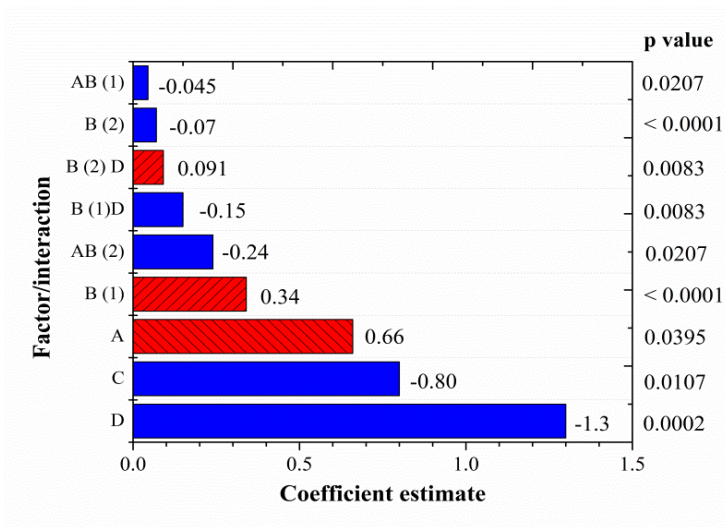
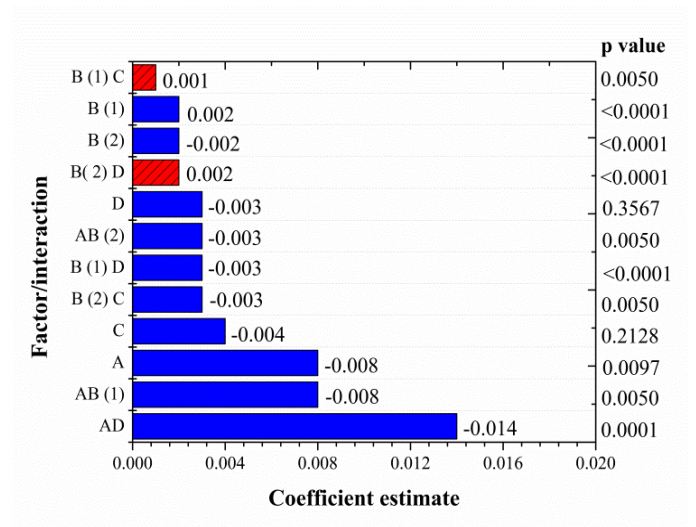


## Supplementary material



(a)



(b)

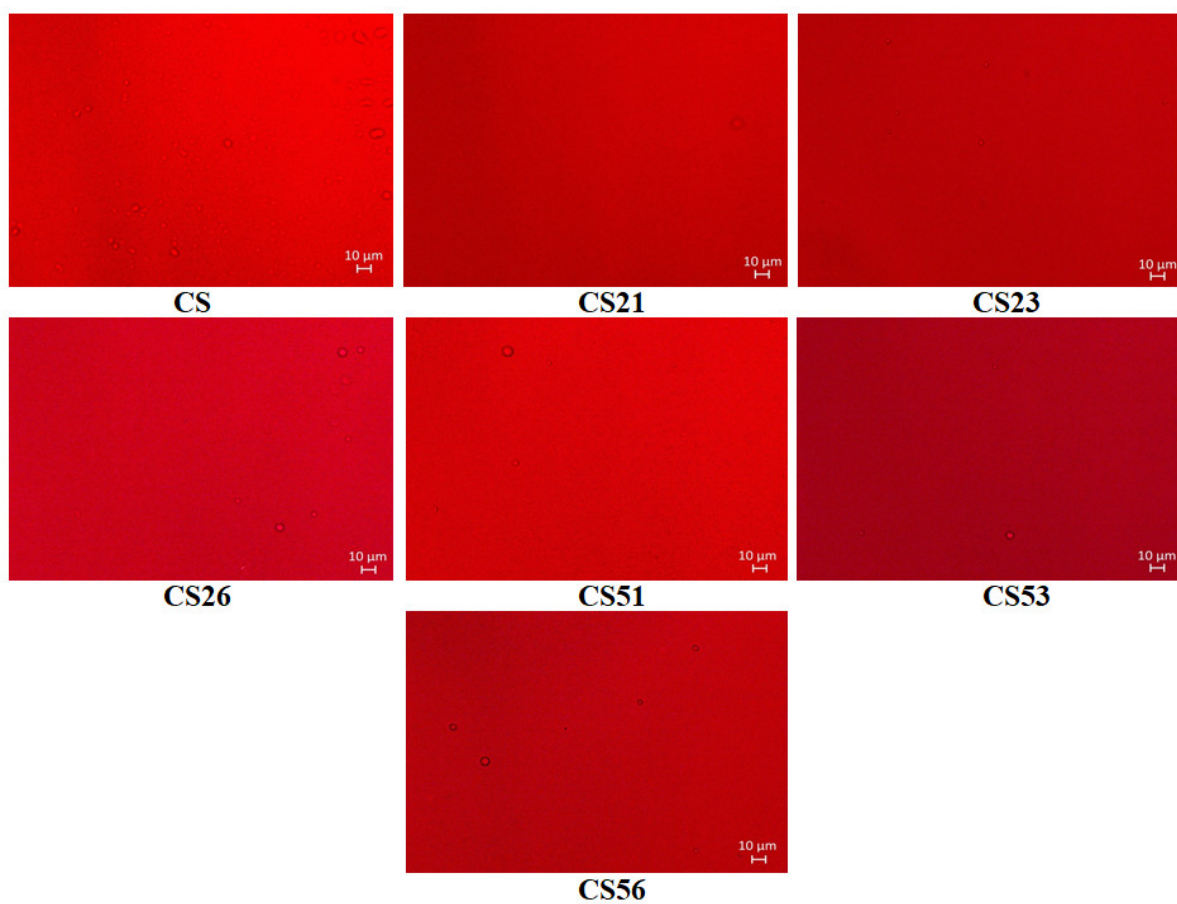
**Figure S1.** Plots for: a) Z-ave – mean droplet size and b) PDI - polydispersity index, with the coefficient and p values for the factors and their interactions. A: PEG-PL type; B: PEG-PL concentration; C- oil type and D: the presence of curcumin.

