

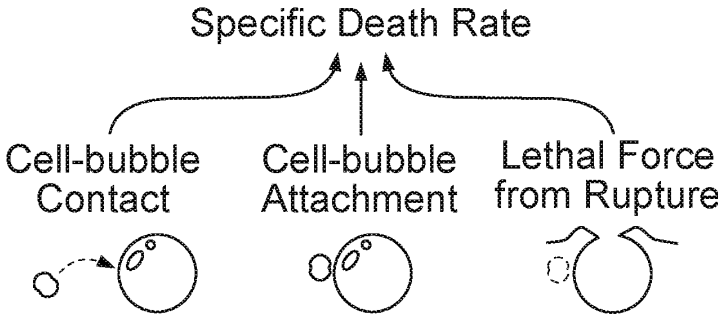


FIG. 1

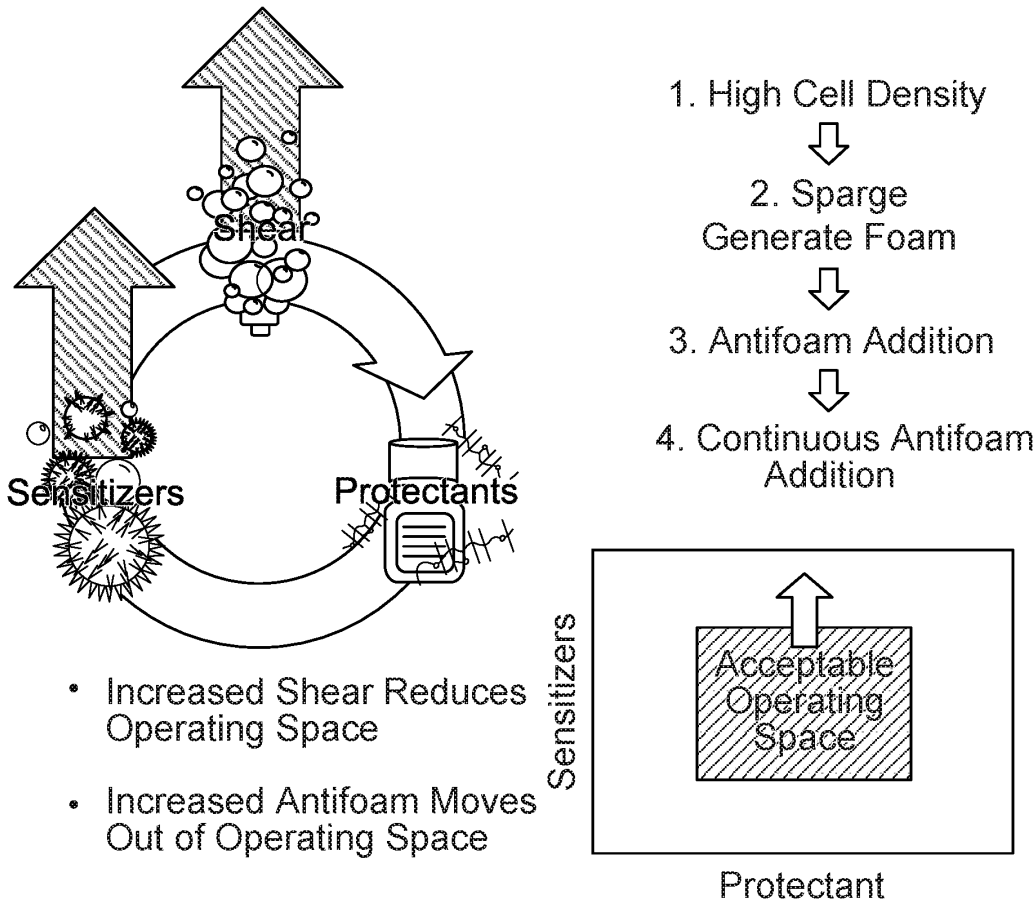


FIG. 2

