass oil	6.67 uL	Gelation in 6 days

Fig. 89A

Vitamin C Type	% silk in solution	Solution volume per gel (mL)	Mass of Vitamin C per gel (mg)	% Vitamin C	Other Additive Name	Other Additive Quantity	Notes
l-ascorbic acid and ascorbic acid-2-glucoside	2	5	500 mg l-ascorbic acid, 500 mg ascorbic acid-2-glucoside	20%	Lemongrass oil	6.67 uL	No gelation occurred
l-ascorbic acid and magnesium ascorbyl phosphate	2	5	25 mg l-ascorbic acid, 25 mg magnesium ascorbyl phosphate	1%	Lemongrass oil	6.67 uL	Gelation in 8 days
ascorbic acid-2-glucoside and sodium ascorbyl phosphate	2	5	25 mg ascorbic acid-2-glucoside, 25 mg sodium ascorbyl phosphate	1%	Lemongrass oil	6.67 uL	Gelation in 13 days
ascorbic acid-2-glucoside and magnesium ascorbyl phosphate	2	5	25 mg ascorbic acid-2-glucoside, 25 mg magnesium ascorbyl phosphate	1%	Lemongrass oil	6.67 uL	Gelation in 8 days
l-ascorbic acid and ascorbic acid-2-glucoside	2	5	25 mg l-ascorbic acid, 25 mg ascorbic acid-2-glucoside	1%	Lemongrass oil	6.67 uL	Gelation in 3 days

Fig. 89B

Films:	Vitamin C Type	% Silk Solution	Solution per mold	Mold Area	Vitamin C %	Result	Solubility
1	Sodium Ascorbyl Phosphate (DSM)	2.2	1.56 mL	5.06 cm^2	40	white/opaque, plastic feel, textured (bumpy) top surface	soluble with insoluble borde, some small insoluble pieces
2	Magnesium Ascorbyl Phosphate	2.2	1.56 mL	5.06 cm^2	40	clear/cloudy, plastic feel, textured (rippled) top surface	soluble with insoluble border
3	Ascorbic Acid-2-Glucoside	2.2	1.56 mL	5.06 cm^2	40	clear, less pliable than control, subtle textureon top surface	soluble with insoluble border, some small insoluble pieces
4	L-ascorbic Acid (Control)	2.2	1.56 mL	5.06 cm^2	40	Clear, pliable, no texture	soluble with insoluble border

Fig. 90

% silk in solution	% Vitamin C (l-ascorbic acid) in film	% Caffeine in film	Result
2.4	20	20	dried 19.5 hrs at 24-26C, white crystals on edges, brittle, curled, insoluble in water when applied to skin
2.4	25	15	half dried 18 hours at 24-26C: clear, flexible, pliable, insoluble. Half dried 22 hours at 24-26C: clear, brittle, insoluble
2.4	25	5	dried 51 hours at 24-29C due to high humidity in lab, insoluble films
2.4	25	10	dried 51 hours at 24-29C due to high humidity in lab, insoluble films

Fig. 91A

% silk in solution	% Vitamin C (l-ascorbic acid) in film	% Caffeine in film	Result
2.4	25	0.5	unknown drying time, soluble films
2.4	25	0.5	dried 46 hours at 24-30C, soluble films
2.4	25	1	dried 46 hours at 24-30C, soluble films
2.4	25	2.5	dried 46 hours at 24-30C, soluble films

Fig. 91B

% silk in solution	Gel Volume	Mass Vitamin C (l-ascorbic acid) in gel	Mass Caffeine in gel	Result
2	15 mL	100 mg	50 mg	Gelled in 4 days with exact appearance of standard vitamin C gels

Fig. 92

Sample	volume of solution (mL)	% Silk	Type of Vitamin C	Additive 1 name/quantity	Additive 2 name/quantity	Mass of vitamin C	Days to gel
1	5	2	l-ascorbic acid	Verstatil/75 uL	Dermofeel PA-3/5 uL	33	7
2	5	2	l-ascorbic acid	Verstatil/75 uL	Dermofeel PA-3/5 uL	33	7
3	5	2	l-ascorbic acid	none	none	33	2
4	5	2	ascorbic acid-2-glucoside	none	none	33	5

Fig. 93

Volume of Final Solution	% Silk (Final Solution)	TFF Batch, % Silk	Volume of TFF Batch	Volume of RO/DI water	% HA	Mass HA (mg)	Additive	Additive %	Additive mass (g)	Vitamin C Type	Mass of vitamin C (mg)
5	1	TFF-10-0055, 3.98%	1.25	3.75	1	0.05	Zinc Oxide	10	0.5	Sodium Ascorbyl Phosphate	33
Results		Zinc Oxide(ZnO) is insoluble but can be dispersed with viscous HA solution. ZnO was mixed with water before HA and became clumpy. Large white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	1	0.05	Titanium Dioxide	10	0.5	Sodium Ascorbyl Phosphate	33
Results		Titanium Dioxide (TiO2) is insoluble but can be dispersed with viscous HA solution. TiO2 was mixed with water before HA and became clumpy. Large white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	1	0.05	Zinc Oxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		ZnO was evenly dispersed after mixing. Solution was low viscosity and ZnO settled to the bottom after a couple days. Minimal white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	1	0.05	Titanium Dioxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		TiO2 was evenly dispersed after mixing. Solution was low viscosity and TiO2 settled to the bottom after a couple days. Minimal white residue on skin when applied.									

