

# Pepsin Protected Synthesis of Copper Nanoclusters for the Sensing of Drugs: Flutamide and Chloramphenicol †

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**Abstract:** Pepsin is one of the most promising proteins used to encapsulate metal nanoclusters, producing pepsin-metal nanoclusters (pepsin- metal NCs) complexes. We have synthesized blue-emitting fluorescent pepsin- copper nanoclusters (pepsin-Cu NCs) in this approach by a simple single-step synthesis method. Herein we have chosen pepsin because it shows double functions working as a ligand and stabilizing agent. The structural, morphological, and optical properties of synthesized pepsin-Cu NCs were systematically characterized using different analytical techniques like Fluorescence, UV/vis, FT-IR, HR-TEM, XPS, and DLS. Pepsin-Cu NCs give blue fluorescence under a UV lamp at 365 nm. The fluorescent pepsin-Cu NCs show emission at 426 nm when excited at 340 nm. The synthesized probe is successfully applied for sensing a nitro group containing drugs flutamide and chloramphenicol. The blue fluorescent pepsin-Cu NCs exhibited linear fluorescence quenching response with the addition of flutamide (0.10 – 100.00 µM) and chloramphenicol (5.00 – 100.00 µM) with very low detection limits of 61.82 and 188.32 nM, respectively. As synthesized fluorescent pepsin-Cu NCs have good stability with an average mean size of less than 3nm. Along with this feature, the pepsin-Cu NCs-based fluorescence method was effectively used for investigating flutamide and chloramphenicol in their formulations and biofluids.

**Keywords:** pepsin; fluorescent pepsin-CuNCs; flutamide; chloramphenicol; quenching of fluorescence.

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## **Conflicts of Interest**

The authors declare no conflict of interest.