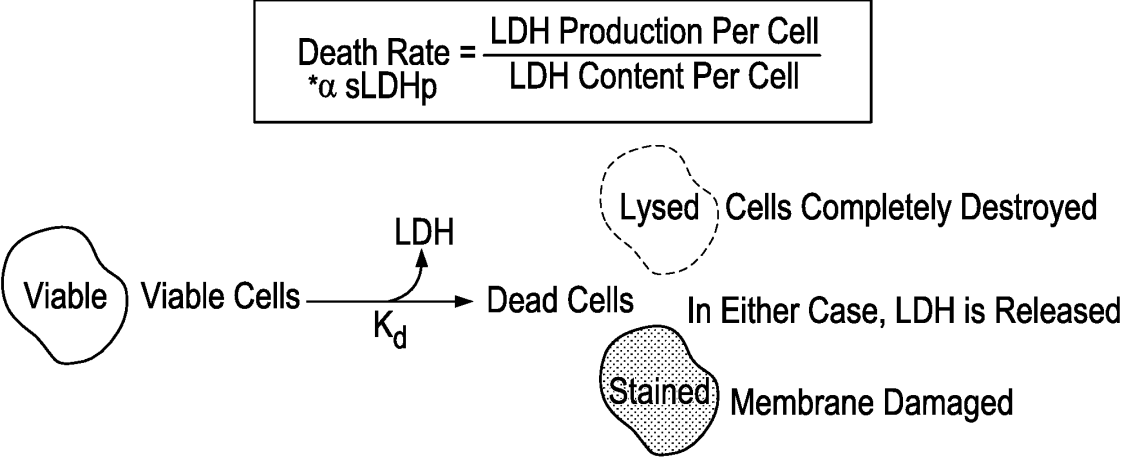


FIG. 3

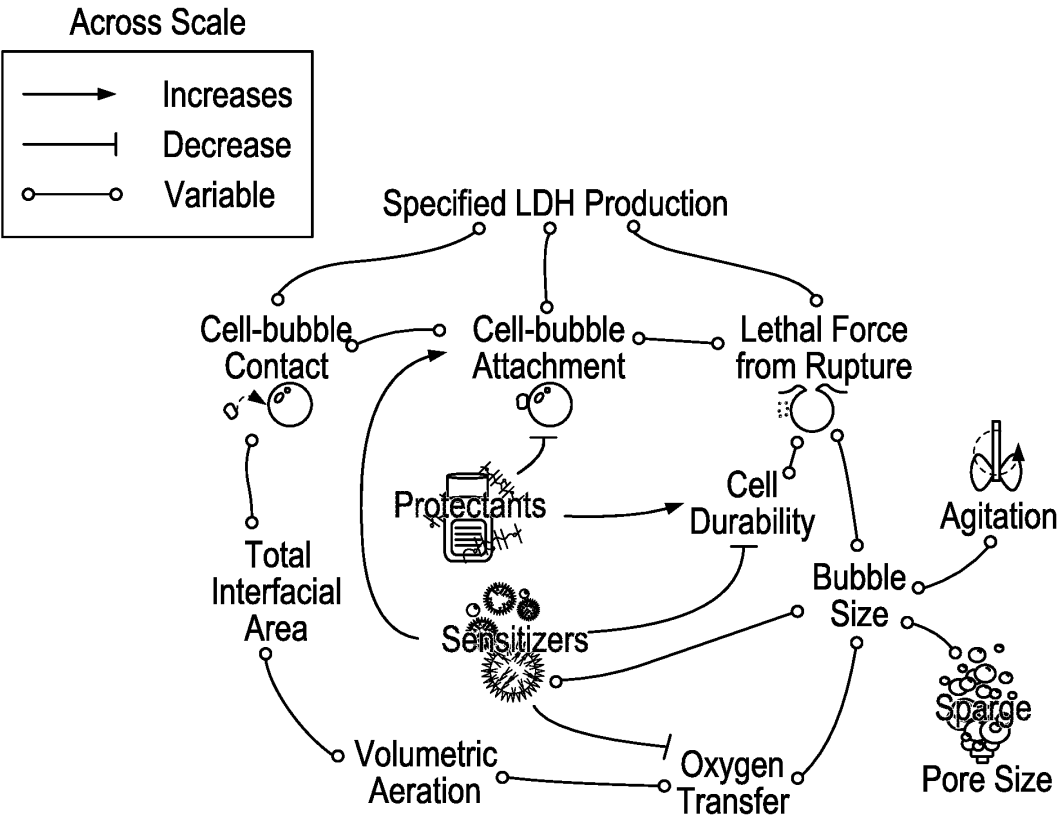


FIG. 4

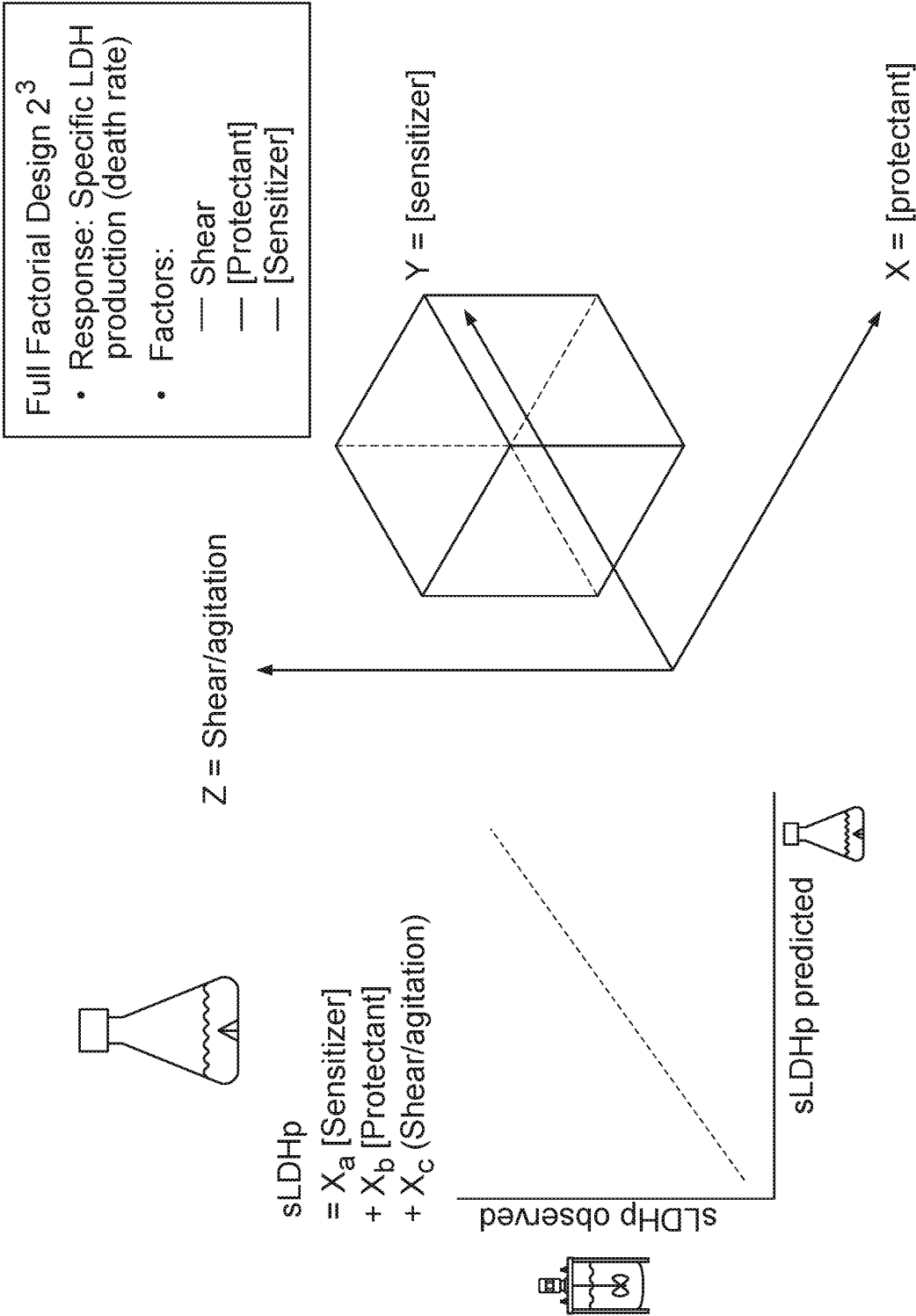


