

Toxicity of lanthanum oxide (La₂O₃) nanoparticles in aquatic environments

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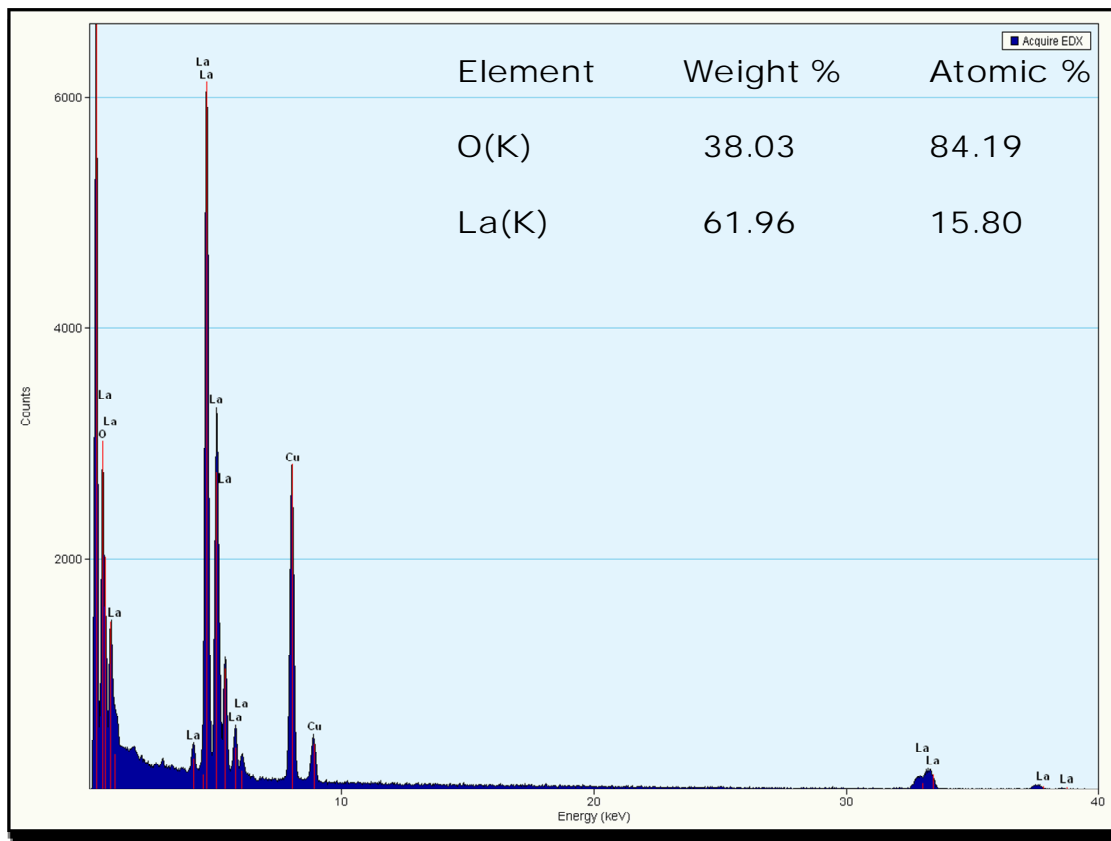


Figure S1: TEM EDS spectra of La₂O₃ NP. The peaks confirm the presence of lanthanum (La-61.96%) and oxygen (O- 38.03%).

