

Supporting Information of: Hydrodynamic Electro spray Ionization Jetting of Calcium Alginate Particles: Effect of Spray-Mode, Spraying Distance and Concentration

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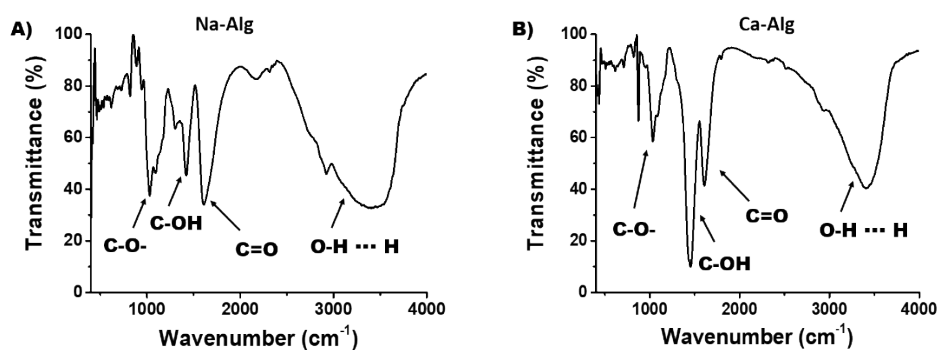


Fig. S1 A) FT-IR spectrum of sodium alginate (Na-Alg). B) FT-IR spectrum of calcium alginate (Ca-Alg). Absorption bands determined according to the data table outlined in references.¹

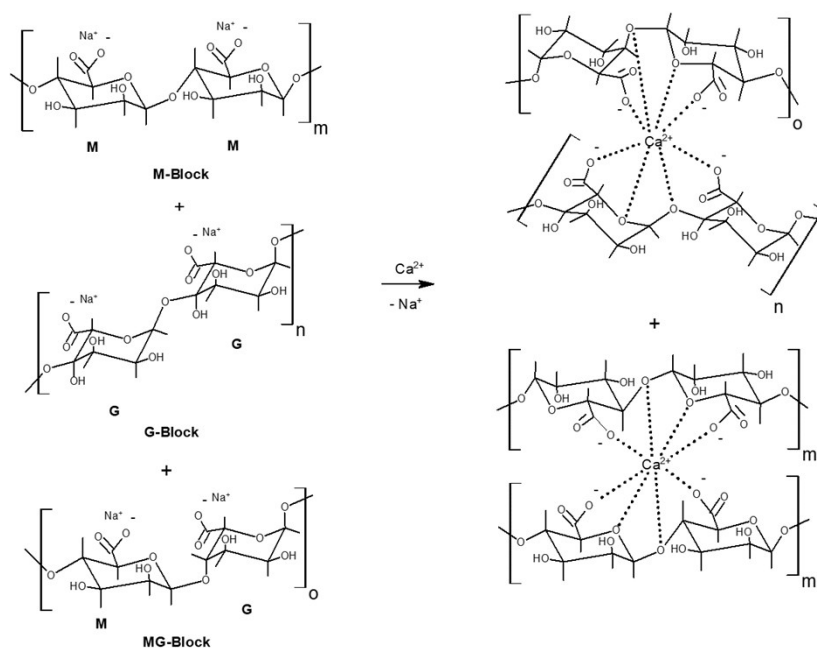


Fig. S2 Illustration of the sodium alginate (Na-Alg) cross-linking process with Ca^{2+} to calcium alginate (Ca-Alg) (G – α -L-guluronic acid block, M – β -D-mannuronic acid block, MG – M + G mixed block).