FIG. 5

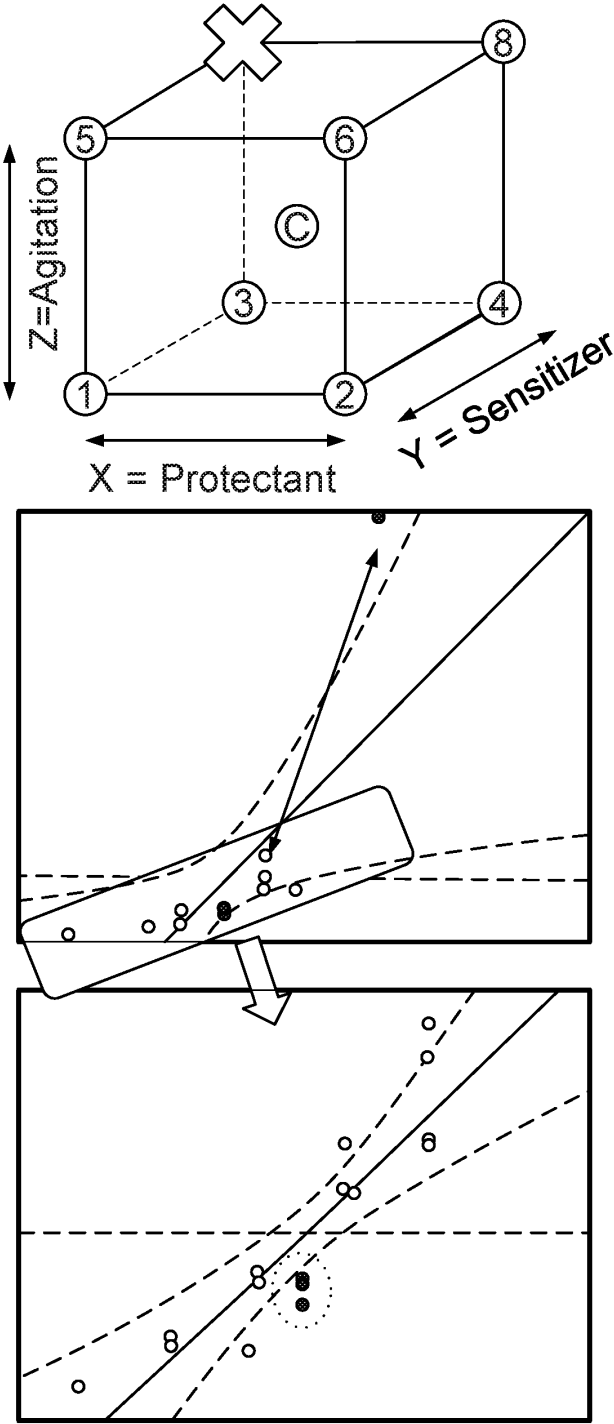
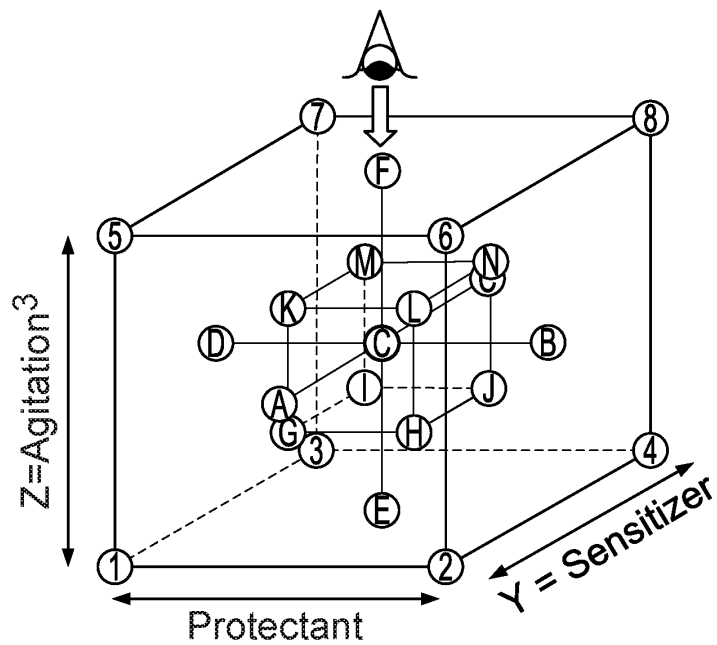


