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Synthesis of Silver Nanoparticle Material Using Plant Livistona Chinensis

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Abstract:

Nanoparticle and nanotechnology refer to emerging field of science that includes synthesis and development of various nanomaterials. Nanoparticles it is used to different purpose such as medical treatment as well as industrial production of solar and oxide fuel batteries for energy storage, to wide incorporation in to diverse materials of everyday use such as cosmetics or clothes. nanomaterial that can act as biological mimets , "nanomachines". We synthesized silver nanoparticles from plant leaves of Livistona Chinensis Spectroscopic techniques such as Ultra violet radiation (UV) , X-ray diffraction (XRD), Fourier Transform Infrared spectroscopy(FTIR) was carried out for characterization. Scanning electron Microscopy (SEM) technique was employed to observe the surface morphology of nanomaterial. Synthesized nanoparticles were studied for their biological activities and found to be most active.

Keywords- Synthesis, Silver nanoparticle, Livistona Chinensis, Characterization, Biological activity

Introduction :

Nanomaterial can be synthesis using various approaches including chemical , physical and biological . [1 although chemical chemicals method of synthesis requires short period of time for synthesis of large quantity of nanoparticles , this method requires capping agents for size stabilization of nanoparticles.[2] chemical used for nanoparticles synthesis and stabilization of tare toxic and lead to non-ecofriendly by products.[3] The need for environmental non-toxic synthetic protocols for nanoparticles synthesis lead to the developing interest in biological approaches which are free from the use of toxic chemicals as by products .[4] many biological approaches for both extracellular and intracellular nanoparticles synthesis have been reported till date using microorganisms including bacteria , fungi and plants.[5] sometimes synthesis of nanoparticles using various plants and their extracts can be advantageous over other biological synthesis processes which involve the very complex procedures of maintaining microbial cultures many such experiments such already been started synthesis of various metal nanoparticles using fungi like Fusarium oxysporium, Pencillium sp. and using bacteria such as Bacillus subtilis etc.[6]

Material and method –

The preparation of metal nanoparticle as view of environmental and physical ways are as follows**,** Effective and externally stimulated heating can be delivered at cellular levels through alternating magnetic field (Ito et al, 2006), in research must be based on botanical plant like Livistona chinensis shows taxonomical study as shown

Common name : Chinese Fan Palm
Botanical name : Livistona Chinensis
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Monocotyledonae
Order: Arecales
Family: Arecaceae
Genus: Livistona

Species: Livistona Chinensis

As also shows some of the plants must be as parkia filicoidea, Azadirachta indica, acalypha indica, medicago sativa etc showing the synthesis of nanoparticals material like Au, Ag, Fe, Zn, etc. Step involving formation of metal nanoparticles **,**

Plant extract

↓

Metal salt solution

↓

Metal nanoparticle material

Result-

Characterization

XRD- X-ray diffraction measurements were taken on maxima X XRD-7000(Shimadu, Tokya, Japan operating at voltage of 40KVand 20mA electrical current radiation source in region of 2Ɵ from 40^0 to 80^0 c.

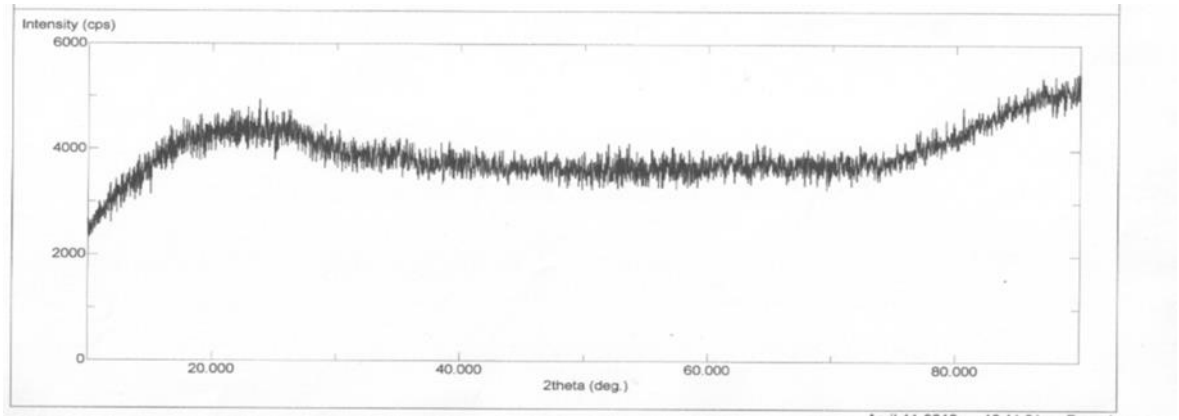

Figure 1- XRD monograph of Livistona chinasis

FTIR analysis

FTIR analysis of silver nanoparticles synthesized by using leaf extract of Livistona chainensis. It is found that nanoparticle possessed definite surface morphology. FTIR spectrum reveals prominent bonds at 3418 cm^{-1}, 3194 cm^{-1}, 2330 cm^{-1}, 1917 cm^{-1}, 1608 cm^{-1}, 1030 cm^{-1}. The groups are responsible for the synthesis and stabilization of generated silver nanoparticles.

