

Preparation and characterization of bioadhesive microparticles comprising of low degree of quaternisation trimethylated chitosan for nasal administration: the effect of concentration and molecular weight

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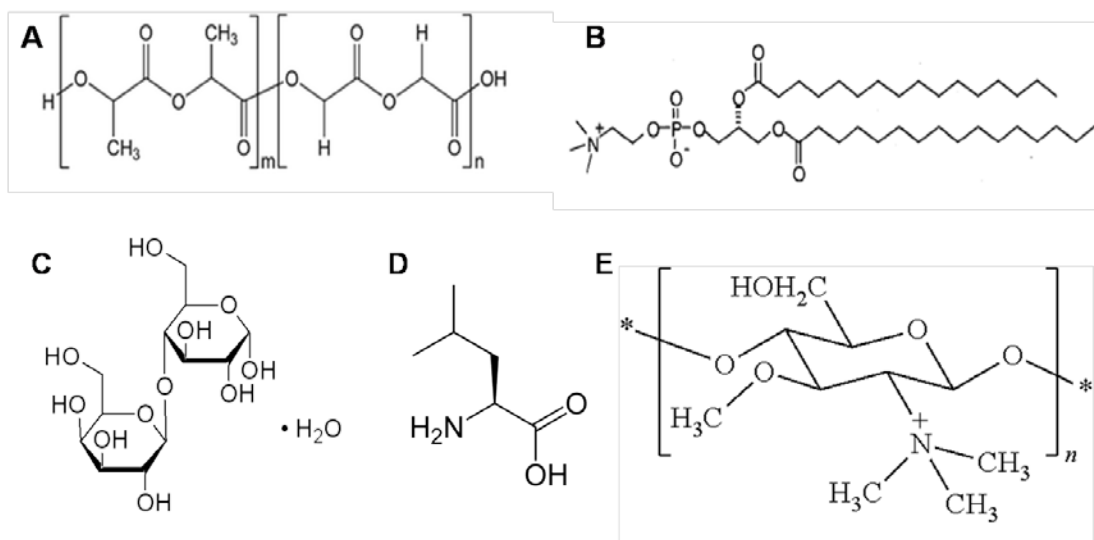


Figure S1: Chemical structures of raw materials A) PLGA (Poly (D,L-lactide-*co*-glycolide), *m* indicates glycolic acid units and *n* lactic acid units, B) DPPC (1,2-Dipalmitoyl-*sn*-glycero-3-phosphocholine, C) α -lactose monohydrate, D) L-leucine and E) N-trimethyl chitosan.

