

# GREEN CARBON DOTS

SUSTAINABLE ANALYTICAL APPROACHES



## SHAHID & HUSSAIN



ACS Publications

## Chapter 9

# Green Carbon Dots in Food Analysis

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Carbon dots (CDs), a promising class of fluorescent carbon nanomaterials, have gained prominence in recent years owing to their outstanding fluorescent properties, straightforward synthetic methods, favorable biocompatibility, and diverse detection applications. These qualities position them as potential replacements for traditional semi-quantum dots. This chapter focuses on the current advancements in CD development, specifically highlighting their fluorescent properties, synthetic methodologies, and applications in food safety. Various synthetic approaches and the characteristics of diverse CD synthesis methods are also discussed. Practical uses of CDs as fluorescent probes in the realm of food safety, with a particular focus on their usefulness in detecting metal ions/anions, pesticides, veterinary medications, bacteria, functional components, and prohibited additives are also explored.

## Introduction

Fluorescent nanomaterials are highly sought after for their broad use as fluorescence indicators in chemical and organic sensors and their role as optical components in sensor advancements. The swift advancement in nanoscience and nanotechnology has brought quantum dots (QDs), a form of fluorescent nanomaterials, to the forefront of research efforts in recent decades. Fluorescent carbon dots (CDs) are carbon-based nanomaterials that are smaller than 10 nm. The unique features,

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