

Shape engineering boost antibacterial activity of chitosan coated mesoporous silica nanoparticle doped with silver: A mechanistic investigation

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Nomenclature of prepared materials

MSP1: Mesoporous silica nanoparticles with aspect ratio value 1

MSP2: Mesoporous silica nanoparticles with aspect ratio value 2

MSP4: Mesoporous silica nanoparticles with aspect ratio value 4

MSP1:Ag⁺: Silver ion doped-mesoporous silica nanoparticles with aspect ratio value 1

MSP2:Ag⁺: Silver ion doped-mesoporous silica nanoparticles with aspect ratio value 2

MSP4:Ag⁺: Silver ion doped-mesoporous silica nanoparticles with aspect ratio value 4

Cht/ MSP1:Ag⁺: Chitosan-coated and silver ion doped-mesoporous silica nanoparticles with aspect ratio value 1

Cht / MSP2:Ag⁺: Chitosan-coated and silver ion doped-mesoporous silica nanoparticles with aspect ratio value 2

Cht / MSP4:Ag⁺: Chitosan-coated and silver ion doped-mesoporous silica nanoparticles with aspect ratio value 4

Cht / MSPs (1/2/4):Ag⁺: Set of samples, Chitosan-coated and silver ion doped-mesoporous silica nanoparticles with all the aspect ratio values (1,2,4)