Fig. 94A

Volume of Final Solution	% Silk (Final Solution)	TFF Batch, % Silk	Volume of TFF Batch	Volume of RO/DI water	% HA	Mass HA (mg)	Additive	Additive %	Additive mass (g)	Vitamin C Type	Mass of vitamin C (mg)
5	1	TFF-10-0055, 3.98%	1.25	3.75	2.5	0.125	Zinc Oxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		ZnO was evenly dispersed after mixing. Solution was viscosity of syrup and ZnO remained dispersed. Best feel and consistency. Minimal white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	2.5	0.125	Titanium Dioxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		TiO2 was evenly dispersed after mixing. Solution was viscosity of syrup and TiO2 remained dispersed. Minimal white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	5	0.25	Zinc Oxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		ZnO was evenly dispersed after mixing. Solution was of high viscosity and ZnO remained dispersed. Best feel and consistency. Small white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	5	0.25	Titanium Dioxide	5	0.25	Sodium Ascorbyl Phosphate	33
Results		TiO2 was evenly dispersed after mixing. Solution was of high viscosity and TiO2 remained dispersed. Small white residue on skin when applied.									
5	1	TFF-10-0055, 3.98%	1.25	3.75	5	0.25	Zinc Oxide	2.5	0.125	Sodium Ascorbyl Phosphate	33
Results		ZnO was evenly dispersed after mixing. Solution was of high viscosity and ZnO remained dispersed.Small white residue on skin when applied.									

Fig. 94B

Volume of Final Solution	% Silk (Final Solution)	TFF Batch, % Silk	Volume of TFF Batch	Volume of RO/DI water	% HA	Mass HA (mg)	Additive	Additive %	Additive mass (g)	Vitamin C Type	Mass of vitamin C (mg)
100	1	TFF-10-0057, 3.8%	26.3	73.7	2.5	2.5	Zinc Oxide and Titanium Dioxide	ZnO (3.75%), TiO2 (1.25%)	ZnO (3.75g), TiO2 (1.25g)	Sodium Ascorbyl Phosphate	666
Results		ZnO and TiO2 was evenly dispersed after mixing. Solution was viscosity of syrup. ZnO and TiO2 remained dispersed. Minimal white residue on skin when applied. Mixed with electric mixer.									
100	1	TFF-10-0057, 3.8%	26.3	73.7	2.5	2.5	Zinc Oxide and Titanium Dioxide	ZnO (5.625%), TiO2 (1.875%)	ZnO (5.625g), TiO2 (1.875g)	Sodium Ascorbyl Phosphate	666
Results		ZnO and TiO2 was evenly dispersed after mixing. Solution was viscosity of syrup. ZnO and TiO2 remained dispersed. Minimal white residue on skin when applied. Mixed with electric mixer.									
110	1	TFF-10-0055, 3.83%	29	81	2.5	2.75	Zinc Oxide and Titanium Dioxide	ZnO (12%), TiO2 (3%)	ZnO (13.2g), TiO2 (3.3g)	Sodium Ascorbyl Phosphate	22000
Results		ZnO and TiO2 was evenly dispersed after mixing. Solution was viscosity of glue. ZnO and TiO2 remained dispersed. Minimal white residue on skin when applied. Mixed with electric mixer.									
110	1	TFF-10-0055, 3.83%	29	81	2.5	2.75	Zinc Oxide and Titanium Dioxide	ZnO (15%), TiO2 (5%)	ZnO (16.5g), TiO2 (5.5g)	Sodium Ascorbyl Phosphate	22000
Results		ZnO and TiO2 was evenly dispersed after mixing. Solution was viscosity of glue. ZnO and TiO2 remained dispersed with some visible particles. Minimal white residue on skin when applied. Mixed with electric mixer.									

Fig. 94C

Vit C Type	Volume (ml)	Vit C %	Vit C mass (g)	% silk	lactic acid	lactic acid volume (uL)	Days to gel
l-ascobic acid	5	5	0.25	2	no	N/A	10
l-ascobic acid	5	5	0.25	3	no	N/A	7
l-ascobic acid	5	5	0.25	3.8	no	N/A	5
l-ascobic acid	5	10	0.5	2	no	N/A	Did not gel at 12 days
l-ascobic acid	5	10	0.5	3	no	N/A	Did not gel at 12 days
l-ascobic acid	5	10	0.5	3.8	no	N/A	Did not gel at 12 days
l-ascobic acid	5	15	0.75	2	no	N/A	Did not gel at 12 days
l-ascobic acid	5	15	0.75	3	no	N/A	Did not gel at 12 days
l-ascobic acid	5	15	0.75	3.8	no	N/A	Did not gel at 12 days
l-ascobic acid	5	20	1	2	no	N/A	Did not gel at 12 days
l-ascobic acid	5	20	1	3	no	N/A	Did not gel at 12 days
l-ascobic acid	5	20	1	3.8	no	N/A	Did not gel at 12 days