**Table S1.** Results of laser diffraction (LD) measurements for soybean oil formulations stored at room temperature for two years.

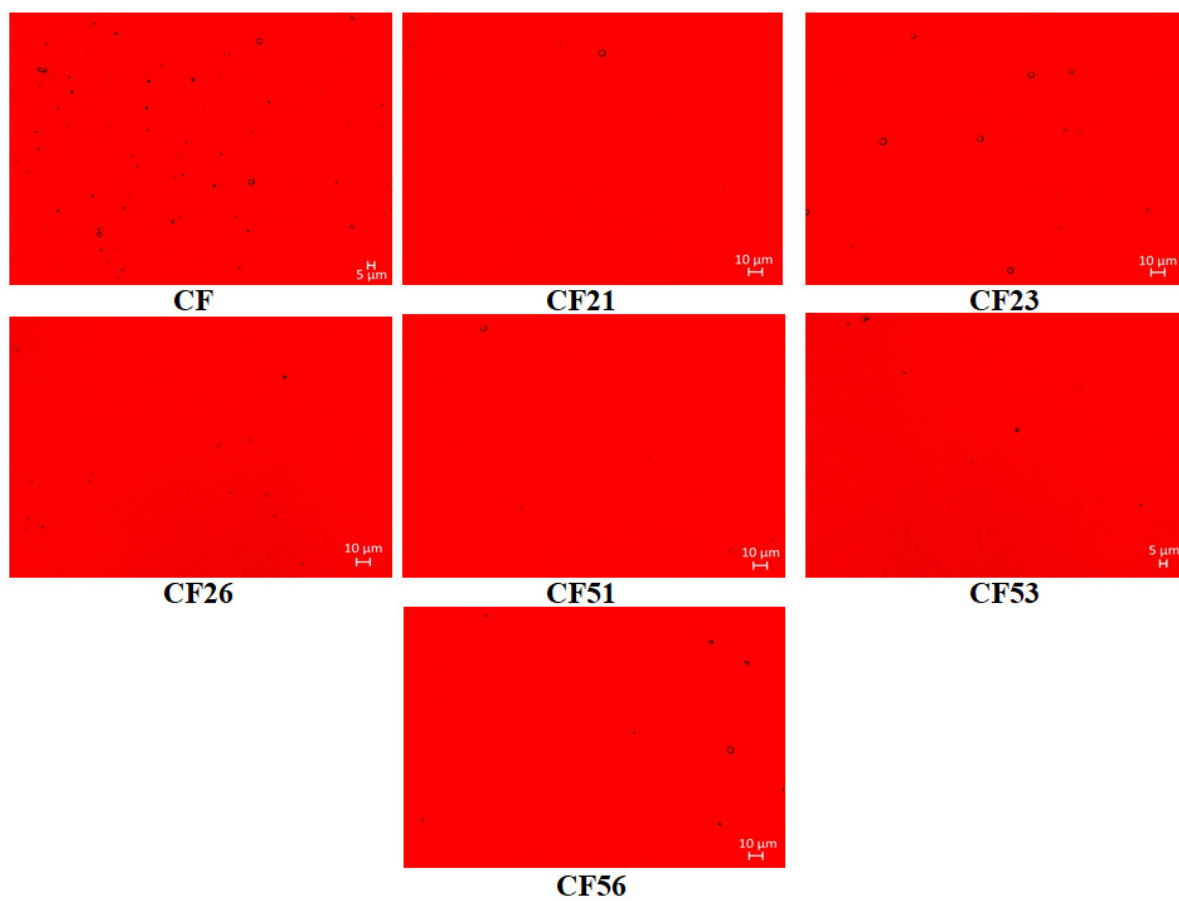
<b>Formulations</b>	<b>d (10) (nm)</b>	<b>d (50) (nm)</b>	<b>d (90) (nm)</b>	<b>D [4,3] (nm)</b>
<b>PS</b>	78	116	173	122
<b>CS</b>	78	117	173	122
<b>S21</b>	76	114	173	120
<b>CS21</b>	76	113	168	118
<b>S23</b>	74	109	163	115
<b>CS23</b>	75	112	166	117
<b>S26</b>	74	109	163	115
<b>CS26</b>	75	111	165	117
<b>S51</b>	76	113	169	118
<b>CS51</b>	76	113	168	118
<b>S53</b>	74	109	164	115
<b>CS53</b>	75	112	167	117
<b>S56</b>	73	106	159	112
<b>CS56</b>	76	112	166	117

