Biosynthesis of Ag Nanoparticle by *Peganum Harmala* Extract; Antimicrobial Activity and Ability for Fabrication of Quercetin Food Electrochemical Sensor

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In this study, we used *Peganum harmala* extract as a powerful reducing agent for biosynthesis of Ag nanoparticle (Ag-NP). The biosynthesized Ag nanoparticle was characterized using XRD and TEM methods. The results confirmed the synthesis of Ag nanoparticle with diameter ~ 10 nm. Then, the antibacterial activity of Ag nanoparticle was identified using *Streptococcus sp* as Gram-positive, and *E. coli* as Gram-negative bacteria, and the results showed good antibacterial activity. In addition, the Ag nanoparticle was used for modification of carbon paste electrode (CPE) in the presence of paraffin oil (PO), and n-hexyl-3-methylimidazolium hexafluoro phosphate (MIHP) as binder. The Ag-NP/PO/MIHP/CPE showed a powerful catalytic activity in accelerating the electrochemical reaction of quercetin. Due to this point, it is suggested as a powerful tool for determining quercetin in the concentration ranged from 0.01 to 550 μ M with detection limit of 5.0 nM. The Ag-NP/PO/MIHP/CPE was successfully used for determination of quercetin in onion and hawthorn food samples.

Keywords: Extract, Quercetin Electrochemical Sensor, Ag Nanoparticle, Modified Electrode *Peganum Harmala*

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