Fig. 95A

Vit C Type	Volume (ml)	Vit C %	Vit C mass (g)	% silk	lactic acid	lactic acid volume (uL)	Days to gel
ascorbic acid 2 glucoside	5	5		2	no	N/A	4
ascorbic acid 2 glucoside	5	5		3	no	N/A	4
ascorbic acid 2 glucoside	5	5		3.8	no	N/A	3
ascorbic acid 2 glucoside	5	10		2	no	N/A	7
ascorbic acid 2 glucoside	5	10		3	no	N/A	7
ascorbic acid 2 glucoside	5	10		3.8	no	N/A	5
ascorbic acid 2 glucoside	5	15		2	no	N/A	Did not gel at 12 days
ascorbic acid 2 glucoside	5	15		3	no	N/A	Did not gel at 12 days
ascorbic acid 2 glucoside	5	15		3.8	no	N/A	12
ascorbic acid 2 glucoside	5	20		2	no	N/A	Did not gel at 12 days
ascorbic acid 2 glucoside	5	20		3	no	N/A	Did not gel at 12 days
ascorbic acid 2 glucoside	5	20		3.8	no	N/A	Did not gel at 12 days

Fig. 95B

Vit C Type	Volume (ml)	Vit C %	Vit C mass (g)	% silk	lactic acid	lactic acid volume (uL)	Days to gel
l-ascobic acid	5	20		3	yes	5	Did not gel at 12 days
l-ascobic acid	5	10		3	yes	5	Did not gel at 12 days
l-ascobic acid	5	20		5.5	no	N/A	Did not gel at 12 days

Fig. 95C

Test Substance	Microorganism Type	Detection Media	CFU/mL or gram	In Use for (days, if applicable)
Water Sample #1 (from 55 gallon tank)	Aerobic Bacteria	Tryptic Soy agar	1.00E+01	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Water Sample #2 (from 5 gallon carboy)	Aerobic Bacteria	Tryptic Soy agar	5.60E+02	N/A
	Yeast and Mold	Potato Dextrose Agar	1.25E+02	
Water Sample #3 (tap water)	Aerobic Bacteria	Tryptic Soy agar	<10	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Pure ProC Silk Smoothing Gel with Lemon Grass	Aerobic Bacteria	Tryptic Soy agar	1.00E+01	0
	Yeast and Mold	Potato Dextrose Agar	<10	
Pure ProC Silk Smoothing Gel with Rosemary	Aerobic Bacteria	Tryptic Soy agar	<10	0
	Yeast and Mold	Potato Dextrose Agar	<10	
Water Sample #1 (5 gallon)	Aerobic Bacteria	Tryptic Soy agar	1.00E+01	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Water Sample #2 (55 gallon tank)	Aerobic Bacteria	Tryptic Soy agar	<10	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Water Sample #1 (carboy)	Aerobic Bacteria	Tryptic Soy agar	2.50E+01	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Water Sample #2 (gallon tank)	Aerobic Bacteria	Tryptic Soy agar	<10	N/A
	Yeast and Mold	Potato Dextrose Agar	<10	
Pure ProC Silk Smoothing Gel with Rosemary	Aerobic Bacteria	Tryptic Soy agar	<10	26
	Yeast and Mold	Potato Dextrose Agar	<10	
Pure ProC Silk Smoothing Gel with Lemongrass	Aerobic Bacteria	Tryptic Soy agar	<10	25
	Yeast and Mold	Potato Dextrose Agar	<10	