Fig. S1: TEM images of MSP1, MSP2, and MSP4

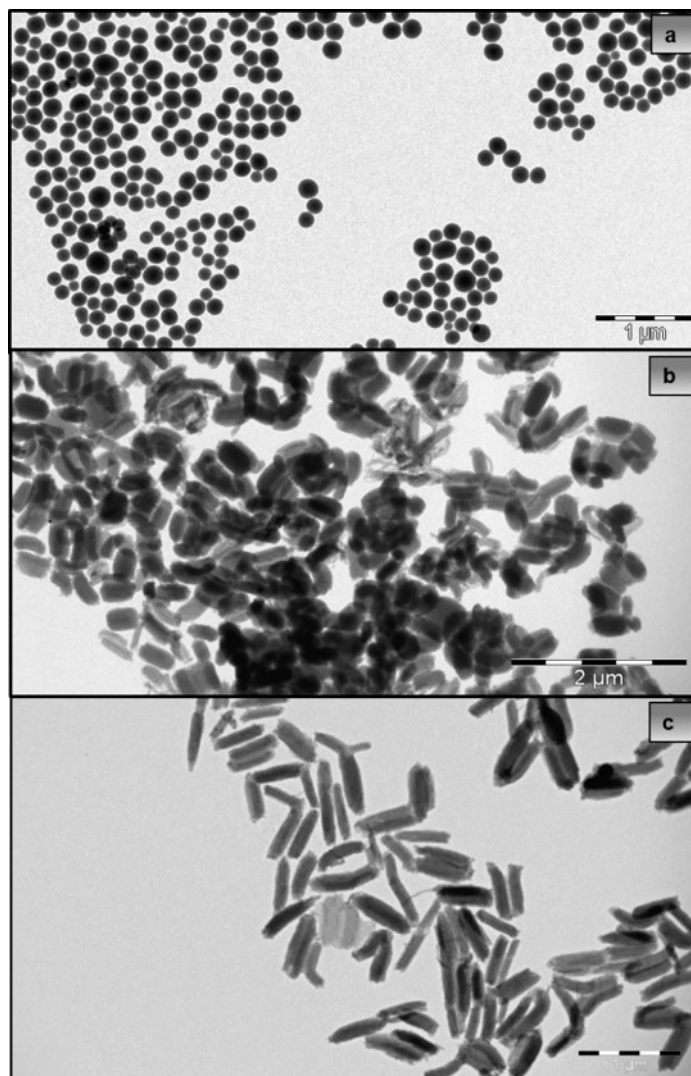


Fig. S2: N₂ sorption isotherms of MSP1, MSP2, MSP4

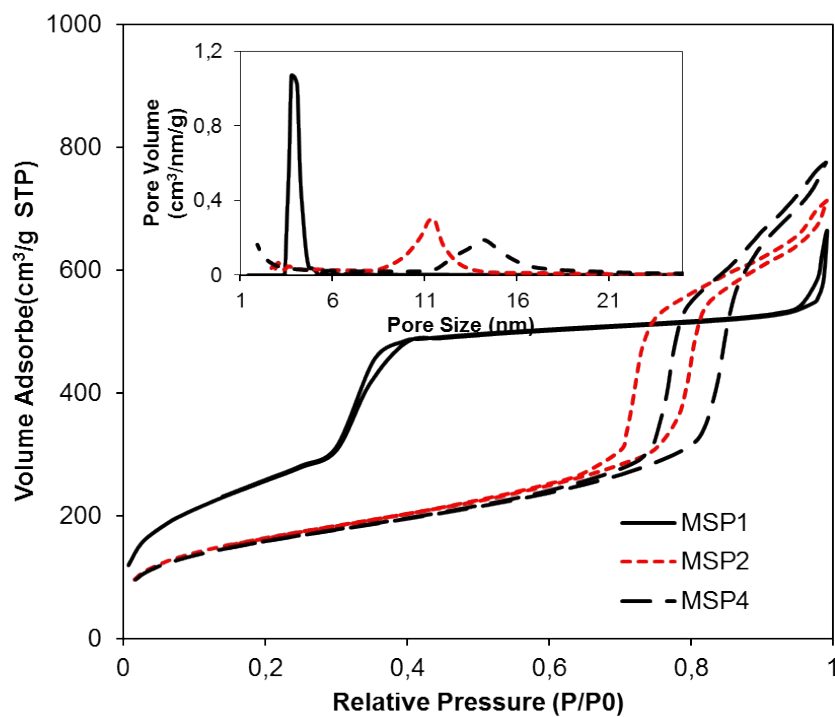


Table.S1: BET surface areas and average pore size values of pristine MSPs.

SAMPLE	Surface Area(m²/g)	Pore size (nm)
MSP1	915	3.8
MSP2	583	11.4
MSP4	575	14.2

Fig S3. SEM images of a) MSP1 b) MSP2 c) MSP4 d) Cht/MSP1:Ag⁺ e) Cht/MSP2:Ag⁺ f) Cht/MSP4:Ag⁺.

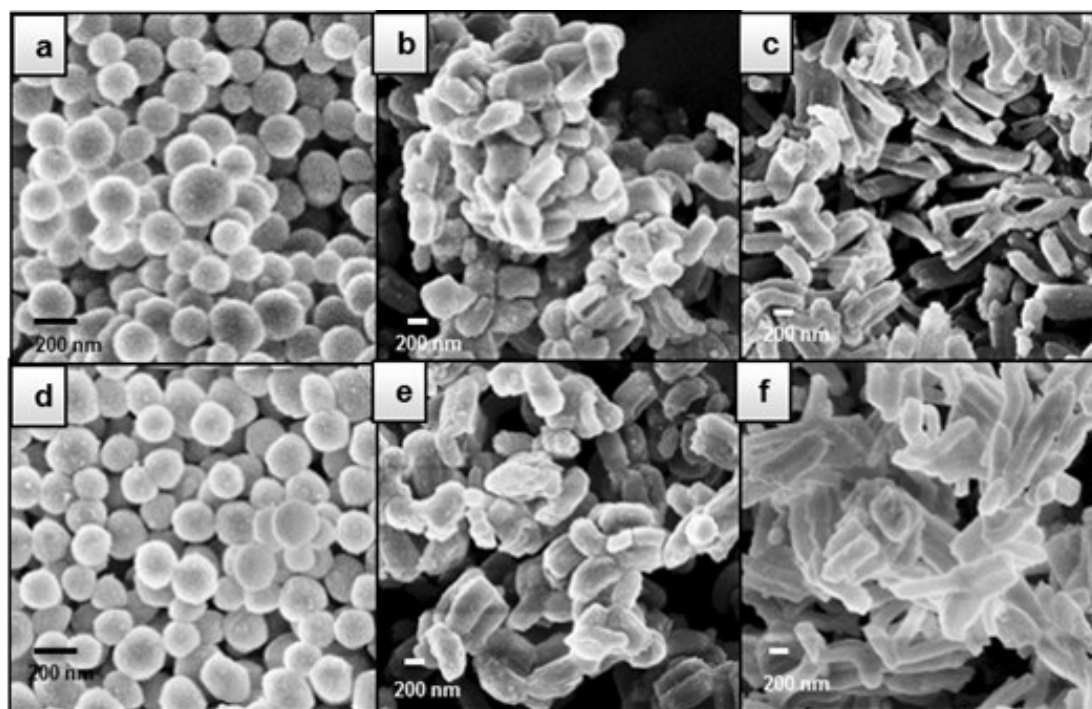


Fig S4. TEM images of a) MSP1 b)MSP2 c)MSP4 d)MSP1:Ag⁺ e)MSP2:Ag⁺ f)MSP4:Ag⁺.

