Már Másson

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Born 1963

Már Másson earned his Bachelor of Science in Chemistry from the University of Iceland in 1987, a Cand. Scient (MS) in Organic Chemistry from Copenhagen University, Denmark, in 1990, and a Doctor of Engineering – Biotechnology from the Tokyo Institute of Technology, Japan, in 1995.

During his doctoral studies in Japan, Már focused on bioelectronics and biosensors. Upon returning to Iceland, he dedicated the next ten years to researching drug delivery with cyclodextrins. In 1995, he joined the University of Iceland's Department of Pharmacy as a Post-Doc and became an Associate Professor in Medicinal Chemistry in 1998. Since 2005, he has served as a Professor in Medicinal Chemistry.

Már Másson's research group primarily focuses on synthesizing and investigating chitosan derivatives. Under his leadership, the group developed the TBDMS protection strategy for chitosan, enabling chemoselective and highly controlled synthesis of chitosan derivatives. The group's studies include applications of chitosan derivatives as antimicrobial agents, permeation enhancers affecting tight-junctions in pulmonary epithelium, chitosan nanocarriers for photochemical internalization, and coatings for use in regenerative medicine.

Már collaborates with engineers and mathematicians in Iceland to develop numerical frameworks for modeling drug delivery systems, including transdermal and ophthalmic delivery.

Additionally, he co-founded the spin-off company Minamo ehf with his Ph.D. student Vivien Nagy. The company, based on his invention (PCT application), focuses on developing antimicrobial coatings for silicone medical devices (https://www.minamo.is/) – Már Másson is now CSO of Minamo (and Vivien Nagy is CEO)

Már Másson is an editor for *Carbohydrate Polymers* (IF 12.5) on the editorial boards of *Molecules* (IF 4.6) and *International Journal of Molecular Sciences* (IF 5.7)

His research group currently includes one PostDoc, two Ph.D. students and two M.S. students. Már Másson has authored or co-authored over 110 ISI publications and is the inventor or co-inventor on four patent applications, with two granted patents. His H-Index is 51 (ISI) and 55 (Google Scholar).Google scholar profile: http://scholar.google.is/citations?user=Mop79jgAAAAJ&hl=en&oi=ao

1. Inventor Már Másson. US Patent 11535684. Chitoan derivatives and methods for preparing the same. 2019-08-23 Application filed by Primex ehf. 2021-08-19, Publication of US20210253745A1. 2022-12-27 Application granted 2022-12-27 Publication of US11535684B2. (see: https://patents.google.com/patent/US11535684B2/en)

ECO-FRIENDLY SURFACE ACTIVATION OF SILICONE FOR CHITOSAN-BASED ANTIMICROBIAL COATINGS IN MEDICAL DEVICES

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INTRODUCTION: Silicone-based materials are extensively used in medical devices due to their flexibility and biocompatibility. However, their inherent susceptibility to microbial adhesion and biofilm formation presents a critical risk in clinical environments [1]. In this study, we developed a green method for silicone surface activation using mild amine-based reagents in eco-friendly solvents.

METHODS: Silicone discs were activated by various amine-based compounds prepared in eco-friendly solvents such as water and isopropanol. Surface amine group density was quantified using a ninhydrin assay, which was also employed to monitor the stability of amine groups on the silicone surface over a 10-day period. Chitosan was then used to coat the activated silicone via glutaraldehyde crosslinking, and the attachment was confirmed through FTIR analysis and additional amine quantification. The antibacterial activity of the coated samples was evaluated against various Gram-positive and Gram-negative bacteria using the drop plate method.

RESULTS: The results demonstrated that the ethanolamine in isopropanol provided the most favorable balance between effective surface modification (303 ± 31 nmol/cm^2) and preservation of mechanical integrity. Chitosan was successfully grafted onto ethanolamine-activated silicone via glutaraldehyde crosslinking, with FTIR and surface amine measurements confirming stable attachment. Antibacterial testing revealed that chitosan-coated silicone significantly reduced bacterial load across all tested strains, with *Enterococcus faecalis* CFUs decreasing from 7.1 to 3.7 Log_{10} CFU/mL (Figure 1). Mechanical testing confirmed that the surface modifications and chitosan coating did not compromise the flexibility or tensile strength of the silicone.

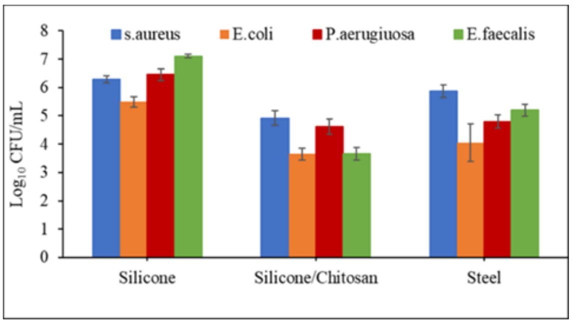

Figure 1. Bacterial density expressed as log CFU mL^{-1} of various bacteria, after 18 h of incubation with silicon, silicon/chitosan and steel surfaces

DISCUSSION & CONCLUSIONS: The green chemistry-based approach offers a non-toxic alternative to conventional surface modification techniques, making it a promising strategy for developing antimicrobial medical devices with enhanced safety and performance.

ACKNOWLEDGEMENTS:

REFERENCES: [1] Levy, M.L.; Luu, T.; Meltzer, H.S.; Bennett, R. Neurosurgery 2004, 54, 488–491.