

# Electronic supplementary information

## Shaping silver nanoparticles size through the carrier composition: synthesis and antimicrobial activity

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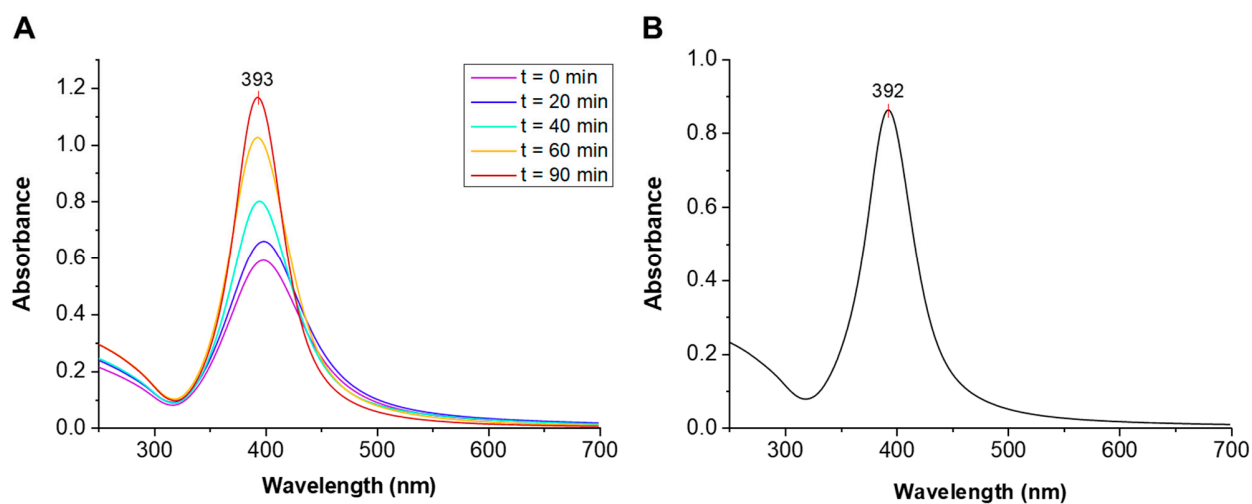
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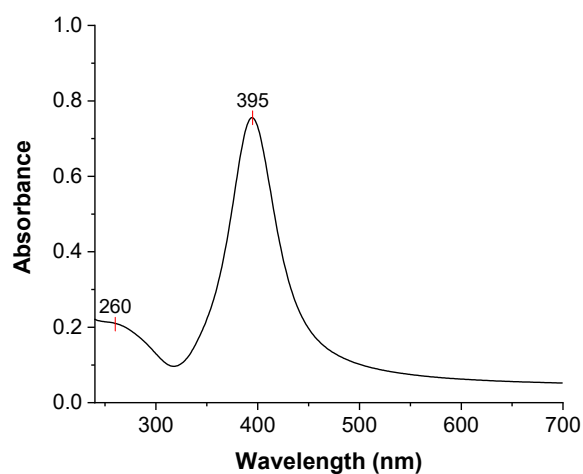
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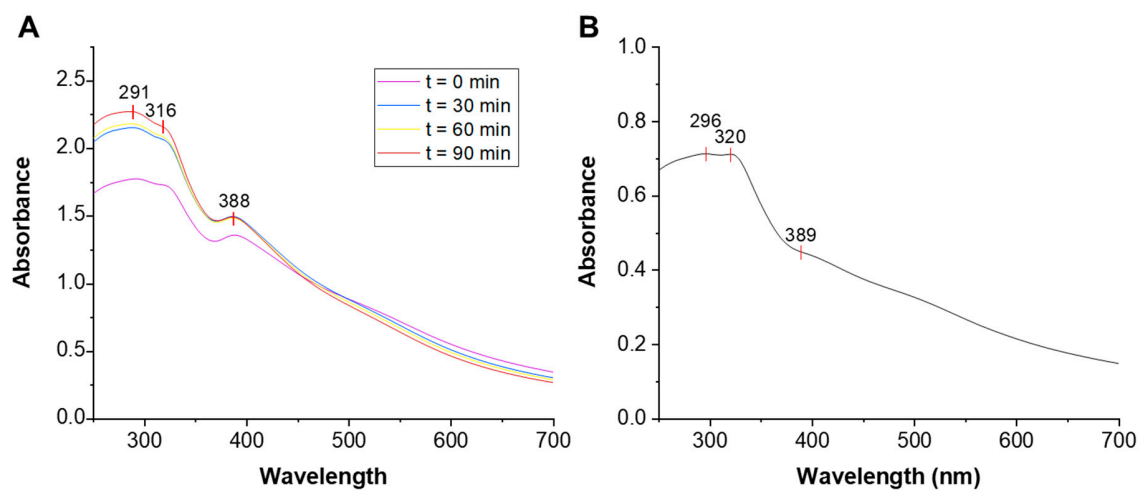
