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BOOK OF ABSTRACTS

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ANTIBACTERIAL AND ANTIFUNGAL EFFECT OF S- AND N-CDS@AGMOFS NANOCOMPOSITES

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Abstract

Bacterial and fungal resistance is an increasingly severe problem. The high microbial resistance appears to be the consequence of the unconsidered use of antibiotics and antifungal drugs, and poor infection control in hospitals. Fighting microbial resistance by using new substances based on organic nanoparticles, carbon dots (CDs) may be a promising strategy in developing new therapeutic approaches. The metal-organic frameworks (MOFs), due to their unique features including high cargo loading, biodegradability, and ability of modification have become an attractive group of nanomaterials used in several fields including nanomedicine. In the current study, we synthesized N- and S-CDs@AgMOFs nanocomposites, new substances based on organic CDs nanoparticles inserted in MOFs structures. One Gram-positive (*Bacillus subtilis*), one Gram-negative (*Escherichia coli*) bacteria, and one fungi (*Candida albicans*) were treated with different concentrations (15.625, 31.25, 62.5, 125, 250, 500, 1000, and 2000 mg/L) of N- and S-CDs@AgMOFs nanocomposites during 48 h. The results showed the bactericidal effect of N- and S-CDs@AgMOFs on *Bacillus subtillis* and the antifungal effect on *Candida albicans*. The effect of S-CDs@AgMOFs was stronger on bacterial cells compared to the N-CDs@AgMOFs, while both agents affected fungi in equal concentrations, indicating different mechanisms in the two types of microorganisms. In *Candida albicans*, minimal inhibitory concentration (MIK) of both nanocomposites was 125 mg/L, while in *Bacillus subtilis* MIK of N-CDs@AgMOFs was 500 mg/L and for S-CDs@AgMOFs was 250 mg/L. It can be concluded that tested nanocomposites are safe for the environment because they are not toxic in the concentrations in which they can be found in the environment.

Keywords: Antifungal, Antibacterial, Carbon dots, Metal-organic frameworks, Nanocomposites.