

## Dual Mode “Turn On-Off-On” Photoluminescence Detection of EDTA and Lead Using Moringa Oleifera Gum-Derived Carbon Dots

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**Abstract :** Lead is one of the most prevalent toxic heavy metal ions, and its pollution poses a significant threat to the environment and human health. On the other hand, Ethylenediaminetetraacetic acid is a widely used metal chelating agent that, due to its poor biodegradability, is an incessant pollutant to the environment. For the first time, a green, simple, and cost-effective approach is used to hydrothermally synthesise photoluminescent carbon dots using Moringa Oleifera Gum in a single step. Then, using Moringa Oleifera Gum-derived carbon dots, a photoluminescent "ON-OFF-ON" mechanism for dual mode detection of trace Pb<sup>2+</sup> and EDTA was proposed. MOG-CDs detect Pb<sup>2+</sup> selectively and sensitively using a photoluminescence quenching mechanism, with a detection limit (LOD) of 0.000472 ppm. (1.24 nM). The quenched photoluminescence can be restored by adding EDTA to the MOG-CD+Pb<sup>2+</sup> system; this strategy is used to quantify EDTA at a level of detection of 0.0026 ppm. (8.9 nM). The quantification of Pb<sup>2+</sup> and EDTA in actual samples encapsulated the applicability and dependability of the proposed photoluminescent probe.

**Keywords :** carbon dots, photoluminescence, sensor, moringa oleifera gum

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