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Synthesis of flower-shaped hybrid nano structures with standard plant molecules and their antimicrobial, peroxidase-like activities

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Today, enzymes are used in many types of sector such as food, textile, pharmaceutical, detergent, paper, leather industry, cosmetics, perfumery and biosensor production. Especially, after discovering the catalytic potential of the enzymes, the industry has begun to benefit in almost all areas. However, various methods have been developed to use enzymes more efficiently; they are immobilization and chemical modification. According to recent studies; a new immobilization method has been developed by looking at the enzyme immobilization from a different perspective. In this respect, both the stability and the catalytic activation of the enzyme have been significantly increased. In one of the studies, flower shaped hybrid nano-structures (FSHNS) were synthesized and their morphology and catalytic activities were investigated under different experimental conditions. It has been noted that the activity and stability of enzymes prepared in the form of flower shaped hybrid structures show a significant increase with respect to free enzymes and immobilized enzymes. However, the production of hybrid nanowires from different bio and organic molecules other than enzymes and the effect of experimental factors have not been fully investigated. In this project, by using Gallic, Ascorbic and Coumaric acid standard plant molecules and Cu^{2+} metal as a model ion, the mechanism of FSHNS formation under different experimental conditions was investigated and antimicrobial activities were investigated. In addition, FSHNS derived from plant extracts have been systematically examined against free horse radish peroxidase (HRP) enzyme and HRP FSHNS to exhibit peroxidase like activity against guaiacol, which is used as a model substrate due to the fenton-like reaction, acting as a fenton agent.

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