Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2020

Supplementary Information

Curcumin loaded zinc oxide nanoparticles for activity-enhanced antibacterial and anticancer applications

W. P. T. D. Perera, [a,b] D. M. R. K. Dissanayake, [b,c*] U. I. Ranatunga, [d] N. M. Hettiarachchi, [a,b] K. D. C. Perera, [a,b] J.M. Unagolla, [e] R. T. DeSilva, [b] and L. R. Pahalagedara [b]

[a.] Academy of the Sri Lanka Institute of Nanotechnology, Nanotechnology and Science Park, Mahenwatte, Pitipana, Homagama 10206, Sri Lanka.
[b.] Sri Lanka Institute of Nanotechnology, Nanotechnology and Science Park, Mahenwatte, Pitipana, Homagama 10206, Sri Lanka.
[c.] Department of Pharmacy and Pharmaceutical Sciences, Faculty of Allied Health Sciences, University of Sri Jayewardenepura, Gangodawila, Nugegoda 10250, Sri Lanka.
[d.] Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, 25 Kynsey Road, Colombo 00800, Sri Lanka.
[e.] Biomedical Engineering Program, Department of Bioengineering, College of Engineering, University of Toledo, Toledo, OH 43607, USA

* Corresponding author (email: rangad@sjp.ac.lk)

1. Loading study

The calibration curve for the quantification of curcumin is presented below, alongside the raw UV-Vis data used for its construction. Linear correlation between concentration and absorbance was shown between 1–9 ppm of curcumin solution.

Figure S1- A) UV-Vis spectra used to plot the calibration curve in **B)**.

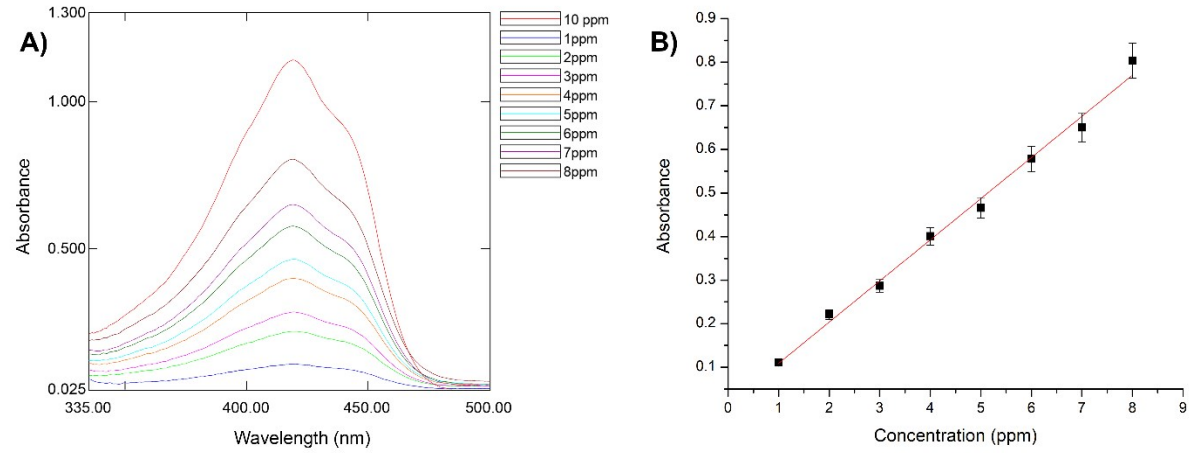

Table S1- Calculated concentrations of curcumin in post-digestion solutions of polymorphic ZnO-curcumin nanocomposites.

Nanocomposite shape	Curcumin concentration (μg mL^{-1})	Loading (%)
Rod	26.6	3.93
Sphere	52.0	5.72
Long petal	102	10.25
Short petal	28.5	3.14
Javelin	75.7	8.37

The highest loading of curcumin was observed in LPZNP-C, while the lowest was observed in SPZNP-C. This pattern largely matches that observed in the calculated, TGA-derived data (see Table 1), likely due to the same reasons discussed previously (*i.e.*- large surface areas with deep crevices in the case of LPZNPs and relatively low surface area-to-volume ratio in the case of the SZNPs).

