

## Biologically Active Collagen/Reduced Graphene Oxide/Fucoidan Nanocomposites

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Collagen-based biomaterials with antimicrobial activity are attractive candidates for variety medical applications like tissue engineering, components of implantable devices, wound dressing and healing, functional coatings, etc. Development of composites that include antimicrobial agents is one of the easiest and most effective ways to add antimicrobial activity. Having for the sharply increasing microbial resistance to the conventional antibiotics and multi-drug treatments, this investigation combines such an easy approach with use of some newly synthesized, biologically active chemical compounds, plant extracts and their combinations. Here are presented collagen/reduced graphene oxide (RGO)/fucoidan nanocomposites, demonstrating antimicrobial activity that is specific toward different microbial species. and dependent on the fucoidan concentration. As compared to that of the collagen/RGO nanocomposites, their activity against Gram-positive bacteria (*L. inoculae* and *B. cereus*) and fungus (*C. lusitaniae*) is increased. Furthermore, the missing activity against Gram-negative bacteria (*P. putida*, *S. enterica*, *P. aeruginosa*, and *E. coli*) in absence of fucoidan is moderate in its presence and the cytotoxicity to eukaryotic cells is low. The different activity toward different test microbial species and eukaryotic cells was attributed to their specific morphology and size. With a wide spectrum, specific and adjustable bioactivity, the new collagen/RGO/fucoidan nanocomposites are promising antimicrobial biomaterial for variety biomedical applications.

Acknowledgments: The authors acknowledge the financial support of the National Science Fund of Bulgaria, Project KP-06-H27/17 17.12.2018.