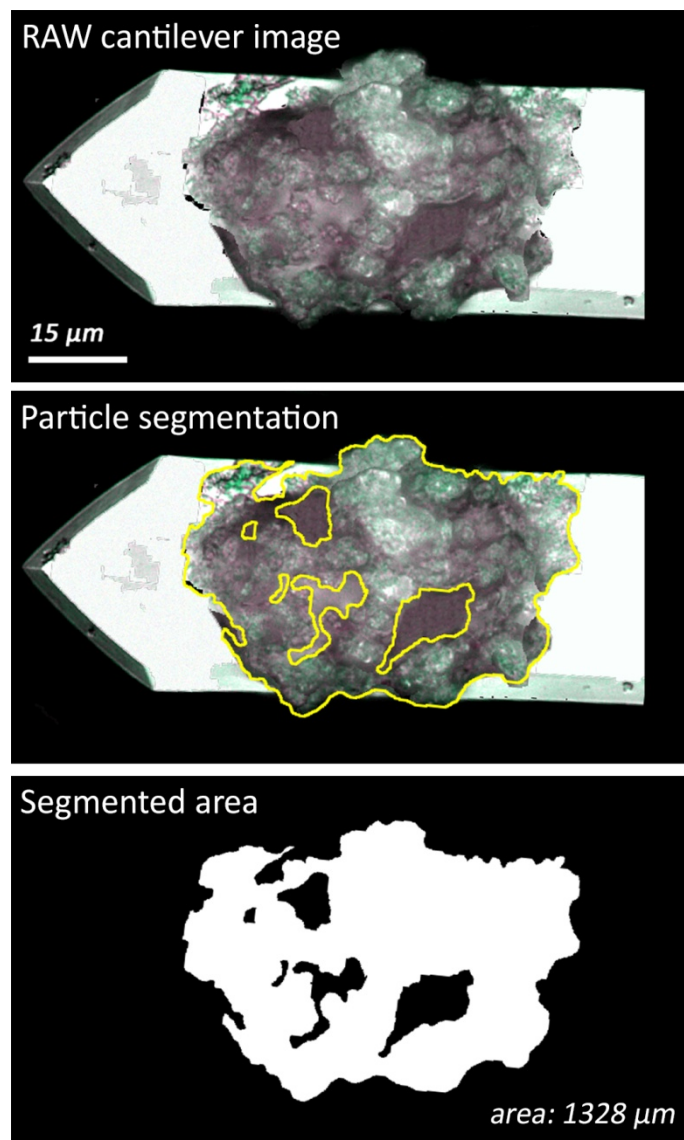


Figure S2 : Coverage area calculation.

Functionalized AFM cantilevers inspected under polarized microscope (Alicona[®] infinite focus microscope). Coverage area was measured in imageJ after manually segmenting the areas where TMC coated microparticles, comprised of PLGA and DPPC, were present.