2. Anticancer assay

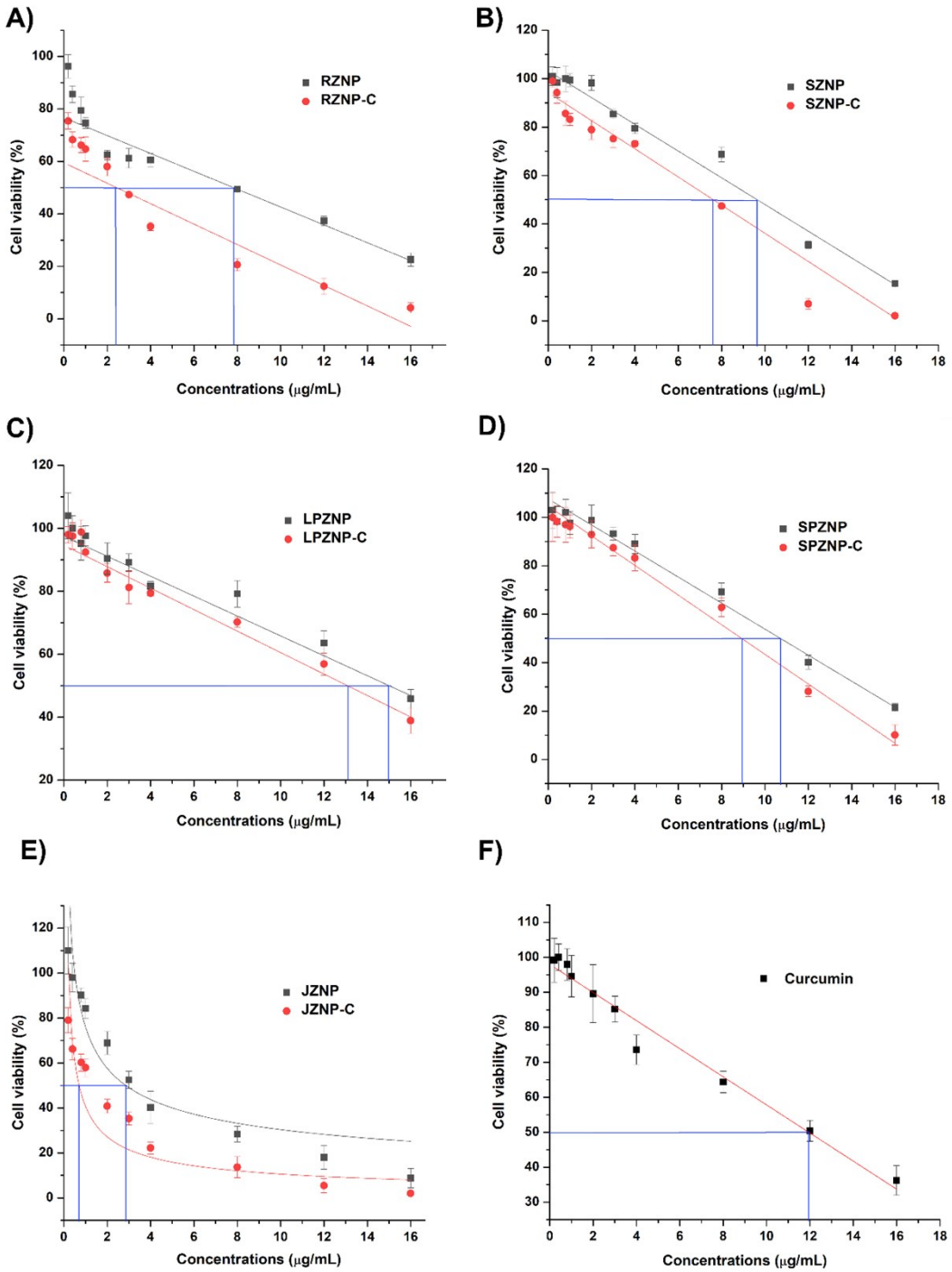

Figure S2- Anticancer activity of different shapes of ZNP, curcumin-loaded ZNPs and pure curcumin. **A)** RZNP and RZNP-C, **B)** SZNP and SZNP-C, **C)** LPZNP and LPZNP-C, **D)** SPZNP and SPZNP-C, **E)** JZNP and JZNP-C, **F)** pure curcumin.