Fig. 96



Fig. 97



Fig. 98

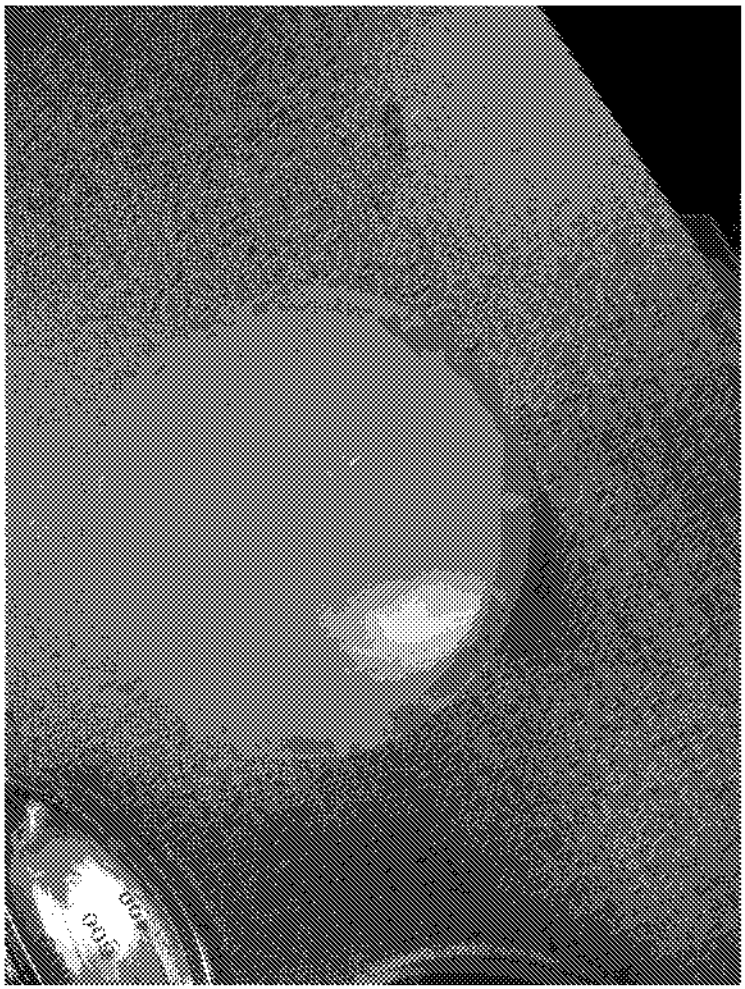


Fig. 99



Fig. 100

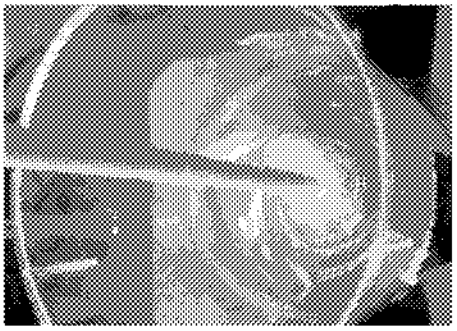


Fig. 103



Fig. 102

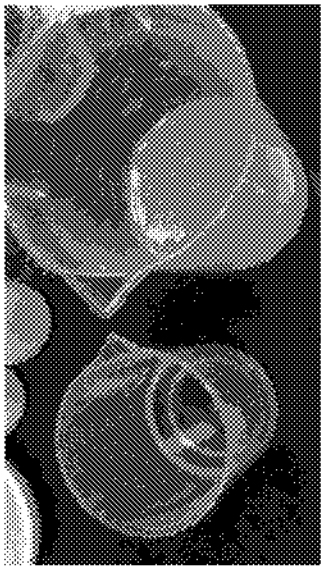


Fig. 101

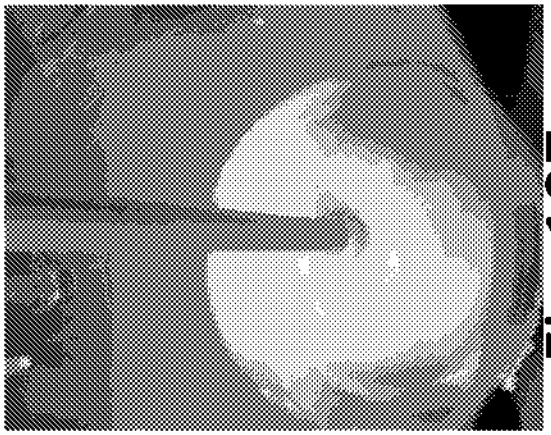


Fig. 107

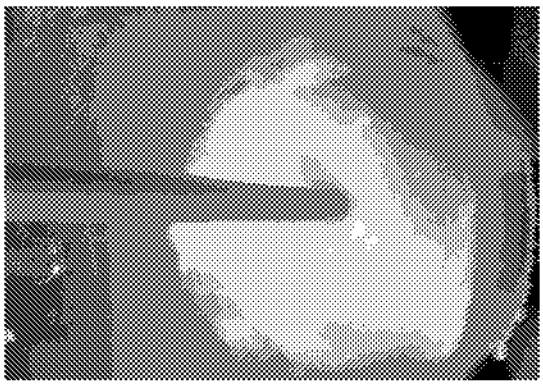


Fig. 106

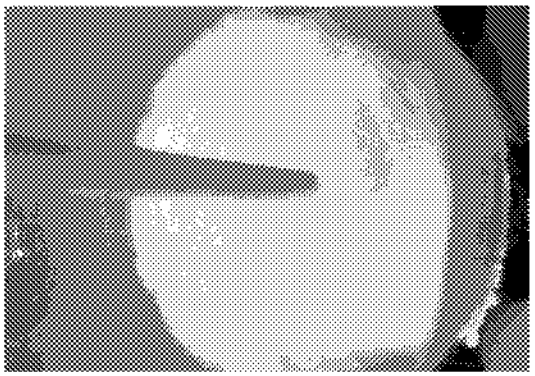


Fig. 105

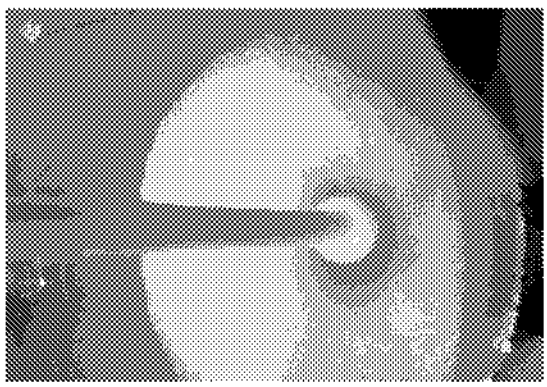


Fig. 104

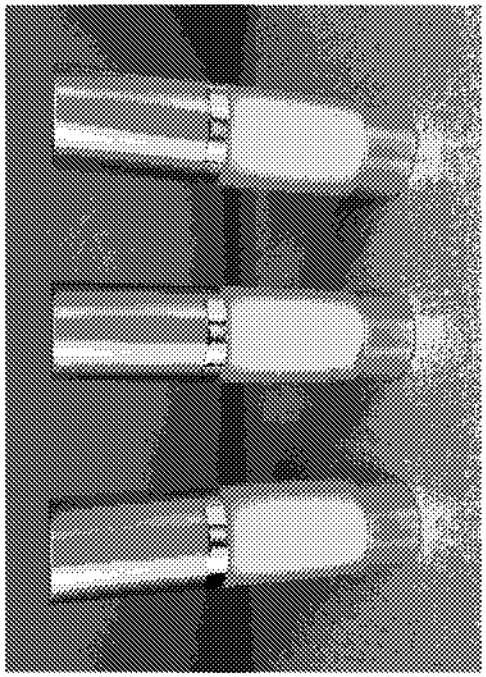


Fig. 109

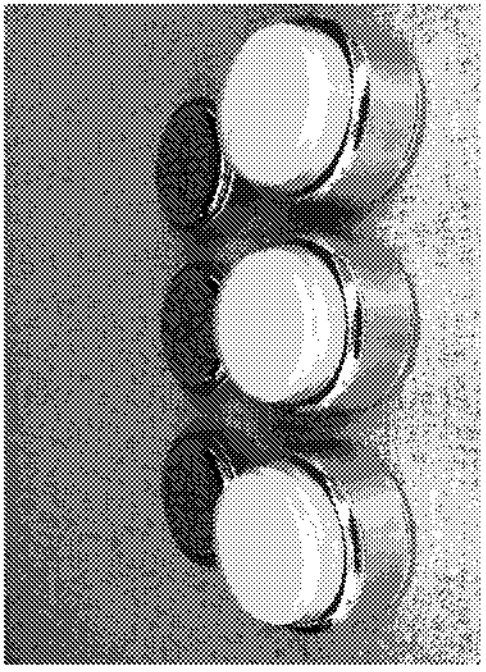


Fig. 108

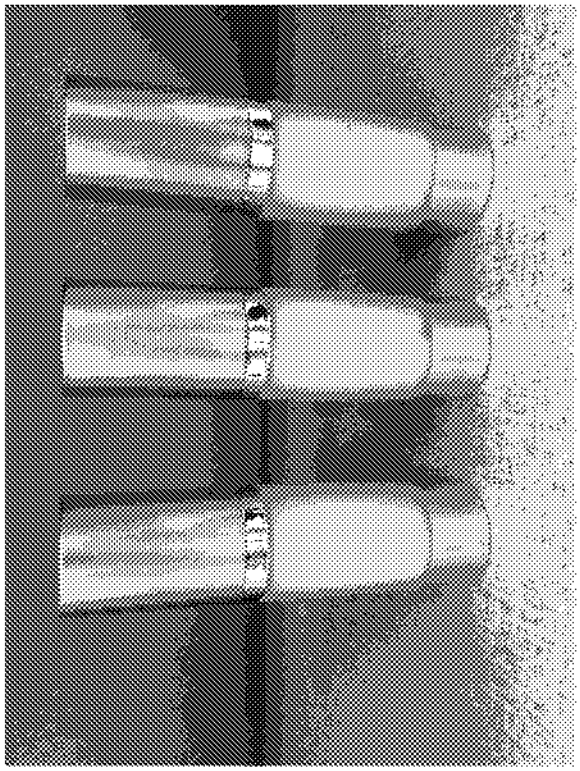


Fig. 111



Fig. 110

Sample	water/HA/silk description	% silk (w/v)	mass(or volume) of water/HA/silk	Additives	Mixing addition notes	Feedback
Moisturizer 1	2.25% hyaluronic acid in water (no silk)	0	~1 mL	50 uL shea butter	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, consistency issue with sticking to itself (hard to scoop)
Moisturizer 2	2.25% hyaluronic acid in water (no silk)	0	~1 mL	50 uL jojoba	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop)
Moisturizer 3	2.25% hyaluronic acid in water (no silk)	0	~1 mL	50 uL fractionated coconut oil	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop)
Moisturizer 4	2.25% hyaluronic acid in water (no silk)	0	~1 mL	50 uL coconut oil	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop), greasy
Moisturizer 5	2.25% hyaluronic acid in water (no silk)	0	~1 mL	25 uL shea butter, 25 uL jojoba, 1 "drop" vitamin E	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, consistency issue with sticking to itself (hard to scoop)
Moisturizer 6	2.25% hyaluronic acid in water (no silk)	0	~1 mL	25 uL jojoba, 25 uL coconut oil, 1 "drop" vitamin E	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop)
Moisturizer 7	2.25% hyaluronic acid in water (no silk)	0	~1 mL	25 uL shea butter, 25 uL coconut oil, 1 "drop" vitamin E	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop)
Moisturizer 8	2.25% hyaluronic acid in water (no silk)	0	~1 mL	25 uL shea butter, 25 uL jojoba, 25 uL coconut oil, 1 "drop" vitamin E	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	consistency issue with sticking to itself (hard to scoop)