**Table S2.** Results of laser diffraction (LD) measurements for fish oil formulations stored at room temperature for two years.

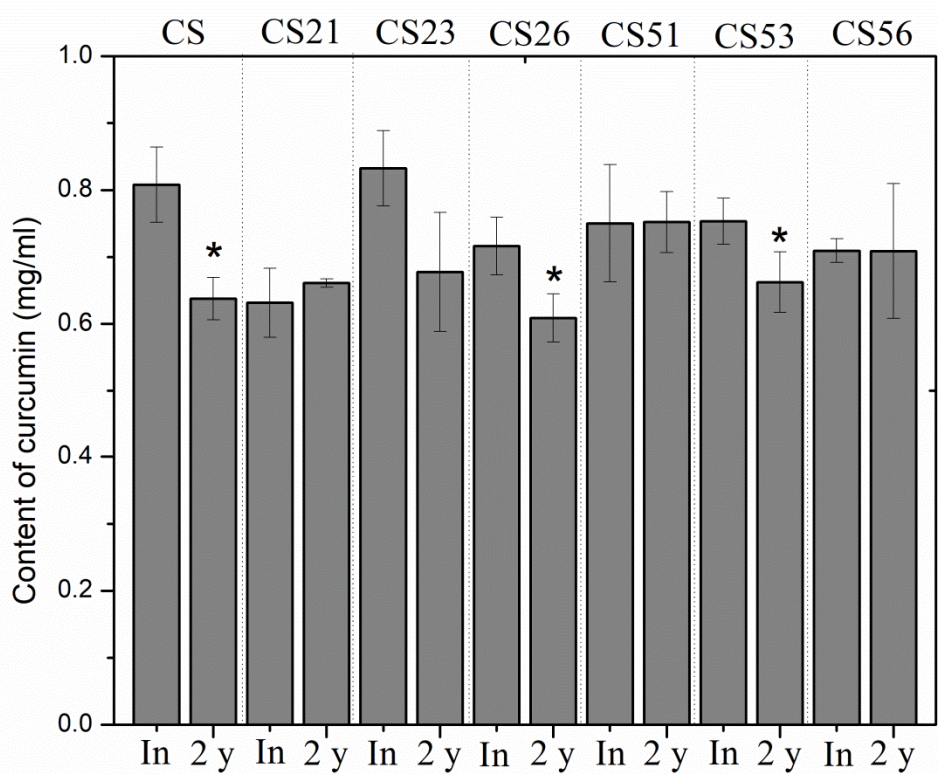
<b>Formulations</b>	<b>d (10) (nm)</b>	<b>d (50) (nm)</b>	<b>d (90) (nm)</b>	<b>D [4,3] (nm)</b>
<b>PF</b>	224	309	421	317
<b>CF</b>	78	116	173	121
<b>F21</b>	74	109	163	115
<b>CF21</b>	76	112	167	118
<b>F23</b>	73	106	159	112
<b>CF23</b>	76	114	171	120
<b>F26</b>	74	109	162	114
<b>CF26</b>	76	112	167	117
<b>F51</b>	76	112	167	118
<b>CF51</b>	76	113	168	118
<b>F53</b>	79	122	207	1378
<b>CF53</b>	76	112	167	117
<b>F56</b>	79	120	195	1897
<b>CF56</b>	76	112	167	117



