PREFACE

Nanoscience and nanotechnology are recent innovative developments in science and technology that are growing at a very fast pace. It is motivated by the desire to formulate materials with novel and superior properties that is likely to impact nearly all areas of science. Synthesis of noble metal nanoparticles for applications in medicine, catalysis, electronics, optics, and environmental protection is an area of recent interest. The investigational developments over the past many decades have afforded the ability to create, manipulate, and assess nanoscale phenomena. But several scientific challenges are to be dealt with for this growing field to cope up to the high potentials that nanoscience and nanotechnology might offer. One major challenge is the development of efficient synthetic techniques that have control over the size and morphologies of nanomaterials and exploitation of these materials for various applications. Several synthetic strategies have been proposed for the generation of metal nanoparticles such as chemical, photochemical, sonochemical, electrochemical, radiolytic etc. in which metal nanoparticles are produced by the reduction of metal ion precursors in solution in presence of suitable stabilizing agents. Microwave heating has gained significant attention as a promising new method for the one step synthesis of metallic nanostructures in solutions. The synthesis of metal nanoparticles by microwave irradiation is a novel method for the rapid production of monodispersed nanoparticles with narrow size distribution and is much less exploited especially in biosynthesis of nanoparticles. In the context of global efforts to reduce hazardous wastes, the continuously increasing demand of nanomaterials must be accompanied by green synthesis methods. This can be achieved by using environmentally benign solvents and non-toxic chemicals in the synthesis process. In this work, an attempt is made to synthesis silver and gold nanoparticles by green chemistry methods and to evaluate their catalytic and antimicrobial activities.