**SUPPLEMENTARY INFORMATION**

# Synthesis of rotenone loaded zein nano-formulation for plant protection against pathogenic microbes

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Table S1 $^{1}$HNMR analysis of zein powder, ZSC, pure rotenone (RN) and RNZSC nanoparticles

| **Zein powder** | **ZSC** | **Pure rotenone (RN)** | **RNZSC** | **±δ (ppm)** |
|---|---|---|---|---|
| | | 7.9-6.5 (H of Aromatic ring) | 7.9-6.6 (RN) | 0.1 |
| | | 5.3-5.0 (H attached to alkene C=CH) | 5.3-4.9 (RN) | 0.1 |
| | | 4.6-2.9 (H of –O–CH–) | 4.6-4.3 (RN) | 0.1 |
| | 3.9 (–O–$CH_2$– of SC) | | 3.8 (ZSC) | 0.1 |
| 2.2 (–CH of –NH) | 2.2 (–CH of –NH of zein) | | | |
| | | 2.1 ($CH_3$-CO) | 2.2 (RN) | 0.1 |
| | 1.9 (–CH of –NH of SC & zein) | 1.9 (–$CH_2$–) | 1.8 (RN & ZSC) | 0.1 |
| | 1.8 (–CH of –NH of SC & zein) | 1.7 (–$CH_2$–) | 1.6 (RN & ZSC) | 0.1 |
| 1.6 (–$CH_2$–) | 1.6 (–$CH_2$– of zein) | | | |
| 1.3 (–$CH_2$–) | 1.4 (–$CH_2$– zein) | | 1.3 (ZSC) | 0.1 |

Table ST2 FTIR peaks with corresponding functional group of the prepared nanoparticles

| Wavenumber/peaks ($cm^{-1}$) | Functional group |
|---|---|
| 1644 $cm^{-1}$ | Amide I of zein protein in ZSC |
| 1545 $cm^{-1}$ | Amide II along with $=CH_2$ of zein protein in ZSC |
| 2928 $cm^{-1}$ | C-H stretching of zein protein in ZSC |
| 2938, 1674, 1605, 1515, 1456, 1357 and 1091 $cm^{-1}$ | cyclic alkene detected in pure rotenone (RN) structures |
| 2968 $cm^{-1}$ | C-H bending of aromatic alkyl of rotenone |
| 2968, 1663, 1535, 1458, 1359 and 1093 $cm^{-1}$ | The characteristic peaks observed in RNZSC which was also present in ZSC and RN |

Fig. S1 Plate assay of antifungal activity of ZSC, RNZSC, RN against *F. oxysporum* and control (*F. oxysporum*).

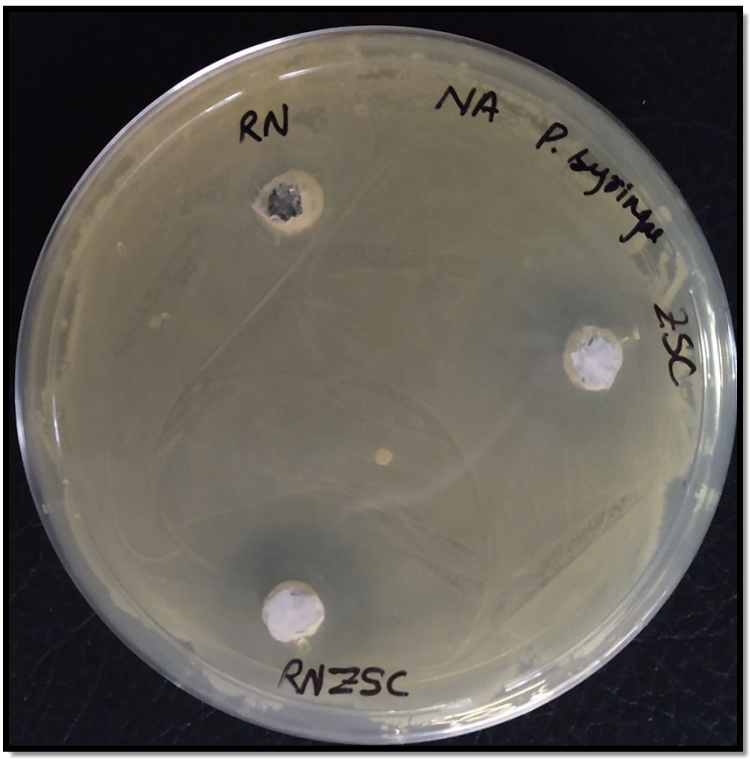


Fig. S2 Antibacterial activity by well diffusion method of ZSC, RNZSC and RN against *P. syringae.*