**Figure S2.** Polarization microscopy images of the curcumin-loaded soybean oil NEs taken after two years of storage.

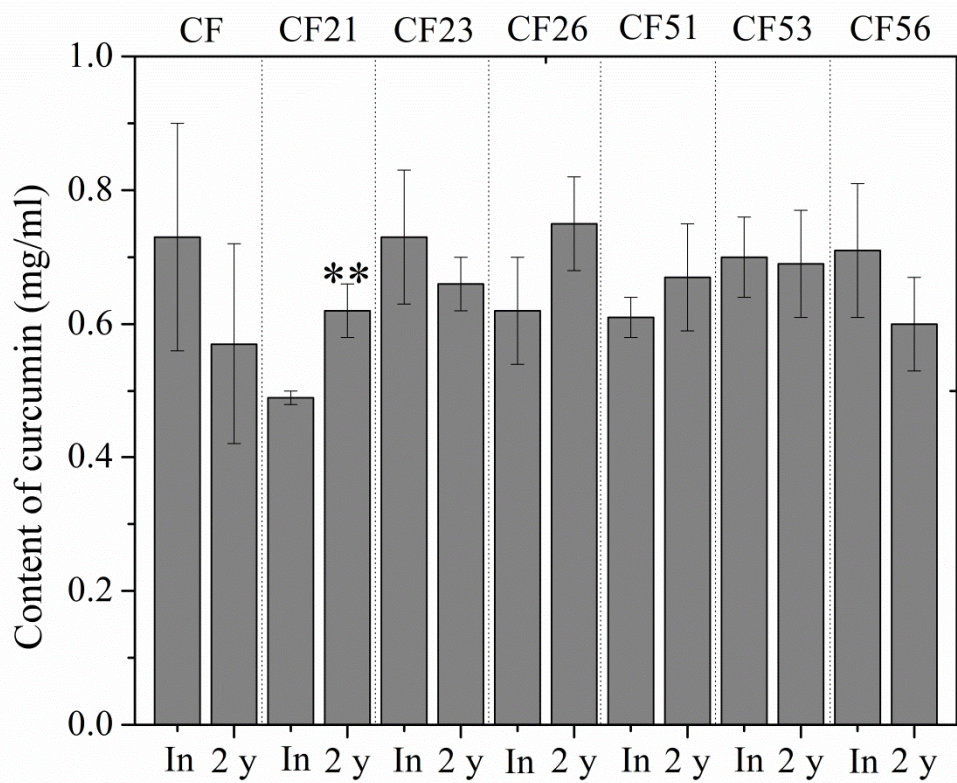


**Figure S3.** Polarization microscopy images of the curcumin-loaded fish oil NEs taken after two years of storage.

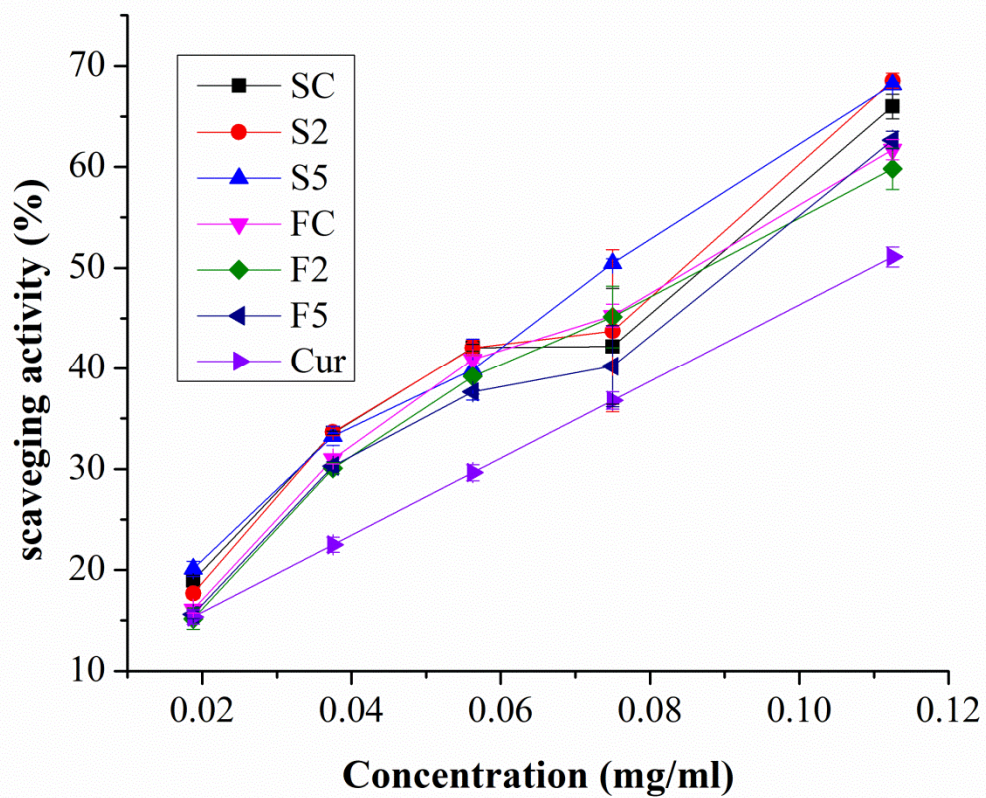


**Figure S4.** Content of curcumin in soybean oil nanoemulsions measured initially (In) and after two years of storage (2y); Values are shown as means  $\pm$  sd (n = 3); \*, p < 0.05, compared to the initially measured values.