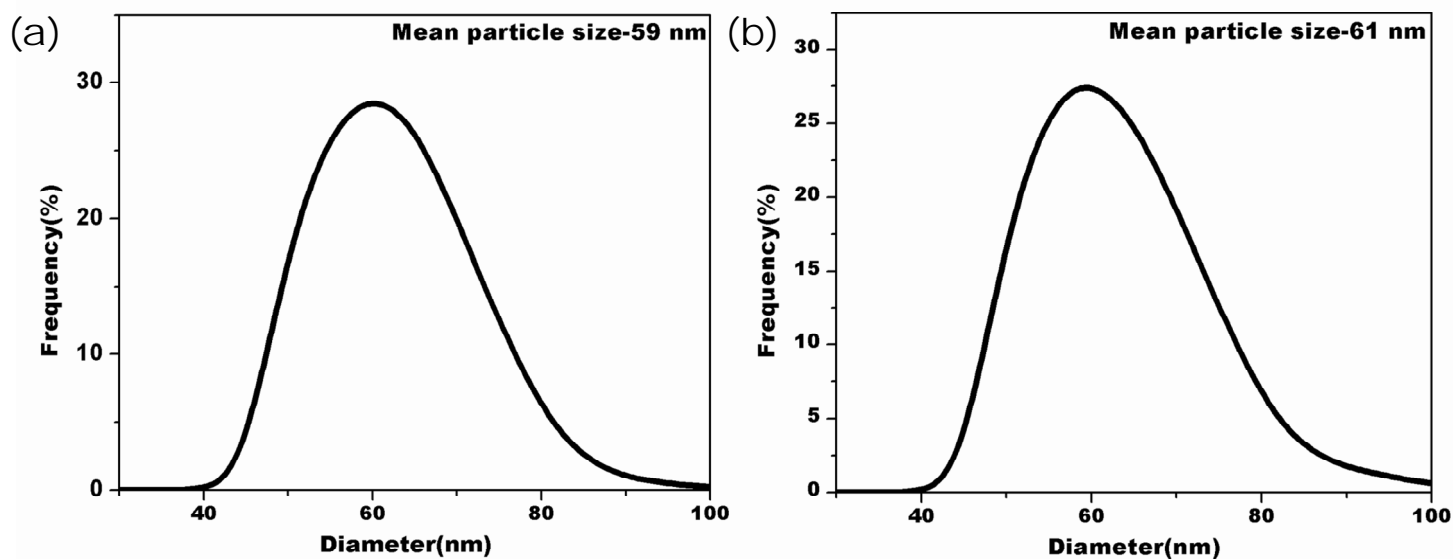


Figure S2: DLS analysis of La_2O_3 NP (a) ISO test medium and (b) BG 11 medium. The distribution graph indicates the mean particle size is 59 nm in ISO test medium and 61 nm in BG 11 medium.

