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ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES SYNTHESIZED BY GREEN SYNTHESIS FROM *YUCCA ALOIFOLIA* EXTRACT

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ABSTRACT : Green synthesis of silver nanoparticles (AGNPS) were synthesized by *Yucca aloifolia* leaves extract to get a dimension within nanometric scale and have antibacterial activity. AGNPS is prepared by reduction of silver ion by fresh extract of *Yucca aloifolia* to produce AGNPS, where the metabolites work as stabilizing and capping agent. AGNPS characterized by UV-visible spectroscopy, atomic force microscopy (AFM) Fourier transform infra-red analysis (FTIR), X-ray diffraction (XRD), and scanning electron microscopy (SEM). These techniques confirmed the morphology, phase, roughness and size of AGNPS are in nanoscale material. Anti-bacterial activity of (AGNPS)demonstrated against *Staphylococcus aureus* and *Escherichia coli* and have inhibition zone 15-20 mm.

Key words : *Yucca aloifolia*, anti-bacterial activity, silver nanoparticles, SEM, AFM.

INTRODUCTION

Nanotechnology is dealing with material at the nano metric scale with dimension between 1 to 100 nm and this modern field has a techniques for synthesis, manipulation and investigation to be suitable in many application like industry and medicine. At this dimension the physical and chemical properties are unusual and more improved in comparison to bulk. The swiftly growing in synthesis and production of nano materials with new properties gaining attention to be applicable in many fields like chemical industries, biomedical, environment, electronics, drug-gene delivery,and food and feed applications (Iravani *et al*, 2014; Reddy *et al*, 2012). Metallic nanoparticles are promising materials according to their unique properties like high surface area and can be synthesized at controlled scale to be anti-bacterial agent as different to antibiotics, which has resistance towards bacteria (Kaviya *et al*, 2011).

Silver nanoparticles have remarkable feature made it very interesting in nanotechnology because of their simplicity in synthesis, safe nanomaterial moderately and very understood. Silver nanoparticles gained high interests due to chemical stability, catalytic, antibacterial, anti-viral, antifungal and also can be incorporated into fiber, cosmetic products and food industry (Ahmed *et al*, 2003). Silver nanoparticles were used in wound dressings, creams, and fabrics, where it play as antiseptic and antibacterial agent. The function of silver nanoparticle is damaging and disruption the cellular membrane causing deactivation of their enzymatic reaction leading to death (Patil *et al*, 2012). Silver nanoparticle can prepared by conventional methods like chemical route, but these methods have many limitations. These methods are high cost, slow production, harm byproducts, environmental burden, and chemically unstable. The synthesis of silver nanoparticle using sodium borohydride or trisodium citrate need further addition of stabilizing or capping agent to suitable in industry applications (Ahmed *et al*, 2015 a; Ahmed *et al*, 2015 b). A new route is established which is green synthesis that used the biological systems as a pathway for nanoparticle production. Silver nanoparticle can be prepared using the plants extracts which are considered as natural and cheap resource, non-harmful byproduct, and rapid synthesis. Feature of green synthesis using plants parts are producing of nanomaterial without toxic chemicals which are metabolites of plants, controlling of size, and benignancy to be compatible in medicine and pharmaceuticals (Mital *et al*, 2014). The advantage of using plant extract in green synthesis is related to the biomolecules that found as a natural product of plant