SUPPLEMENTAL MATERIALS

Table S1. *Detailed concentrations of each component in the bubble system of 4 samples and 3 controls used in the study.*

Sample / Control name	$[NaCl]_{final}$ (mM)	$[QCT]_{final}$ (µM)	$[Silk fibroin]_{final}$ (µg/mL)	$[Silk fibroin]_{final}$ (µM)	$[PEG-400]_{final}$ (%v/v_{SF})	$[PEG-400]_{final}$ (µM)
S10P2	154	50	10	0.10	2	564
S10P1	154	50	10	0.10	1	282
S5P2	154	50	5	0.05	2	264
S5P1	154	50	5	0.05	1	282
C-Ø	154	50	0	0	0	0
C-SF	154	50	10	0.10	0	0
C-PEG	154	50	0	0	2	564

Table S2. *Statistical results from one-tailed Mann Whitney U test comparing S10P2 system with three controls' $\Delta_{scattering}$ to conclude on differences of their stability.*

Test samples	Hypotheses	Sample size	p-value	Significant level	Conclusions
S10P2, C-Ø	H_0: S10P2 had a higher or equal decreasing level. H_1: S10P2 had the lower decreasing level.	5, 5	0.004	0.05	Reject H_0
S10P2, C-SF		5, 5	0.004	0.05	
S10P2, C-PEG		5, 5	0.014	0.05	

Table S3. *Statistical results from one-tailed Mann Whitney U test comparing four different SF-PEG formulations, S10P2, S10P1, S5P2, S5P1's $\Delta_{scattering}$ to conclude on differences of their stability.*

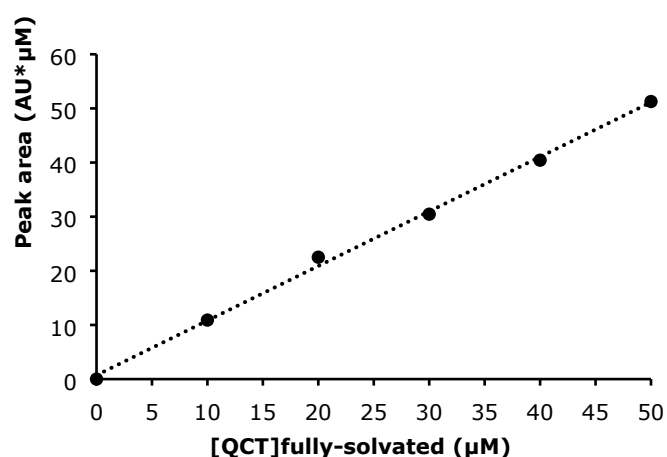| Test samples	Hypotheses	Sample size	p-value	Significant level	Conclusions
S10P2, S10P1	H_0: S10P2 had a higher or equal decreasing level. H_1: S10P2 had the lower decreasing level.	5, 5	0.008	0.05	Reject H_0
S10P2, S5P2		5, 5	0.826	0.05	Fail to reject H_0
S10P2, S5P1		5, 5	0.004	0.05	Reject H_0

Figure S1. *Standard curve plotting [QCT]$_{fully-solvated}$, fully-solvated or unloaded quercetin concentration, with its corresponding UV-Vis peak area.*

Table S4. *Measured peak area from UV-Vis with its corresponding concentration (µM) using standard curve in Figure S1, and the resulting loaded concentration (µM) for two SF-PEG formulations and three controls. The data for the triplicates were reported under the form of mean(±SD).*

Sample names	Peak area	[QCT]$_{supernatant,}$ from the standard curve (µM)	[QCT]$_{initial}$ - [QCT]$_{supernatant,}$ or loaded concentration (µM)
S10P2	10.26(±1.76)	9.46(±1.75)	40.54(±1.75)
S5P2	8.42(±0.88)	7.63(±0.88)	42.37(±0.88)
C-Ø	5.05(±0.58)	4.29(±0.57)	45.71(±0.57)
C-SF	7.25(±2.48)	6.47(±2.46)	43.53(±2.46)
C-PEG	14.21(±6.14)	13.37(±6.09)	36.63(±6.09)