Moisturizer 9	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea butter, 62.5 uL jojoba, 2 "drop" vitamin E, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin

Fig. 112

Moisturizer 10	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea butter, 62.5 uL jojoba, 2 "drop" vitamin E, 0.1g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	white residue
Moisturizer 11	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	125 uL shea butter, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, good texture
Moisturizer 12	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	125 uL shea butter, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	white residue
Moisturizer 13	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	125 uL jojoba, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, good texture
Moisturizer 14	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	125 uL jojoba, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, good texture, white residue
Moisturizer 15	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL jojoba, 62.5 uL coconut oil, 1 "drop" vitamin E, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin
Moisturizer 16	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea, 62.5 uL coconut oil, 1 "drop" vitamin E, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin
Moisturizer 17	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea, 62.5 uL jojoba, 62.5 uL coconut oil, 1 "drop" vitamin E, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, good consistency
Moisturizer 18	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	125 uL argan oil, 0.05g oat flour	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	
Moisturizer 19	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea, 62.5 uL jojoba, 1 "drop" vitamin E, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	white residue
Moisturizer 20	2.25% hyaluronic acid in water (no silk)	0	~2-3 mL	62.5 uL shea, 62.5 uL jojoba, 62.5 uL coconut oil, 1 "drop" vitamin E, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin

