

Supplementary Materials: Lyophilization for Formulation Optimization of Drug-Loaded Thermoresponsive Polyelectrolyte Complex Nanogels from Functionalized Hyaluronic Acid

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1. Thermoresponsiveness of reconstituted PEC-NGs after lyophilization

HA-M2005/PLL PEC-NGs ($n/n^+ = 2.5$) prepared at $C_P = 0.5 \text{ g.L}^{-1}$ were lyophilized with 2 % m/v trehalose and then reconstituted at the same C_P in Milli-Q water. DLS characterization was performed on reconstituted PEC-NGs at 25 °C (after 120 s of temperature stabilization) and then at 50 °C (after 10 min of temperature stabilization) (**Error! Reference source not found.**).

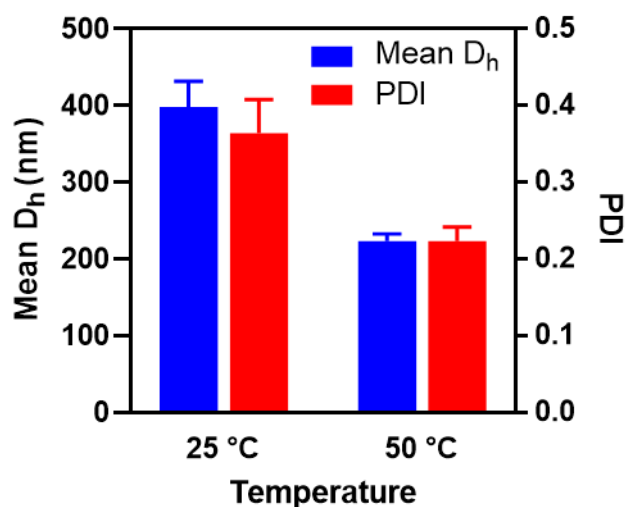


Figure S1. Mean D_h and PDI of reconstituted HA-M2005/PLL PEC-NGs ($n/n^+ = 2.5$, $C_P = 0.5 \text{ g.L}^{-1}$) at 25 and 50 °C ($n \geq 3$).

2. Stability of reconstituted PEC-NGs after lyophilization

HA-M2005/PLL PEC-NGs ($n/n+ = 2.5$) prepared at $C_P = 0.2 \text{ g.L}^{-1}$ were lyophilized with 1 % m/v trehalose and then reconstituted in PBS to reach final $C_P = 0.5 \text{ g.L}^{-1}$, thus $C_{TRE} = 2.5 \%$. The reconstituted PEC-NGs were directly characterized by DLS (day 0) and then stored at 4 °C for reevaluation after 1, 3 and 7 days (**Error! Reference source not found.**).

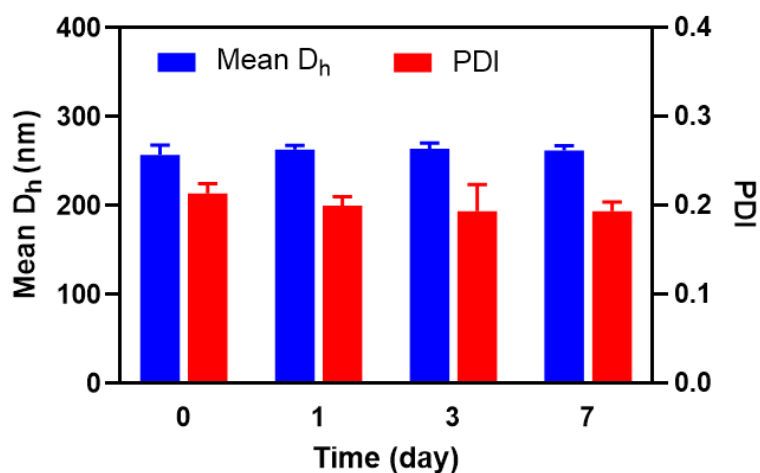


Figure S2. Mean D_h and PDI of HA-M2005/PLL PEC-NGs ($n/n+ = 2.5$) reconstituted at $C_P = 0.5 \text{ g.L}^{-1}$ and $C_{TRE} = 2.5 \%$ m/v in PBS (after lyophilization of NGs prepared at $C_P = 0.2 \text{ g.L}^{-1}$) within 7 days of conservation ($n \geq 3$).