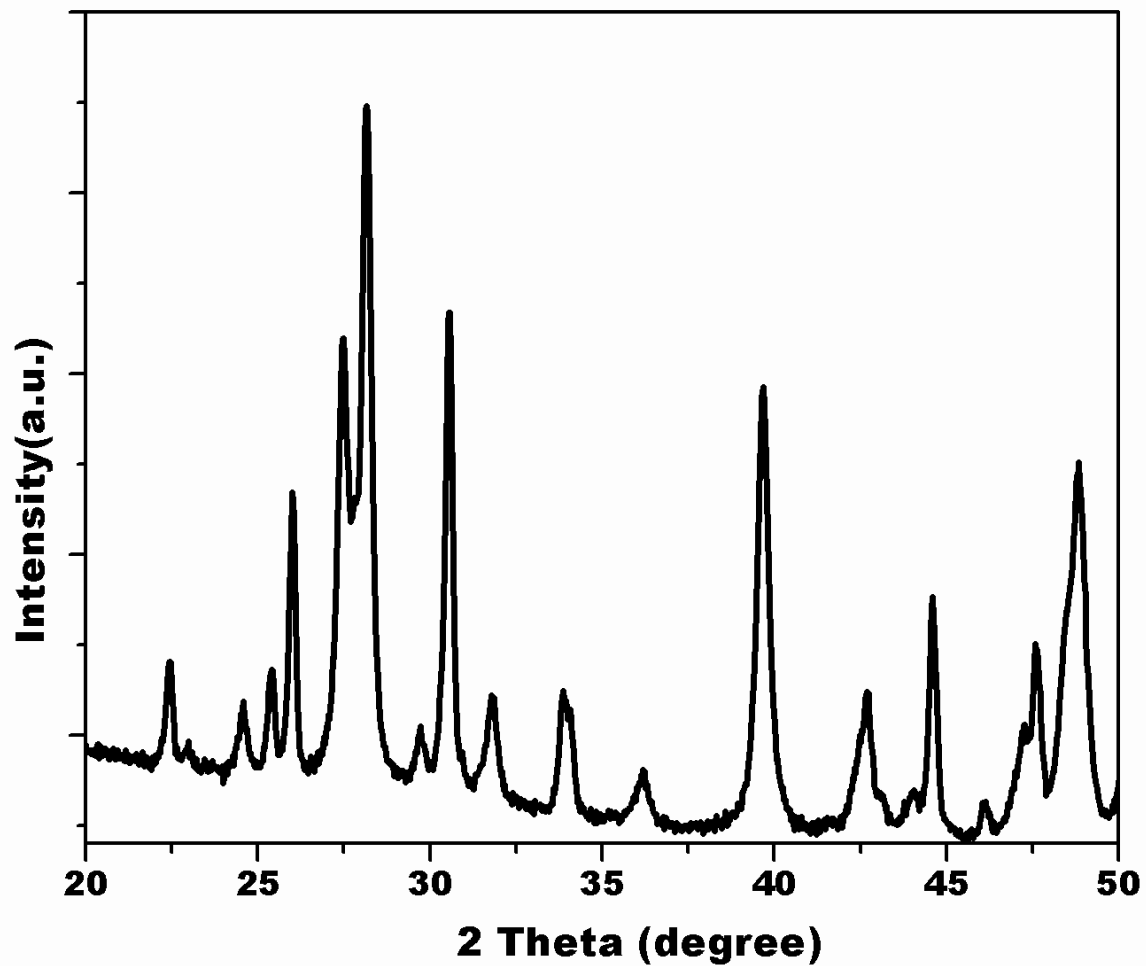


Figure S3: XRD Spectra of La_2O_3 NP. The diffraction peaks are consistent with the values of standard card JCPDS file 65-3185.

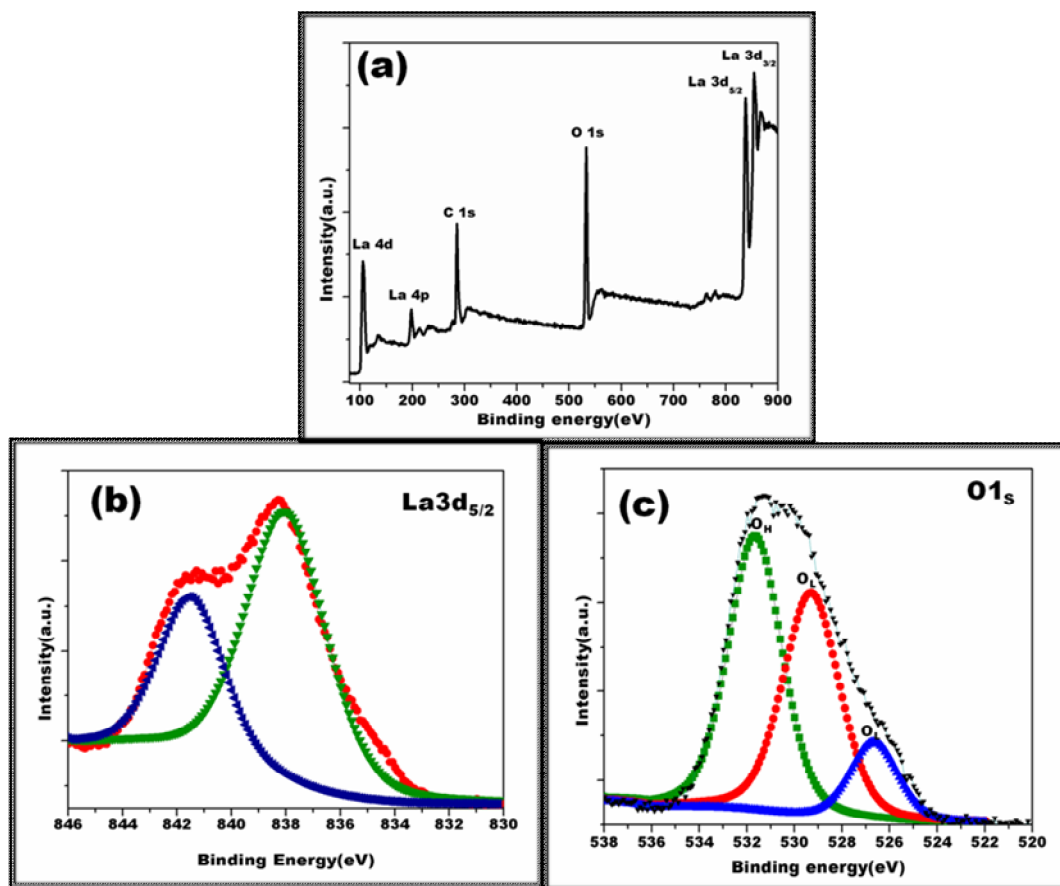


Figure S4: XPS Spectra of La_2O_3 NP. (a) Survey spectrum (b) La 3d region and (c) O 1s region.



Figure S5: Photograph of the *Chlorella sp.*, culture flasks following 72 h exposure. The visual observation of increase in chlorophyll content production is clearly seen over control culture. The flask left to right contains 0, 10, 50, 100, 250, 500 and 1000 mg/L of La_2O_3 NP.

