

Supplementary Data

Cinnamic acid-derived carbon dots by microwave irradiation synergise ciprofloxacin effect against *Staphylococcus aureus* and promote its skin permeability

Authors: Tompe Krishna Vitthal¹, Varaprasad Rao Regu¹, Bhabani Shankar Das², Ashirbad Sarangi², Mahendra Gaur¹, Amrita Ray^{3,4}, Arun Kumar Pradhan², Soma Chattopadhyay³, Bharat Bhusan Subudhi^{1*}

Affiliations:

¹Drug Development and Analysis Laboratory, School of Pharmaceutical Sciences, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India-751003

²Center of Biotechnology, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India-751003

³Infectious Disease Biology, Institute of Life Sciences, NALCO square, Bhubaneswar, Odisha, India-751023

⁴Regional Centre for Biotechnology, Faridabad, India-121001

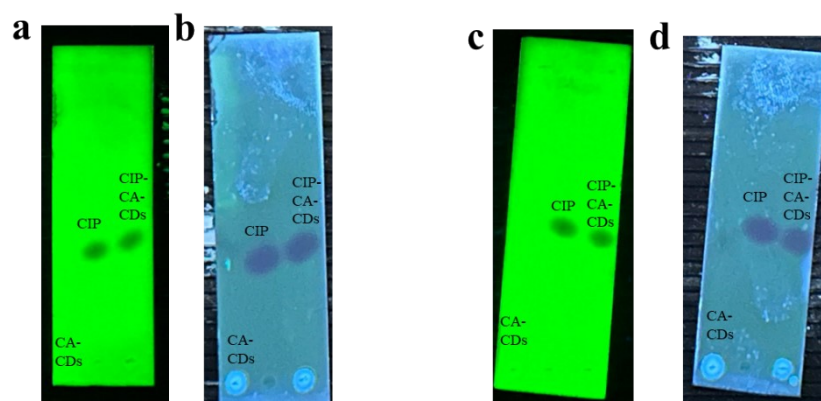


Fig. S1. Photographs of TLC of CA-CDs, CIP and CIP-CA-CDs in (a, c) short wavelength 254 nm, and (b, d) long wavelength 364 nm at 0 and 15 min. respectively. It represents the optimization complex formation.

