Electronic Supplementary Material (ESI) for Food & Function.

THERMAL PROTECTION AND PH-GATED RELEASE OF FOLIC ACID IN MICROPARTICLES AND NANOPARTICLES FOR FOOD FORTIFICATION

SUPPLEMENTARY INFORMATION

Ilja Gasan OSOJNIK ČRNIVEC [a], Katja ISTENIČ [a], Mihalea SKRT [a], Nataša POKLAR ULRIH [a]*

[a] Chair of Biochemistry and Food Chemistry, Department of Food Science and Technology, Biotechnical Faculty, University of Ljubljana, Jamnikarjeva 101, SI-1000 Ljubljana, Slovenia.

* natasa.poklar@bf.uni-lj.si

Statistical analysis and release curve similarity

Student's t-tests were performed to differentiate between the means with a 95% confidence interval ($P < 0.05$). For comparing of the release curves, the similarity factor (f2) was calculated according to the guidelines of the Food and Drug Administration (Evaluation 4 (1997) 15–22), according to Equation (S1), where n = number of points, R_t = release of the reference compound at the given time point (in %), M_t = release of the monitored compound at the given time point (in %). Generally, f_2 values > 50 are considered to ensure equivalence of the two curves.

$$f_2 = 50 \log\left\{100 \times \left[1 + \frac{1}{n}\sum_{i=1}^{n}\left(R_t - M_t\right)^2\right]^{-0.5}\right\} \quad \text{(S1)}$$

Analyses and calculations were performed with the OriginPro 2018 SR1 b9.5.1.195 (OriginLab, USA) software package.