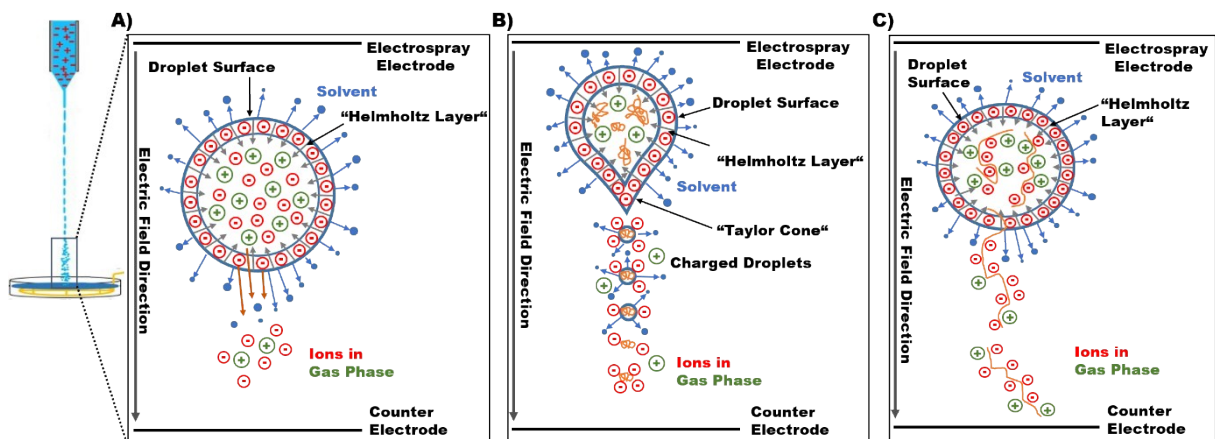


Fig. S3 Visualization of the release mechanism in step 3 main paper (Section: Methods and Materials - Different spray modes in ES jetting process), with **A)** ion evaporation model (IEM), **B)** charge residue model (CRM) and **C)** chain ejection model (CEM).

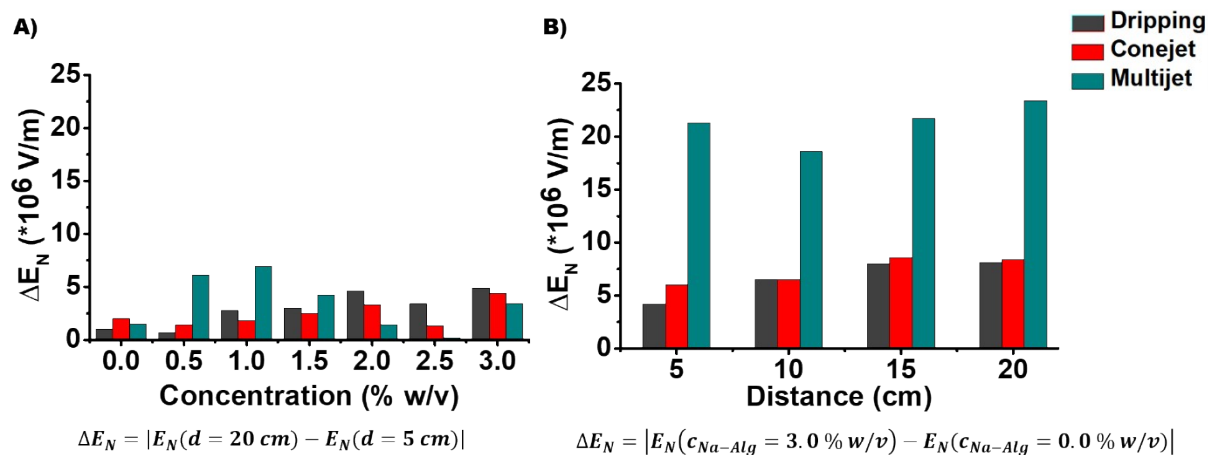


Fig. S4 A) ΔE_N is absolute value of E_N at $c_{Na-Alg} = 3.0 \% w/v$ minus absolute value of E_N at $c_{Na-Alg} = 0.0 \% w/v$ (only solvent Water: Ethanol = 8:2) against distance d (cm). **B)** ΔE_N is absolute value of E_N at $d = 20$ cm minus absolute value of E_N at $d = 5$ cm against c_{Na-Alg} (% w/v).