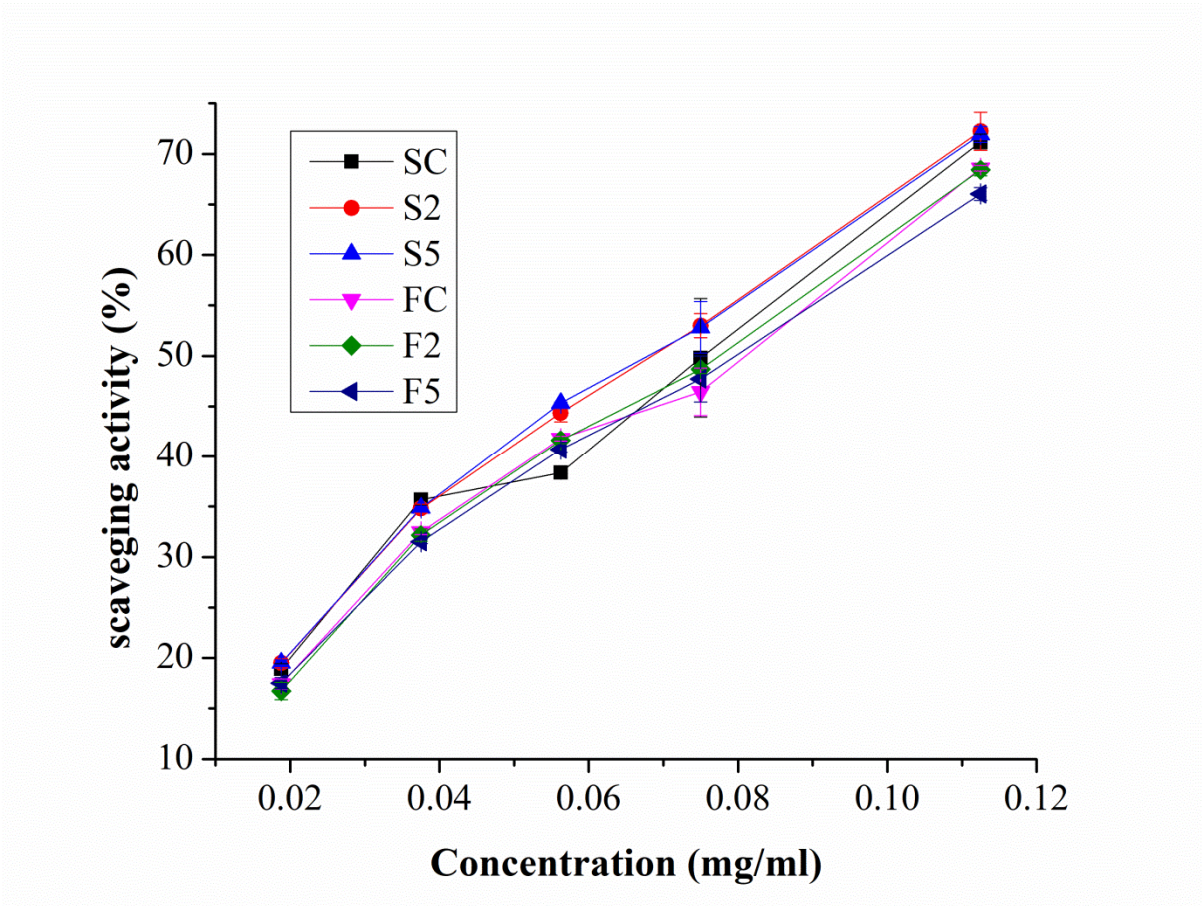


**Figure S5.** Content of curcumin in fish oil nanoemulsions measured initially (In) and after two years of storage (2y); Values are shown as means  $\pm$  sd (n = 3); \*\*, p < 0.01, compared to the initially measured values.



**Figure S6.** DPPH assay results for freshly prepared nanoemulsions with soybean oil (SC, S21, S51), fish oil (FC, F21, F51) and pure curcumin (Cur).





**Figure S7.** DPPH assay results for nanoemulsions with soybean oil (SC, S21, S51) and fish oil (FC, F21, F51) after two years of storage.