3. Cytotoxicity study

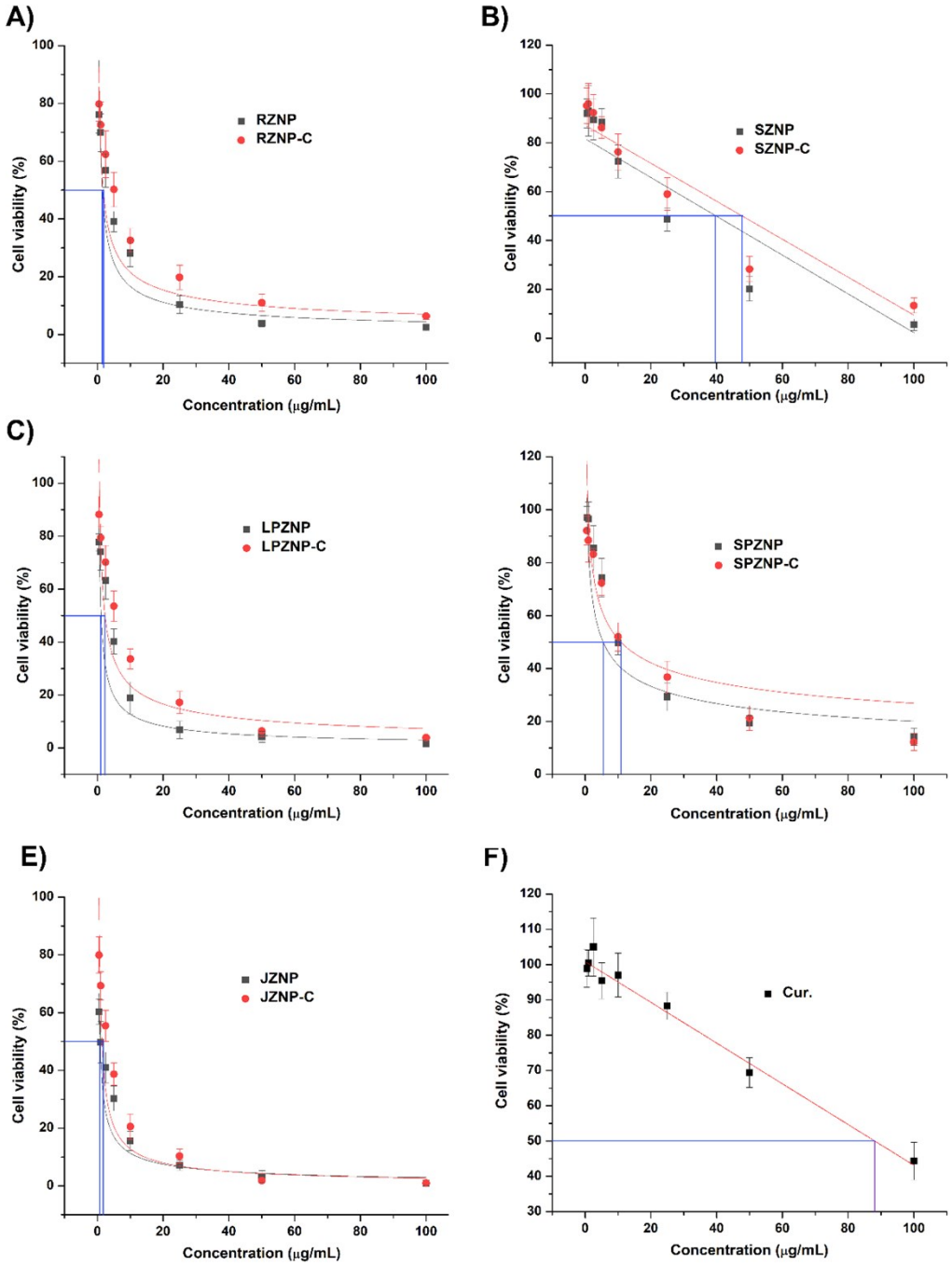

Figure S3- Cytotoxicity of different shapes of ZNP, curcumin-loaded ZNPs and pure curcumin towards Human Embryonic Kidney (HEK) cells. **A)** RZNP and RZNP-C, **B)** SZNP and SZNP-C, **C)** LPZNP and LPZNP-C, **D)** SPZNP and SPZNP-C, **E)** JZNP and JZNP-C, **F)** pure curcumin.