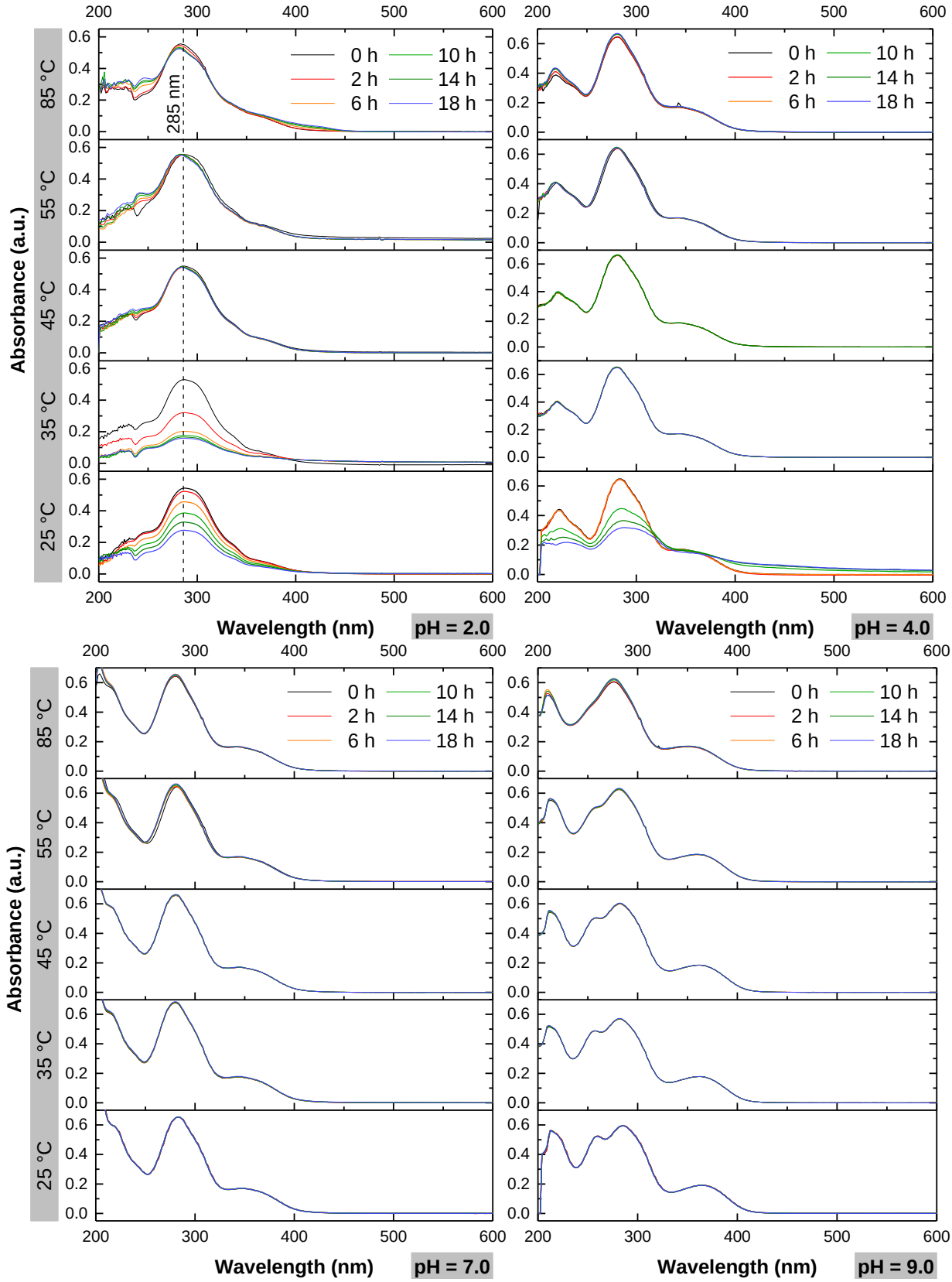

Fig. S1 UV/Vis spectra (200-600 nm) of 25 µM folic acid over 18 h at pH 2.0 to 9.0 and at 25 °C to 85 °C, in the dark.