FIG. 6



RPM set to the 3rd power

FIG. 7

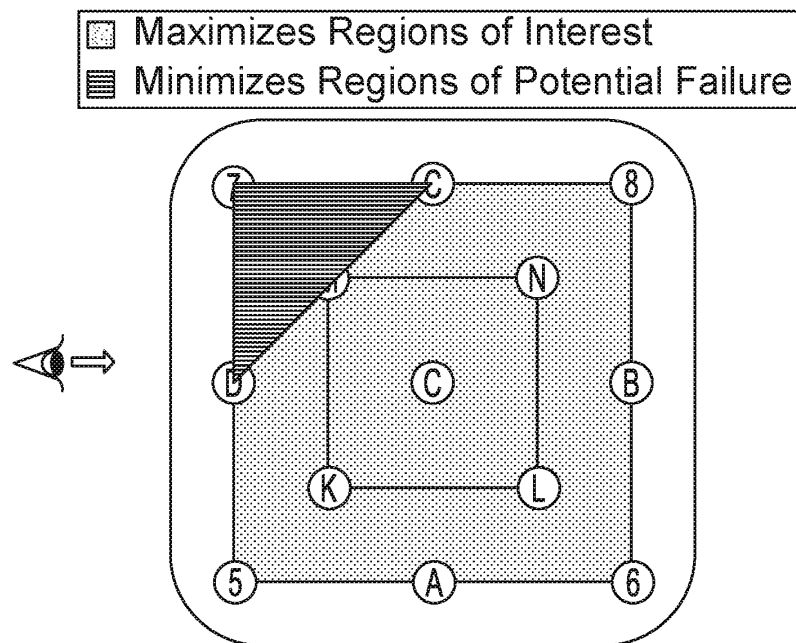
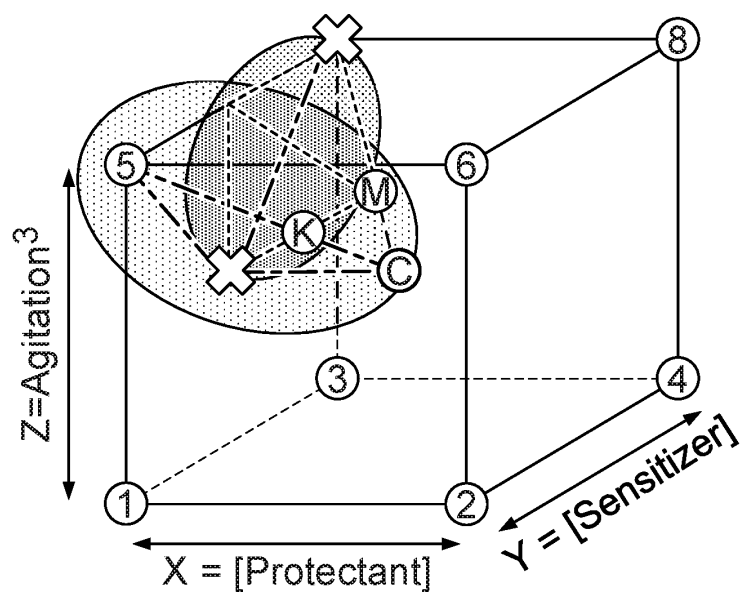


FIG. 8

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Identified Poor Region of Poor Performance/Failure