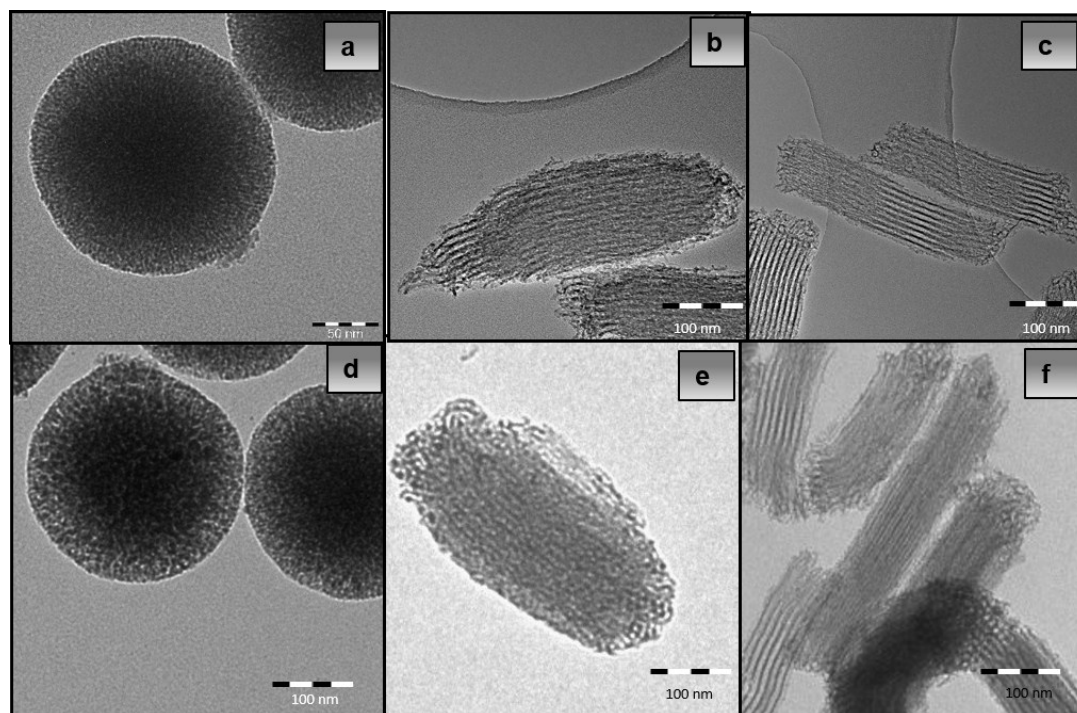


Fig. S5. Thermogravimetric analysis of MSP (1/2/4): Ag⁺ and Cht/MSP(1/2/4):Ag⁺

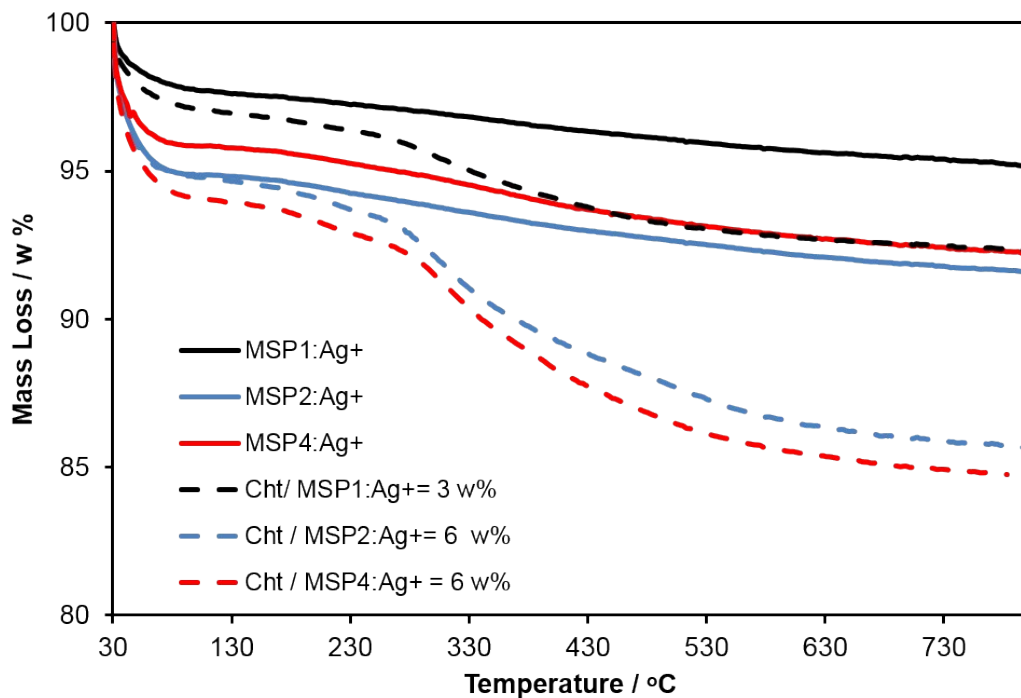


Fig. S6. Time dependent microcalorimetric measurement of chitosan release from Cht/MSP (1/2/4):Ag⁺ samples in HEPES (pH7.2, 25mM at 36.5 °C) buffer.

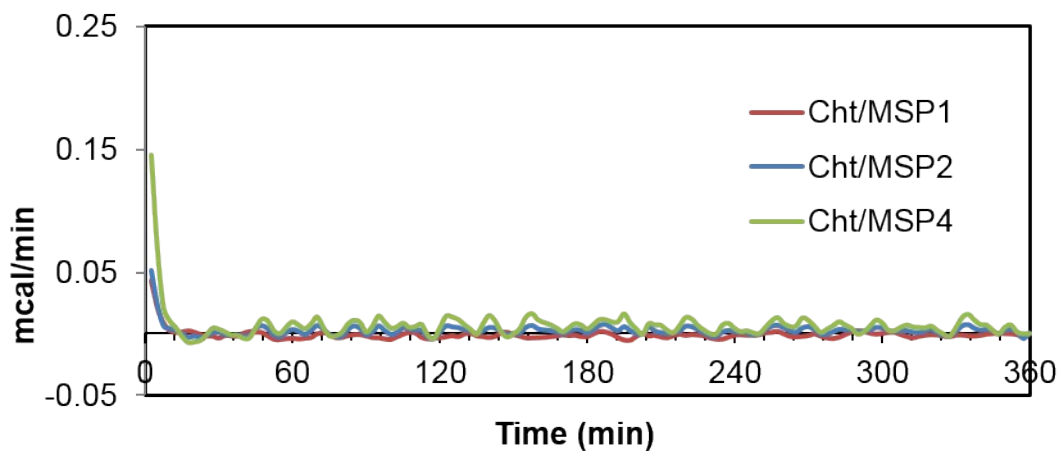


Fig. S7. LB plates showing reduction in number of colonies on MSP treatment.