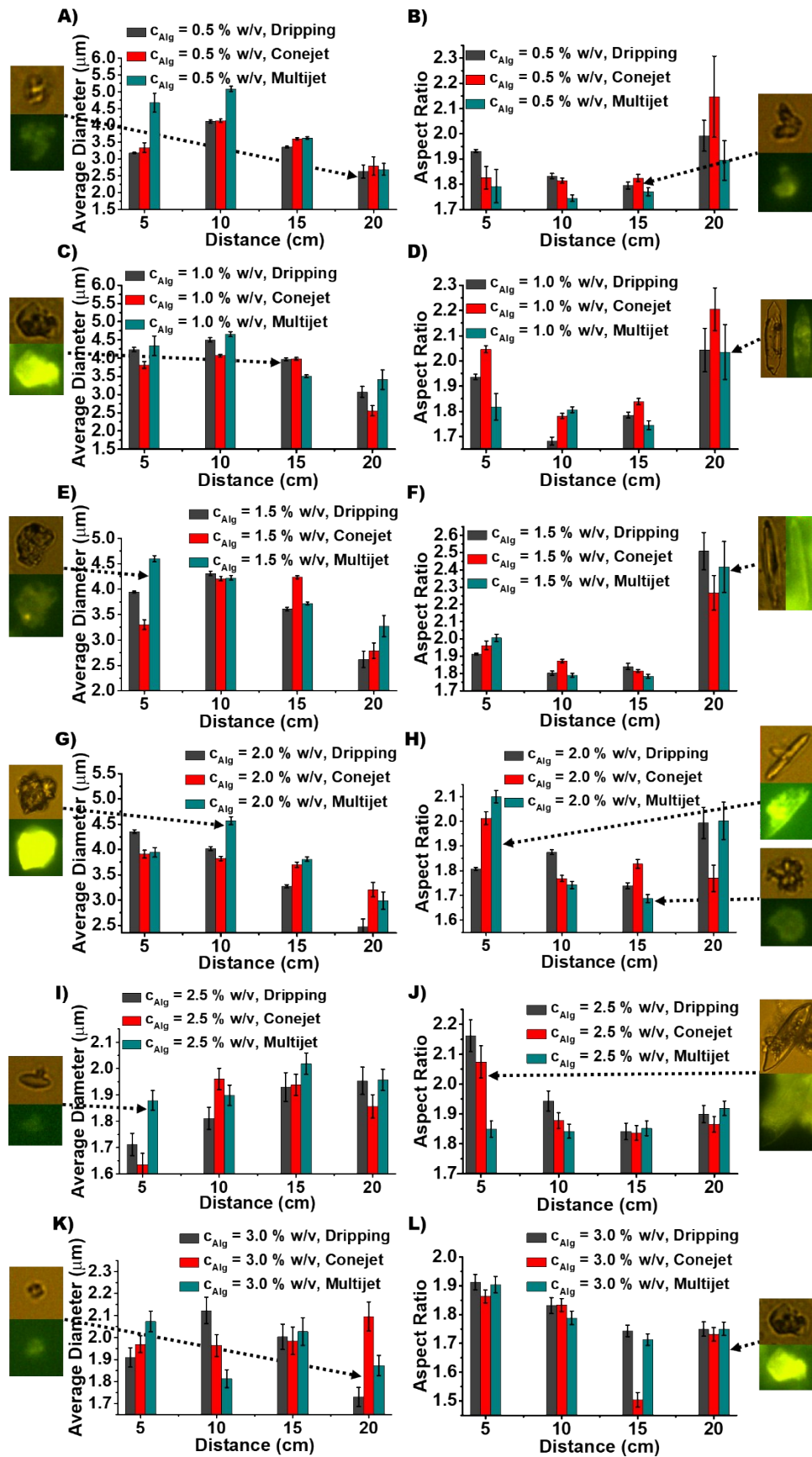


Fig. S5 A), C), E), G), I), K) Average diameter (μm) vs. distance (cm) with increasing $c_{\text{Na-Alg}}$ (% w/v) and B), D), F), H), J), L) Aspect ratio vs. distance (cm) with increasing $c_{\text{Na-Alg}}$ (% w/v). The inset images were acquired with a microscope Olympus IX71 and cropped to different scale bars. All plotted error bars are representing the standard error.