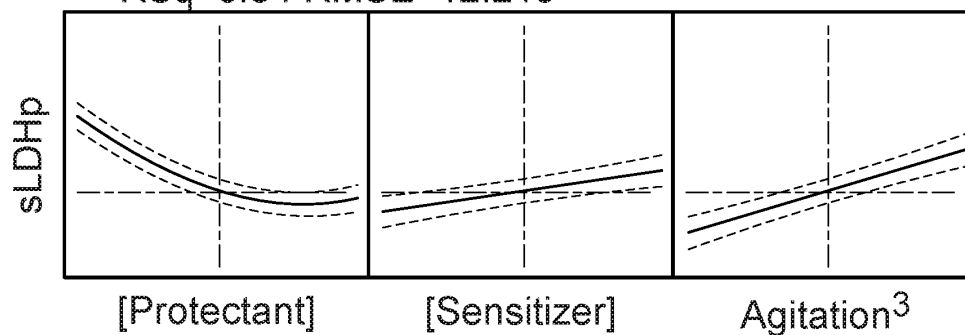
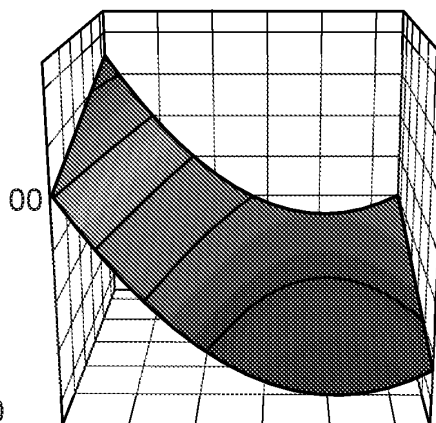
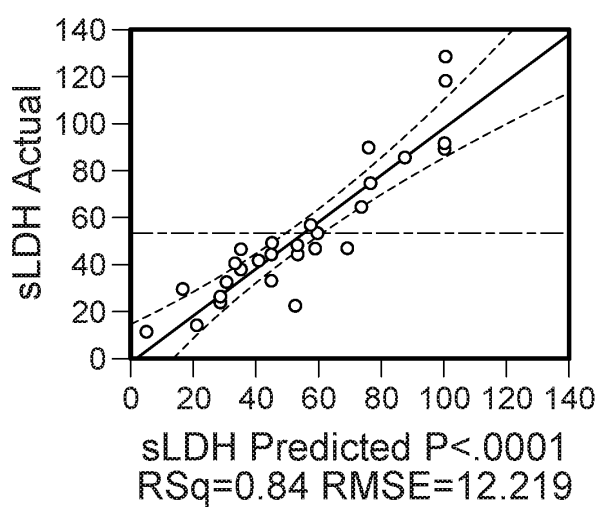


