

Functional Nanostructured Lipid Carrier-Enriched Hydrogels Tailored to Repair Damaged Epidermal Barrier

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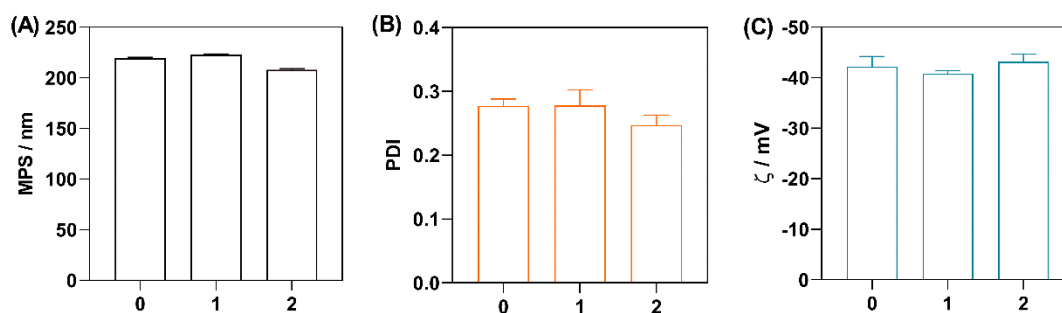


Figure S1. Accelerated stability test of the optimized NLC_PS80 dispersion: mean particle size (*MPS*, A), polydispersity index (*PDI*, B) and zeta potential (ζ , C) of the dispersion immediately after preparation (0), one and two cycles of centrifugation at $3000 \times g$ for 30 min (1 and 2, respectively). Before the experiments, NLC_PS80 dispersion was diluted with purified water 100 \times and all measurements were performed in triplicate.

