Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Evaluation of Multilayer Coated Magnetic Nanoparticles as Biocompatible Curcumin delivery Platforms for Breast Cancer Treatment

Table S1. *Zeta potentials, particle size distributions and average sizes of different MNPs.*

Name	Zeta potential(mV)	Average size (nm)
Fe_3O_4 MNPs	+ 3.2	82±3.1
Fe@PEI	+19.1	105±3.4
Fe@HAP-PEI	+4.9	153±6.5
Fe@PEI-CD	-4.3	205±7.8
Fe@HAP-PEI-CD	-11.6	260±8.9

Fig. S1: *FTIR analysis of different MNPs*

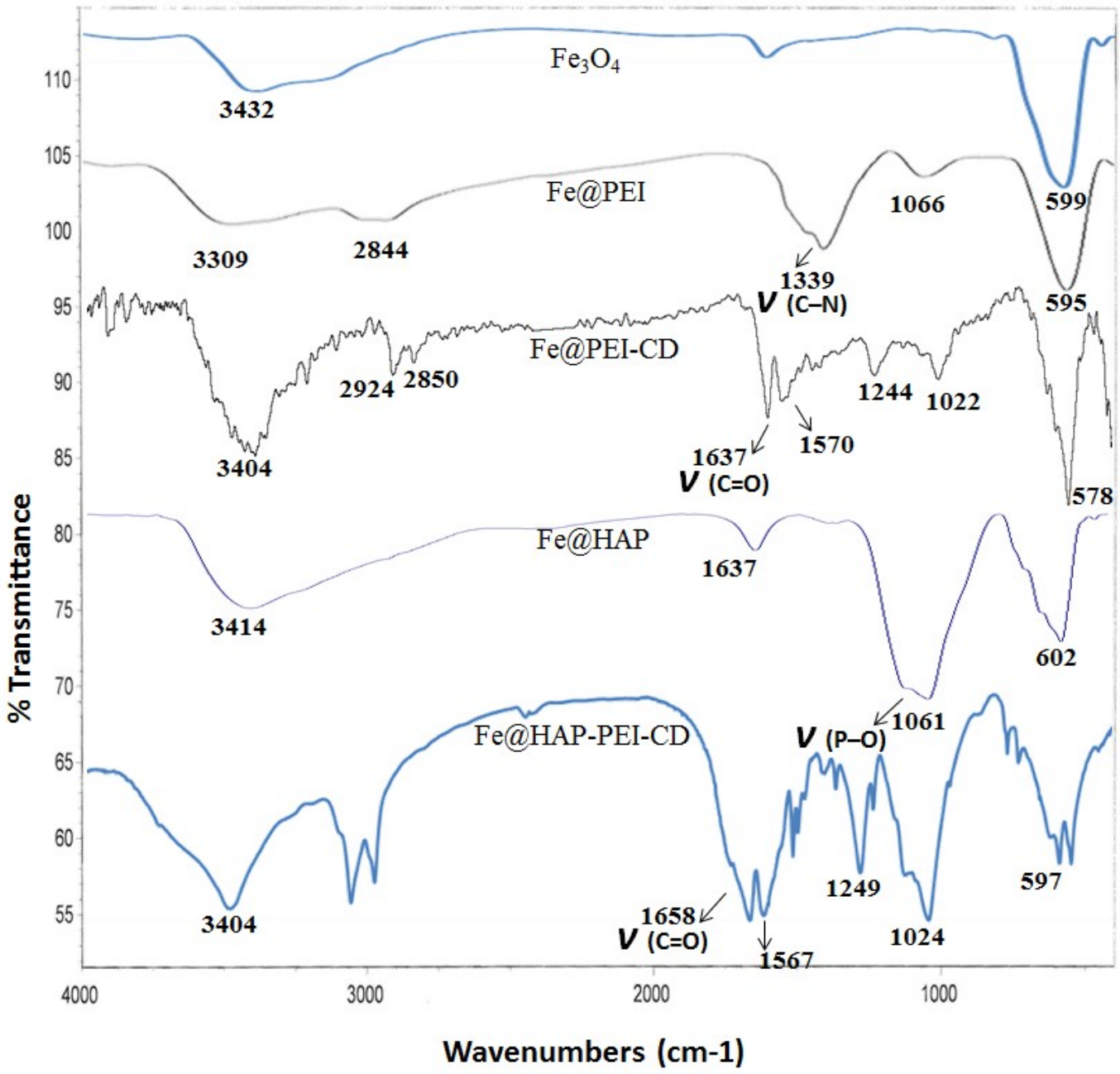
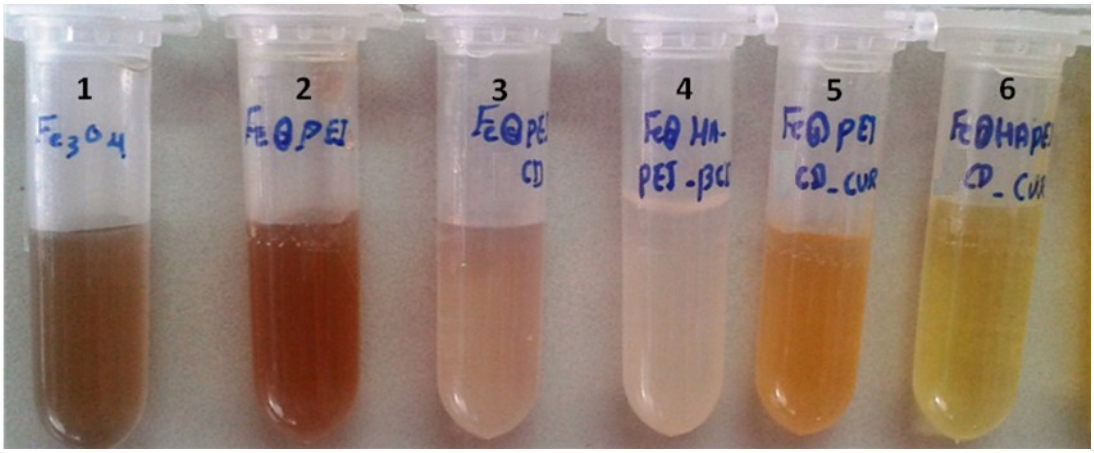