FIG. 9

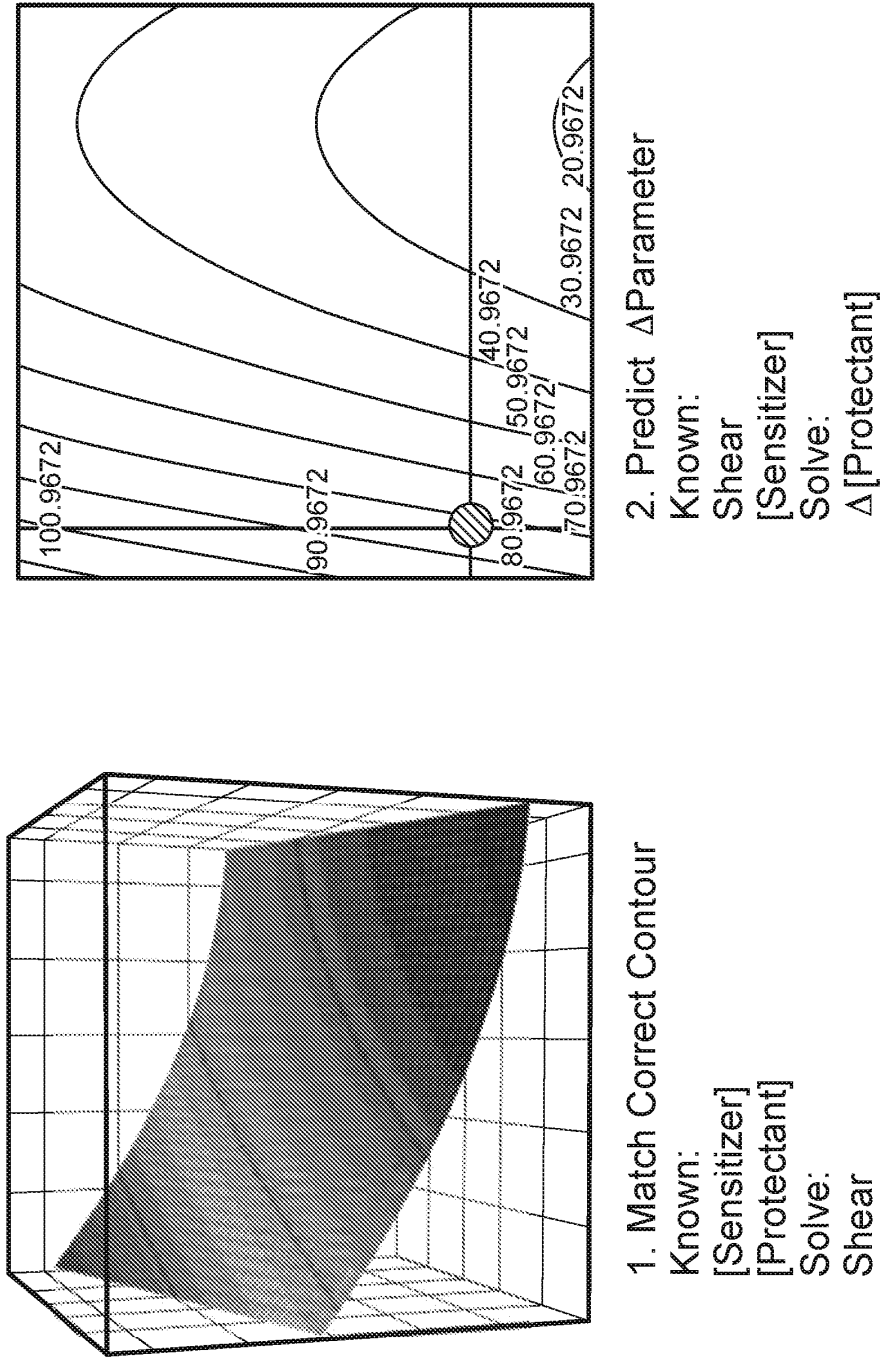


FIG. 10

Process Optimization

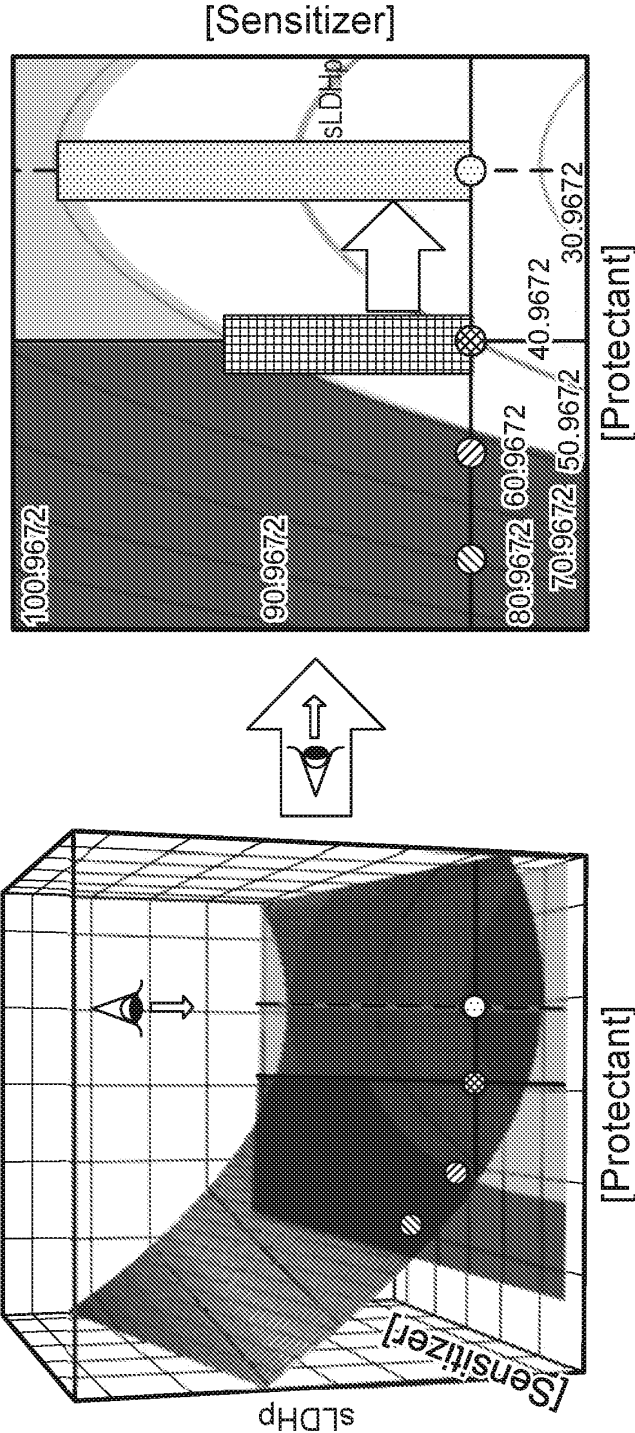


FIG. 11

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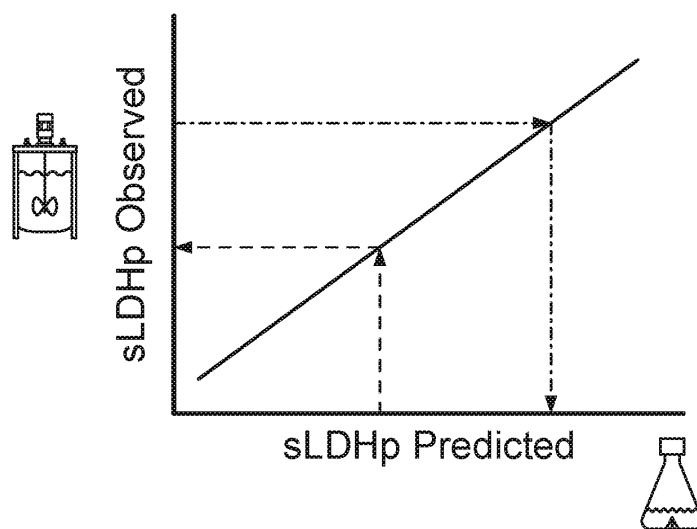


