Supplementary Information

Pareto Chart Analysis for AD

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Homogenization Speed*Polymer Type[PLGA502]	2.243195
Porogen(0,7.5)	2.089817
Homogenization Speed*Porogen	-2.072825
Drug Loading*Drug Loading	1.891128
Homogenization Speed*Polymer Type[PLGA752]	-1.201953
Homogenization Speed(4000,8000)	1.157677
Homogenization Speed*Homogenization Speed	-1.038296
Polymer Type[PLGA 502]	-0.994375
Drug Loading*Porogen	0.939968
Drug Loading*Homogenization Speed	-0.802498
Polymer Type[PLGA 752]*Porogen	0.771278
Polymer Type[PLGA 502]*Porogen	0.654856
Drug Loading*PolymerType[PLGA 752]	0.413984
Drug Loading(5,15)	0.303846
Polymer Type[PLGA 752]	-0.211598
Porogen*Porogen	-0.178411
Drug Loading*PolymerType[PLGA 502]	0.033640

Pareto Chart Analysis for FPF

	Orthog
Term	Estimate
Homogenization Speed(4000,8000)	-1.875181
Homogenization Speed*Porogen	1.813834
Polymer Type[PLGA 752]	1.589188
Homogenization Speed*Polymer Type[PLGA502]	-1.450963
Polymer Type[PLGA 502]	1.177590
Homogenization Speed*Polymer Type[PLGA752]	1.089740
Porogen(0,7.5)	-0.985199
Drug Loading*PolymerType[PLGA 752]	-0.702157
Drug Loading*Homogenization Speed	-0.656644
Drug Loading(5,15)	-0.576533
Polymer Type[PLGA 502]*Porogen	0.488987
Homogenization Speed*Homogenization Speed	-0.356634
Porogen*Porogen	-0.223099
Drug Loading*Porogen	-0.198914
Drug Loading*PolymerType[PLGA 502]	0.188189
Polymer Type[PLGA 752]*Porogen	-0.176092
Drug Loading*Drug Loading	0.073667

Supplementary Information

Pareto Chart Analysis for Surface Energy

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Drug Loading*Drug Loading	1.981804
Homogenization Speed*Polymer Type[PLGA502]	1.682276
Porogen(0,7.5)	1.627528
Homogenization Speed*Homogenization Speed	-1.568679
Homogenization Speed*Porogen	-1.481282
Homogenization Speed*Polymer Type[PLGA752]	-1.307950
Homogenization Speed(4000,8000)	1.285177
Polymer Type[PLGA 502]	-1.265447
Polymer Type[PLGA 502]*Porogen	0.895919
Polymer Type[PLGA 752]*Porogen	0.796586
Drug Loading*Porogen	0.682356
Drug Loading*PolymerType[PLGA 752]	0.658121
Porogen*Porogen	0.631283
Polymer Type[PLGA 752]	-0.617239
Drug Loading*PolymerType[PLGA 502]	0.509229
Drug Loading(5,15)	0.308044
Drug Loading*Homogenization Speed	0.223248

Pareto Chart Analysis for GSD

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Polymer Type	1.165441
Homogenization Speed(4000,8000)	-0.972730
Polymer Type[PLGA 502]*Porogen	0.680565
Homogenization Speed*Polymer Type[PLGA752]	0.610128
Homogenization Speed*Porogen	0.580784
Drug Loading*Homogenization Speed	-0.563484
Drug Loading*PolymerType[PLGA 752]	-0.525825
Homogenization Speed*Polymer Type[PLGA502]	-0.518965
Drug Loading*Porogen	-0.394449
Polymer Type[PLGA 752]	-0.228327
Drug Loading*PolymerType[PLGA 502]	0.213914
Porogen(0,7.5)	-0.189308
Homogenization Speed*Homogenization Speed	-0.148004
PolymerType[PLGA 752]*Porogen	0.129715
Porogen*Porogen	0.099389
Drug Loading*Drug Loading	-0.067499
Drug Loading(5,15)	-0.011457

Supplementary Information

Pareto Chart Analysis for Span

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Homogenization Speed*Homogenization Speed	-6.290991
Polymer Type[PLGA 752]*Porogen	-6.144085
Porogen*Porogen	4.657985
Drug Loading*Drug Loading	-4.385057
Polymer Type[PLGA 502]	3.440527
Drug Loading(5,15)	-3.326409
Polymer Type[PLGA 752]	2.961535
Homogenization Speed*PolymerType[PLGA 502]	-2.775466
Polymer Type[PLGA 502]*Porogen	2.638490
Drug Loading*PolymerType[PLGA 752]	-2.202903
Homogenization Speed*Porogen	1.934095
Drug Loading*Porogen	1.797859
Homogenization Speed*Polymer Type[PLGA 752]	-1.625047
Drug Loading*PolymerType[PLGA 502]	0.882288
Porogen(0,7.5)	0.849432
Drug Loading*Homogenization Speed	0.677356
Homogenization Speed(4000,8000)	0.275574

