Supplementary material

Progressing Towards the Sustainable Development of Cream Formulations

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Table S1. ANOVA parameter summary of fitted model's characterization.

CQAs	Regression			Lack of fit	
	F_1	Prob > F	R^2	F_2	Prob > F
Droplet size	12.9885	0.0057**	0.958982	2.5973	0.2902
η_{10}	29.8836	0.0008**	0.981749	1.5428	0.4165
S_R	14.9581	0.0041**	0.964189	6.1523	0.143
LVR plateau	7.8369	0.0177*	0.933803	19.232	0.0498*
τ_0	5.2838	0.0407*	0.90486	1.9635	0.355
τ_f	3.4703	0.0921	0.862004	23.756	0.0407*
$G`$	6.9352	0.0231*	0.925835	32.4403	0.0301*
$G``$	5.6682	0.0353*	0.910736	35.2677	0.0277*
$tan\ \delta$	2.4786	0.1651	0.816897	2.3963	0.308
c_1	0.9974	0.5317	0.642256	5.1618	0.166
c_2	2.4233	0.1712	0.813503	6.8294	0.1340
R_{6h}	0.5377	0.8027	0.49183	5.0926	0.1685
R_{24h}	3.0795	0.1142	0.847167	3.8964	0.2109
J_{ss}	1.2724	0.4151	0.696082	0.0308	0.9907
K_p	1.064	0.5004	0.65696	0.0406	0.9863
Q_{6h}	0.5377	0.8027	0.49183	5.0926	0.1685
Q_{24h}	0.6115	0.7545	0.523969	0.1184	0.9415
Q_{48h}	0.7798	0.6494	0.583961	0.0439	0.9846
Assay	2.5771	0.1548	0.822655	22.0697	0.0437*
pH	6.7825	0.0242*	0.924291	0.0845	0.9623
Instability index	31.6506	0.0007**	0.98275	1.9759	0.3534
Sedimentation rate	1.7489	0.279	0.758916	23.7031	0.0408*
Creaming rate	38.8792	0.0004**	0.985912	73.7965	0.0134*

Signif. codes: ´***`0.001´**`0.01 ´*`0.05.

Table S2. Coefficients values and Student's t-test analysis.

CQAs	Regression	β_0	β_1	β_2	β_3	β_{12}	β_{13}	β_{23}	β_{11}	β_{22}	β_{33}
	Coefficient value	2.59	0.195	-0.027	-0.566	0.095	0.158	-0.246	0.0013	-0.1213	-0.126
Droplet size	t Ratio	26.19	3.23	-0.45	-9.41	1.12	1.86	-2.9	0.01	-1.37	26.19
	Prob >|t|	**<0.0001*** **	**0.0233***	0.6682	**0.0002****	0.3152	0.1216	**0.0339***	0.9893	0.2294	**<0.0001*** **
	Coefficient value	7.127	4.382	0.075	0.358	0.32	0.8398	-0.08	-1.49	0.095	-0.025
η_{10}	t Ratio	15.72	15.85	0.27	1.3	0.82	2.16	-0.21	-3.67	0.23	15.72
	Prob >|t|	**<0.0001*** **	**<0.0001*** **	0.7967	0.2515	0.4493	0.0835	0.8453	**0.0144***	0.8243	**<0.0001*** **
	Coefficient value	16490.457	33638.394	1374.818	3949.038	-1728.925	-343.890	995.626	17440.783	4531.708	16490.457
S_R	t Ratio	3.23	10.79	0.44	1.27	-0.39	-0.08	0.23	3.81	0.99	3.23
	Prob >|t|	**0.0233***	**0.0001****	0.6776	0.2602	0.7105	0.9406	0.8296	**0.0125***	0.3678	**0.0233***
	Coefficient value	4483.521	15139.833	-469.379	1463.244	-3911.885	-1055.075	2803.487	9620.348	3279.695	4483.5214
LVR plateau	t Ratio	1.34	7.42	-0.23	0.72	-1.36	-0.37	0.98	3.21	1.09	1.34
	Prob >|t|	0.2375	**0.0007****	0.8271	0.5043	0.2322	0.7284	0.3738	**0.0237***	0.3235	0.2375
	Coefficient value	17.92	19.524	-11.92	0.169	-8.258	-0.402	4.165	-0.083	13.6	17.92
τ_0	t Ratio	2.93	5.24	-3.2	0.05	-1.57	-0.08	0.79	-0.02	2.48	2.93
	Prob >|t|	**0.0325***	**0.0034****	**0.024***	0.9656	0.1772	0.9419	0.4635	0.9884	0.0555	**0.0325***
	Coefficient value	23.249	35.7	-10.121	-1.6	-0.622	-4.039	6.226	9.389	22.574	23.249
τ_f	t Ratio	1.92	4.83	-1.37	-0.22	-0.06	-0.39	0.6	0.87	2.08	1.92
	Prob >|t|	0.1129	**0.0047****	0.2289	0.8367	0.9547	0.7138	0.5756	0.4264	0.092	0.1129
	Coefficient value	4508.099	17153.397	-1032.435	1810.603	-5289.17	-985.054	3239.560	11356.588	4452.188	4508.099
$G`$	t Ratio	1.1	6.87	-0.41	0.73	-1.5	-0.28	0.92	3.09	1.21	1.1
	Prob >|t|	0.3211	**0.001****	0.6965	0.5003	0.1939	0.7907	0.3995	**0.027***	0.2792	0.3211

