

## ORT\_01 - Median Tissue Culture Infectious Dose (TCID<sub>50</sub>) as a validated tool to measure antiviral activity in functionalized textiles

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**Introduction:** The SARS-CoV-2 pandemic has spurred the textile industry to develop functional textiles formulated with antiviral agents, first conceived to produce personal protective equipment. The textiles antiviral efficacy need to be evaluated and approved. Therefore, to assure the results it is essential to validate viral quantification methodologies based on ISO 18184. Furthermore, this validated TCID<sub>50</sub> is offered by Bio-Manguinhos to SENAI CETIQT partner as a technological service to measure antiviral activity of fabrics produced by national companies.

**Objective:** This study aims to assess and to validate the TCID<sub>50</sub> as a toll to measure the antiviral efficacy of functional textiles.

**Methodology:** Analytical performance was established under cell-based assay characteristics using a model virus. Briefly, the Measles Schwarz stock solution was diluted and quantified by TCID<sub>50</sub>. Assays were performed by different operators and days to assess linearity, accuracy, and precision. Textile samples were also evaluated for cytotoxicity and antiviral activity to determine selectivity and robustness. Statistics were performed with the software R Studio.

**Results:** The theoretical viral titer was calculated and compared with experimentally TCID<sub>50</sub> titer obtained and linear regression analysis showed a significant correlation between both ( $p < 0,001$ ;  $R^2 = 0.98$ ;  $R = 0.99$ ) with high accuracy. Neither the treated nor control fabrics induced cytotoxicity or loss of cellular sensibility to infection, according to the criteria down to 0.5 Log TCID<sub>50</sub>/mL. The method to quantify antiviral activity was robust with minimal variation in all samples inoculated with different volume inoculum and washing medium.

**Conclusion:** Our findings represent an important step regarding the development of methods able to infer virus titers and antiviral activity in the field of fabrics. The validated TCID<sub>50</sub> to quantify antiviral activity demonstrated precision, accuracy and robustness, has supported the SENAI CETIQT in the development and validation of the effectiveness of functional textiles used by society and its implementation has represented the first technological service in Bio-Manguinhos.

**Keywords:** TCID<sub>50</sub>; Validation method; Antiviral textiles