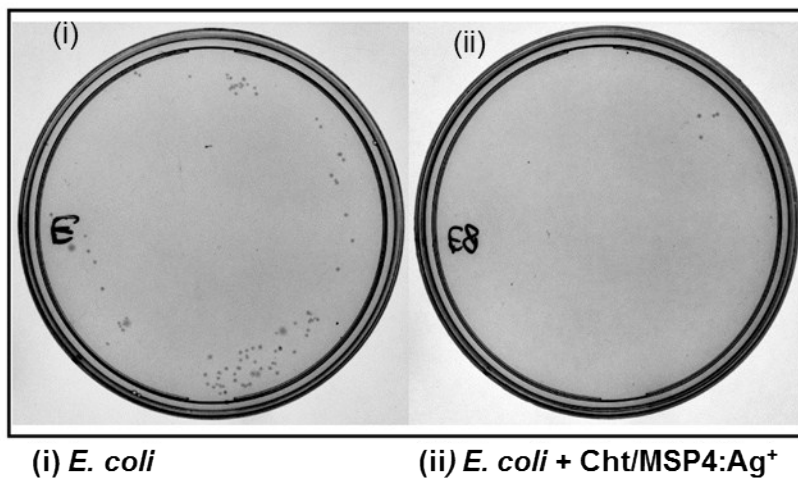


Table S2: Change in *E.coli* and *V.cholerae* cell length on Cht/MSP4:Ag⁺ treatment based on SEM measurement.

Strain Name	Total number cell screened	Cell Length in μM		
		Normal (2.5 μm)	Elongated (2.5-10 μm)	Super-elongated (>10 μm)
<i>E.coli</i>	100	95	5	-----
<i>E.coli</i> +Chitosan/MSP4:Ag ⁺	100	8	22	70
<i>V.cholerae</i>	100	96	4	-----
<i>V.Cholerae</i> +Chitosan/MSP4:Ag ⁺	100	40	52	8