	Coefficient value	1234.326	6135.938	-387.326	672.716	-2222.433	-479.471	1432.262	4308.715	1234.326	6135.938
$G``$	t Ratio	0.75	6.08	-0.38	0.67	-1.56	-0.34	1.01	2.9	0.75	6.08
	Prob >|t|	0.4893	**0.0017****	0.7171	0.534	0.1796	0.7497	0.3601	**0.0336***	0.4893	**0.0017****
	Coefficient value	0.26480	$1.21e^{-03}$	$6.17e^{-04}$	0.04538	0.01425	-0.06970	0.02458	0.06825	$5.00e^{-04}$	0.03945
tan δ	t Ratio	8.64	0.06	0.03	2.43	0.54	-2.65	0.93	2.48	0.02	1.42
	Prob >|t|	**0.0003****	0.951	0.9749	0.0593	0.6124	**0.0456***	0.3935	0.0555	0.9862	0.2144
	Coefficient value	126.31	3.3484	-7.7206	7.1475	5.585	-11.448	-8.731	19.732	2.242	16.218
c_1	t Ratio	10.04	0.44	-1.01	0.93	0.52	-1.06	-0.81	1.75	0.20	1.42
	Prob >|t|	**0.0002***	0.6808	0.3606	0.3936	0.6281	0.3380	0.4559	0.1405	0.8502	0.2138
	Coefficient value	0.5127	-0.0146	0.0007	0.0413	0.0055	-0.0224	0.0412	-0.0003	0.0003	0.0028
c_2	t Ratio	26.49	-1.24	0.06	3.50	0.33	-1.35	2.48	-0.01	0.01	0.16
	Prob >|t|	**<0.0001*****	0.2699	0.9519	**0.0173***	0.7548	0.2351	0.056	0.9891	0.9891	0.8805
	Coefficient value	1.76424	0.02716	0.05	-0.025	-0.05	0.04753	$-3.46e^{-18}$	0.01667	-0.03333	0.01910
R_{6h}	t Ratio	28.31	0.71	1.31	-0.66	-0.93	0.89	0	0.3	-0.6	0.34
	Prob >|t|	**<.0001*****	0.507	0.2456	0.5391	0.3942	0.4154	1	0.7774	0.5766	0.7488
	Coefficient value	10.82357	-0.78275	1.40621	1.78875	0.56500	-3.55293	0.46671	3.74792	0.93542	3.11101
R_{24h}	t Ratio	7.27	-0.86	1.55	1.97	0.44	-2.78	0.37	2.81	0.7	2.31
	Prob >|t|	**0.0008***	0.428	0.1821	0.1053	0.6776	**0.039***	0.73	**0.0375***	0.5143	0.069
	Coefficient value	0.65803	0.03875	-0.02483	-0.072	-0.03	0.0303	-0.01002	-0.13992	-0.20342	-0.15087
J_{ss}	t Ratio	6.58	0.63	-0.41	-1.18	-0.35	0.35	-0.12	-1.56	-2.27	-1.67
	Prob >|t|	**0.0012****	0.5534	0.701	0.2903	0.7418	0.7389	0.9118	0.1794	0.0726	0.1567
	Coefficient value	0.01725	$6.36e^{-04}$	$-3.27e^{-04}$	$-1.64\ e^{-03}$	$8.75e^{-05}$	$4.56E^{-04}$	$1.98E^{-04}$	$-3.15\ e^{-03}$	$-5.35\ e^{-03}$	$-3.94e^{-03}$
K_p	t Ratio	6.43	0.39	-0.2	-1	0.04	0.2	0.09	-1.31	-2.22	-1.62
	Prob >|t|	**0.0013****	0.7136	0.8493	0.3616	0.9712	0.851	0.935	0.2471	0.0767	0.1656
	Coefficient value	1.76424	0.02716	0.05	-0.025	-0.05	0.04753	-3.463^{-18}	0.01667	-0.03333	0.01910