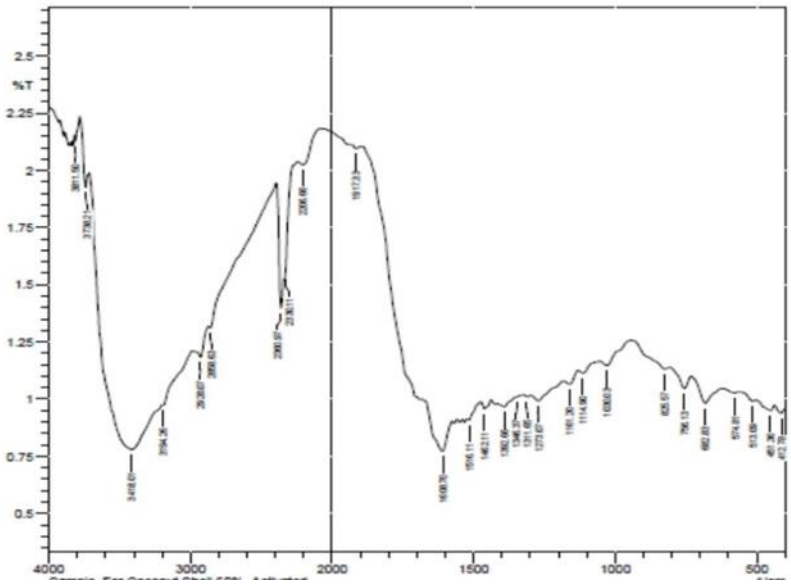

Figure 2- FTIR monograph of livistona chinensis

SEM- The morphology and geometry of AuNPs were investigated by 200 scanning electon microscopy shown microporous surface area.

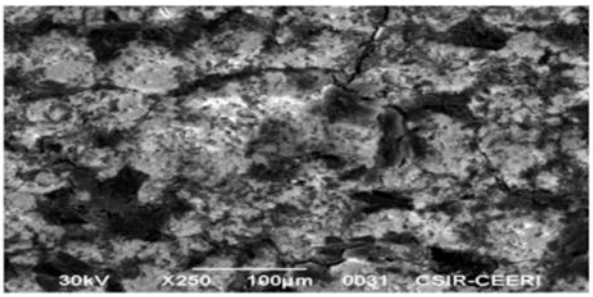

Figure 3- SEM monograph of Livistona Chinensis

UV-vis spectroscopy is one of the most widely used simple and sensitive technique for the analysis of nanoparticle synthesis. The silver nanoparticles synthesized by livistona chinensis leaf extract were confirmed by uv-vis spectrophotometer. It showed the peak at 423.02 mm which correspond to absorbance of silver nanoparticles.

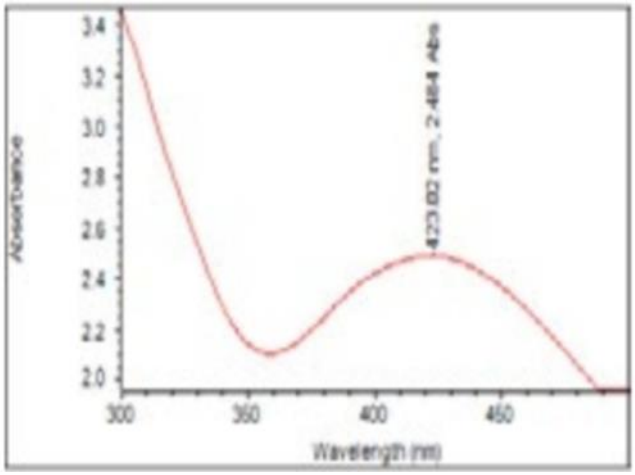

Figure 4- UV-Visible monograph of Livistona chinensis

Antimicrobial activity- silver nanoparticles generated by leaves extract of Livistona chinensis tested for the antimicrobial activity. Extract 50 µl and 100 µl sample of nanoparticles solution were poured into wells by using micropipette

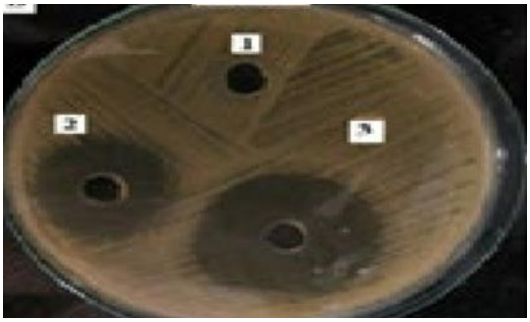

Figure 5- Antimicrobial activity monograph of Livistona Chinensis

Conclusions

In these research it production of nanoparticles material from Livistona Chinensis. It must be used to analyzed by different types of diseases as well as different field are used for the relevant benefit like . the current study, we have assessed the antioxidant activity of aqueous-methanolic extract of Livistona chinensis bark (LCB) in vitro and its effect on the redox status of mitochondria isolated from the liver and brain of rats. In view of mounting concerns over the side effect caused by the use of these toxic and environmentally unfriendly chemicals, direction of research is now focusing on alternative nontoxic, biological, and environmentally friendly methods of control.

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