Fig. 112 (Continued)

Moisturizer 21	2.25% hyaluronic acid and 0.25% silk in water	~0.23%	~2-3 mL	125 uL argan oil, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	white residue
Moisturizer 22	2.25% hyaluronic acid and 0.25% silk in water	~0.23%	~2-3 mL	62.5 uL shea, 62.5 uL jojoba, 1 "drop" vitamin E, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, white residue
Moisturizer 23	2.25% hyaluronic acid and 0.25% silk in water	~0.22%	~2-3 mL	62.5 uL shea, 62.5 uL jojoba, 62.5 uL coconut oil, 1 "drop" vitamin E, 0.05g titanium dioxide	all additives mixed and then added to HA/water by hand mixing, 1"drop" vit E= ~25uL	desirable feel on the skin, good texture and consistency, flake/ball up if rubbed, white residue
Moisturizer 24	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	500 ul jojoba (~10%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour	All additives mixed and then added to HA/water by hand mixing. Only 250 uL jojoba was added at first. When 250 uL more jojoba was added the consistency became more flubber-like.	favorite texture/feel on the skin and consistency of the group 24-29. Better than 1-23. Smoother than 30.
Moisturizer 25	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	500 ul jojoba (~10%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g titanium dioxide, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. Only 250 uL jojoba was added at first. When 250 uL more jojoba was added the consistency became more flubber-like. Honey suckle was added after initial ingredients were mixed with HA/water. After mixing, the solution was split in half. To one half 100 uL glycerin was added.	Decent-good texture, feel, consistency. Some flake/ball up on skin when rubbed in. Glycerin made it stickier.

Fig. 112 (Continued)

Molsturizer 26	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	250 ul shea (~5%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. Honey suckle was added after initial ingredients were mixed with HA/water. After mixing, the solution was split in half. To one half 100 uL glycerin was added.	Decent-good texture, feel, consistency. Some flake/ball up on skin when rubbed in. Glycerin made it stickier.
Moisturizer 27	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	250 ul shea (~5%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g titanium dioxide, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. Honey suckle was added after initial ingredients were mixed with HA/water. After mixing, the solution was split in half. To one half 100 uL glycerin was added.	Decent-good texture, feel, consistency. Some flake/ball up on skin when rubbed in. Glycerin made it stickier. Better than 32.
Moisturizer 28	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	250 ul jojoba (~5%), 250 ul shea (~5%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. Honey suckle was added after initial ingredients were mixed with HA/water. After mixing, the solution was split in half. To one half 100 uL glycerin was added.	favorite texture/feel on the skin and consistency of the group 24-29. Better than 1-23.
Molsturizer 29	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	5 mL	175 ul coconut (~3.5%), 175 ul jojoba (~3.5%), 175 ul shea (~3.5%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. Honey suckle was added after initial ingredients were mixed with HA/water. After mixing, the solution was split in half. To one half 100 uL glycerin was added.	Decent-good texture, feel, consistency. Some flake/ball up on skin when rubbed in. Glycerin made it stickier. Needs to be richer
Molsturizer 30	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	500 ul jojoba (~10%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	30 with glycerin feels better than 30 w/o

Fig. 112 (Continued)

Moisturizer 31	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	500 ul shea (~10%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	
Moisturizer 32	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	500 ul shea (~10%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.25g TiO2, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	left white remnants on skin
Moisturizer 33	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	250 ul jojoba (~5%), 250 ul shea (~5%), 50 uL vitamin E (~1%), 3 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	
Moisturizer 34	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	250 ul jojoba (~5%), 250 ul shea (~5%), 100 uL vitamin E (~1%), 20 uL rosehip, 3 uL lemongrass, 0.75g oat flour, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	34 with glycerin feels better than 34 w/o. Needs more hydration
Moisturizer 35	2.25% hyaluronic acid and 0.25% silk in water	~0.2%	5 mL	500 ul shea (~10%), 100 uL vitamin E (~1%), 20 uL rosehip, 5 uL lemongrass, 0.25g titanium dioxide, 5 uL honeysuckle blend	All additives mixed and then added to HA/water by hand mixing. . After mixing, the solution was split in half. To one half 100 uL glycerin was added.	35 w/ glycerin seemed to flake/ball up but w/o glycerin did not. Better than 32
Moisturizer 36	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	8 g	800 ul jojoba (10%), 80 uL vitamin E (1%), 8 uL rosehip (0.1%), 0.12g oat flour (1.5%), 80 uL honeysuckle blend (1%), 250 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.9. Added 2M HCl by hand mixing and pH was recorded at 3.5.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.

