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Assessment of antimicrobial activity of textiles for wound dressing: methodology optimization

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Normally, the skin is capable of restore the tissue integrity, after wound injury. However, the deposition of bacteria on the wound site results on infection causing pain and healing delay. To control bacteria proliferation, antimicrobial textiles have been developed, and the assessment of their activity is a required step. Although, several standard methods were published to assess textiles antimicrobial activity, they are time and material consuming and have some shortcomings with regard to the real conditions of use. Therefore, the aim of this work was to optimize the method described on JIS L 1902:2008-Testing for antibacterial activity and efficacy on textile products, the most commonly used standard. Two textile samples were used: A-cotton without treatment (control) and B-cotton with 10% of the recommend concentration of Ruco-bac AGP. The microorganism used was *Staphylococcus aureus*-ATCC 6538.The first improvement was sample size. On the qualitative method, square samples with 1x1cm^2 were used instead 2.5x2.5cm^2 (suggested by the standard). For sample A no antimicrobial activity was observed and for sample B the halo size was similar for both sizes used. For the quantitative method, the samples used had 0.4g (standard suggestion) and 0.1g. Sample A had the same bacterial growth before and after contact with the fabric and sample B had no bacterial growth. With this improvement, the amount of sample and solutions need for the test was reduced four times. To reduce the use of disposable material, instead of 50mL falcons, 6 well plates were used. In this case, no bacteria were recovered from the sample A after incubation period on 6 well plates. These means, that the centrifugation is a crucial step to detach all bacteria from the fabric.The effect of the bacterial inoculum volume was also assessed. Three inoculum volumes (250, 100 and 50µL) were added to 0,1g samples. No significant differences were observed for both samples. A healthy skin has 10^5 bacteria/cm^2 and up to this value it is considered that the skin is infected. Therefore, 3 inoculum concentrations were tested: 3x10^5, 3x10^6, 3x10^7cell/mL. The results showed that the inoculum concentration had no significant changes for both samples after the incubation period. In conclusion, it is possible to use samples 4 times smaller than the standard suggestion, use higher inoculum volume to simulate wound exudate and higher concentration, to accurately predict the sample behaviour on an infected skin.