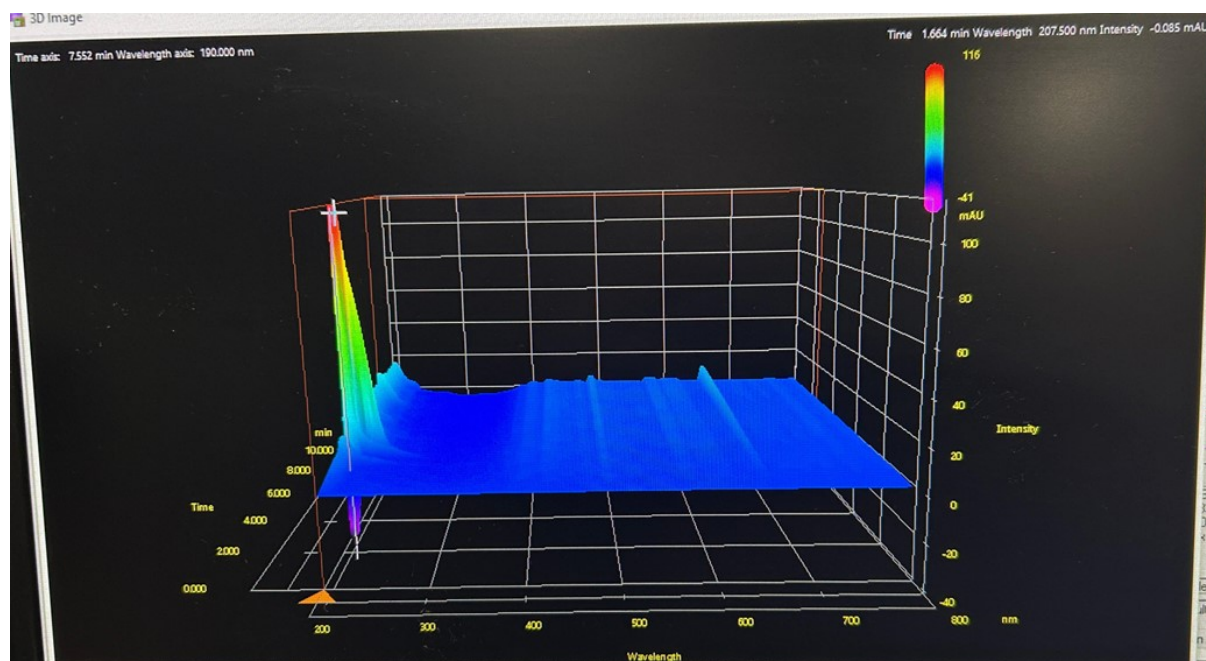


Fig. S2 3 D chromatogram obtained from HPLC analysis of CA-CDs. It shows the purity of the compounds.

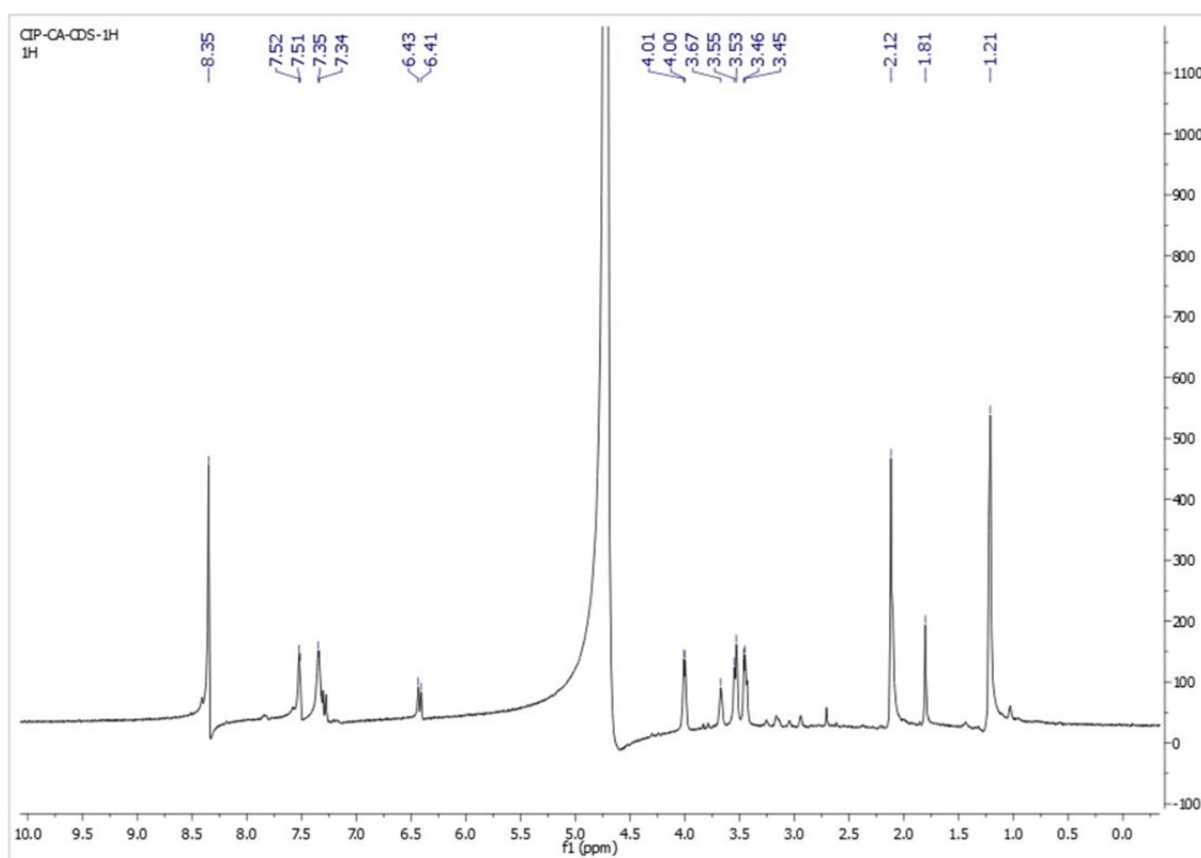


Fig. S3 ¹H NMR spectrum of CIP-CA-CDs.