3. Model fitting of curcumin release data

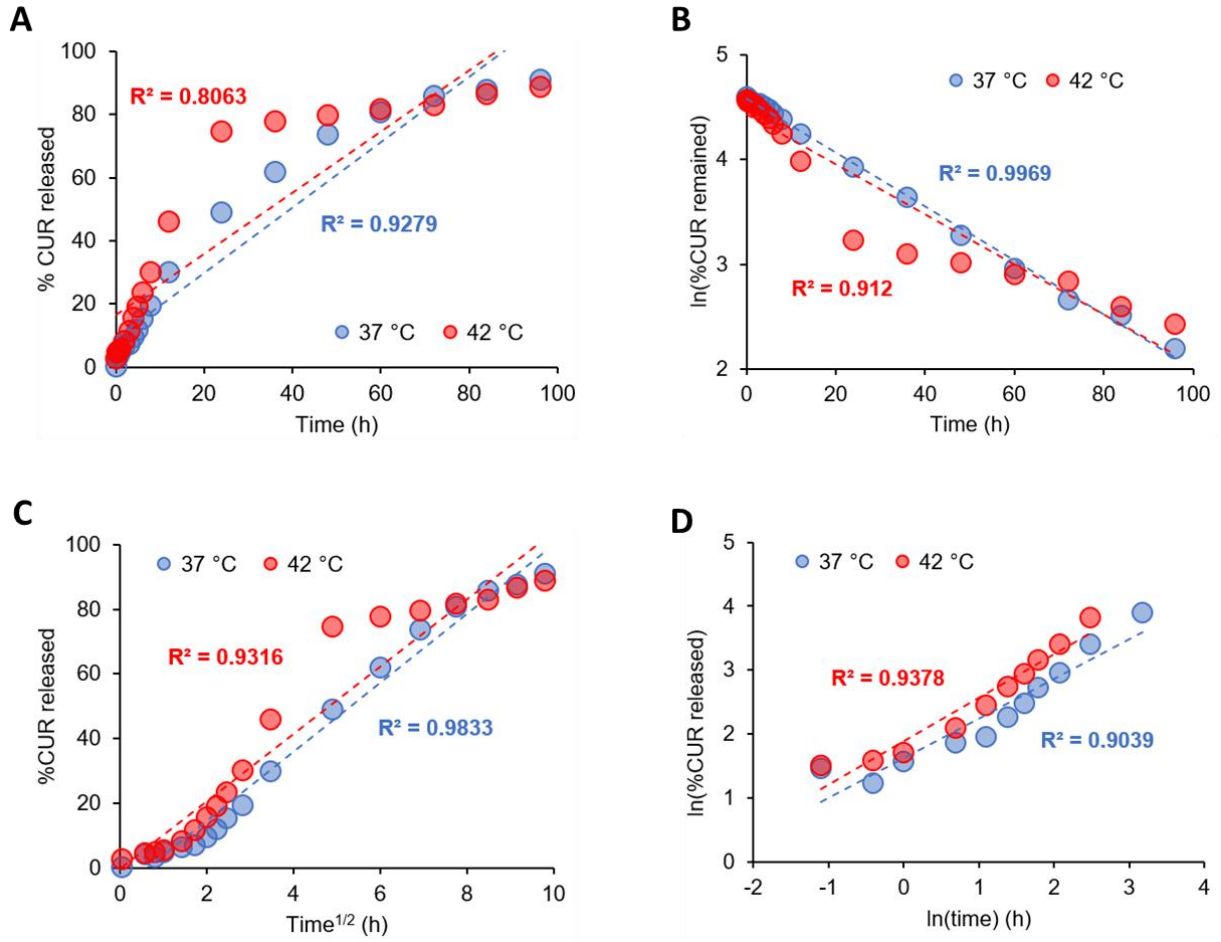


Figure S3. Mathematical model fitting of curcumin release data at 37 and 42 °C from HA-M2005/PLL PEC-NGs ($n/n+ = 2.5$) prepared at $C_P = 0.5 \text{ g.L}^{-1}$: **(A)** zero-order model (linear regression between time and CUR release fraction), **(B)** first-order model (linear regression between time and logarithm of CUR release fraction), **(C)** Higuchi model (linear regression between CUR release fraction and square root of time), **(D)** Korsmeyer-Peppas model (linear regression between logarithms of both time and the CUR release fraction within the first 60 %).