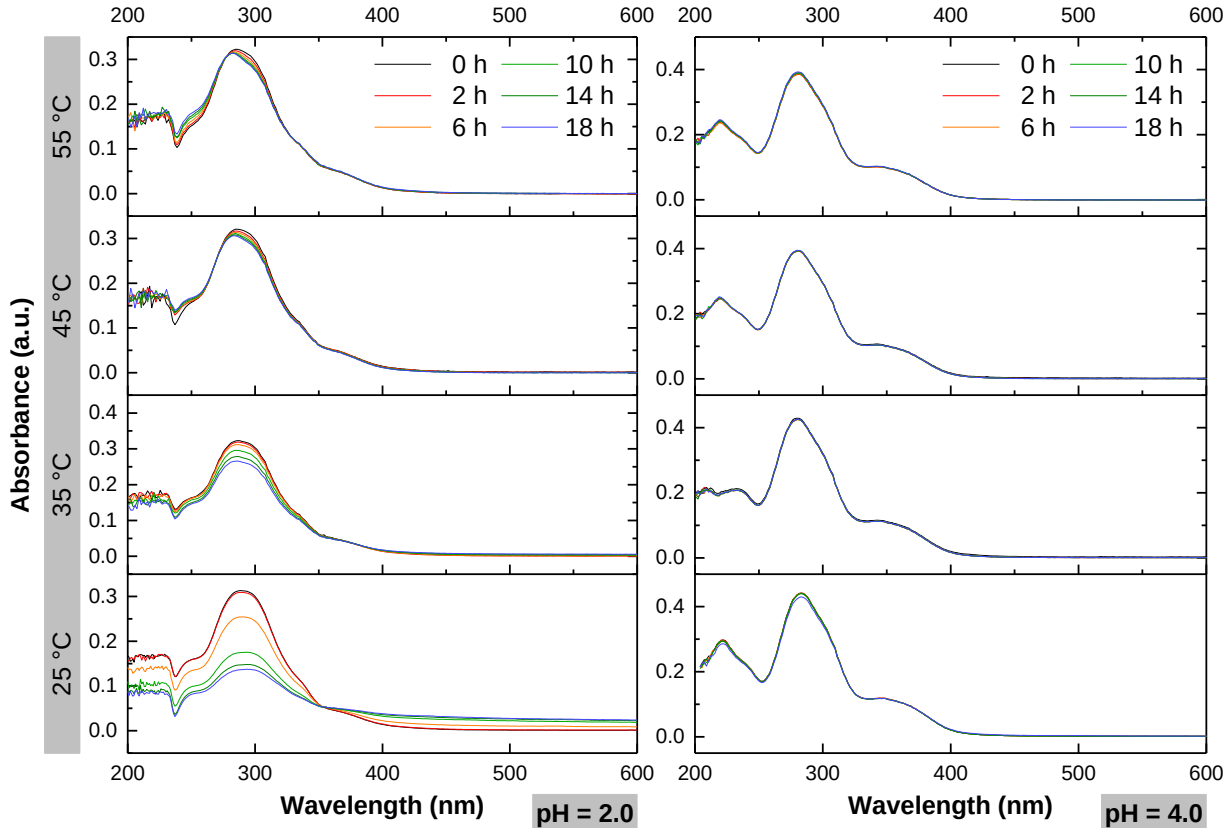

Fig. S2 UV/Vis spectra (200-600 nm) of 15 µM folic acid over 18 h at pH 2.0 and 4.0 and at 25 °C to 55 °C, in the dark.

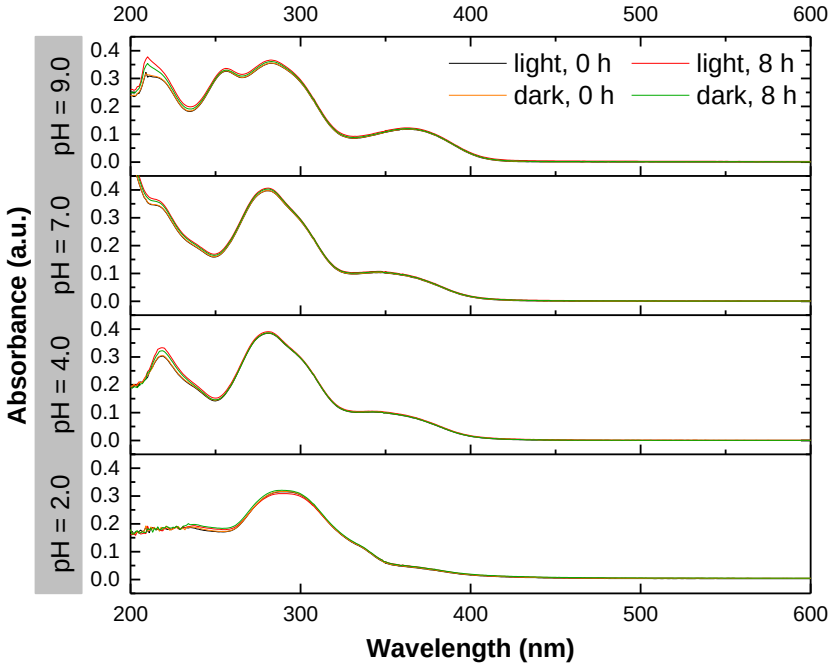

Fig. S3 UV/Vis spectra (200-600 nm) of 15 µM folic acid over 8 h at pH 2.0 to 9.0 and at 25 °C in the absence and presence of light.

