

Chitosan-alginate sponges loaded with silver nanoparticles for biomedical application

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Chitosan (Ch) has been recently employed for chitosan-based delivery systems or as haemostatic sponges [1]. It is a cationic polymer, so it can be successfully combined with anionic sodium alginate. In this work we loaded sponges based on Ch, Alg and their combinations (Fig.) with Ag nanoparticles (AgNPs) and examine their antimicrobial effect against biofilms of *P. aeruginosa* and *E. coli* depending on AgNPs concentrations.

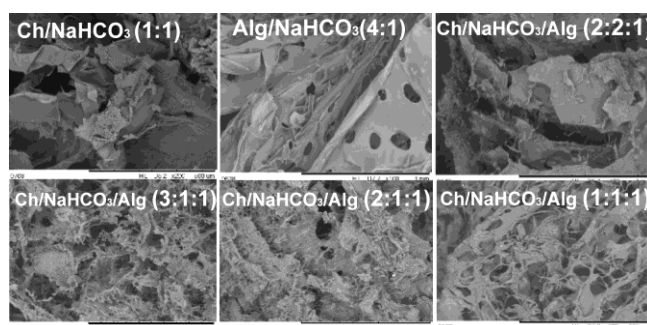


Fig. SEM images of Ch/Alg composite materials

The antibacterial activity was defined using zone inhibition test and pour plate technique. The concentration of the bacterial suspension was 10^5 CFU/ml. Most samples showed inhibitory effect on bacteria growth at AgNPs concentrations from $3.03 \cdot 10^{-6}$ (a) to $8.42 \cdot 10^{-6}$ (b). Sponges doped with AgNPs prevented bacterial growth more effectively than control samples. Moreover, sponge Alg/NaHCO₃ possessed bactericidal activity in both (a) and (b) compositions. Sponge Ch/NaHCO₃ demonstrated stronger bactericidal action for sample (b). Adding of AgNPs improves the antibacterial effect of Ch, Ch/Alg and Alg sponges against Gram-negative bacteria.

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1. E. Szymańska, K. Winnicka, P. Laurienzo, Mar. Drugs. **13**(4) (2015) 1819.