FIG. 12

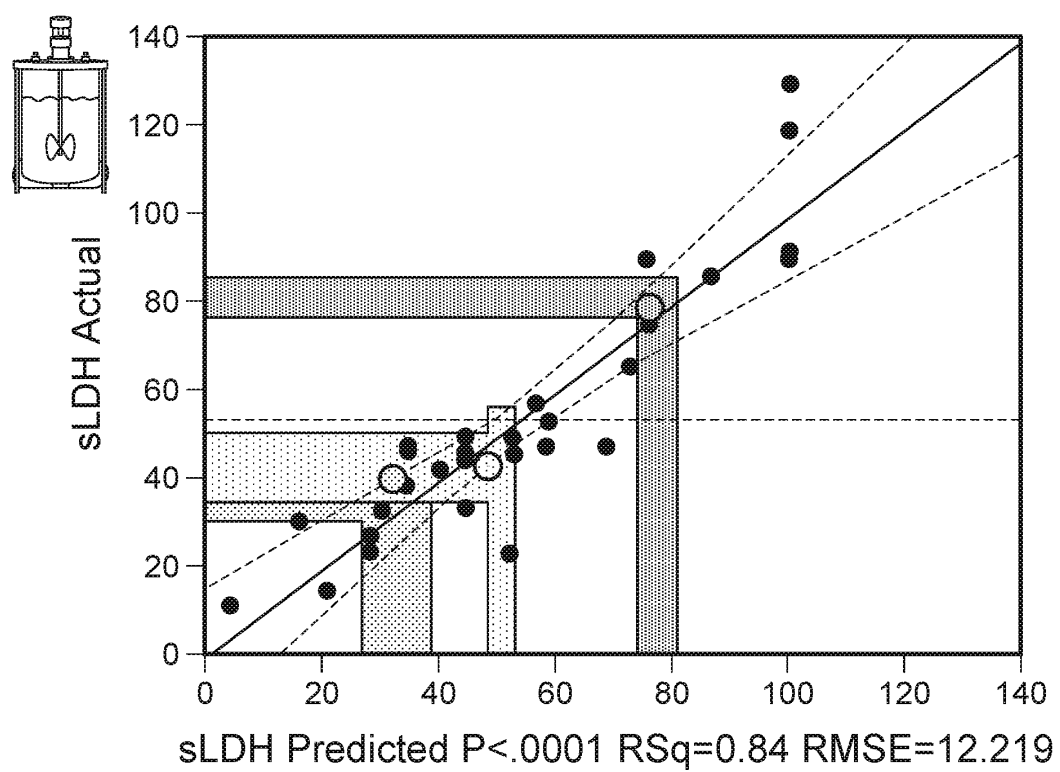


FIG. 13A

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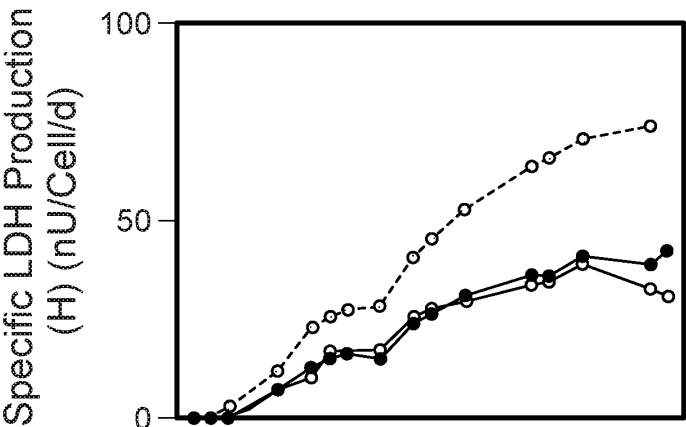
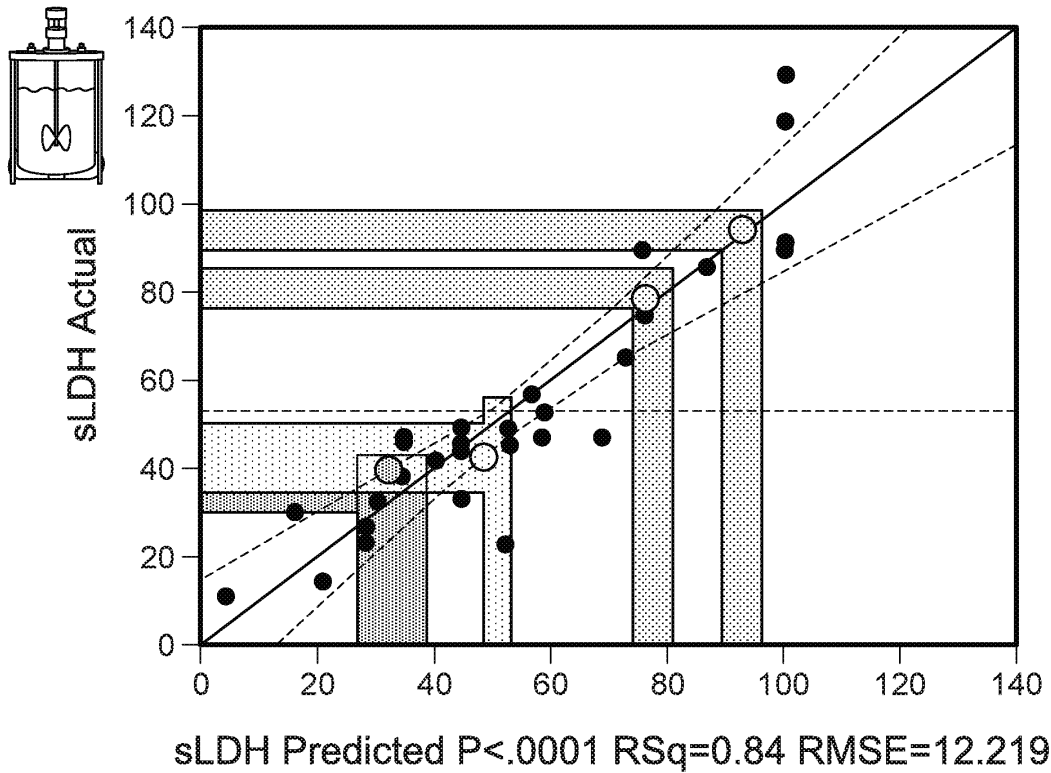


