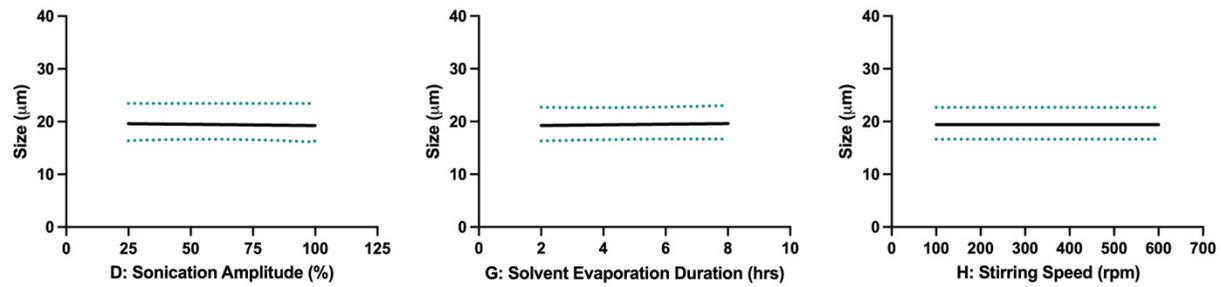
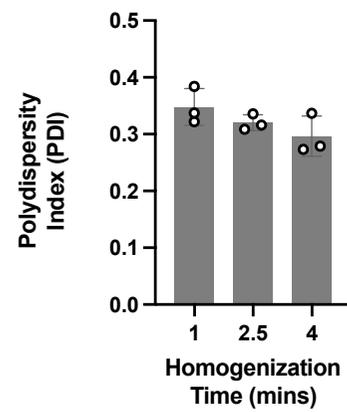


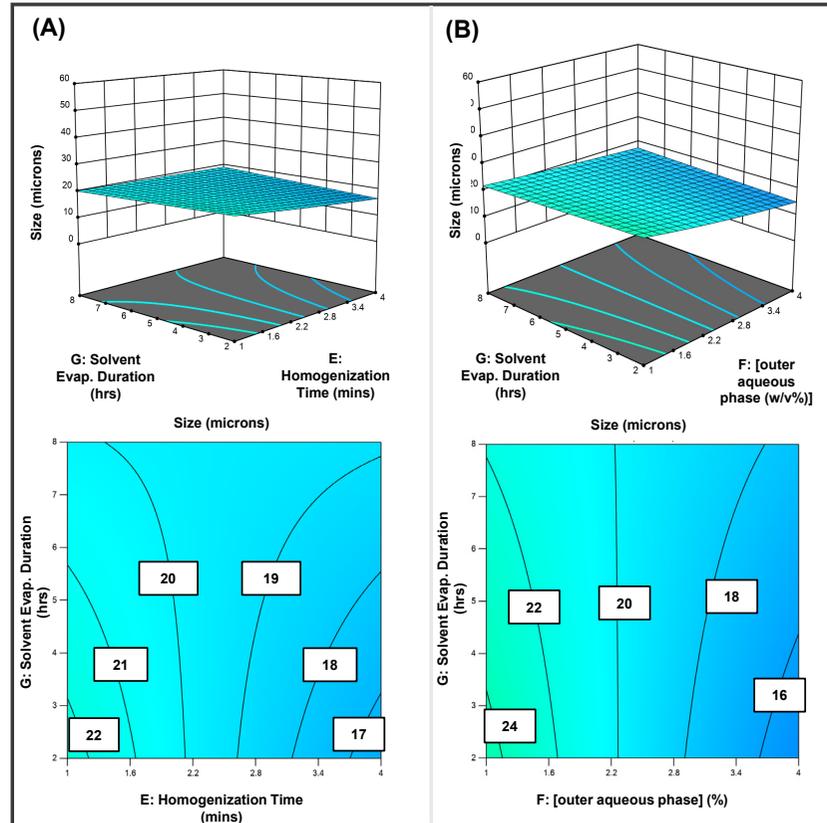
**Figure S1.** Non-transformed and log transformed microparticle size distributions from design of experiments study.



