



ABSTRACT

Leather industry is well known by its innovative capability in production of comfortable and added value fashion leather products. Recently, consumers needs and expectations require the preparation of leather products that integrates emotional desires, fashion and multifunctional performance. Consumers have become more demanding and enlightened, searching for differentiated products which can promote their health, comfort, and welfare is remarkably increasing, and maximum efforts are being put in the development of differentiated and advanced products to meet the needs of the actual market by the development of new and functional materials mainly with antimicrobial properties. The control of bacteria and fungus growth is important to prevent and minimize the generation of malodors and some foot skin problems. The leather industry has been exploring the benefits of remarkable properties of nanoparticles on the development of new products with high performance especially with antimicrobial properties. In the present study, a facile, eco-friendly and cost effective method for green synthesis of silver nanoparticles (AgNPs) has been developed using aqueous extract of *Trachyspermum ammi* seeds and aqueous solution of silver nitrate. The synthesized AgNPs were characterized by UV-Vis spectroscopy and dynamic light scattering analysis technique. Maximum absorption peak was observed at 430 nm by UV-Vis Spectroscopy. The average particle size was 50nm as observed by dynamic light scattering analysis. Synthesized silver nanoparticles were then applied to leather pieces for the assessment of anti-fungal property of treated leather against *Aspergillus niger* fungal strain. Furthermore physical properties of leather such as thickness, tensile strength, elongation percentage, tear strength; bursting strength, feel and texture of grain were also evaluated. Results revealed that application of silver nanoparticles to the leather made it anti-fungal as well as physical properties of treated leather were also enhanced. From this study it is concluded that advanced and innovative nanotechnology based synthesized silver nanoparticle can be applied to leather footwear products, aiming a new sustainable and customer-driven production of consumer goods; where the environment, health, fair marketing communication, high quality of components with antibacterial properties, and competitive sales price are combined to promote the competitiveness of the companies.