Fig. 112 (Continued)

Molsturizer 37	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	8 g	400 ul jojoba (5%), 400 ul shea (5%), 80 uL vitamin E (1%), 8 uL rosehip (0.1%), 0.12g oat flour (1.5%), 80 uL honeysuckle blend (1%), 150 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.9. Added 2M HCl by hand mixing and pH was recorded at 4.5.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Moisturizer 38	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	8 g	800 ul jojoba (10%), 80 uL vitamin E (1%), 8 uL rosehip (0.1%), 0.12g oat flour (1.5%), 80 uL honeysuckle blend (1%), 125 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.75. Added 2M HCl by hand mixing and pH was recorded at 4.5.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Molsturizer 39	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	8 g	800 ul jojoba (10%), 80 uL vitamin E (1%), 8 uL rosehip (0.1%), 0.12g oat flour (1.5%), 80 uL honeysuckle blend (1%), 150 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.79. Added 2M HCl by hand mixing and pH was recorded at 4.85.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Molsturizer 40	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	1.5 ml jojoba (10%), 300 uL vitamin E (2%), 150 uL rosehip (1%), 0.225g oat flour (1.5%), 150 uL honeysuckle blend (1%), 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.8. Added 2M HCl by hand mixing and pH was recorded at 4.79.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Molsturizer 41	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	1.5 ml jojoba (10%), 300 uL vitamin E (2%), 750 uL rosehip (5%), 0.225g oat flour (1.5%), 150 uL honeysuckle blend (1%), 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.41. Added 2M HCl by hand mixing and pH was recorded at 4.87.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.

Fig. 112 (Continued)

Moisturizer 42	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	1.5 ml jojoba (10%), 150 uL vitamin E (1%), 150 uL rosehip (1%), 150 uL honeysuckle blend (1%), 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.93. Added 2M HCl by hand mixing and pH was recorded at 4.85.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Moisturizer 43	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	1.5 ml jojoba (10%), 150 uL vitamin E (1%), 150 uL rosehip (1%), 0.375g oat flour (2.5%), 150 uL honeysuckle blend (1%), 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.31. Added 2M HCl by hand mixing and pH was recorded at 5.07.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Moisturizer 44	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	0.75 ml jojoba (5%), 0.75 ml shea (5%), 150 uL vitamin E (1%), 750 uL rosehip (5%), 0.225g oat flour (1.5%), 150 uL honeysuckle blend (1%), 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.64. Added 2M HCl by hand mixing and pH was recorded at 4.86.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Moisturizer 45	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	15 g	0.75 ml jojoba (5%), 0.75 ml shea (5%), 150 uL vitamin E (1%), 750 uL rosehip (5%), 0.225g oat flour (1.5%), 150 uL honeysuckle blend (1%), 37 ul lemongrass, 325 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl) . pH was than recorded at 9.58. Added 2M HCl by hand mixing and pH was recorded at 4.9.	The mixing of additives with HA/silk/water initially appeared to separate the viscous HA solution into HA solution in oil. After continued mixing, the solution become a homogenous mixture with a lotion-like consistency and appearance. The addition of 2M HCl did not cause separation or a significant change in viscosity.
Moisturizer 46	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	2.3 ml jojoba (10%), 207 ul Vit E (0.9%), 230 ul rosehip (1%), 207 mg Aspen Bark (0.9%), 69 mg sodium anisate (0.3%), 10 uL 2M HCl	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl). The solution separated. Added 2M HCl by hand mixing and pH was recorded at 5.62.	
Moisturizer 47	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	2.41 ml jojoba (10%), 217 ul Vit E (0.9%), 1.205 mL rosehip (5%), 217 mg Aspen Bark (0.9%), 72 mg sodium anisate (0.3%), 200 uL 2M HCl, 40 uL 5N NaOH	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl and 5N NaOH). The solution separated. 5N NaOH was then added and the solution became homogenous with a pH of 9.85. Added 2M HCl by hand mixing and pH was recorded at 5.02.	

Fig. 112 (Continued)

Moisturizer 48	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	1.205 ml jojoba (5%) 1.205 ml shea (5%), 217 ul Vit E (0.9%), 1.205 mL rosehip (5%), 217 mg Aspen Bark (0.9%), 72 mg sodium anisate (0.3%), 200 uL 2M HCl, 40 uL 5N NaOH	All additives mixed and then added to HA/water by hand mixing (other than 2M HCl and 5N NaOH). The solution separated and pH=6.3. 5N NaOH was then added and the solution became homogenous with a pH of 9.75. Added 2M HCl by hand mixing and pH was recorded at 5.03.	Good consistency
Moisturizer 49	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	2.3 ml jojoba (10%), 207 ul Vit E (0.9%), 230 ul rosehip (1%), 207 mg Aspen Bark (0.9%), 69 mg sodium anisate (0.3%), 40 uL 5N NaOH, 200 uL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.41. 2M HCl was then added and hand mixed and pH was recorded at 3.53. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.02.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.
Moisturizer 50	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	2.41 ml jojoba (10%), 217 ul Vit E (0.9%), 1.205 mL rosehip (5%), 217 mg Aspen Bark (0.9%), 72 mg sodium anisate (0.3%), 200 uL 2M HCl, 40 uL 5N NaOH	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.34. 2M HCl was then added and hand mixed and pH was recorded at 3.63. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.12.	Best (of 49-51) consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.
Moisturizer 51	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	20 g	1.205 ml jojoba (5%) 1.205 ml shea (5%), 217 ul Vit E (0.9%), 1.205 mL rosehip (5%), 217 mg Aspen Bark (0.9%), 72 mg sodium anisate (0.3%), 200 uL 2M HCl, 40 uL 5N NaOH	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.43. 2M HCl was then added and hand mixed and pH was recorded at 3.63. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.24.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.