**Table S3.** Dissolution modelling for non-PEGylated formulations.

	Formulations	
	CS	CF
Zero order	<b>K = 0.100</b> <b>R<sup>2</sup> = 0.9918</b> <b>R<sup>2</sup><sub>adj</sub> = 0.9918</b> <b>AIC = 8.7911</b>	K = 0.250 R <sup>2</sup> = 0.9930 R <sup>2</sup> <sub>adj</sub> = 0.9930 AIC = 17.8459
First order	K = 0.001 R <sup>2</sup> = 0.9907 R <sup>2</sup> <sub>adj</sub> = 0.9907 AIC = 10.0073	K = 0.003 R <sup>2</sup> = 0.9581 R <sup>2</sup> <sub>adj</sub> = 0.9851 AIC = 23.3072
Higuchi	K = 1.198 R <sup>2</sup> = 0.8009 R <sup>2</sup> <sub>adj</sub> = 0.8009 AIC = 28.3909	K = 3.031 R <sup>2</sup> = 0.8278 R <sup>2</sup> <sub>adj</sub> = 0.8278 AIC = 38.0503
Baker-Lonsdale	K = 0.000 R <sup>2</sup> = 0.7883 R <sup>2</sup> <sub>adj</sub> = 0.7883 AIC = 28.7596	K = 0.000 R <sup>2</sup> = 0.7914 R <sup>2</sup> <sub>adj</sub> = 0.7914 AIC = 39.2015
Korsmeyer-Peppas	K = 0.095 N = 1.013 R <sup>2</sup> = 0.9925 R <sup>2</sup> <sub>adj</sub> = 0.9906 AIC = 10.2221	<b>K = 0.325</b> <b>N = 0.952</b> <b>R<sup>2</sup> = 0.9945</b> <b>R<sup>2</sup><sub>adj</sub> = 0.9931</b> <b>AIC = 18.5235</b>
Hixson-Crowell	K = 0.000 R <sup>2</sup> = 0.9916 R <sup>2</sup> <sub>adj</sub> = 0.9916 AIC = 9.2999	K = 0.001 R <sup>2</sup> = 0.9927 R <sup>2</sup> <sub>adj</sub> = 0.9927 AIC = 19.0848

**Table S4.** Dissolution modelling for PEGylated formulations containing PEG2000-DSPE.

	Formulations					
	CS21	CS23	CS26	CF21	CF23	CF26
Zero order	K = 0.101	<b>K = 0.105</b>	K = 0.082	K = 0.282	<b>K = 0.382</b>	<b>K = 0.324</b>
	R <sup>2</sup> = 0.9894	<b>R<sup>2</sup> = 0.9907</b>	R <sup>2</sup> = 0.9640	R <sup>2</sup> = 0.9911	<b>R<sup>2</sup> = 0.9876</b>	<b>R<sup>2</sup> = 0.9956</b>
	R <sup>2</sup> <sub>adj</sub> = 0.9894	<b>R<sup>2</sup><sub>adj</sub> = 0.9907</b>	R <sup>2</sup> <sub>adj</sub> = 0.9640	R <sup>2</sup> <sub>adj</sub> = 0.9911	<b>R<sup>2</sup><sub>adj</sub> = 0.9876</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9956</b>
	AIC = 10.4473	<b>AIC = 10.5040</b>	AIC = 14.5805	AIC = 20.6449	<b>AIC = 26.3692</b>	<b>AIC = 18.5561</b>
First order	K = 0.001	K = 0.001	K = 0.001	K = 0.004	K = 0.006	K = 0.005
	R <sup>2</sup> = 0.9860	R <sup>2</sup> = 0.9896	R <sup>2</sup> = 0.9546	R <sup>2</sup> = 0.9471	R <sup>2</sup> = 0.9434	R <sup>2</sup> = 0.9535
	R <sup>2</sup> <sub>adj</sub> = 0.9860	R <sup>2</sup> <sub>adj</sub> = 0.9896	R <sup>2</sup> <sub>adj</sub> = 0.9546	R <sup>2</sup> <sub>adj</sub> = 0.9471	R <sup>2</sup> <sub>adj</sub> = 0.9434	R <sup>2</sup> <sub>adj</sub> = 0.9535