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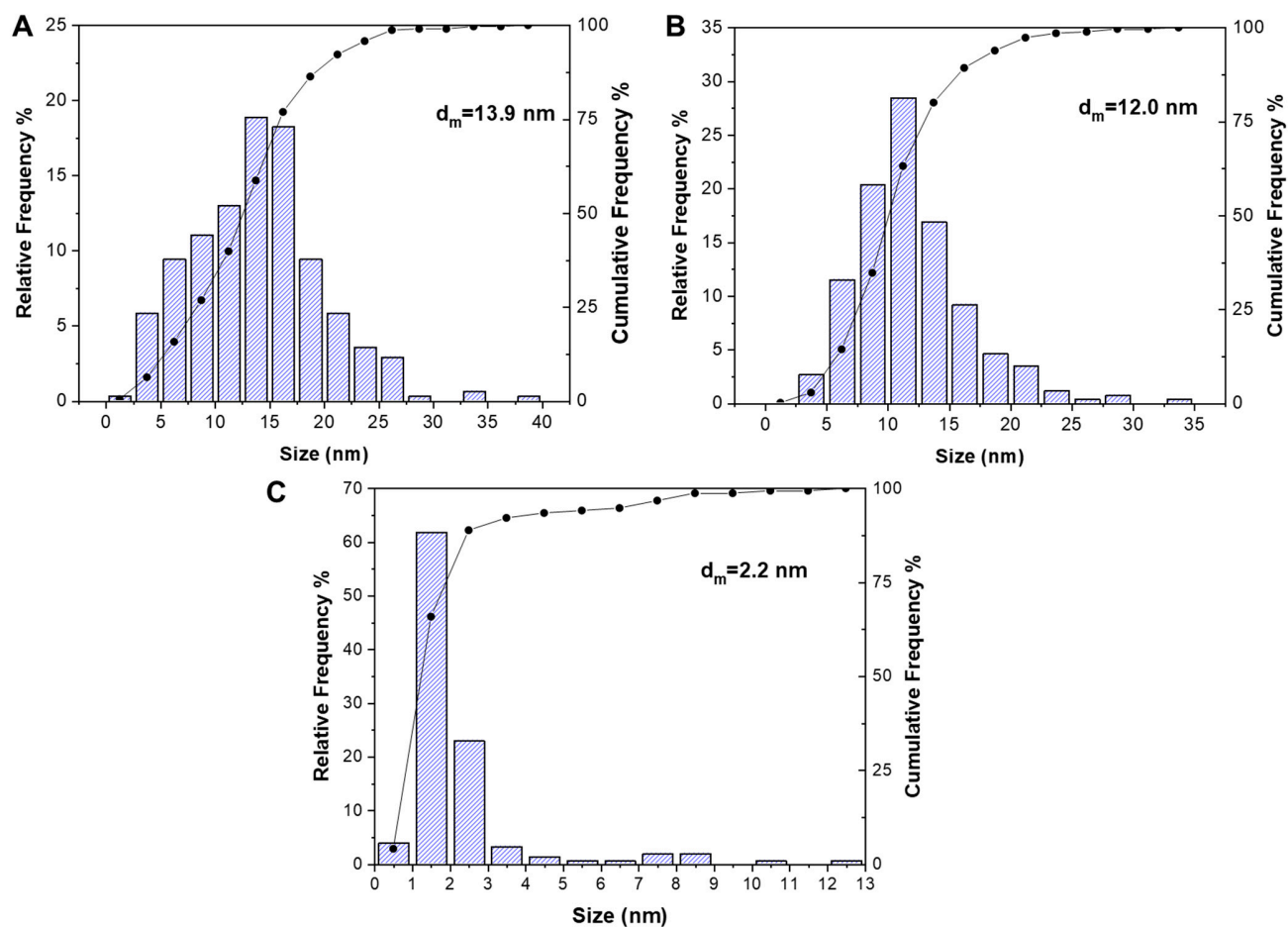
**Figure S1. A.** Overlapped UV-Vis spectra of the reaction mixture over time for the synthesis of **CNC-AgNPs**;  $\lambda_{\text{max}} = 392$  nm; **B.** UV-Vis spectrum of **CNC-AgNPs** (0.13 mg/mL AgNPs in H<sub>2</sub>O);  $\lambda_{\text{max}} = 392$  nm.



