Chapter-2

RATIONALE & OBJECTIVES

2.1 Rationale

Rationale of the present research work is to understand the rational amalgamation of natural products and nanotechnology. For this purpose, carbon nanodots (CNDs) derived from natural products with different variables such as solvents, plant parts, passivating agents and different plants to be prepared, characterized and investigated for multifaceted applications in the field of pharmaceutical, biomedical and environmental applications. The method employed for the synthesis of CNDs is one-pot, environment friendly and cost-effective.

2.2 Objectives

Objectives of the present research work are as follows:

I. To fabricate and characterize fluorescent CNDs from aqueous extract of *Andrographis paniculata* leaves and their applications for metal sensing, cancer cell bioimaging, free radicals sensing and scavenging, fluorescent ink, and anti-bacterial activity against MDR bacterial strains.

II. To fabricate and characterize pink fluorescent CNDs from ethanolic extract of *Andrographis paniculata* leaves and their applications for metal sensing, cancer cell bioimaging, free radicals sensing and scavenging, and anti-bacterial activity against MDR bacterial strains.

III. To fabricate and characterize fluorescent CNDs from *Asparagus racemosus* and their evaluation for metal sensing, cytotoxicity, free radicals scavenging, and anti-bacterial activity against MDR bacterial strains.

IV. To fabricate and characterize fluorescent CNDs from quercetin and their evaluation for metal sensing, cytotoxicity, as a drug-carrier, free radicals scavenging, and anti-bacterial activity against MDR bacterial strains.