Biomimetic application of *Ianthella basta* demosponge capillary structured chitin scaffolds

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Introduction

Macroporous chitinous scaffolds, derived from marine demosponges like *Ianthella basta*, have garnered significant interest in interdisciplinary research, particularly within the biomedical scientific community. This is primarily due to evolutionarily distinctive design, and renewability due to high level of chitinous tissue regeneration in this sponge. Recently, these biocompatible chitinous scaffolds have been successfully used in tissue engineering of human mesenchymal stromal cells [1].

Methods

In this study, we investigated the characteristics of 3D microtubular *I. basta* sponge chitin, assessing its potential as a derived capillary system [2]. Various model liquids, including corresponding solutions of brilliant green (Fig.1), gentian violet, rivanol, iodine, potassium permanganate, decamethoxine, polyhexanide, as well as sea buckthorn oil and bromotyrosine-glycerin extract were selected due to their antibacterial properties. The scaffolds, treated with these solutions, were evaluated against clinical gram-positive, gram-negative bacterial strains as well as fungi.

Results

The results showed zones of growth retardation for brilliant green, gentian violet, decamethoxine, and polyhexanide solutions. Notably, chitin matrices impregnated with antiseptic solutions retained their antibacterial properties for more than 72 hours and effectively transmitted these properties to fresh microbial cultures.

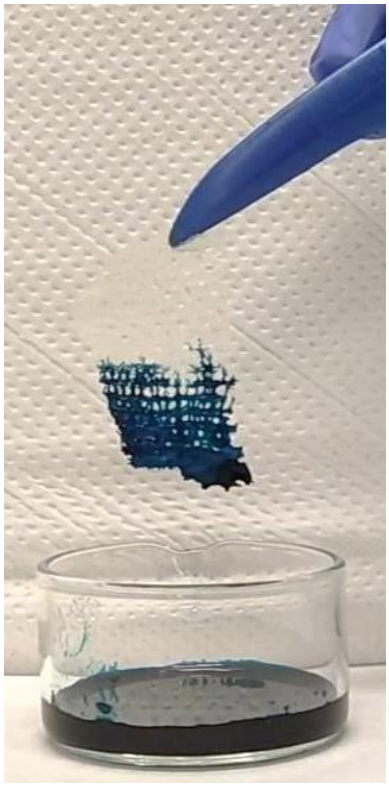

Figure 1. Capillary effect of the chitinous scaffold isolated from *I. basta* in relation to 1% brilliant green solution.

Conclusions

The results with diverse antiseptics impregnated chitin scaffolds demonstrate considerable potential as an innovative material for wound dressing applications and controlled drug release.

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References:

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2. Klinger C. et al. (2019) *Mar Drugs.*, 17(2), 131.