

# Synthesis of Silver Nanoparticles Using Aqueous Extract of Medicinal Plant *Impatiens Balsmina* Fresh Leaves

Sabale A. D\*, Thube K. M, Pawar S. L, Walunj S. R

Department of Chemistry, Nutan Arts, Science and Commerce College, Rajapur, Tal-Sangmner, India

**Corresponding Author :** Sabale A ([archusabale31@gmail.com](mailto:archusabale31@gmail.com))

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## ABSTRACT

The synthesis of nanoparticles has been increasingly gaining popularity because of its eco-friendly nature. In this paper, we represent the synthesis of silver nanoparticles (AgNPs) through a simple green route by using leaf extract of the medicinal plant *Impatiens balsamina*. The silver nanoparticle was prepared by a simple and eco-friendly method. This method allowed to the synthesis of nanoparticles, which was confirmed by the simple technique of colorimetry and visual observation. The chemically synthesis technique for the formation of AgNPs synthesis involves toxic chemicals that are effective on the human body as well as the environment. AgNPs were rapidly synthesized by treating silver ions with *Impatiens balsamina* fresh leaves. The reaction process was simple and easy to hand and that was monitored by using colorimetry.

**Keywords:** Silver, Nanoparticles, Aqueous Extract, Medicinal, Fresh Leaves.

## INTRODUCTION

Green synthesis of silver nanoparticles decreases the usage of poisonous chemicals, which might dangerous to human health as well as to the atmosphere. Nanoparticles represent a particle with nm size 1-100nm [1]. Plant mediated synthesis of nanoparticles has been eco-friendly nature and cost-effectiveness [2-4]. In the present study, we synthesize AgNPs using aqueous extract of fresh leaves of *impatiens balsmina* as bio reducing agent and is very good bioreductant. AgNPs can be synthesized through several methods including chemical reduction which includes reducing Ag salts by reducing agents such as sodium nitrate or sodium borohydrate [5-6]. Use chemical results adsorption of toxic chemicals. It is harmful and effects its application, so the green synthesis method used to determine the synthesis of AgNPs was confirmed by colorimetry and visual observation.

Silver nanoparticles can be synthesized through several methods, including chemical reduction. In this synthesis, the reduction of silver salt is carried out by reducing agents such as sodium nitrate or sodium borohydrate [7-9]. Silver nanocrystals are one of the most attractive inorganic materials not only because of it's a tremendous application in photography catalyst biosynthesis bimolecular detection diagnostics and particularly antimicrobial activities but also because of their environmentally benign nature [10-13]. The synthesis of different morphologies of advanced silver nanomaterial (nanowires, nanotubes, nanocubes and nanosheets) has been the subject of the large number of researchers in many laboratories. Several methods were used in the past for the synthesis of silver nanoparticles for example, reduction in solution, radiation-assisted chemicals and photo reduction in reverse micelles, thermal decomposition of silver compounds, and recently via bio or green synthesis route [14].



further use, to synthesize silver nanoparticles from silver nitrate precursor solution.

### Synthesis of silver nanoparticles

silver nitrate was dissolved in distilled water to prepare 10nm , silver nitrate stock solution from which series of 1mm, 2mm, 3mm, 4mm, 5mm silver nitrate solution were prepared. The silver nitrate solution was mixed with aqueous extract of *Impatiens Balsmina* fresh leaves at a ratio of 1:1 (v/v) volume of 25ml flask. It was wrapped with an aluminum foil and was heated in water bath at 60°C for 3 hours .

## RESULT AND DISCUSSION

### Analysis by colorimetry

The aqueous extract of fresh leaves of *Impatiens Balsmina* change their colour when warm.

The extract changes colour from colorless to brownish-yellow. Adding silver nitrate , the colour again get changed due to  $Ag^+$  ions begins to be reduced due to effect of heat and producing  $Ag^+$  complex . color changes from brownish-yellow to grayish brown indicate the formation of silver nanoparticles. Characteristics of silver nanoparticles appear at wavelength intervals 400-600 nm.

## CONCLUSION

Medicinal plant namely aqueous extract of fresh leaves *Impatiens Balsmina* can be used as a bioreduction agent to produce silver nanoparticles.

### Consent And Ethical Approval

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors

### Competing interests

Authors have declared that no competing interests exist.

### Authors' Contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## MATERIAL AND METHODS

Reagents that we have used are of analytical grade and used without any further purification. Silver nitrate ( $AgNO_3$ ) was nearly 99.5% pure. Fresh leaves of *Impatiens balsamina* were collected from the department of botany garden of sangmner college .distilled water were used for preparing aqueous solution all over the method.

### Green synthesis method

The procedure of preparation of leaf extract: fresh leaves of *Impatiens balsmina* collected and wash with water until it is free from impurities .cut the leaves into small pieces and take it in a small beaker. Weigh 10g of these leaves and put them into a beaker and 100 ml of water. This mixture was heated for 20 minutes at 60°C meanwhile stir the mixture occasionally and then allow cooling at room temperature. After this the mixture was filtered through whatmann no.42 filter paper and then centrifuged at 81-G force for 20 minutes. The extract was stored in a refrigerator for

Table 1

Concentration (nm)	Wave-length (nm)	Absorbance (A)	Concentration (nm)	Wave-length (nm)	Absorbance (A)
1mm	400	0.69	4 mm	400	0.75
	420	1.15		420	1.32
	470	0.85		470	0.94
2mm	400	0.66	5 mm	400	0.81
	420	1.17		420	1.34
	470	0.91		470	0.96
3mm	400	0.77			
	420	1.26			
	470	1.01			

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