Figure S2. *Representative photograph of dispersed solutions of 0.5mg bare MNP, unloaded and CUR- loaded different MNPs in 1mL ethanol: 1) Fe_3O_4 MNP; 2) Fe@PEI; 3) Fe@PEI-CD; 4) Fe@HAP-PEI-CD; 5) Fe@PEI-CD-CUR; 6) Fe@HAP-PEI-CD-CUR.*



CUR standard solution for loading estimation:

Standard CUR solutions in DMSO (1–7 μg/mL) was prepared and measured on UV-vis spectrophotometer at 450 nm. The absorbance of the solutions has been tabulated in Table S2. A standard plot was made from absorbance values (Figure S2).

Calculation of CUR loaded quantity:

1 mg of both Fe@HAP-PEI-CD and Fe@PEI-CD was separately dissolved in 100 mL DMSO **(Solution A and B, respectively).** CUR was extracted in DMSO according to the method in manuscript and absorbency was measured at 438 nm using UV-vis spectrophotometer, **i.e., 0.2355** for **solution A** and **0.2150** for **solution B.**

CUR in Solution A and **B** = (Absorbance value – intercept of standard plot) / (slope of standard plot)

CUR in Solution A = (0.2355 - 0.0077) / (0.1469)= 1.551 μg/mL

CUR in Solution B = (0.2150 - 0.0077) / (0.1469)= 1.411 μg/mL

CUR containing in 1 mg Fe@HAP-PEI-CD = 1.551 x 100 = **155.1 μg**

CUR containing in 1 mg Fe@PEI-CD = 1.411 x 100 = **141.1 μg**

Table S2. *Absorbance values for 1–7 µg/mL CUR containing DMSO solutions*

CUR Standard solutions	
µg/mL	UV-vis absorbance
7.1	1.03
5.3	0.774
4.2	0.613
2.1	0.303
1.1	0.149