FIG. 13B

10L Benchtop		Shakeflask Model	
Observed LDH		Predicted LDH	
Avg	Std	Avg	Std
39.00	8.49	37.00	4.24
43.00	7.07	54.00	4.24
80.50	3.54	80.00	4.24
Min	Max	Min	Max
30.51	47.49	32.76	41.24
35.93	50.07	49.76	58.24
76.96	84.04	75.76	84.24

FIG. 13C



n=1 for Condition Changed

Antifoam Increased 30ppm to 80ppm			
Observed LDH Range		Predicted LDH Range	
94.74	99.36	90.19	96.38

FIG. 14

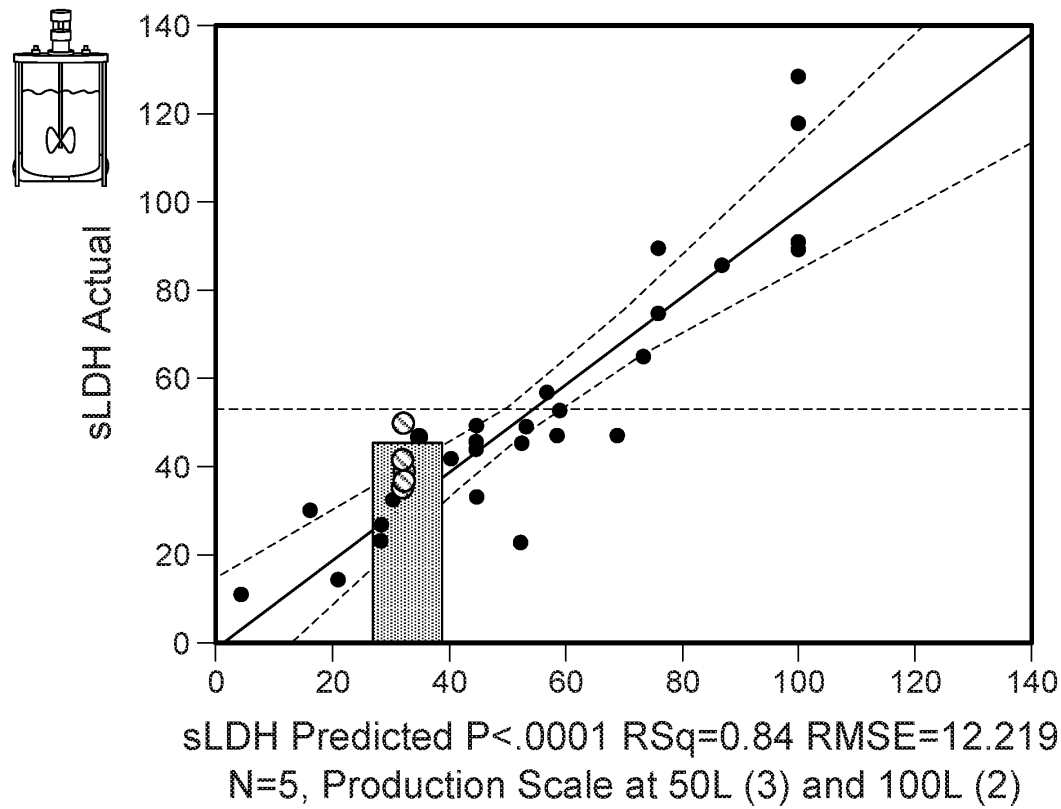


FIG. 15A

LDH		Predicted	
50L		Model	std
S16	39.72	37.00	4.24
S18	51.05	37.00	4.24
S19	39.6	37.00	4.24
100L		37.00	4.24
S27	37.61	37.00	4.24
S28	42.55	37.00	4.24

FIG. 15B