	AIC = 12.7480	AIC = 10.9469	AIC = 16.4633	AIC = 31.9855	AIC = 36.5120	AIC = 33.4300
Higuchi	K = 1.205	K = 1.254	K = 0.960	K = 3.351	K = 4.627	K = 3.904
	R <sup>2</sup> = 0.7860	R <sup>2</sup> = 0.7996	R <sup>2</sup> = 0.7129	R <sup>2</sup> = 0.7756	R <sup>2</sup> = 0.8206	R <sup>2</sup> = 0.8086
	R <sup>2</sup> <sub>adj</sub> = 0.7860	R <sup>2</sup> <sub>adj</sub> = 0.7996	R <sup>2</sup> <sub>adj</sub> = 0.7129	R <sup>2</sup> <sub>adj</sub> = 0.7756	R <sup>2</sup> <sub>adj</sub> = 0.8206	R <sup>2</sup> <sub>adj</sub> = 0.8086
	AIC = 29.1103	AIC = 28.9471	AIC = 28.8838	AIC = 41.5504	AIC = 43.5013	AIC = 41.9425
Baker-Lonsdale	K = 0.000	K = 0.000	K = 0.000	K = 0.000	K = 0.000	K = 0.000
	R <sup>2</sup> = 0.7732	0.7863R <sup>2</sup> =	R <sup>2</sup> = 0.7023	R <sup>2</sup> = 0.7317	R <sup>2</sup> = 0.7565	R <sup>2</sup> = 0.7560
	R <sup>2</sup> <sub>adj</sub> = 0.7732	R <sup>2</sup> <sub>adj</sub> = 0.7863	R <sup>2</sup> <sub>adj</sub> = 0.7023	R <sup>2</sup> <sub>adj</sub> = 0.7317	R <sup>2</sup> <sub>adj</sub> = 0.7565	R <sup>2</sup> <sub>adj</sub> = 0.7560
	AIC = 29.4613	AIC = 29.3340	AIC = 29.1155	AIC = 42.6221	AIC = 45.3473	AIC = 43.4036
Korsmeyer-Peppas	<b>K = 0.080</b>	K = 0.100	<b>K = 0.031</b>	<b>K = 0.178</b>	K = 0.494	K = 0.315
	<b>N = 1.050</b>	N = 1.014	<b>N = 1.300</b>	<b>N = 1.096</b>	N = 0.959	N = 1.008
	<b>R<sup>2</sup> = 0.9913</b>	R <sup>2</sup> = 0.9917	<b>R<sup>2</sup> = 0.9924</b>	<b>R<sup>2</sup> = 0.9965</b>	R <sup>2</sup> = 0.9901	R <sup>2</sup> = 0.9958
	R <sup>2</sup> <sub>adj</sub> = 0.9891	R <sup>2</sup> <sub>adj</sub> = 0.9896	<b>R<sup>2</sup><sub>adj</sub> = 0.9905</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9956</b>	R <sup>2</sup> <sub>adj</sub> = 0.9876	R <sup>2</sup> <sub>adj</sub> = 0.9948
	<b>AIC = 9.7759</b>	AIC = 11.8500	<b>AIC = 7.2300</b>	<b>AIC = 18.4773</b>	AIC = 27.5574	AIC = 20.2089
Hixson-Crowell	K = 0.000	K = 0.000	K = 0.000	K = 0.001	K = 0.002	K = 0.001
	R <sup>2</sup> = 0.9877	R <sup>2</sup> = 0.9906	R <sup>2</sup> = 0.9580	R <sup>2</sup> = 0.9660	R <sup>2</sup> = 0.9695	R <sup>2</sup> = 0.9746
	R <sup>2</sup> <sub>adj</sub> = 0.9877	R <sup>2</sup> <sub>adj</sub> = 0.9906	R <sup>2</sup> <sub>adj</sub> = 0.9580	R <sup>2</sup> <sub>adj</sub> = 0.9660	R <sup>2</sup> <sub>adj</sub> = 0.9695	R <sup>2</sup> <sub>adj</sub> = 0.9746
	AIC = 11.8910	AIC = 10.4372	AIC = 15.8103	AIC = 29.0151	AIC = 32.7449	AIC = 29.7493

