## SYNTHESIS OF CARBON DOTS FOR BIO-SENSING APPLICATIONS

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Carbon Dots (CDs) are one of the most important nanomaterials ever known to humanity. They have been widely concerned in recent years because of their biocompatibility, low cytotoxicity, photostability, easy surface functionalization, and eco-friendliness. CDs have a wide range of applications in the fields of bio-imaging, bio-sensing, photocatalysis and optoelectronics, etc. In the present study, nitrogendoped carbon dots (N-CDs) were prepared by thermal decomposition method with citric acid as the carbon source and urea as a nitrogen source. Various sources of citric acid were used to synthesize N-CDs as well as the citric acid was isolated from lemon juice by chemical method and also synthesized by fermentation using the filamentous fungus Aspergillus niger. The Fourier transform infrared spectrometer and UV-visible spectrophotometer were used to discover surface functional groups and luminescence properties of N-CDs. The results of N-CDs synthesized from various sources of citric acid were analyzed. The sensing application of the prepared N-CDs as a reducing agent was tested, demonstrating the reduction of ferric ions ( $Fe^{3+}$ ). Some applications of CDs are monitoring blood glucose levels, identification of cancer cells, heavy metal detection in polluted water, and usage of CDs in drug development will be conducted in the future.

Key words: Carbon dots, N-doped carbon dots, Citric acid, Urea, Fermentation, Biosensor.