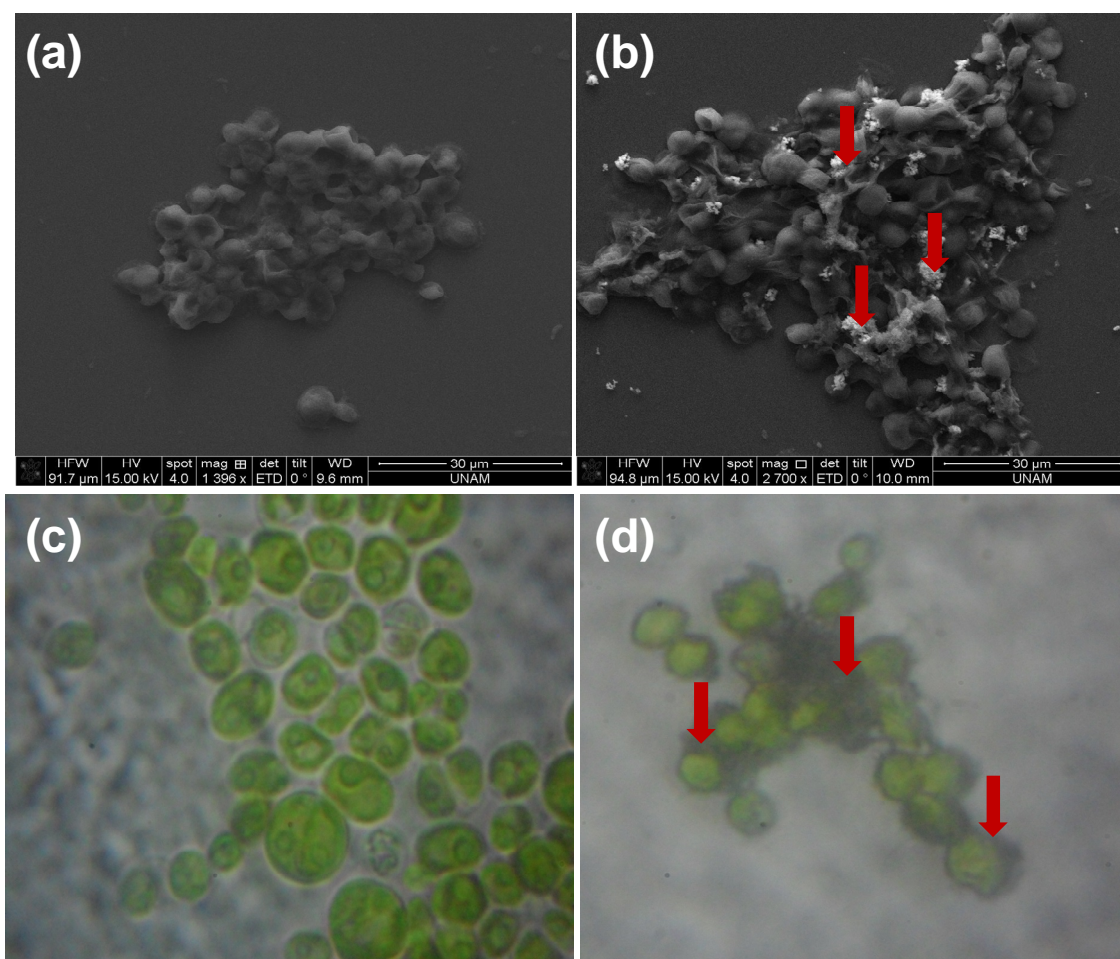


Figure S6: Microscopy image of *Chlorella sp.*, (a) & (b) SEM image before and after treatment. (c) & (d) OM image before and after treatment. The attachment of La_2O_3 NP with algae is clearly seen following the exposure for 72 h. The red arrows indicate attachment of La_2O_3 NP.