Table S5. *Results of six one-tailed Mann Whitney U tests on the loading efficiency, LE%, between two samples, S10P2 and S5P2, with three controls, C-Ø, C-SF, and C-PEG.*

Test samples	Hypotheses	Sample size	p-value	Significant level	Conclusions
S10P2, C-Ø	H_0: S10P2 had a higher or equal LE%. H_1: S10P2 had the lower LE%.	3, 3	0.004	0.05	Reject H_0
S10P2, C-SF		3, 3	0.014	0.05	Reject H_0
S10P2, C-PEG		3, 3	0.125	0.05	Fail to reject H_0

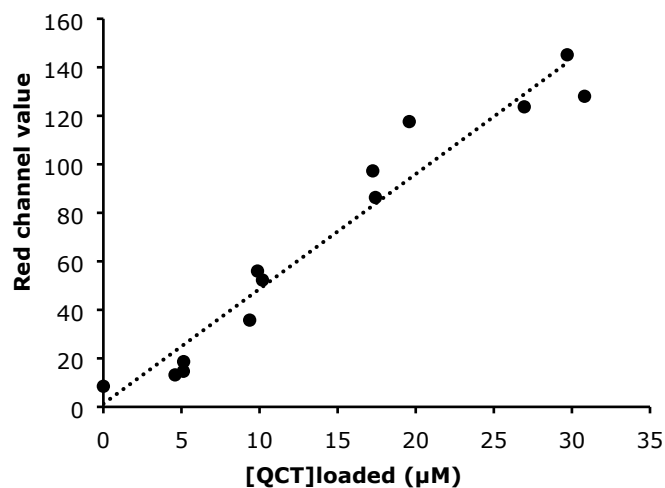| S5P2, C-Ø	H_0: S5P2 had a higher or equal LE%. H_1: S5P2 had the lower LE%.	3, 3	0.004	0.05	Reject H_0
S5P2, C-SF		3, 3	0.023	0.05	Reject H_0
S5P2, C-PEG		3, 3	0.232	0.05	Fail to reject H_0

Figure S2. *Standard curve plotting loaded quercetin concentration (µM), [QCT]$_{loaded}$, with its corresponding red channel value.*

Table S6. *Measured red channel value with its corresponding remained-loaded concentration (µM) using standard curve in Figure S2, and the resulting released concentration (µM) for two SF-PEG formulations and three controls. The data for the triplicates were reported under the form of mean(±SD).*

Sample names	Red channel value after release	[QCT]$_{remained}$ (µM)	[QCT]$_{loaded}$ - [QCT]$_{remained}$, or [QCT]$_{released}$ (µM)
S10P2	100.27(±4.16)	20.91(±0.88)	19.64(±0.69)
S5P2	103.98(±4.93)	21.69(±1.04)	20.68(±0.68)
C-Ø	114.71(±1.60)	23.95(±0.34)	21.75(±0.24)
C-SF	111.29(±8.41)	23.23(±1.78)	20.30(±0.51)
C-PEG	95.55(±12.11)	19.91(±2.56)	16.72(±0.62)

Table S7. *Results of six one-tailed Mann Whitney U tests on the releasing efficiency, RE%, between two samples, S10P2 and S5P2, with three controls, C-Ø, C-SF, and C-PEG.*

Test samples	Hypotheses	Sample size	p-value	Significant level	Conclusions
S10P2, C-Ø	H_0: S10P2 had a higher or equal RE%. H_1: S10P2 had the lower RE%.	3, 3	0.087	0.05	Fail to reject H_0
S10P2, C-SF		3, 3	0.087	0.05	Fail to reject H_0
S10P2, C-PEG		3, 3	0.087	0.05	Fail to reject H_0
S5P2, C-Ø	H_0: S5P2 had a higher or equal RE%. H_1: S5P2 had the lower RE%.	3, 3	0.087	0.05	Fail to reject H_0
S5P2, C-SF		3, 3	0.125	0.05	Fail to reject H_0
S5P2, C-PEG		3, 3	0.087	0.05	Fail to reject H_0