Pareto Chart Analysis for tMMAD

Pareto Plot of Transformed Estimates	Orthog	
Term	Estimate	
Polymer Type[PLGA 752]	2.445332	
Homogenization Speed(4000,8000)	-2.112548	
Homogenization Speed*Porogen	1.721490	
Homogenization Speed*Homogenization Speed	-1.004494	
Drug Loading*PolymerType[PLGA 752]	-0.982454	
Homogenization Speed*Polymer Type[PLGA 502]	-0.963280	
Drug Loading*Homogenization Speed	-0.905474	
Polymer Type[PLGA 502]	0.590661	
Drug Loading(5,15)	-0.580492	
Porogen(0,7.5)	-0.419345	\
Polymer Type[PLGA 502]*Porogen	0.384726	$\langle \rangle$
Drug Loading*Drug Loading	-0.340065	
Drug Loading*PolymerType[PLGA 502]	-0.302886	
Homogenization Speed*Polymer Type[PLGA 752]	0.277747	
Polymer Type[PLGA 752]*Porogen	0.238002)
Porogen*Porogen	0.133375	
Drug Loading*Porogen	-0.051851	

Pareto Chart Analysis for Practical Loading

Term	Orthog Estimate
Polymer Type	-1.030089
Drug Loading(5,15)	0.431438
Homogenization Speed(4000,8000)	0.347023
Drug Loading*Homogenization Speed	0.340844
Homogenization Speed*Polymer Type[PLGA752]	0.179195
Drug Loading*Drug Loading	-0.121513
Homogenization Speed*Homogenization Speed	0.088301
Polymer Type[PLGA 752]	-0.079522
Drug Loading*PolymerType[PLGA 502]	-0.072201
Homogenization Speed*Polymer Type[PLGA502]	0.071613
Drug Loading*Porogen	0.056474
Drug Loading*PolymerType[PLGA 752]	0.043412
Porogen(0,7.5)	0.033790
Polymer Type[PLGA 502]*Porogen	0.030691
Polymer Type[PLGA 752]*Porogen	0.020282
Porogen*Porogen	0.017952
Homogenization Speed*Porogen	0.002683

Pareto Chart Analysis for Geometric diameter

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Homogenization Speed(4000,8000)	6.320550
Porogen(0,7.5)	-5.837903
Polymer Type[PLGA 752]	4.692243
Drug Loading*PolymerType[PLGA 502]	-2.665064
Drug Loading(5,15)	2.543147
Drug Loading*PolymerType[PLGA 752]	-1.801378
Drug Loading*Homogenization Speed	-1.603740
Polymer Type[PLGA 752]*Porogen	1.530611
Polymer Type[PLGA 502]*Porogen	-1.522371
Homogenization Speed*Polymer Type[PLGA752]	-0.705631
Polymer Type[PLGA 502]	0.687497
Homogenization Speed*Porogen	0.614205
Drug Loading*Drug Loading	0.469252
Porogen*Porogen	0.376693
Drug Loading*Porogen	-0.268944
Homogenization Speed*Homogenization Speed	0.141847
Homogenization Speed*Polymer Type[PLGA502]	0.027545

Pareto Chart Analysis for Entrapment Efficiency

Term	Orthog Estimate		
Drug Loading(5,15)	-11.89799		
Polymer Type	-10.60873		1.1
	3.46667		
Homogenization Speed(4000,8000)			
Drug Loading*PolymerType[PLGA 502]	3.14423		
Drug Loading*Drug Loading	2.63478		
Porogen(0,7.5)	2.32297	1.1.1	1
Drug Loading*Homogenization Speed	1.89577		$\langle \rangle$
lomogenization Speed*Polymer Type[PLGA752]	1.77788		
)rug Loading*Porogen	-1.20618	1.1.1	: \
Polymer Type[PLGA 752]	-1.17395		
Drug Loading*PolymerType[PLGA 752]	1.14508		
Homogenization Speed*Homogenization Speed	0.85215		
Porogen*Porogen	-0.78600		
Polymer Type[PLGA 502]*Porogen	-0.57079		1.0
Iomogenization Speed*Polymer Type[PLGA502]	0.44174		
Homogenization Speed*Porogen	0.17245		
Polymer Type[PLGA 752]*Porogen	-0.06335		

