

ORT_26 - Assessment antiviral activity of functional textiles: pioneering service offered by Bio-Manguinhos to partners

Adriana de Souza Azevedo Soares¹; Caio Denani^{1*}; Ingrid Horbach¹; Brenda de Moura Dias¹; Stephanie Almeida da Silva¹; Marcia Arissawa¹; Sotiris Missailidis¹; Cintia Nunes Cardoso Lopes¹; Sheila Maria Barbosa de Lima¹; Waleska Dias Schwarcz¹.

¹Fiocruz/Bio-Manguinhos.

Introduction: The pandemic of SARS-CoV-2 brought interest to fabric industry to develop functional textiles formulated with antiviral and/or virucidal agents, able to inactivate virus and reduce risk of infection and transmission. The antiviral textiles could be use in production of individual protection equipment (IPE), but that fabrics need to be tested in many specific antiviral assays.

Objective: This study aims to assess the antiviral efficacy of functional textiles using an antiviral activity evaluation platform, which uses as model viruses of respiratory transmission, such as Measles virus (Laboratory with Biosafety level 2 - NB-2) and/or SARS-CoV-2 virus (NB-3).

Methodology: To meet this demand, it was designed a work plan, outlined a pricing strategy and developed a technical protocol adapted from ISO18184. Textile samples were analyzed at different steps: analysis of cytotoxicity in NB-2 and antiviral activity against the Measles virus (previous antiviral efficacy screening in NB-2) and/or against the SARS-CoV-2 virus in NB-3. Briefly, after cytotoxicity analysis approved, samples (20mm x 20mm) of control or formulated textiles were challenged with a virus suspension for 1 or 30 minutes (contact time/room temperature = Fabric plus Virus). Afterwards, washed out samples with recovered viruses were quantified by TCID₅₀ method, using Vero CCL-81 cells to determine the virus infectivity titer. Likewise, antiviral samples submitted industrially washed were evaluated for wash-stable. The antiviral performance of products were measured and the differences among 2.0-3.0 (log TDID₅₀/mL) or higher than 3.0 (log TDID₅₀/mL) were considered as good or excellent effect, with antiviral efficacy higher than 99% or 99.9%, respectively.

Results: Our platform screened firstly formulated antiviral samples against Measles virus in NB-2 environment allowed antiviral activity test standardization in our lab, as well as, against SARS-CoV-2 in a superior level (NB-3). We observed that some textiles showed antiviral efficacy higher than 99% or 99.9% against both established virus models after 1 or 30 minutes of virus contact, respectively. Currently, this unprecedented technological service of assessment antiviral activity of functional textiles has been offered by Bio-Manguinhos to SENAI-CETIQT partner, according to the Innovation Law and ST&I Legal Framework. All the financial aspects of this partnership are being managed by the supporting foundation Fiotec and applied exclusively to R&D initiatives at Fiocruz.

Conclusion: We expect this pioneering project could be used as model to future initiatives at Deputy Director of Technological Development (VDTEC) of Bio-Manguinhos, opening possibilities to new service renderings with other external partners. The authors thank the Multi-user Research Facility of Biosafety Platform NB3-HPP, Oswaldo Cruz Institute, Oswaldo Cruz Foundation, Rio de Janeiro, Brazil.

Keywords: antiviral textiles; service renderings; SARS-CoV-2