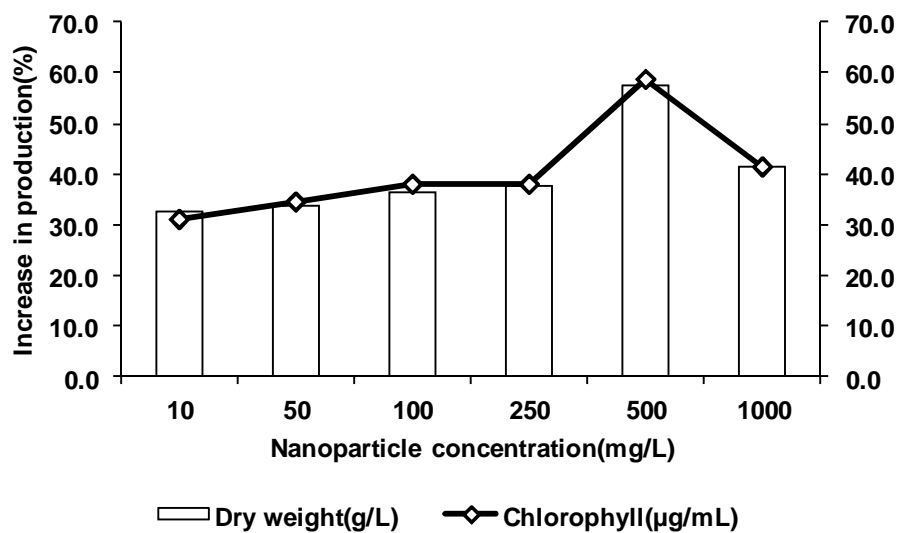


Figure S7: Effect of La_2O_3 NP on the biomass and chlorophyll content production. The curve shows that the acute exposure treatment significantly enhanced the production.

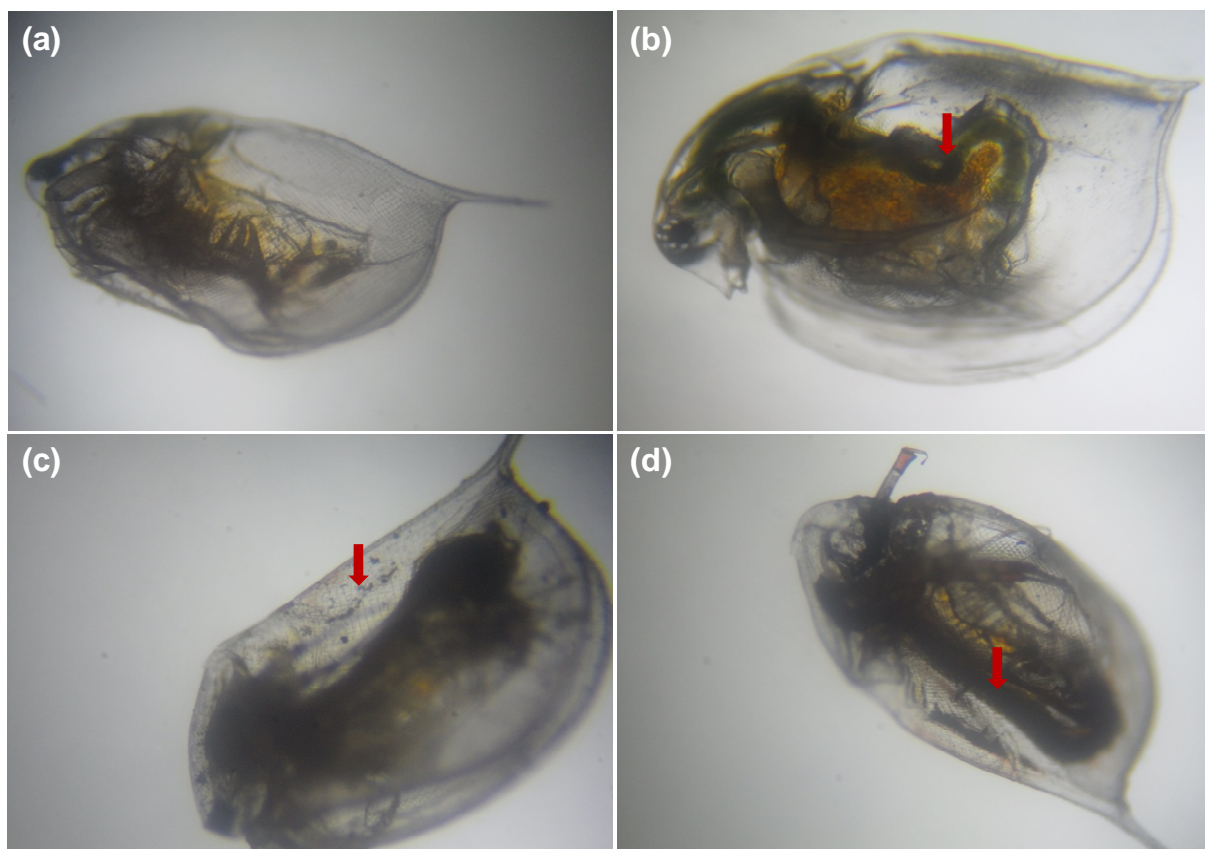


Figure S8: OM image of *D. magna* (a) Control (b) Fed with micro algae *Chlorella sp.*, (c & d) after 48 h exposure to La_2O_3 NP. Attachment of nanoparticle on the carapace and accumulation in intestinal tract is observed. The red arrows indicate attachment and accumulation of La_2O_3 NP.