Pareto Chart Analysis for Poured Density

Pareto Plot of Transformed Estimates	
Term	Orthog Estimate
Porogen(0,7.5)	-0.1002339
Drug Loading(5,15)	-0.0464886
Drug Loading*Drug Loading	-0.0298719
Homogenization Speed*Polymer Type[PLGA752]	0.0230812
Polymer Type[PLGA 502]*Porogen	0.0214761
Homogenization Speed*Polymer Type[PLGA502]	-0.0205451
Polymer Type[PLGA 502]	-0.0204289
Homogenization Speed(4000,8000)	-0.0179018
Drug Loading*Porogen	0.0173874
Polymer Type[PLGA 752]*Porogen	-0.0144076
Polymer Type[PLGA 752]	-0.0032800
Drug Loading*Homogenization Speed	-0.0029030
Drug Loading*PolymerType[PLGA 752]	0.0026640
Homogenization Speed*Homogenization Speed	-0.0020413
Drug Loading*PolymerType[PLGA 502]	0.0015298
Homogenization Speed*Porogen	-0.0010855
Porogen*Porogen	-0.0006207

Pareto Chart Analysis for Tapped Density

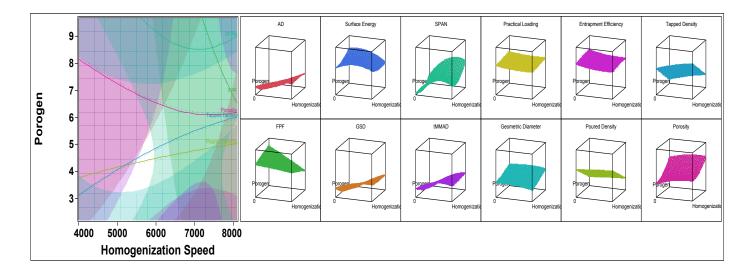
	Orthog	
Term	Estimate	
Porogen(0,7.5)	-0.1028939	
Drug Loading(5,15)	-0.0542184	
Polymer Type[PLGA 502]*Porogen	0.0313457	
Homogenization Speed*Polymer Type[PLGA502]	-0.0278007	
Drug Loading*Drug Loading	-0.0266542	
Drug Loading*Porogen	0.0242877	
Homogenization Speed*Polymer Type[PLGA752]	0.0206432	
Polymer Type[PLGA 502]	-0.0158172	
Polymer Type[PLGA 752]*Porogen	-0.0146278	
Homogenization Speed(4000,8000)	-0.0135192	
Drug Loading*Homogenization Speed	-0.0079179	
Homogenization Speed*Homogenization Speed	-0.0052158	
Polymer Type[PLGA 752]	-0.0040664	
Drug Loading*PolymerType[PLGA 752]	-0.0016025	
Homogenization Speed*Porogen	-0.0009106	
Porogen*Porogen	0.0003881	
Drug Loading*PolymerType[PLGA 502]	0.0002626	

Pareto Chart Analysis for Porosity

Pareto Plot of Transformed Estimates		
Term	Orthog Estimate	
Porogen(0,7.5)	0.0885999	
Drug Loading*Drug Loading	0.0247220	
Drug Loading(5,15)	0.0216396	
Drug Loading*PolymerType[PLGA 502]	-0.0190575	
Porogen*Porogen	0.0189280	
Polymer Type[PLGA 502]	0.0183712	
Drug Loading*Porogen	0.0151048	
Homogenization Speed(4000,8000)	0.0130415	
Homogenization Speed*Porogen	-0.0129845	
Polymer Type[PLGA 752]*Porogen	0.0125243	
Polymer Type[PLGA 752]	0.0115386	
Polymer Type[PLGA 502]*Porogen	0.0093044	
Homogenization Speed*Polymer Type[PLGA752]	-0.0087174	
Homogenization Speed*Polymer Type[PLGA502]	0.0055501	
Homogenization Speed*Homogenization Speed	0.0027235	
Drug Loading*Homogenization Speed	0.0023986	
Drug Loading*PolymerType[PLGA 752]	0.0019547	

Surface profiler explaining the relationship between factors and responses measurements of VLPP fabricated from PLA. This has been mentioned as supplementary information since design space was only identified in the case of VLPP fabricated from PLA.

A) Surface profiler between porogen and homogenization speed and its relation with various response parameters measured



B) Surface profiler between porogen and drug loading and its relation with various response

AD Surface Eneroy SPAN Practical Loading Entranment Efficienc Tanned Densit 9 8 7 Porogen 6 Poured Densit GSD IMMAR 5-4 3ug Lo Drug Lo rug Lo nuo Loa Drug Lo 12.5 5 7.5 10 15 Drug Loading

parameters measured

C) Surface profiler between homogenization speed and drug loading and its relation with various response parameters measured