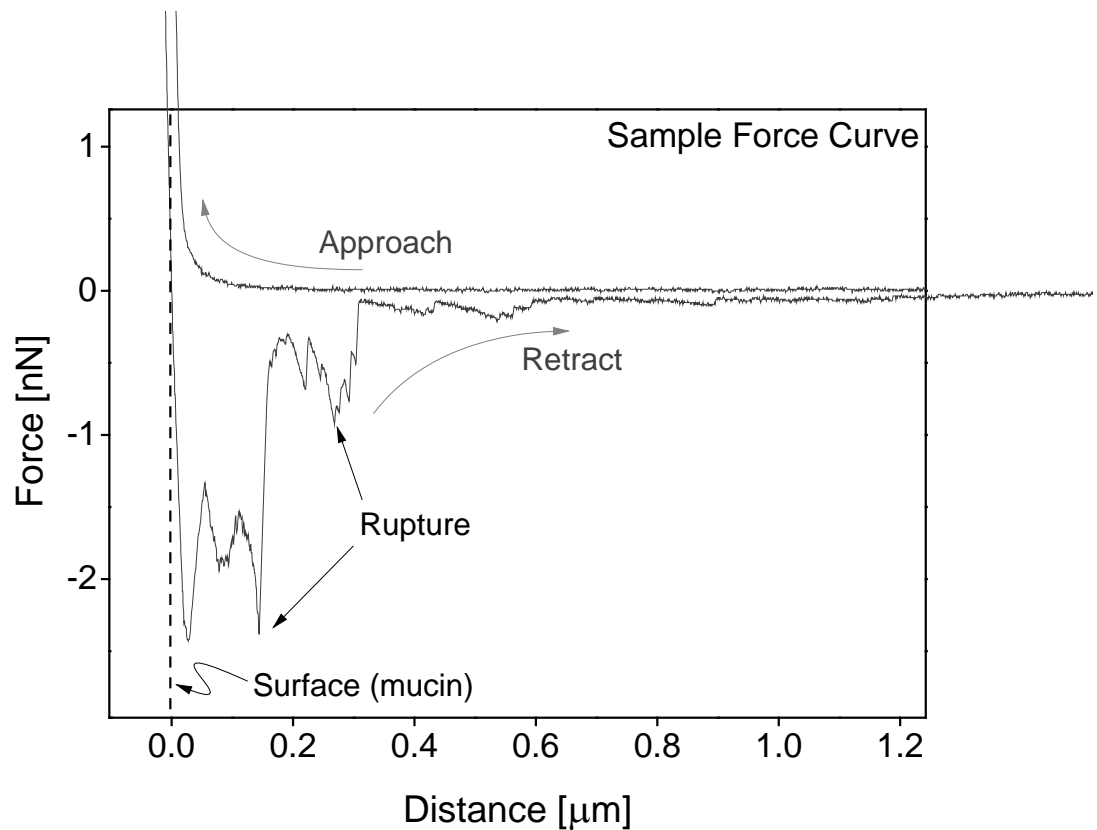
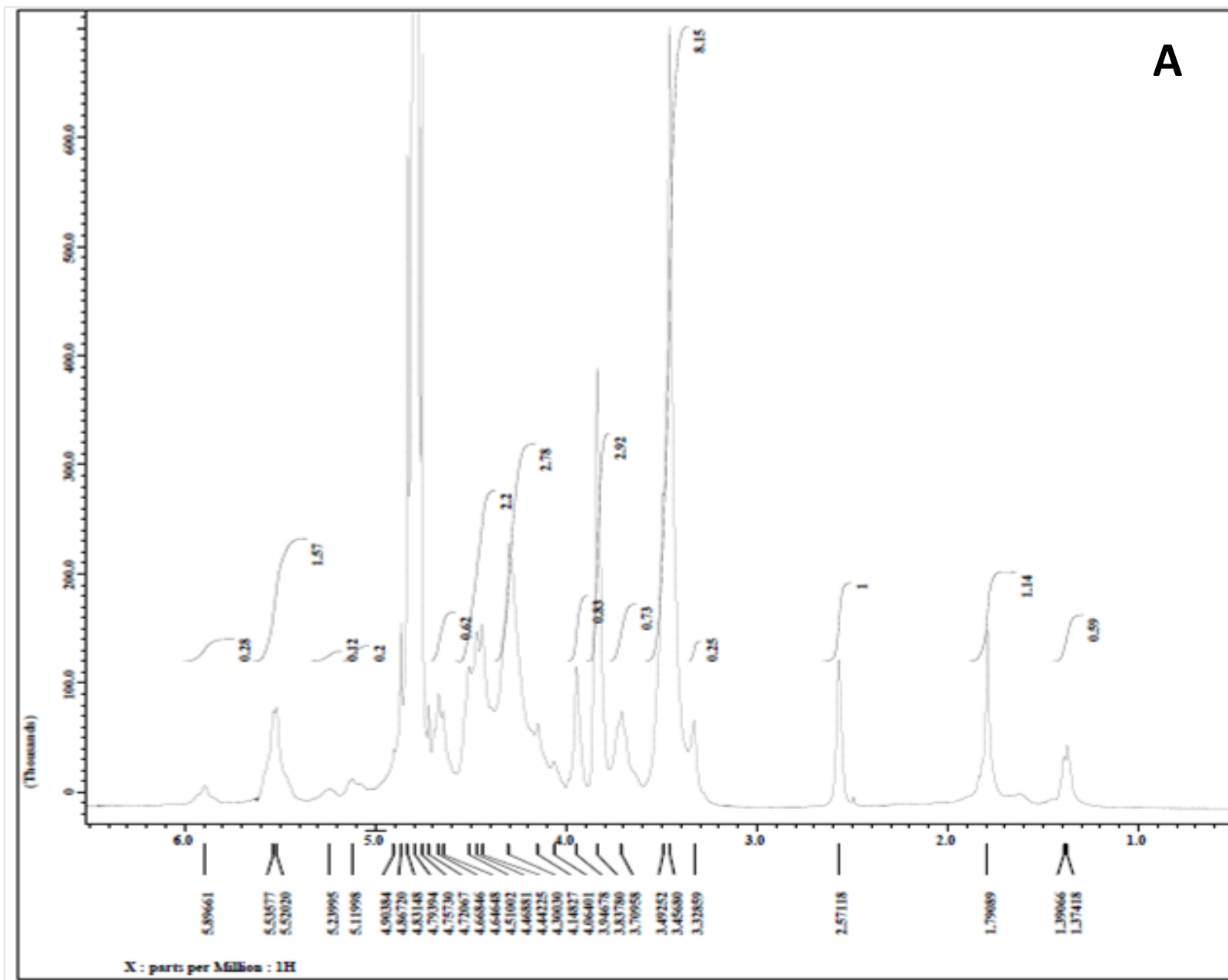


Figure S3: Representative Force – pulling curve recorded during the detachment of a functionalized cantilever from the mucin coated surface. The curve is comprised of two distinct parts; that is the approaching and the retraction part. The retraction part carries the characteristic detachment “signature” of the micro-particle from the mucin from which all the features are extracted. During retraction, the mucin polymers attached onto the particles are stretched opposing the detachment of the cantilever. This causes the cantilever to deflect towards the surface. The deflection is then translated into force using the spring constant value, k , of the cantilever (the negative sign represents that force is acting towards the surface). When the force overcomes a maximum value, some of the molecules eventually detach resulting in a sharp peak which is followed by another peak as new mucin molecules attached to the particles are being exposed to the force. The process is repeated until there are no more molecules attached to the cantilever and the deflection has return to 0.



