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Extraction of stem bark of *Khaya senegalensis* using silver nanoparticles

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Abstract
An essential aspect of nanotechnology is the creation, analysis, and use of biologically produced nanomaterials. We describe the manufacture of highly distributed silver nanoparticles in this research utilizing a dried stem bark extract of the *Khaya senegalensis* act as reducing agent. Ions of silver rapidly reduce after being exposed to bark extract, resulting formation of silver ions. AgNPS in an aqueous solution revealed a Sholder peak in the UV-VIS spectra at about 420 nanometres. The Scanning Electronic Microscopy image showed amorphous nature with spherical shape nano ions are formed at magnification of 10-24000x at an electrical voltage of 15kV according to a SEM micrograph examination.

Keywords: Silver, Nanoparticles, UV-VIS, SEM

Introduction
Based on certain qualities including size, distribution, and shape, nanoparticles defined as particles size less thane 100 nm display entirely better properties in comparison with bigger particles [1]. Gold, silver, and platinum are commonly called as noble metal nanoparticles are used in contact with human body. These nanoparticles are environmentally friendly and relates to close with chemical, physical, microbes, plants and plant extracts [2]. Recent findings describe that use of different parts of *K. senegalensis* in the phytosynthesis of silver nanoparticles [3].

The *Khaya senegalensis* is most commonly available tree in Africa, medium in size and commonly called as African mahogany or dry zone mahogany [4]. Tree of *K. senegalensis* can grow 1 m in diameter with 15-30 meter in height. The bark might may be dark grey colour or grey brown in colour, but the heartwood is usually brown with a pink-red colour composed of coarse interlocking grains. The leaves arranged in a spiral pattern and cluster near the tips of the branches [5]. It is used to treat a variety of diseases including malaria, dermatoses, jaundice, syphilis, leprosy, and mental illness. It has a wide spectrum of therapeutic activity in both people and animals, including effects on growth regulation and anthelminthic activity against nematodes [6, 7]. It has been reported that the bark extract of *K. senegalensis* has trypanocidal action against *T. evansi* infection in rats [8].

Materials and Methods
Plant material
K. senegalensis stem barks were collected from botanical garden Department of forestry and environment Science, GKVK, university of Agricultural Sciences, Bengaluru, Karnataka, India.

Synthesis of AgNPS of *K. senegalensis*
The stem bark was air dried for 7 days then bark were ground to a fine powder. 1 mm silver nitrate was added to plant extract to make up a final solution and centrifuged at 15.000 rpm for 20 min. The collected pellet stored at -4 °C.

UV-VIS Spectra analysis
At 8 hrs diluting a small amount of the sample in distilled water, the UV-Vis spectrum of the reaction medium was measured to monitor the decrease of pure Ag^+ ions. A UV-VIS spectrophotometer was used to perform the spectral study.

SEM analysis of AgNPS

Scanning Electron Microscopic analysis was done by using Hitachi S-4500 SEM machine, to evaluate the formation of growth kinetics, shape and size of the nanoparticles. A very little amount of the lyophilized *K. senegalensis* sample was produced on a copper grid that had been coated with carbon. Extra solution was then blotted off the grid using paper towels, and the film was then dried for five minutes under a mercury lamp.

Results and Discussion

The colour could alter after the synthesis of silver ion into silver nanoparticles, when exposed to extracts of the plant. The surface of the silver nanoparticle gives it a dark yellowish-brown colour in aqueous solution. Because of surface PR (Fig.1). The outcome of this experiment is really intriguing. Making silver nanoparticles using synthesis. With an absorbance peak at 420 nm, the UV-Vis spectrograph of an amorphous solution of silver nanoparticles has been recorded (Fig.2).

The SEM image revealed amorphous nature and showed relatively spherical shape nanoparticle formed at magnification of 10-24000x at an electrical voltage of 15kV (Fig.3). Similar phenomenon was reported Danbature *et al.* [9].

a.1)

b.2)

Fig 1: a.1: *K. senegalensis* tree b: b.2: Stem bark.