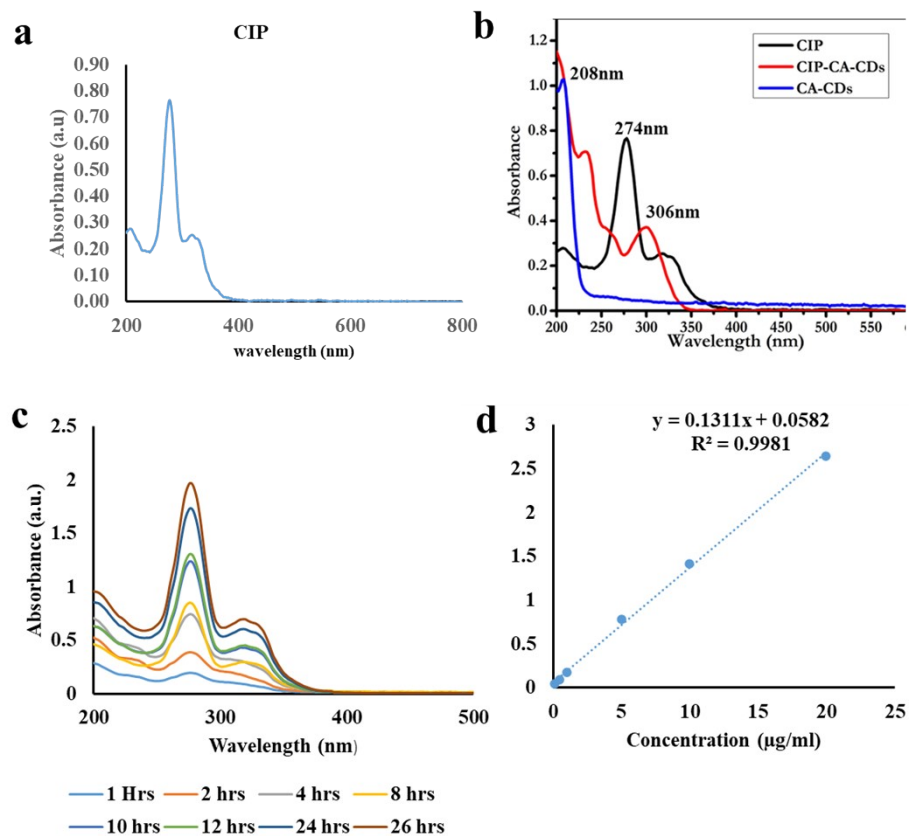


Fig. S4. UV-Visible method development for CIP. (a) Spectra showing CIP maximum absorbance at 274 nm. (b) Overlay absorption spectra of CA-CDs (208 nm), CIP (274 nm) and CIP-CA-CDs (306 nm). (c) *In vitro* release profile of CIP-CA-CDs solution at different time points and (d) Graphical representation of calibration curve of CIP with high linearity.