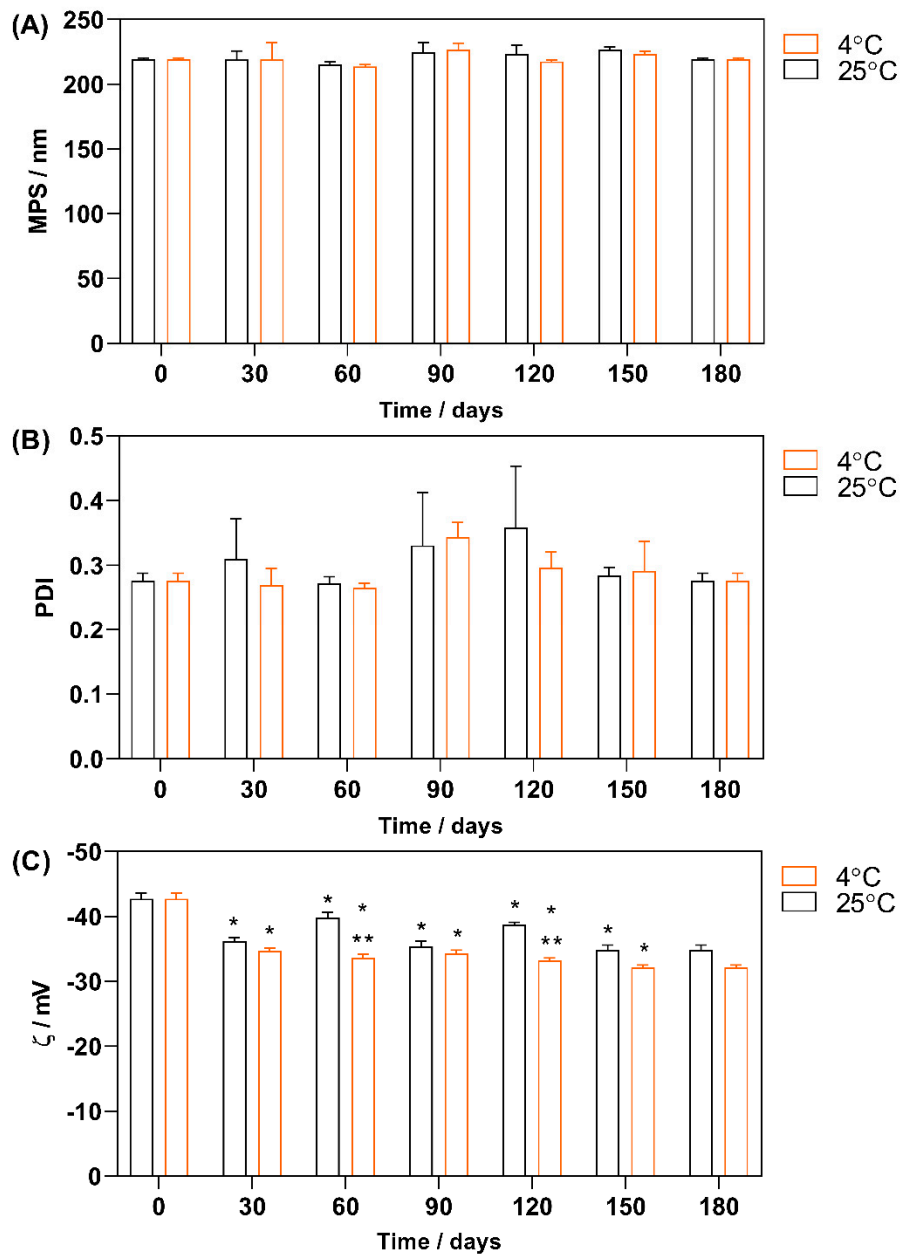


Figure S2. Real-time stability studies of the optimized NLC_PS80 dispersion stored at 25 and 4°C, respectively, monitoring mean particle size (*MPS*, A), polydispersity index (*PDI*, B), and zeta potential (ζ , C) as a function of time. One asterisk (*) denotes a statistically significant difference compared to the initial sample stored at the same temperature ($p < 0.0001$), while two asterisks (**) denotes a statistically significant difference compared to the sample in the same timepoint stored at 25°C ($p < 0.0001$).

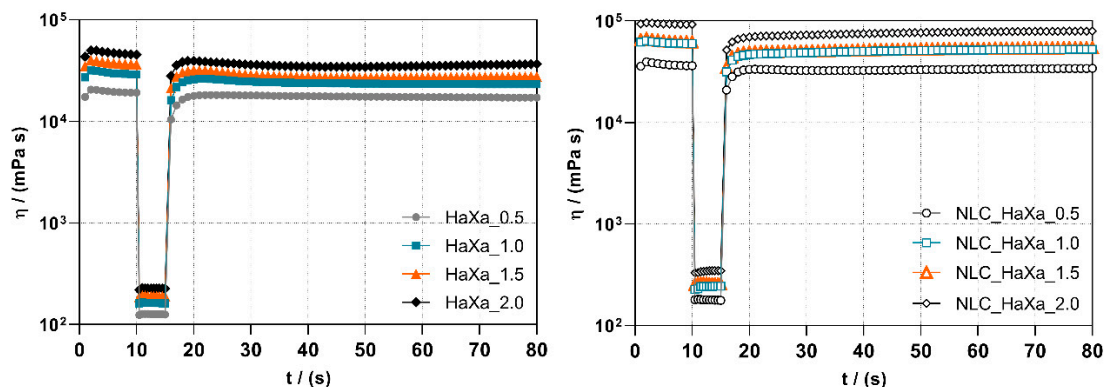


Figure S3. Time-dependent viscosity change of blank (left) and NLC-loaded (right) HaXa hydrogels containing different amounts of XA (0.5, 1.0, 1.5 and 2.0% (*w/w*), respectively) as observed by 3-interval thixotropy test.

Table S1. Influence of xanthan content and NLC loading to $\tan \delta$ values for the HaXa hydrogels at 32°C. The values presented were obtained at the angular frequency of 1 rad s⁻¹ and deformation of 1%. Asterisk (*) denotes a statistically significant difference compared to the corresponding blank HaXa hydrogel ($p < 0.0001$).

<i>xanthan</i> / (%)	$\tan \delta$	
	HaXa hydrogel	NLC_HaXa hydrogel
0.5	1.214 ± 0.015	0.874 ± 0.014 *
1.0	0.973 ± 0.009	0.734 ± 0.024 *
1.5	0.827 ± 0.010	0.635 ± 0.031 *
2.0	0.709 ± 0.007	0.490 ± 0.030 *

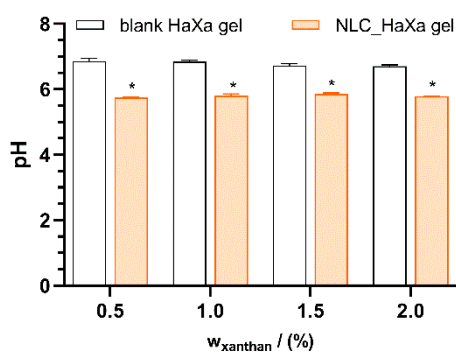


Figure S4. The pH of blank (left) and NLC-loaded (right) HaXa hydrogels containing different amounts of XA (0.5, 1.0, 1.5 and 2.0% (*w/w*), respectively). Asterisk (*) denotes a statistically significant difference compared to the corresponding blank HaXa hydrogel ($p < 0.0001$).