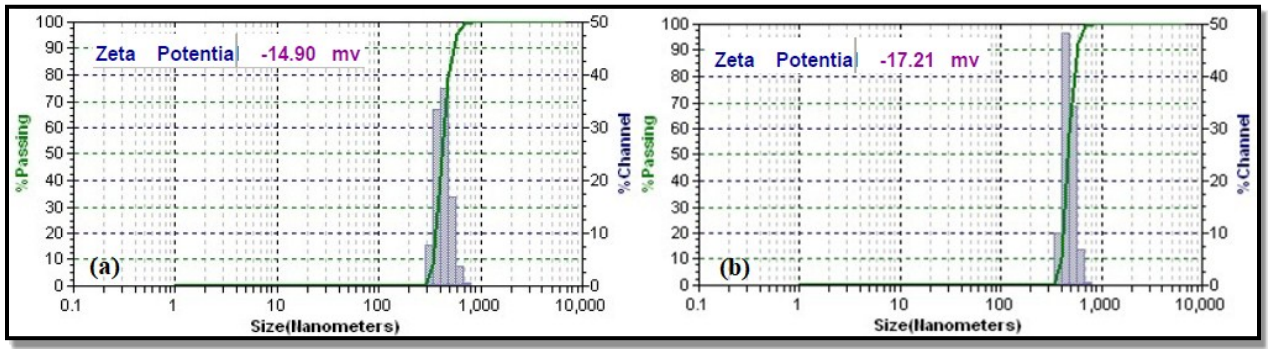


Fig. S3 DLS measurement of (a) ZSC and (b) RNZSC showing particle size and zeta potential.

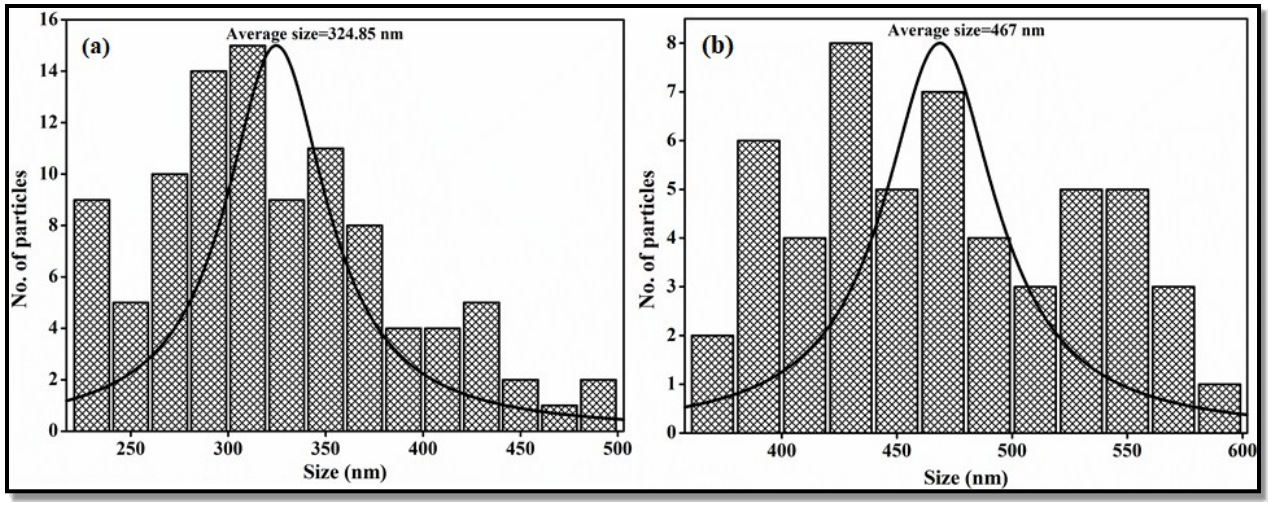


Fig. S4 Average size histogram of (a) ZSC and (b) RNZSC from FE-SEM