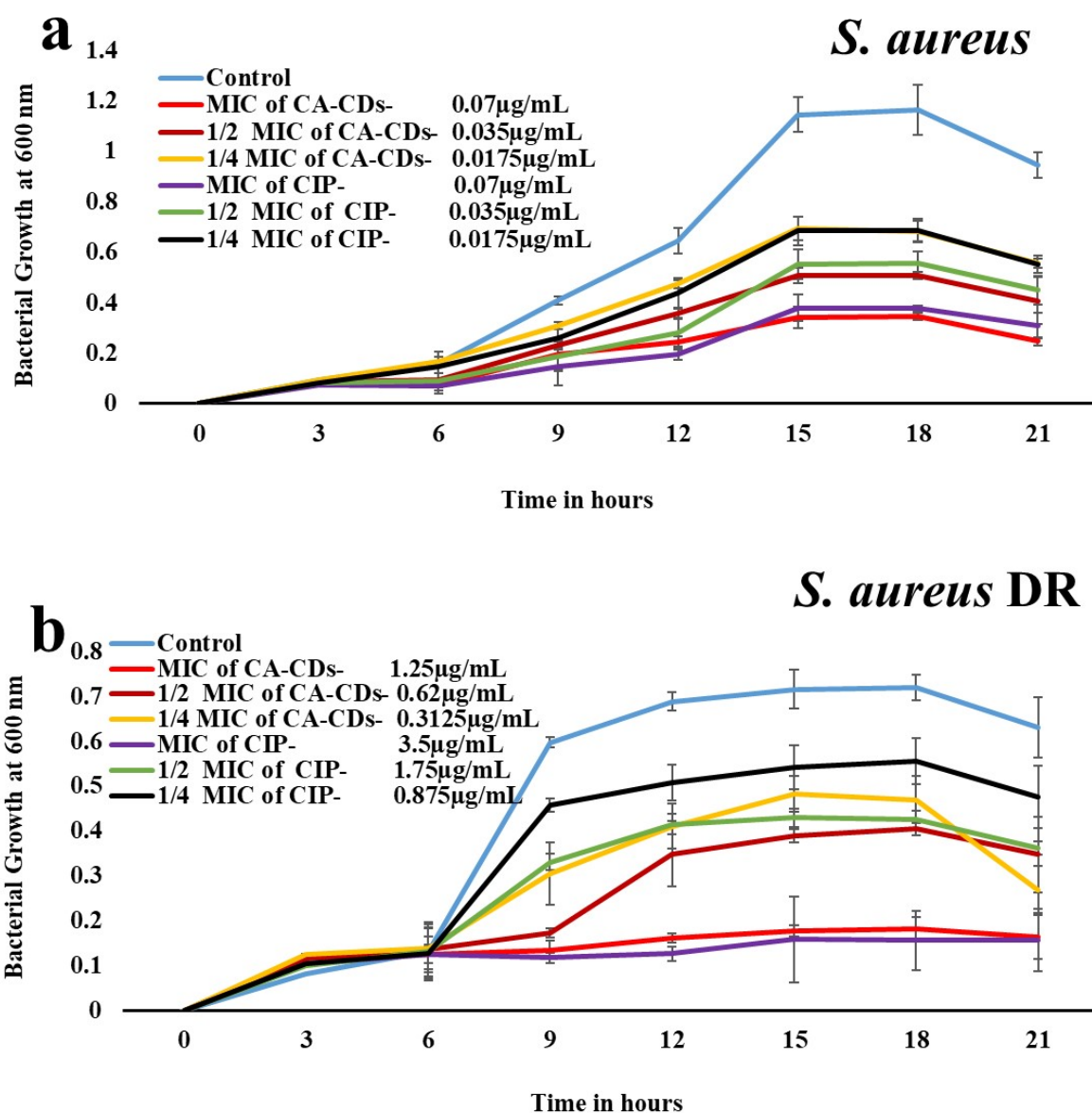


Fig. S5. Graphical representation of growth kinetic assay of MIC, $\frac{1}{2}$ and $\frac{1}{4}$ th MIC concentrations of CA-CDs and CIP against (a) *S. aureus*, and (b) *S. aureus* DR.

Table S1 UV-visible method validation data of CIP.

Validation parameters	Values
Accuracy	108.8%
intraday precision	3.224 %RSD
Inter-day precision	3.358 %RSD
limit of detection	0.19784 µg/mL
limit of quantification	0.59953 µg/mL

Note: %RSD: Percent relative standard deviation.

Table S2. Release models of CIP from conjugated CIP-CA-CDs.

Model	Equations	R ²	AIC	RSS
Zero-order	$F = 0.22 * t$	0.9424	36.1724	4.6880
First-order	$F = 100 * [1 - \text{Exp}(-0.003 * t)]$	0.9080	39.4507	5.9249

Note: F: Fraction (%) of drug release at time t.