**Figure S2.** UV-Vis spectrum of **rGO-SA-AgNPs**. (0.1 mg/mL in H<sub>2</sub>O);  $\lambda_{\text{max}} = 395$  nm (AgNPs)  $\lambda = 260$  nm (rGO-SA)



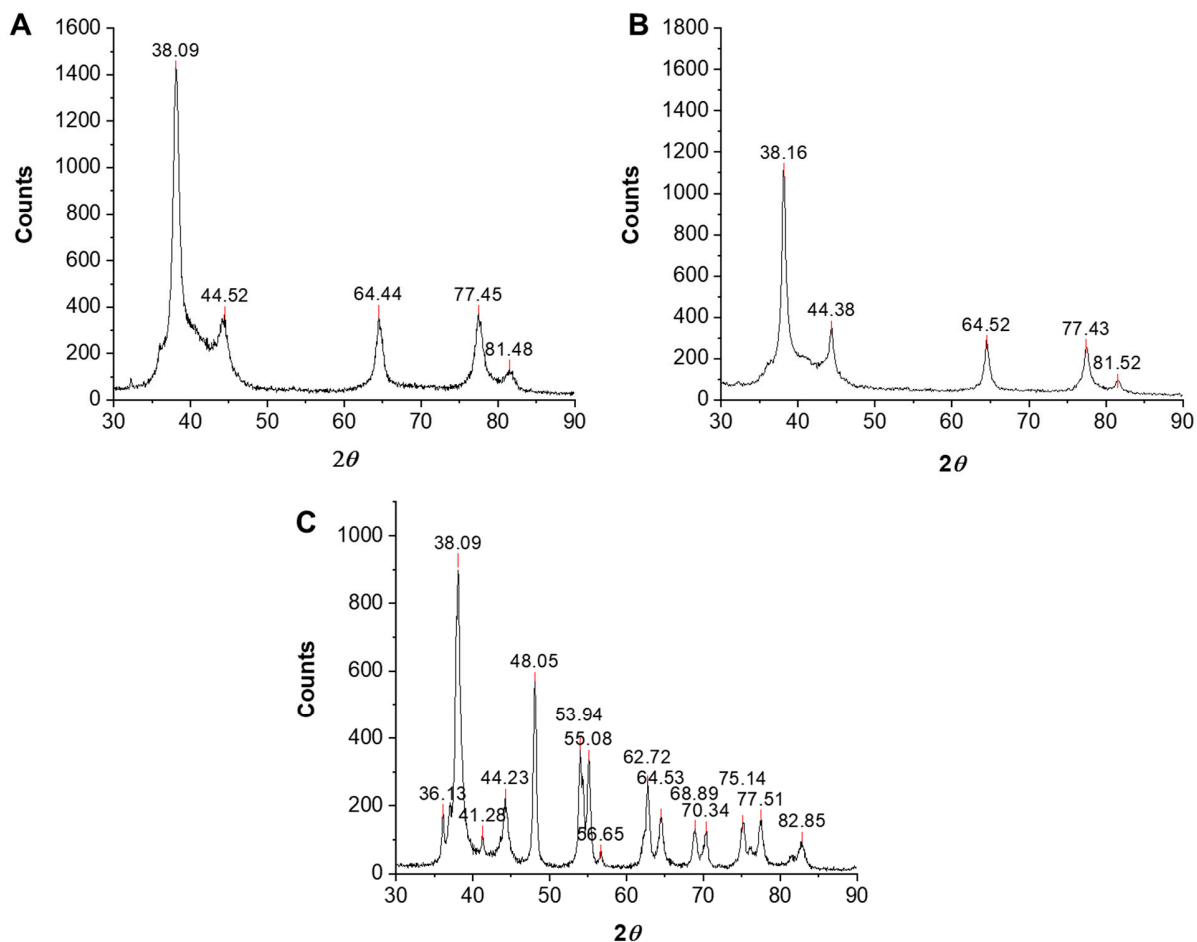
**Figure S3.** A) Overlapped UV-Vis spectra of reaction media for the synthesis of  $\text{TiO}_2\text{-AgNPs}$  (0.1 mg/mL) AgNPs  $\lambda_{\text{max}} = 388$  nm; B) UV-Vis spectrum of  $\text{TiO}_2\text{-AgNPs}$  (0.1 mg/mL) after dialysis (AgNPs,  $\lambda_{\text{max}} = 389$  nm), ( $\text{TiO}_2$ ,  $\lambda_{\text{max}} = 316$  and 291).



