



# ULTRASONICATOR ASSISTED RAPID AND FACILE GREEN SYNTHESIS OF GOLD NANOPARTICLES: STUDY OF ITS APPLICATION FOR DETECTION OF EXTRACTED DICHLOROVOS RESIDUE FROM DIFFERENT SAMPLES SPECTROPHOTOMETRICALLY

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## Abstract

Gold nanoparticles (Au-Nps) were synthesized from Chloroauric acid (HAuCl<sub>4</sub>) using leaf extract of *Citrus limonum*. This protocol was found to be simple, efficient, faster and greener approach by using ultrasonication in an aqueous medium and aqueous leaf extract of *Citrus limonum*. The use of renewable aqueous solvent, reducing biocatalyst and ultrasonicator assisted method, seems to be a green chemical approach for synthesis of gold nanoparticles with well controlled size, structure and shape.

The advancement in science and technology in past few decades has also increased applications of nanoparticles remarkably. By this the emerging field nanoscience could be interestingly introduced in Forensic Science. The compounds of gold and gold nanoparticles contribute excellently in detection of fingerprint and illicit drugs. This method not only enhances visual detection but also helpful for qualitative and quantitative analysis of organophosphate insecticide, "Dichlorvos" extracted from different samples like soil, cloth etc. as well as body fluid samples. The characterization of synthesized gold nanoparticles was done by EDS, FE-SEM, UV-VIS, TLC and FT-IR.

**Keywords:** Green synthesis, Gold Nanoparticle, Ultrasonicator, Dichlorvos, Spectrophotometrically

## 1.0 Introduction

Nanoparticle size of 1 to 100 nm, exhibit completely new or improved properties as compared to the greater particles of the bulk substantial that they are composed of, based on precise characteristics such as scattering, dimensions, and morphology [1]. Nanoparticles of coinage metal such as Copper (Cu), silver (Ag), gold (Au) and platinum (Pt) are extensively useful in products that directly come in interaction with the human body like soaps, cosmetic, detergent and tooth paste, besides medical and pharmaceutical applications. Gold has an extensive antiquity of use. Red colloidal gold has been used as medicine for renaissance in China and India [2]. Gold nanoparticles (Au-Nps) have capacity to deliver large number of biomolecules, without confining themselves as transporters of only minor molecules of drugs. Tunable size and functionality make them a valuable scaffold for proficient gratitude and delivery of biomolecules [3]. There are numerous ways publicized in number of literatures to synthesis Au-Nps. It consists of chemical, physical and biological approaches. The physico-chemical methods are abundant in number, and many of these methods are costly or use noxious materials, hence this methodology 'not so favored' for synthesis of Nanoparticles. The feasible method to synthesize Au-Nps is employed to biological methods such as use of plant extract [4]. The greener synthesis of Au-Nps using plant extract is interesting technique in Nano-science. Various plant extracts are used for synthesis of Au-Nps such as *Aloe vera* [5],