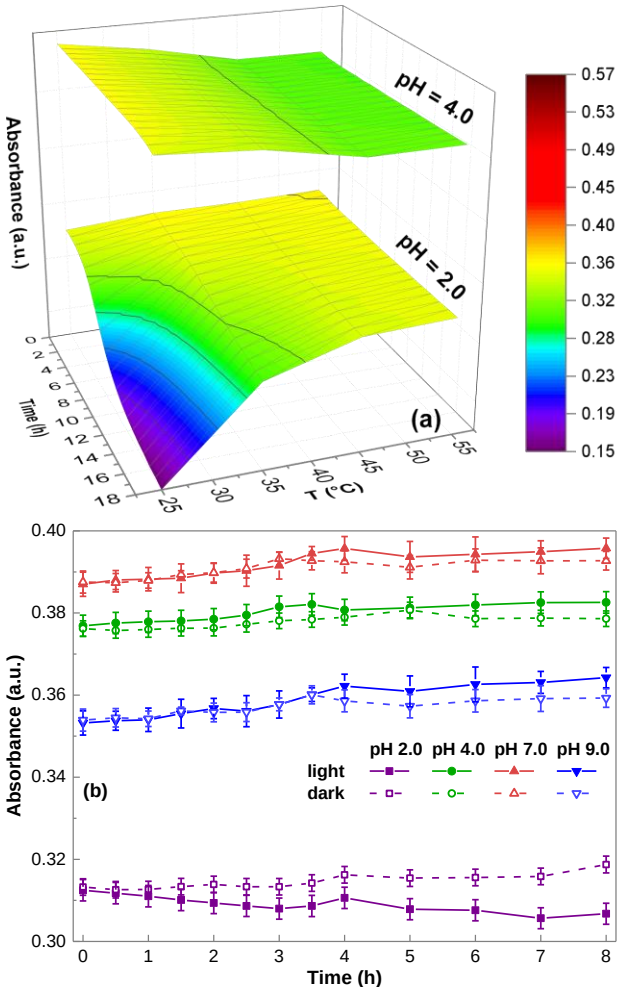

Fig. S4 Stability of free folic acid in aqueous solutions during exposure to environmental factors. (a) 15 µM folic acid, pH 2-4, 25-55 °C, in the dark. (b) 15 µM folic acid, pH 2-9, 25 °C, in the dark *versus* the light. Data are means (a-b) ±SD (b) (n = 3).

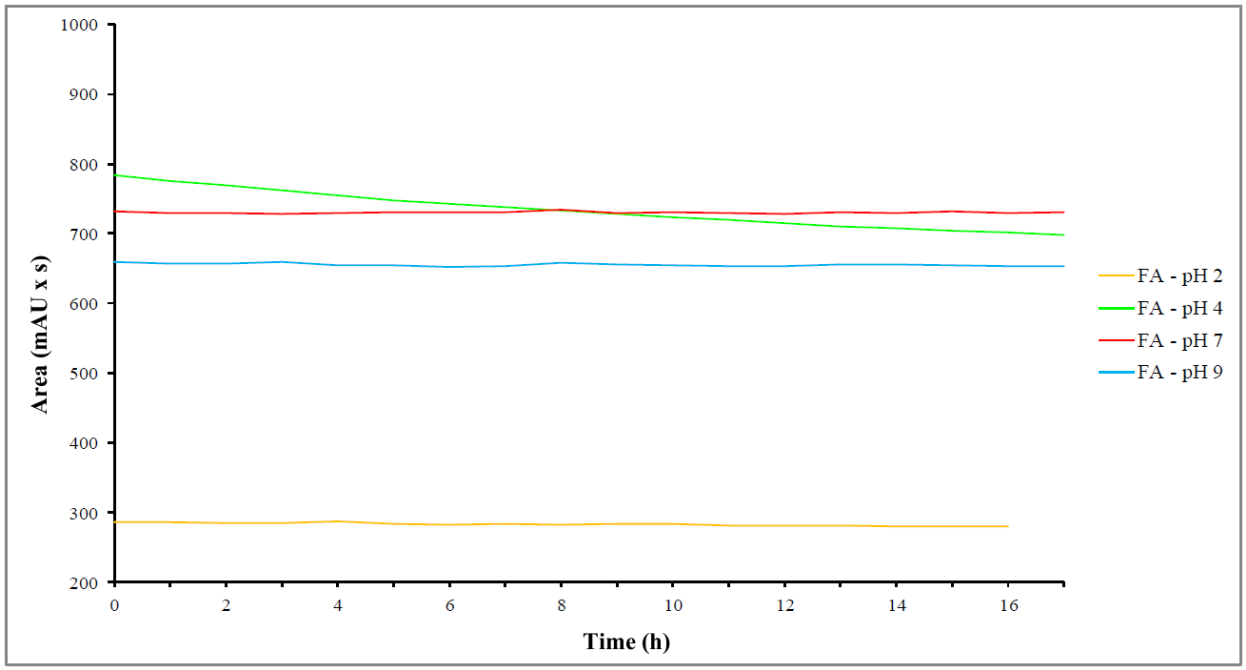

Fig. S5 Chromatographic peak area of 25 µM folic acid (FA) over 16 h at pH 2.0 to 9.0 at 25 °C, in the dark (diode array detector, 280 nm).

