International Journal of Recent Trends in Science And Technology, P-ISSN 2277-2812 E-ISSN 2249-8109
Special Issue, ICRAFHN 2018 pp 83-84

Original Research Article

Extracellular biochemical synthesis of silver nanoparticles

R. A. Andhare[1*], Afrin Jikare[2]

[1]Shivneri Mahavidyalaya Shirur Anantpal Dist. Latur, Maharashtra, INDIA.
Email: rupeshandhare@gmail.com

Abstract

Metallic nanoparticles are produced by various methods more common are chemical and physical methods. Silver nanoparticles received attention due to their physical, chemical and biological properties. Due to their catalytic and biological activity they have many applications in Nano biotechnology. Nanoparticles are used as antimicrobial agents, as anticancer agents. Synthesis of silver nanoparticles from plant extract are inexpensive environmentally safe. The production of silver nanoparticles and their applications are gaining momentum. Microbial source for the production of silver nanoparticles have great interest among the researchers. Silver nanoparticles from plant extract are less expensive an easy for characterization also. There are number of chemical methods used for the production of silver nanoparticles. In this present study we produced silver nanoparticles from *Pseudomonas* spp, plant extract and chemical material.
Key Words: Silver nanoparticles, plant extract, Pseudomonas, Reduction of AgO, biosynthesis.

[*]**Address for Correspondence:**
Dr. R. A. Andhare, Shivneri Mahavidyalaya Shirur Anantpal Dist. Latur, Maharashtra, INDIA.
Email: rupeshandhare@gmail.com

Access this article online

Quick Response Code:

Website: www.statperson.com

Accessed Date: 10 March 2018

INTRODUCTION

Biological synthesis process provides a wide range of environmentally acceptable methodology, low cost production and minimum time required. At the same time the biologically synthesized silver nanoparticles has many applications includes catalysts in chemical reactions, biolabelling, antimicrobial agent, electrical batteries and optical receptors. Microbial source to produce the silver nanoparticles shows the great interest towards the precipitation of nanoparticles due to its metabolic activity. Of course the precipitation of nanoparticles in external environment of a cell, it shows the extracellular activity of organism. In recent years noble metal nanoparticles have been the subjects of focused researches due to their unique electronic, optical, mechanical, magnetic and chemical properties that are significantly different from those of bulk materials. These special and unique properties could be attributed sizes and large specific surface area. For these reasons metallic nanoparticles have found uses in many applications in deferent fields as catalysis, electronics, and photonics. Indian greeneries are the chief and cheap source of medicinal plants and plant products. From centuries till date, these medicinal plants have been extensively utilized in Ayurveda. Recently, many such plants have been gaining importance due to their unique constituents and their versatile applicability in various developing fields of research and development. Nano biotechnology is presently one of the most dynamic disciplines of research in contemporary material science whereby plants and different plant products are finding an imperative use in the synthesis of nanoparticles (NPs). The present work based on the preparation of Nano sized silver nanoparticles from aqueous solution of silver nitrate, we employed as reductant a citrate of sodium, Bacterial culture and leaf extract.

MATERIALS AND METHODS

Materials: Bacterial culture (Pseudomonas spp)**,** Silver Nitrate, Sodium Citrate, Leafs of plant (Ocimum tenuiflorum)

METHODS

Production of Silver Nanoparticle by Bacteria:

Bacterial Culture Grown in NB →→After incubation add silver Nitrate →→ Observe Color formation.

Production of Silver Nanoparticle by Chemically:

2ml Sodium Nitrate (2mM) add silver Nitrate solution→→ Observe color formation

Nanoparticle Production of Silver by plant leaf:

Wash and crush Leafs of Ocinum tenuiflorum →→1.2g leaf extract add into 100ml D/W and boil it→→Ammonium and Silver nitrate added drop by drop→→ Observe color formation

RESULTS

The primary conformation of synthesis of nanoparticles in the medium was characterized by the changes in color from greenish to brown. Addition of Ag+ ions to the supernatant and pellet culture, samples showed the results as color formation to brown, the color intensity increased with period of incubation due to the reduction in Ag0. Control (without silver nitrate) showed no color formation in the culture when incubated for the same period and condition. In the supernatant culture color changes depends on incubation period, but the pellet culture takes long lag period to formation of color. Synthesis of silver nanoparticles also depends on incubation period of the culture.

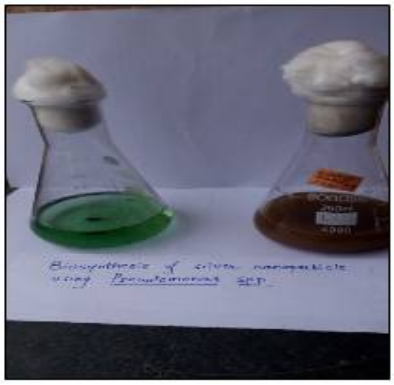

Figure 1:

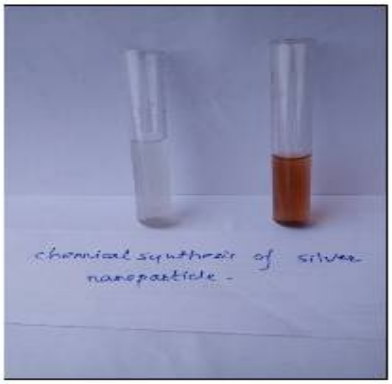

Figure 2:

Figure 3:

(Photo Plate No.1)Silver nanoparticles were synthesized according to the method described in the previous section, the colloidal solution turned pale brown that the silver nanoparticles were formed. Photo Plate No.2 shows the photographs of samples obtained control showed colorless Ag+ solution and in the case of adding citrate of sodium the color changed to pale red (Photo Plate 2).As the different leaf extracts were added to aqueous silver nitrate solution, the color of the solution changed from faint light to yellowish brown to reddish brown and finally to colloidal brown indicating AgNP formation. Similar changes in color have also been observed in previous studies (Shukla *et al.*, (2010)) and hence confirmed. The completion of reaction between leaf extract and $AgNO_3$ (Photo Plate No.3).

CONCLUSIONS

We have demonstrated a simple biotechnological process for the extracellular synthesis of silver nanoparticles using this bacterial strain, leaf extract and chemically. Extract of plants can be used for Production of silver nanoparticles. By these simple methods we can produce silver nanoparticles.

FUTURE DIRECTIONS: This work provides a starting point for more intensive study with respect to following mentioned perspective: Comparative study of antagonistic action of silver nanoparticles produced by different sources *like*, Bacterial, Plant and Chemical.

REFERENCES

1. Banerjee Priya, Mantosh Satapathy, Aniruddha Mukhopahayay and Papita Das.(2014). Leaf extract mediated green synthesis of silver nanoparticles from widely available Indian Plants: synthesis, characterization, antimicrobial property and toxicityanalysis. Bioresources and Bioprocessing.1:3
2. Maribel G. Guzmán, Jean Dille, Stephan Godet (2009) Synthesis of silver nanoparticles by chemical reduction method and their antibacterial activity. International Journal of Chemical and Biomolecular Engineering, 2:3.
3. Shukla VK, Pandey S, Pandey AC (2010) Green synthesis of silver nanoparticles using neem leaf (Azadirachta indica) extract. In: Proceedings of International Conference On Advanced Nanomaterials And Nanotechnology. ICANN-2009, Guwahati, Assam (India). 9–11 December 2009.

Source of Support: None Declared
Conflict of Interest: None Declared