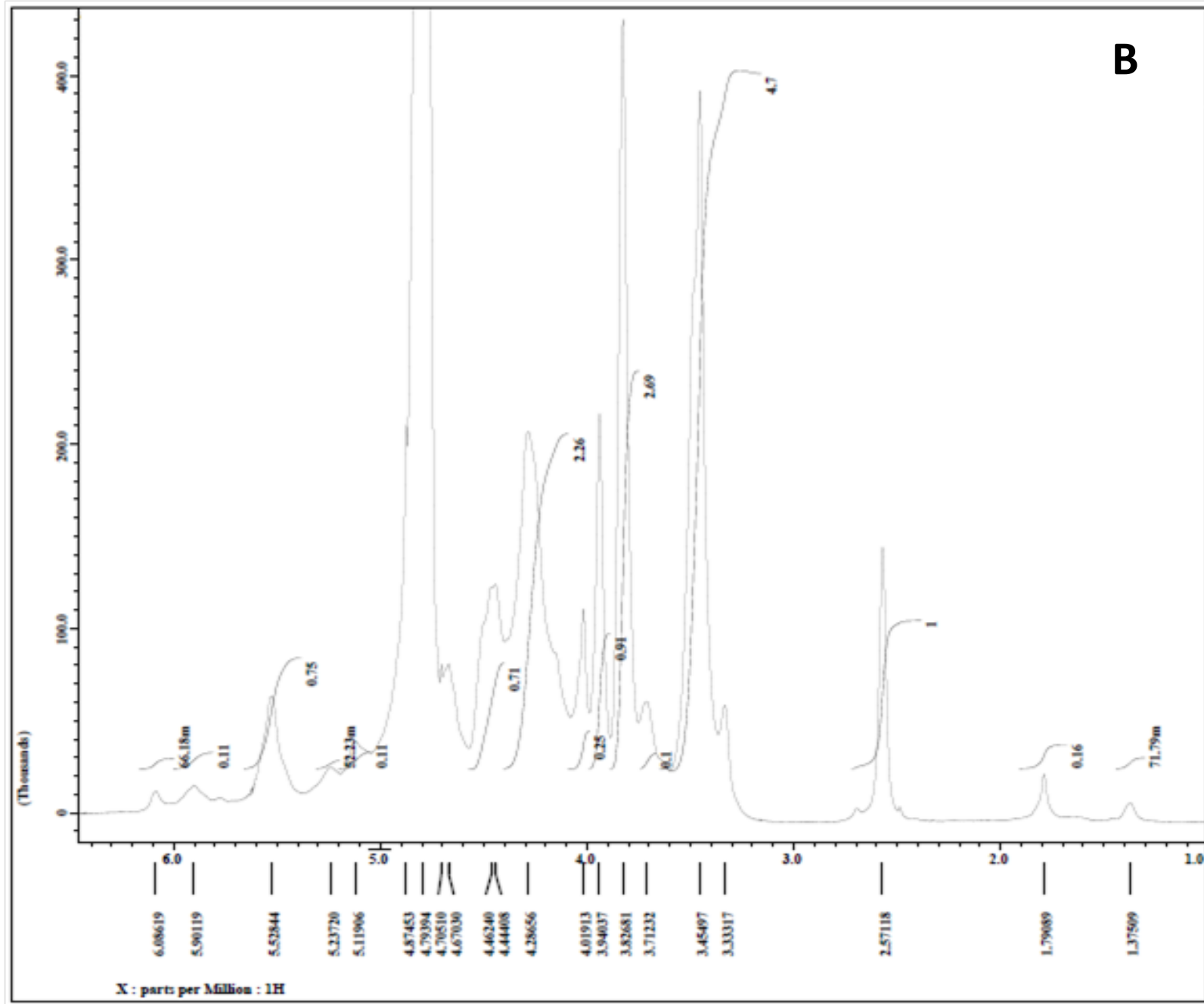


Figure S4: NMR spectra of (A) LMW TMC (B) HMW TMC.