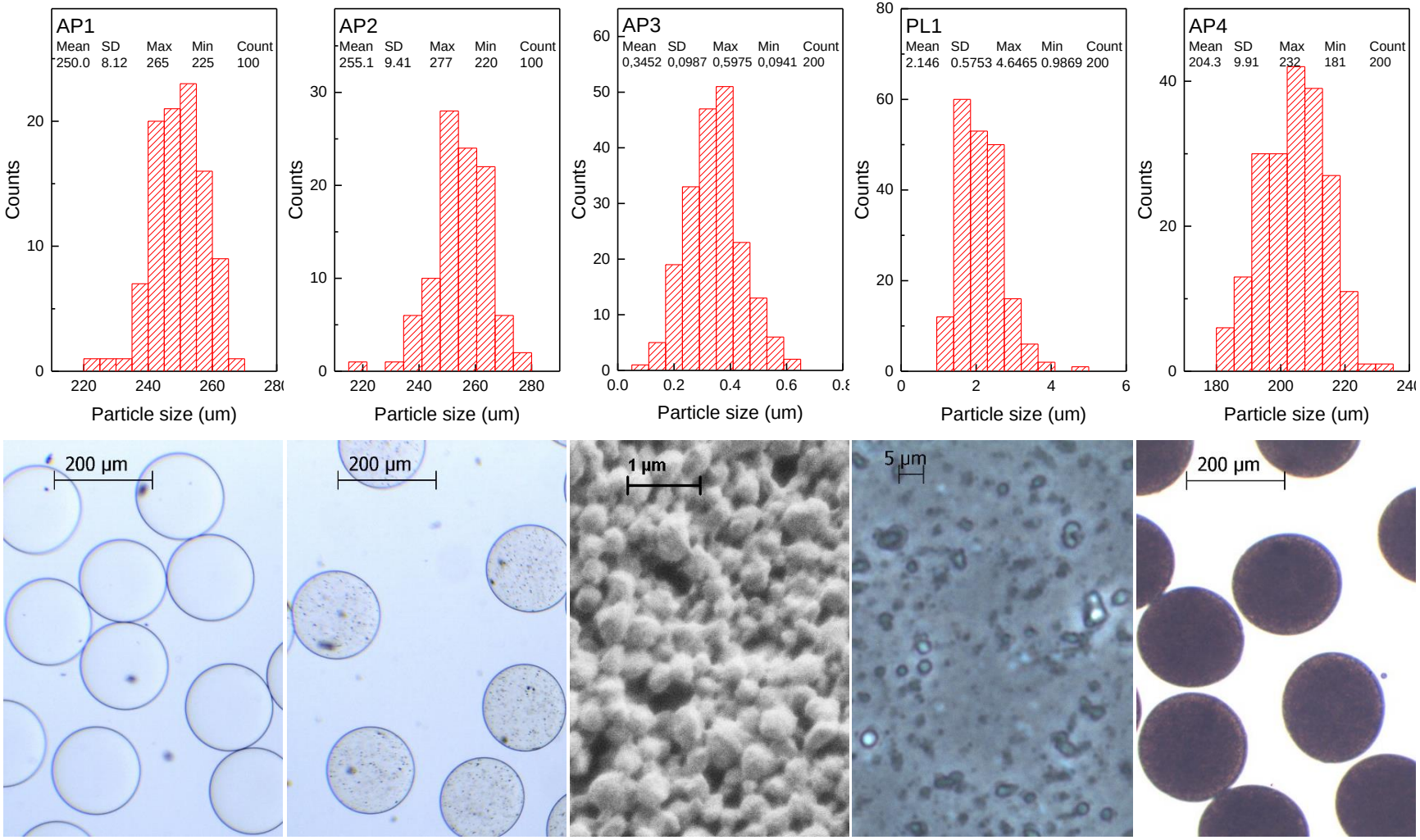

Fig. S6 Particle size distributions (top) and corresponding morphologies (bottom) of the prepared samples. Micrographs were obtained by light microscopy (AP1, AP2, AP4, 4× magnification; PL1, 40× magnification) or electron microscopy (AP3, 1.0 kV acceleration voltage, 30 µm aperture, ~3 mm working distance). Scale bars, as indicated.