O 41. DECORATION OF SILVER NANOPARTICLES SYNTHESIZED BY GREEN APPROACH ONTO NATURALLY COLORED NYLON 6,6 NANOFIBERS: INVESTIGATION OF ANTIBACTERIAL ACTIVITY

Havva Tutar Kahraman[1], Emre Yüksel[1*], Kezban Buse Altun [1], Gülsüm Aydın[2]

[1]*Department of Chemical Engineering, Konya Technical University, Konya, Turkey*
[2]*Department of Biotechnology, Selcuk University, Konya, Turkey*

E-mail: yuksel.emre@outlook.com.tr

ABSTRACT: Since, organic dyes are non-eco friendly and expensive, recent researches have been focused on natural dyes. Natural dyes can be derived from natural sources. Most are of plant origin and extracted from roots, wood, berries, lichens, leaves, flowers, nuts, and seeds. Generally, they show various colors and contain several pigments which can be easily extracted and used as a coloring agent. However, studies regarding the dyeing process with natural dyes are very limited due to easy availability of cheap synthetic dyes. Hence, this research aimed to produce colored nanofibers using plant extracts. Metallic nanoparticles with physicochemical properties different from bulk materials are widely applied in various fields such as environmental remediation, photocatalysis, imaging, catalysis, biosensors and biomedical applications. Nanoparticles have emerged due to unique physical and chemical properties, high surface to volume ratio as novel antimicrobial agents. Among them, silver nanoparticles (AgNPs) show excellent antimicrobial efficiency against organisms such as bacteria, fungi and viruse. As a result of increasing interest in green chemistry, an eco-friendly nanoparticle synthesis that is simple, affordable, compatible with biomedical and pharmacological applications have been widely preferred. In this regard, the aim of the present work was to decorate the AgNPs synthesized by green method onto colored Nylon 6,6 nanofibers. Firstly, Nylon 6,6 nanofibers were fabricated by electrospinning method followed by dyeing process using reddish orange and onion peel extracts. During dyeing process of the nanofibers, vinegar was used as a dye fixative agent. Secondly, synthesis of AgNPs using water extract of *Alchemilla vulgaris* plant under ambient conditions was performed. The formation of AgNPs was analyzed by UV–visible spectrophotometer. Synthesized AgNPs were decorated onto nanofibers by ultrasonication technique followed by mechanical mixing. The nanofibers were characterized using Scanning Electron Microscope (SEM) and Fourier-transform infrared (FT-IR) spectrophometer. The antibacterial acitivities of obtained novel nanofibers were investigated using Gram-positive bacteria (*Staphylococcus aureus*) and Gram-negative bacteria (*Escherichia coli)*. The activity test shows that nanofibers showed better antibacterial activities against to Gram-positive bacteria (*Staphylococcus aureus*) as compared to Gram-negative bacteria (*Escherichia coli).*

Keywords: Antibacterial, nanofiber, silver nanoparticle, nylon 6,6, green synthesis