Q_{6h}	t Ratio	28.31	0.71	1.31	-0.66	-0.93	0.89	0	0.3	-0.6	0.34
	Prob >|t|	**<0.0001*** **	0.507	0.2456	0.5391	0.3942	0.4154	1	0.7774	0.5766	0.7488
Q_{24h}	**Coefficient value**	6.29618	0.62449	-0.12449	-0.5	0.25	-0.01132	0.01132	-0.79167	-1.29167	-1.00451
	t Ratio	6.28	1.02	-0.2	-0.82	0.29	-0.01	0.01	-0.88	-1.44	-1.11
	Prob >|t|	**0.0015****	0.3543	0.8468	0.4501	0.7838	0.99	0.99	0.4188	0.2102	0.319
Q_{48h}	**Coefficient value**	25.84479	2.76132	-0.76337	-2.25	0.25	0.24897	-0.29424	-5.125	-6.625	-5.96979
	t Ratio	5.55	0.97	-0.27	-0.79	0.06	0.06	-0.07	-1.23	-1.59	-1.42
	Prob >|t|	**0.0026****	0.376	0.799	0.4637	0.9527	0.9528	0.9443	0.2743	0.1735	0.2162
Assay	**Coefficient value**	109.23	1.62426	-4.51307	-1.16	-11.08250	11.36870	-8.09745	-8.07375	2.29625	-5.50378
	t Ratio	21.33	0.52	-1.44	-0.37	-2.51	2.58	-1.84	-1.76	0.5	-1.19
	Prob>|t|	**<0.0001*** **	0.6253	0.2081	0.7251	0.0536	0.0492*	0.1251	0.1388	0.638	0.2884
pH	**Coefficient value**	6.69280	0.04441	$3.60e^{-04}$	0.03	0.0325	0.01460	0.03542	-0.02875	$-3.75e^{-03}$	$-9.05e^{-03}$
	t Ratio	476.18	5.18	0.04	3.51	2.69	1.21	2.93	-2.28	-0.3	-0.71
	Prob >|t|	**0.0035****	**0.0035****	0.9681	**0.0172***	**0.0435***	0.2808	**0.0325***	0.0713	0.7779	0.5087
Instability index	**Coefficient value**	0.12260	-0.10978	0.02638	-0.01225	$8.75e^{-03}$	$-3.38e^{-03}$	-0.01081	0.05154	-0.01046	$-5.64e^{-03}$
	t Ratio	10.51	-15.43	3.71	-1.73	0.87	-0.34	-1.08	4.93	-1	-0.53
	Prob >|t|	**0.0001****	**<0.0001*** **	**0.0139***	0.145	0.4234	0.7493	0.33	**0.0044****	0.3629	0.616
Sedimentation rate	**Coefficient value**	0.11150	$5.57e^{-03}$	-0.01075	-0.03545	0.04355	-0.01144	0.03656	0.01143	0.03350	-0.02645
	t Ratio	4.16	0.34	-0.66	-2.17	1.89	-0.5	1.59	0.48	1.4	-1.09
	Prob >|t|	**0.0088****	0.7472	0.5396	0.0817	0.1176	0.6402	0.173	0.6541	0.2216	0.3252
Creaming rate	**Coefficient value**	0.05321	-0.16185	0.0297104	$-7.13e^{-03}$	-0.02299	$-5.97e^{-03}$	-0.01407	0.12435	-0.01906	0.01752
	t Ratio	3.24	-16.15	2.96	-0.71	-1.62	-0.42	-1	8.44	-1.29	1.18
	Prob >|t|	**0.0230***	**<0.0001*** **	**0.0314***	0.5078	0.1651	0.69	0.3647	**0.0004****	0.252	0.292

Signif. codes: 0 ´***`0.001´**`0.01 ´*`0.05