**Table S5.** Dissolution modelling for PEGylated formulations containing PEG5000-DPPE.

	Formulations					
	CS51	CS53	CS56	CF51	CF53	CF56
Zero order	K = 0.120	K = 0.414	K = 0.147	<b>K = 0.308</b>	<b>K = 0.374</b>	<b>K = 0.434</b>
	R <sup>2</sup> = 0.9614	R <sup>2</sup> = 0.9752	R <sup>2</sup> = 0.9767	<b>R<sup>2</sup> = 0.9929</b>	<b>R<sup>2</sup> = 0.9848</b>	<b>R<sup>2</sup> = 0.9931</b>
	R <sup>2</sup> <sub>adj</sub> = 0.9614	R <sup>2</sup> <sub>adj</sub> = 0.9752	R <sup>2</sup> <sub>adj</sub> = 0.9767	<b>R<sup>2</sup><sub>adj</sub> = 0.9929</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9848</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9931</b>
	AIC = 21.0680	AIC = 20.6748	AIC = 20.7972	<b>AIC = 21.5793</b>	<b>AIC = 28.5973</b>	<b>AIC = 25.2423</b>
First order	K = 0.001	K = 0.002	K = 0.002	K = 0.004	K = 0.006	K = 0.007
	R <sup>2</sup> = 0.9435	R <sup>2</sup> = 0.9559	R <sup>2</sup> = 0.9581	R <sup>2</sup> = 0.9686	R <sup>2</sup> = 0.9176	R <sup>2</sup> = 0.8965
	R <sup>2</sup> <sub>adj</sub> = 0.9435	R <sup>2</sup> <sub>adj</sub> = 24.2330	R <sup>2</sup> <sub>adj</sub> = 0.9581	R <sup>2</sup> <sub>adj</sub> = 0.9686	R <sup>2</sup> <sub>adj</sub> = 0.9176	R <sup>2</sup> <sub>adj</sub> = 0.8965
	AIC = 23.5581	AIC = 24.2330	AIC = 24.3848	AIC = 30.1040	AIC = 38.9857	AIC = 41.9234
Higuchi	K = 1.389	K = 1.648	K = 1.713	K = 3.728	K = 4.457	K = 5.202
	R <sup>2</sup> = 0.6986	R <sup>2</sup> = 0.7237	R <sup>2</sup> = 0.7298	R <sup>2</sup> = 0.8196	R <sup>2</sup> = 0.7780	R <sup>2</sup> = 0.7951
	R <sup>2</sup> <sub>adj</sub> = 0.6986	R <sup>2</sup> <sub>adj</sub> = 0.7237	R <sup>2</sup> <sub>adj</sub> = 0.7298	R <sup>2</sup> <sub>adj</sub> = 0.8196	R <sup>2</sup> <sub>adj</sub> = 0.7780	R <sup>2</sup> <sub>adj</sub> = 0.7951
	AIC = 34.0295	AIC = 35.3250	AIC = 35.5760	AIC = 40.9533	AIC = 44.9222	AIC = 46.0397
Baker-Lonsdale	K = 0.000	K = 0.000	K = 0.000	K = 0.000	K = 0.000	K = 0.001
	R <sup>2</sup> = 0.6826	R <sup>2</sup> = 0.7045	R <sup>2</sup> = 0.7099	R <sup>2</sup> = 0.7716	R <sup>2</sup> = 0.7147	R <sup>2</sup> = 0.7151
	R <sup>2</sup> <sub>adj</sub> = 0.6826	R <sup>2</sup> <sub>adj</sub> = 0.7045	R <sup>2</sup> <sub>adj</sub> = 0.7099	R <sup>2</sup> <sub>adj</sub> = 0.7716	R <sup>2</sup> <sub>adj</sub> = 0.7147	R <sup>2</sup> <sub>adj</sub> = 0.7151
	AIC = 34.3458	AIC = 35.7292	AIC = 36.0033	AIC = 42.3767	AIC = 46.4540	AIC = 48.0304
Korsmeyer-Peppas	<b>K = 0.031</b>	<b>K = 0.044</b>	<b>K = 0.051</b>	K = 0.366	K = 0.294	K = 0.377
	<b>N = 1.307</b>	<b>N = 1.227</b>	<b>N = 1.201</b>	N = 0.971	N = 1.061	N = 1.034
	<b>R<sup>2</sup> = 0.9899</b>	<b>R<sup>2</sup> = 0.9920</b>	<b>R<sup>2</sup> = 0.9903</b>	R <sup>2</sup> = 0.9942	R <sup>2</sup> = 0.9877	R <sup>2</sup> = 0.9941
	<b>R<sup>2</sup><sub>adj</sub> = 0.9874</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9900</b>	<b>R<sup>2</sup><sub>adj</sub> = 0.9879</b>	R <sup>2</sup> <sub>adj</sub> = 0.9927	R <sup>2</sup> <sub>adj</sub> = 0.9846	R <sup>2</sup> <sub>adj</sub> = 0.9927
	<b>AIC = 15.5387</b>	<b>AIC = 15.8758</b>	<b>AIC = 17.2340</b>	AIC = 22.1855	AIC = 29.4679	AIC = 25.9541
Hixson-Crowell	K = 0.000	K = 0.001	K = 0.001	K = 0.001	K = 0.002	K = 0.002
	R <sup>2</sup> = 0.9501	R <sup>2</sup> = 0.9632	R <sup>2</sup> = 0.9653	R <sup>2</sup> = 0.9842	R <sup>2</sup> = 0.9483	R <sup>2</sup> = 0.9359
	R <sup>2</sup> <sub>adj</sub> = 0.9501	R <sup>2</sup> <sub>adj</sub> = 0.9632	R <sup>2</sup> <sub>adj</sub> = 0.9653	R <sup>2</sup> <sub>adj</sub> = 0.9842	R <sup>2</sup> <sub>adj</sub> = 0.9483	R <sup>2</sup> <sub>adj</sub> = 0.9359
	AIC = 22.7485	AIC = 23.1150	AIC = 23.2384	AIC = 25.5464	AIC = 36.1667	AIC = 39.0479

**Table S6.** Maximum injection force (N) for soybean and fish oil nanoemulsions.

<b>Formulations</b>	<b>Maximum injection force (Fmax)</b>
CS	19.65 ± 1.54
CS21	22.94 ± 0.26
CS23	27.66 ± 1.00
CS26	29.34 ± 1.20
CS51	25.21 ± 0.33
CS53	28.58 ± 2.34
CS56	34.60 ± 2.58
CF	19.58 ± 1.55
CF21	23.39 ± 2.45
CF23	26.53 ± 2.51
CF26	30.57 ± 0.45
CF51	24.35 ± 0.46
CF53	29.06 ± 2.37
CF56	35.81 ± 3.27

Values are shown as means ± sd (n = 3).