**Figure S4.** Nanoparticles size distribution of: A) **CNC-AgNPs**; B) **rGO-SA-AgNPs**; C) **TiO<sub>2</sub>-AgNPs**.

**Table S1.** AgNPs diameter evaluated by statistical analysis of TEM images ( $d_{\text{TEM}}$ ); crystal size ( $d_{\text{XRD}}$ ) and lattice parameter ( $a$ ) calculated by the XRD pattern fittings.

AgNPs composites	$d_{\text{TEM}}$ (nm) <sup>a</sup>	$d_{\text{XRD}}$ (nm)
<b>CNC-AgNPs</b>	$13.93 \pm 0.34$	$9.9 \pm 0.7$
<b>rGO-SA-AgNPs</b>	$4.90 \pm 0.27$	$16.2 \pm 0.7$
<b>TiO<sub>2</sub>-AgNPs</b>	$2.2 \pm 0.2$	$14.2 \pm 0.7$



**Figure S5.** XRD spectra of: A) **CNC-AgNPs**, B) **rGO-SA-AgNPs**, C) **TiO<sub>2</sub>-AgNPs**.

**Table S2.** Lattice parameters values (*a* and *c*) and crystal sizes (*d<sub>XRD</sub>*) obtained from the Pawley refinement of the acquired XRD patterns of AgNPs (\*) and TiO<sub>2</sub> (\*\*) mean values and error on the last significant digit reported in brackets.

AgNPs composites	<i>a</i> <sup>*</sup> (Å)	<i>d<sub>XRD</sub></i> <sup>*</sup> (nm)	<i>a</i> <sup>**</sup> (Å)	<i>c</i> <sup>**</sup> (Å)	<i>d<sub>XRD</sub></i> <sup>**</sup> (nm)
<b>CNC-AgNPs</b>	4.0849(4)	9.9(7)	-	-	-
<b>rGO-SA-AgNPs</b>	4.0877(3)	16.2(7)	-	-	-
<b>TiO<sub>2</sub>-AgNPs</b>	4.0876(3)	14.2(7)	4.5958(9) <sup>e</sup>	2.9568(7) <sup>e</sup>	33.3(1) <sup>e</sup>
			3.7849(4) <sup>f</sup>	9.5082(8) <sup>f</sup>	24.4(1) <sup>f</sup>

<sup>e</sup> rutile form; <sup>f</sup> anatase form.

**Table S3.** Silver and titanium content of the nanomaterials measured by ICP-AES and expressed as % w/w.

<b>AgNPs composites</b>	<b>Ag <math>\mu\text{g}/\text{mg}</math></b>	<b>Ag % w/w</b>	<b>Ti <math>\mu\text{g}/\text{mg}</math></b>	<b>Ti % w/w</b>
<b>CNC-AgNPs</b>	445.66	44.6	-	-
<b>rGO-SA-AgNPs</b>	1.89	18.9	-	-
<b>TiO<sub>2</sub>-AgNPs</b>	89.4	8.9	145.74	14.6