**Design and Applications of Hybrid Silver Nanoparticles Exploiting Natural Sources**

Asma MUNIR – *University of Bologna*

Natural sources offer a diverse range of raw materials, including fibers, minerals and polymers, which can be tailored to specific applications. These natural sources are important for developing new advanced materials due to their sustainability, biocompatibility, unique properties and potential to address environmental challenges. This research focuses on combining different products derived from Helix Aspersa and H. parthenopeia with inorganic phases to develop hybrid nanostructures with a range of potential applications. Snail slime from Helix Aspersa and mucus of H. Parthenopeia contain proteins and glycoproteins that can be employed for the synthesis of metallic nanoparticles. In this research we optimized several trials to find the best fit procedure to synthesize silver nanoparticles (AgNPs) by mixing solutions of AgNO3 with different volumes of slime extracted from Helix Aspersa and mucus from H. Parthenopeia at room temperature. The designed AgNPs were characterized using several techniques, including XRD, FTIR, UV-Vis spectroscopy, SEM, and DLS. Biomacromolecules from Helix Aspersa and H. Parthenopeia serve as reducing and stabilizing agents for the synthesis of silver nanoparticles. AgNPs synthesized from both slime and mucus were stable over time and showed the spherical shape, with average particles size ranging from 15-30 nm. Furthermore, both snail slime and mucus enhanced the antibacterial properties of silver NPs against strains of Gram+ and Gram- bacteria, due to their synergistic effect. The unique properties of these AgNPs making them a potent candidate for different applications ranging from biomedical to food packaging.