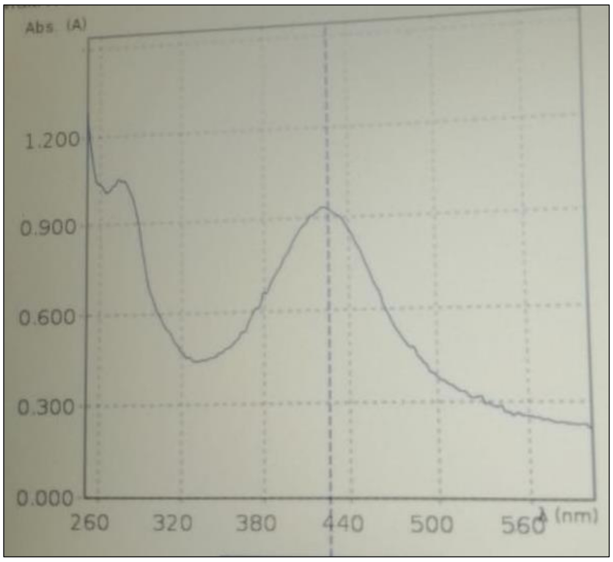

Fig 2: Absorbtion spectra of silver nanoparticle synthesized from *K. senegalensis* stem bark at 1mM silver nitrate by UV-VIS.

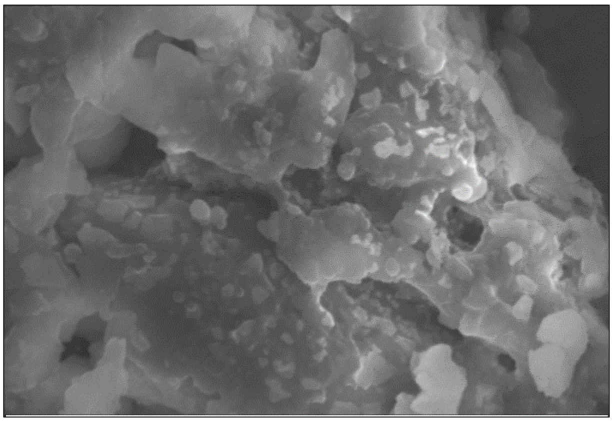

Fig 3: Scanning Electron Microscopic image of silver nanoparticles of *K. senegalensis* bark extract

Conclusion

Silver nanoparticles with pretty well-defined dimensions are created as a result of bark extracts' reduction of aqueous Ag+ ions. The capacity to easily scale up the process, economic viability, and other benefits are just a few of the benefits of this silver nanoparticle synthesis. This technology may be intriguing for the various inorganic nanomaterials because of the uses of such environmentally benign nanoparticles in antibacterial, and other medical applications. Investigations are being done on manufactured silver nanoparticles that were mediated by *K. senegalensis* for antitrypanosomal purposes.

References

1. Willems, van den Wildenberg. Roadmap report on nanoparticles. Barcelona, Spain: W&W Espanasl; c2005.
2. Mohanpuria P, Rana NK, Yadav SK. Biosynthesis of nanoparticles: technological concepts and future applications. J Nanopart Res. 2008;10:507.
3. Abalaka ME, Akpor OB, Bello AB, Olonitola OS, Sani A, Osemwegie O, *et al*. Synthesis of silver nanoparticles (Agnps) from bark and root of African mahogany (*Khaya senegalensis*) and the comparative studies of their antimicrobial properties. Asian J Microbiol. Biotechnol. 2016;1(1):25-32.
4. Chiezey NP, Gefu JO, Jagun AG, Abdu PA, Alawa CBI, Magaji SO, *et al*. August. Evaluation of some Nigerian

plants for anthelmintic activity in young cattle. In Proceedings of an international workshop on Ethnovet. Practices held between; c2000. p. 14-18.
5. Onoja SO, Anaga AO. Bioassay-guided fractionation, antihyperglycemic and antioxidant properties of the methanol leaf extract of *Helianthus annuus*. International Journal of Pharmacognosy and Phytochemical Research. 2015;7(2):340-346.
6. Gill BS. Trypanosomes and Trypanosomiosis in Indian Livestock. ICAR Publication, New Delhi, India; c1991. p. 2-12.
7. Arbonnier M. Trees, shrubs and lianas of West African dry zones. Trees, Shrubs and Lianas of West African Dry Zones; c2004. p. 1-574.
8. Adeiza AA, Mohammed A, Mamman M. Comparative *in vivo* evaluation of the trypanocidal activities of aqueous leaf, stem-bark, and root extracts of *Khaya senegalensis* on *Trypanosoma evansi*. J Med. Plant Res. 2010;4(17):1770-1777.
9. Danbature WL, Shehu Z, Joshua J, Adam MM. *Moringa oleifera* Root-Mediated Synthesis of Nano Silver Particles and the Antibacterial Applications. J Chem. Soc. 2021;46(3).