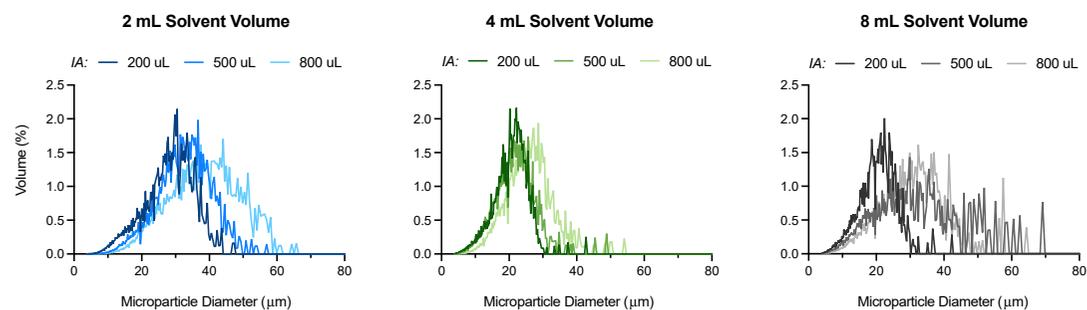
**Figure S2.** Single factor plots demonstrating the relationship between microparticle size and insignificant critical processing parameters, including (D) sonication amplitude (%) ( $n = 200$ ), (G) solvent evaporation duration ( $n = 200$ ), and (H) stirring speed ( $n = 200$ ). The black solid line represents the expected trend, and the blue dotted line illustrates the confidence bands for that trend, as predicted by the RSM.



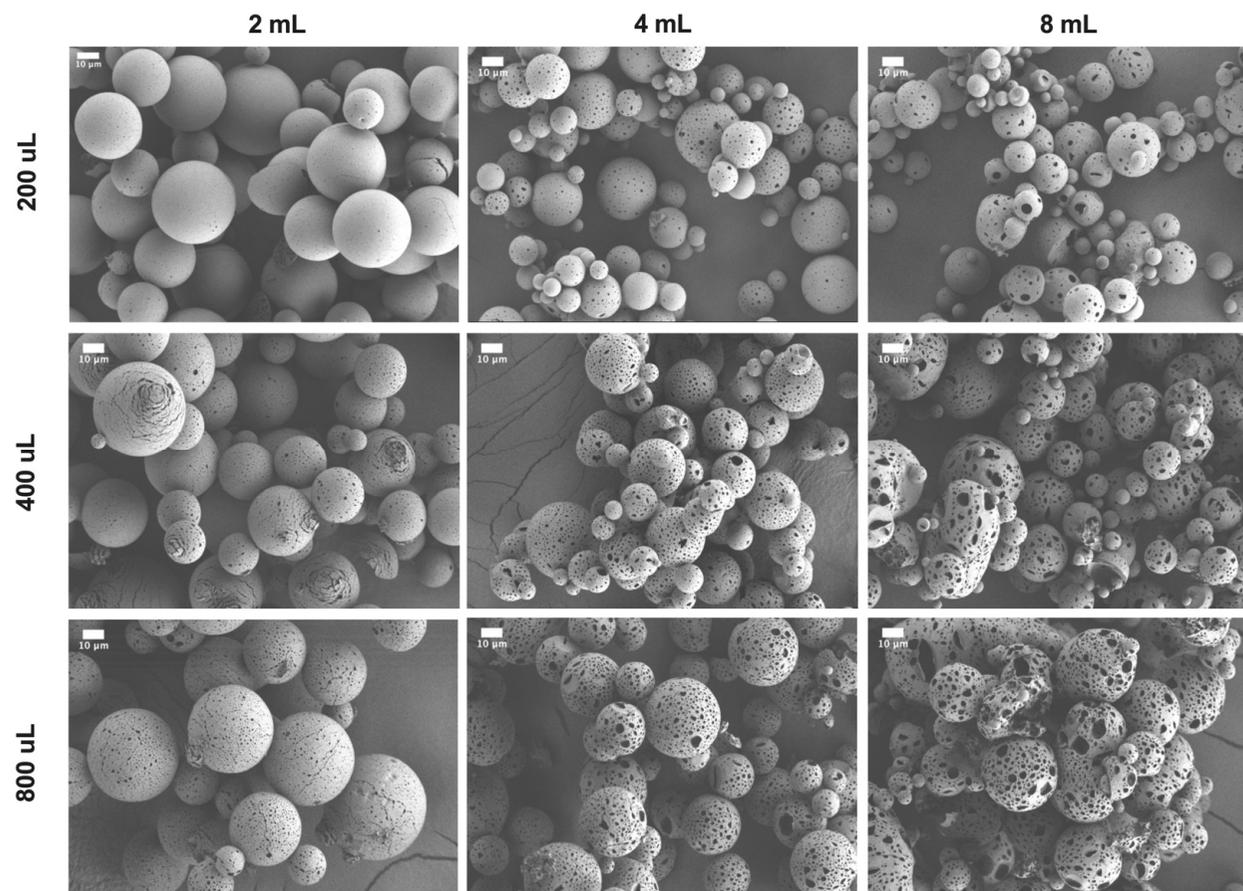
**Figure S3.** Microparticle polydispersity index (PDI) decreases slightly as homogenization time increases.