Fig. 112 (Continued)

Moisturizer 52	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	40 g	4.6 ml jojoba (10%), 414 ul Vit E (0.9%), 460 ul rosehip (1%), 414 mg Aspen Bark (0.9%), 138 mg sodium anisate (0.3%), 60 uL 5N NaOH, 375 uL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.58. 150 uL 2M HCl was then added and hand mixed and pH was recorded at 4.52. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.85. 225 uL 2M HCl was then added and hand mixed and pH was recorded at 4.96.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.
Moisturizer 53	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	40 g	2.28 ml jojoba (5%), 456 ul Vit E (1%), 2.28 mL rosehip (5%), 456 mg Aspen Bark (1%), 137 mg sodium anisate (0.3%), 375 uL 2M HCl, 60 uL 5N NaOH	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.62. 300 uL 2M HCl was then added and hand mixed and pH was recorded at 3.72. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.32. 75 uL 2M HCl was then added and hand mixed and pH was recorded at 5.02.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.
Moisturizer 54	2.25% hyaluronic acid and 0.1% silk in water	~0.085%	40 g	4.57 ml jojoba (10%), 411 ul Vit E (0.9%), 457 ul rosehip (1%), 228 mg Aspen Bark (0.5%), 45.7 mg sodium anisate (0.1%), 60 uL 5N NaOH, 200 uL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.6. 200 uL 2M HCl was then added and hand mixed and pH was recorded at 4.32. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.11.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up will ball up and not rub into the skin.

Fig. 112 (Continued)

Moisturizer 55	1.5% hyaluronic acid and 0.1% silk in water	~0.085 %	40 g	4.6 ml jojoba (10%), 414 ul Vit E (0.9%), 460 ul rosehip (1%), 414 mg Aspen Bark (0.9%), 138 mg sodium anisate (0.3%), 60 uL 5N NaOH, 205 uL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.38. 205 uL 2M HCl was then added and hand mixed and pH was recorded at 3.68. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.03.	Good, texture, lotion appearance, feel on the skin. Not thick enough. When make up is applied over the moisturizer the make up will ball up and not rub into the skin but not as much so as solutions with 2.25% HA.
Moisturizer 56	1.5% hyaluronic acid and 0.1% silk in water	~0.085 %	40 g	2.28 ml jojoba (5%), 456 ul Vit E (1%), 2.28 mL rosehip (5%), 456 mg Aspen Bark (1%), 137 mg sodium anisate (0.3%), 250 uL 2M HCl, 60 uL 5N NaOH	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.21. 250 uL 2M HCl was then added and hand mixed and pH was recorded at 3.68. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.12.	Good, texture, lotion appearance, feel on the skin. Not thick enough. When make up is applied over the moisturizer the make up will ball up and not rub into the skin but not as much so as solutions with 2.25% HA.
Moisturizer 57	2.25% hyaluronic acid and 0.1% silk in water	~0.06%	25 g	8.66 ml jojoba (20%), 433 ul Vit E (1%), 8.66 mL rosehip (20%), 433 mg Aspen Bark (1%), 130 mg sodium anisate (0.3%), 60 uL 5N NaOH	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution separated to an HA in oil solution and failed to create a lotion.	Failed
Moisturizer 58	2.25% hyaluronic acid and 0.1% silk in water	~0.08%	33.5 g	4.33 ml jojoba (10%), 433 ul Vit E (1%), 4.33 mL rosehip (10%), 433 mg Aspen Bark (1%), 130 mg sodium anisate (0.3%), 65 uL 5N NaOH, 415 uL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.65. 320 uL 2M HCl was then added and hand mixed and pH was recorded at 3.71. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.55. 95 uL 2M HCl was then added and hand mixed and pH was recorded at 5.16.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up does not ball up and will rub into the skin.

Fig. 112 (Continued)

Moisturizer 59	2.25% hyaluronic acid and 0.1% silk in water	~0.075%	307.08 g	39.68 ml jojoba (9.99%), 3.968 ml Vit E (0.99%), 39.68 mL rosehip (9.99%), 3.968 mg Aspen Bark (0.99%), 1.188 g sodium anisate (0.3%), 596 uL 5N NaOH, 3.8 mL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.72. 2M HCl was then added and hand mixed and pH was recorded at 2.98. Aspen bark and sodium anisate were then added by hand mixing and pH was recorded at 5.36.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up does not ball up and will rub into the skin. Passed challenge testing
Moisturizer 60	2.25% hyaluronic acid and 0.1% silk in water	~0.075%	116.55 g	15 ml jojoba (10%), 1.5 ml Vit E (1%), 15 mL rosehip (10%), 226 uL 5N NaOH, 2.18 mL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by hand mixing. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.60. 2M HCl was then added and hand mixed and pH was recorded at 5.15.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up does not ball up and will rub into the skin. Failed challenge testing
Moisturizer 61	2.25% hyaluronic acid and 0.1% silk in water	~0.075%	344.74 mL	43.39 ml jojoba (10%), 3.9 ml Vit E (1%), 43.39 mL rosehip (10%), 3.905 g Aspen Bark 0.9%), 1.30 g sodium anisate (0.3%), 651 uL 5N NaOH, 4.14 mL 2M HCl	Jojoba, Vit E, rosehip and 5N NaOH were mixed and added to HA/water/silk mixture by lab overhead mixer. The solution first separated to an HA in oil solution but after continued mixing gained a lotion texture and appearance. pH was recorded at 11.71. 2M HCl was then added and mixed by lab overhead mixer. Aspen bark and sodium anisate were then added by an lab overhead mixer and pH was recorded at 5.14.	Good consistency, texture, lotion appearance, feel on the skin. When make up is applied over the moisturizer the make up does not ball up and will rub into the skin.

Fig. 112 (Continued)