Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

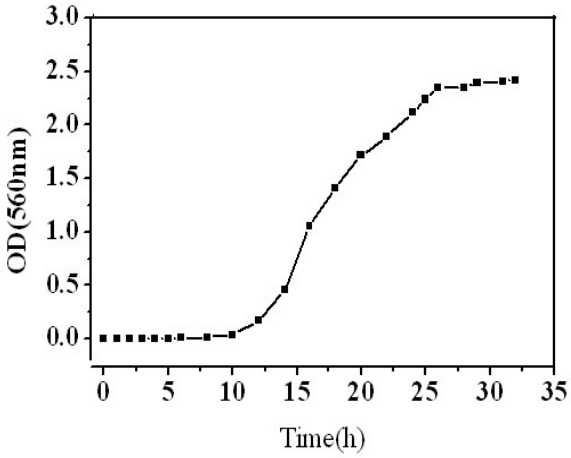

Figure 1. Growth curve of *Saccharomyces cerevisiae*

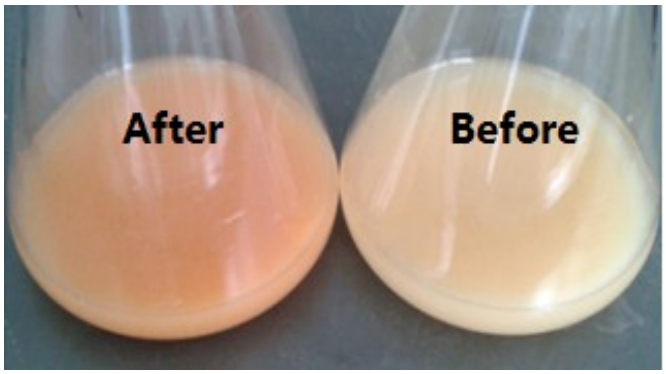

Figure 2. Color change of culture medium after incubated with Na_2SeO_3

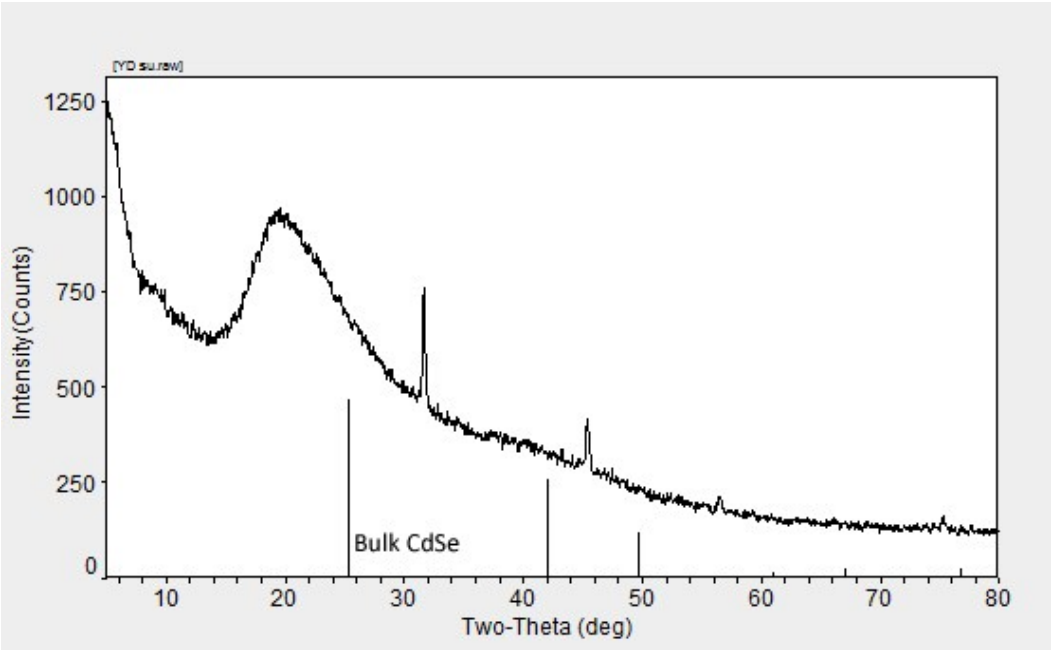

Figure 3. XRD of QDs products.

The original spectra of XRD has a wide high base line, like other published work, which overlaps the distinguish pattern of CdSe to clearly identify the core crystal structure. Hence, an accurate JCPDS pattern of CdSe bulk crystal is presented located in the spectrum.

Table 1. Comparisons of QDs products between our work and previous reports'.

characteristics	Synthesis method				
	Chemistry method		Biological method		
	Ref 1[1]	**Ref 2[2]**	**Ref 3[3]**	**Ref 4[4]**	**The work**
Particle size	1.2 to 11.5 nm	2.1 to 4.8 nm	2.69 to 6.34 nm	ca. 8 nm to ca. 11 nm	15 to 20 nm
Capped layer	Trimethylsilyl (TMS) Or Tri-n-octylphosphine/Tri-n-octylphosphine oxide (TOP/TOPO)	Stearic acid and dioctylamine	Not mentioned	Protein molecules confirmed by FTIR	Protein molecules shows in UV and EDS
Water soluble	Insoluble in water	Insoluble in water	Well-dispersed in yeast cell	Not mentioned	Water solublable.
XRD	The X-ray powder diffraction spectra for small CdSe crystallites (particle diameter ranging from – 1.2 to 4 nm) all exhibit broadening peaks in all reflections. There are two diffraction feature peaks, ca. 2θ ~ 27° and 45°, respectively.[1]	The X-ray powder diffraction spectra of CdSe nanocrystals, with an average of diameter 7.5 nm, are similar to bulk wurtzite crystal of CdSe.[2]	Not mentioned	Not mentioned	Provided in SI Figure 3
EDS	Not mentioned	Not mentioned	It can be confirmed that the QDs contained elements cadmium, selenium, oxygen, and phosphorus.[3]	Not mentioned	Provided in Fig. 4c, which confirmed that the QDs contained elements cadmium, selenium, oxygen, carbon and sulphur.
FL emitting wavelength	Not mentioned	from red (centered at 650 nm) to blue (centered at 450 nm)	520 to ca. 560 nm and then to ca. 670 nm	495 nm to 510 nm	506 nm to 562 nm
cytotoxicity	Not mentioned	Not mentioned	Not mentioned	MTT assay was carried out, showing that the biosynthesized CdSe QDs displayed	The biosynthesized CdSe QDs displayed lower cytoxicity compared with hydrothermally

				lower cytoxicity.	synthesized thioglycolic acid (TGA)-capped CdSe and TGA capped-CdTe.

Reference

1. C. Murray, D. J. Norris and M. G. Bawendi, *J. Am. Chem. Soc.*, 1993, **115**, 8706-8715.
2. L. Qu and X. Peng, *J. Am. Chem. Soc.*, 2002, **124**, 2049-2055.
3. R. Cui, H. H. Liu, H. Y. Xie, Z. L. Zhang, Y. R. Yang, D. W. Pang, Z. X. Xie, B. B. Chen, B. Hu and P. Shen, *Adv. Funct. Mater.*, 2009, **19**, 2359-2364.
4. Z. Yan, J. Qian, Y. Gu, Y. Su, X. Ai and S. Wu, *Materials Research Express*, 2014, **1**, 015401.