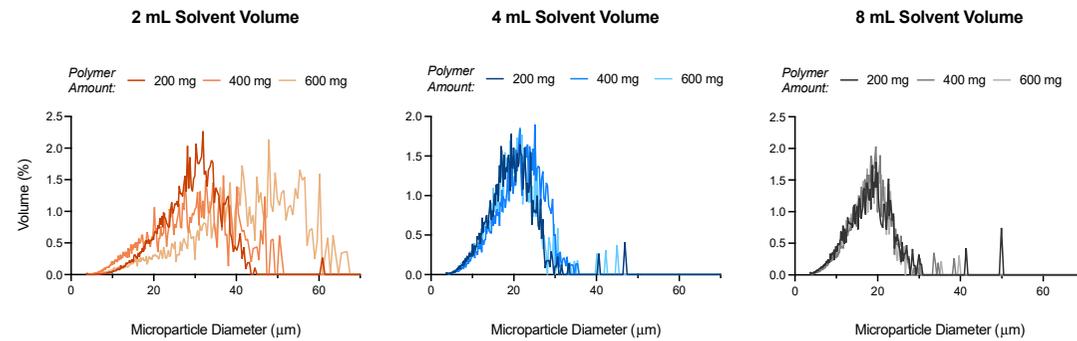
**Figure S4. Homogenization time and outer aqueous phase concentration both interact with solvent evaporation duration to impact microparticle size.** 3D surface and contour plots for the interactions of (A) homogenization time (mins) and solvent evaporation duration (hrs) and (B) [outer aqueous phase (w/v%)] and solvent evaporation duration (hrs). These interaction effects were found to be significant ( $p < 0.5$ ).



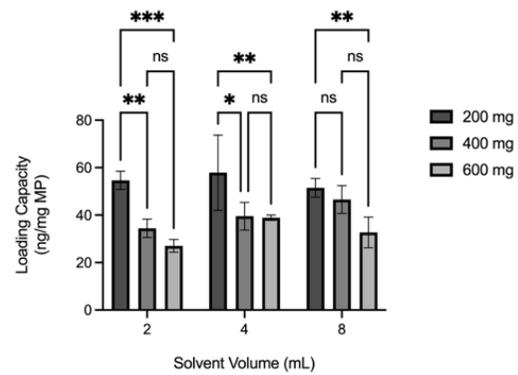
**Figure S5. Increasing inner aqueous phase volume increases size and polydispersity of rhCCL22-MPs.** Volume-weighted size distributions of rhCCL22-MPs formulated with various inner aqueous phase volumes (200, 500, 800 uL) at each solvent volume (2, 4, 8 mL), as determined by volume impedance measurements of  $n = 10,000$  particles.



**Figure S6. Microparticle surface porosity increases as solvent volume (mL) and inner aqueous phase volume (uL) increase.** Scanning electron microscopy (SEM) images taken at 650x magnification. Scale bars correspond to 10  $\mu\text{m}$ .



**Figure S7. Increasing polymer amount at 2 mL of solvent volume impacts size and polydispersity of rhCCL22-MPs.** Volume-weighted size distributions of rhCCL22-MPs formulated with various polymer amounts (200, 400, 600 mg) at each solvent volume (2, 4, 8 mL), as determined by volume impedance measurements of  $n = 10,000$  particles.



**Figure S8. Impact of polymer amount and solvent volume on rhCCL22 loading capacity.** Increasing polymer amounts within solvent volumes decreases loading capacity of rhCCL22-MPs (n = 3). \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , ns indicates non-significant difference.