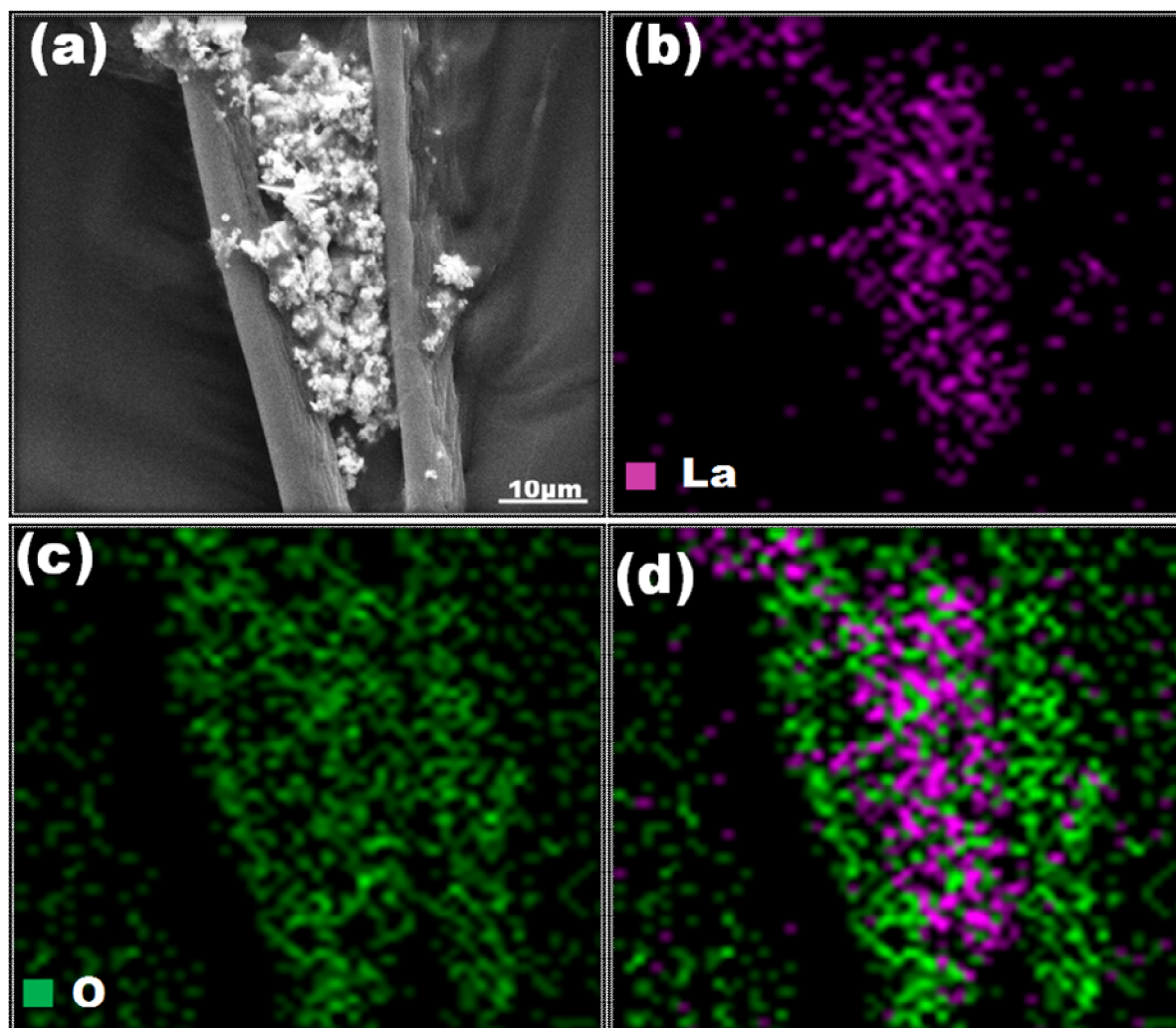


Figure S9: (a) SEM image of antenna from *D. magna* exposed to La_2O_3 NP (48 h; 1000 mg/L). (b-d) EDS dot map of corresponding SEM image. It shows the attachment and distribution of lanthanum and oxygen on antenna.