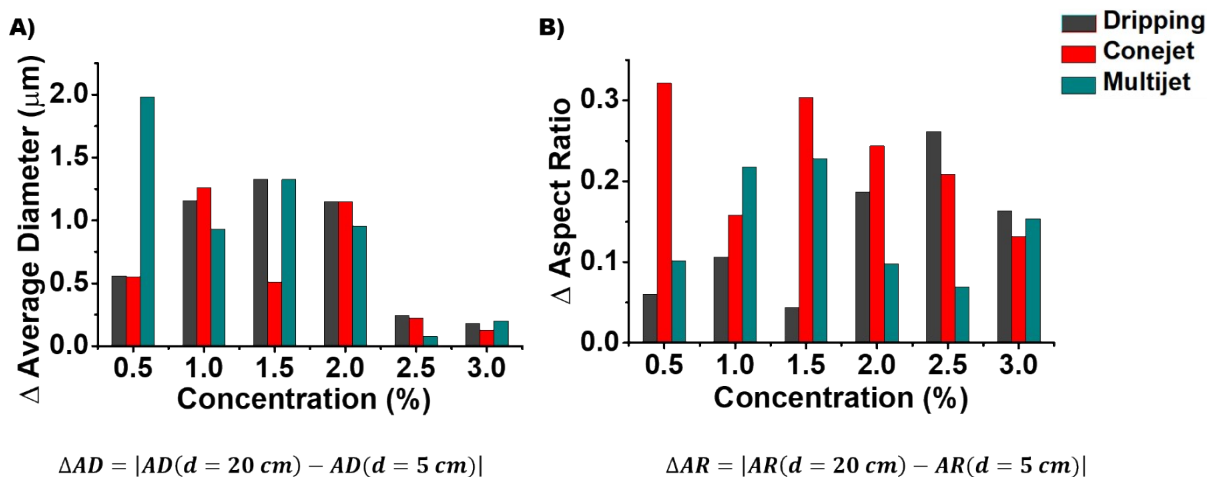


Fig. S6 A) Δ Average diameter (ΔAD) is absolute value of average diameter at $d = 20$ cm minus absolute value of average diameter at $d = 5$ cm against $c_{\text{Na-Alg}}$ (% w/v). **B)** Δ Aspect ratio (ΔAR) is absolute value of aspect ratio at $d = 20$ cm minus absolute value of aspect ratio at $d = 5$ cm against $c_{\text{Na-Alg}}$ (% w/v).

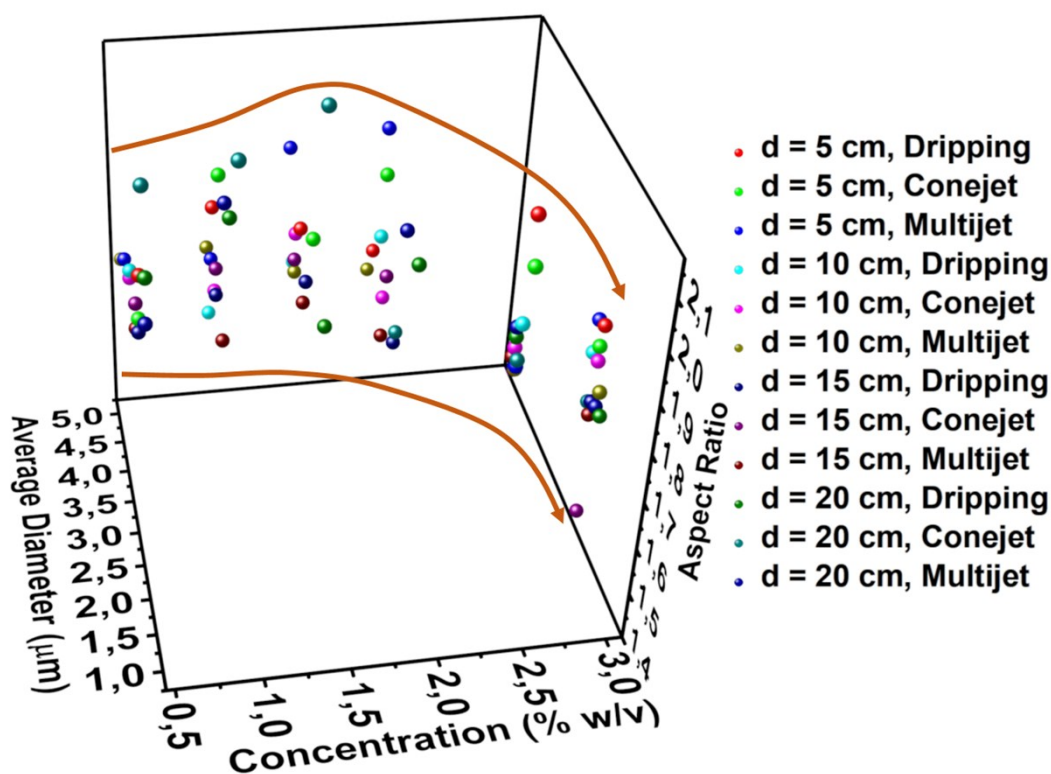


Fig. S7 Three dimensional plot of Average diameter (μm) vs. $c_{\text{Na-Alg}}$ (% w/v) vs. aspect ratio for the three applied electrospay modes. The two dark orange colored arrows are guiding the eyes.

Supporting References

- 1 M. Hesse, H. Meier, B. Zeeh, *Georg Thieme Verlag Stuttgart*, 1995, **5. Revised Edition**, 364 pages, ISBN: 3-13-576105-3.