Figure S3*. Standard plot of pure CUR in DMSO solution.*

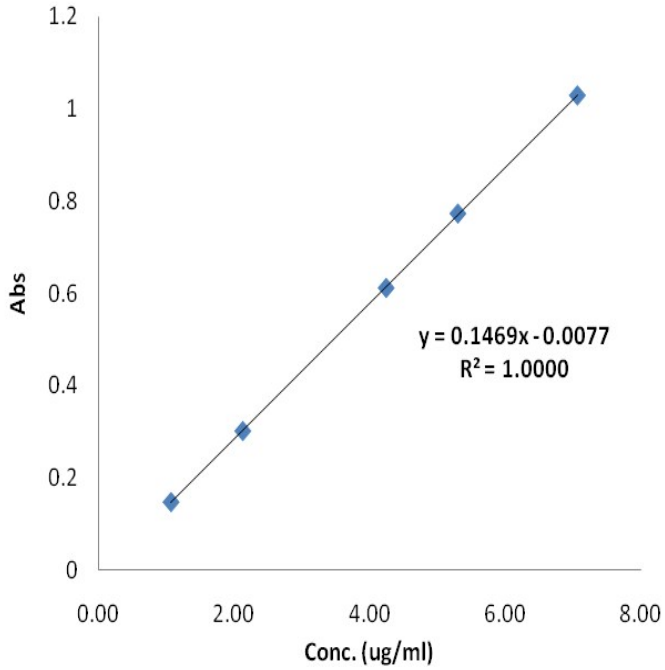


***Figure S4**: Standard calibration curve of CUR for estimation of CUR release percentage*

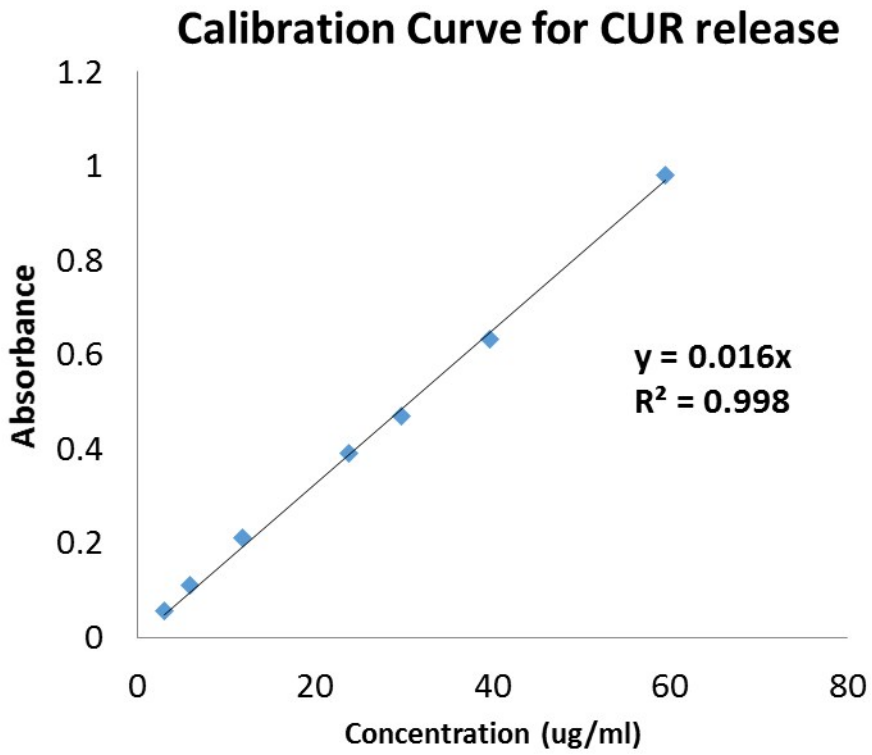


Figure S5: *Uptake quantitative analysis of free CUR and CUR loaded MNP nanocomposites by flow cytometry*