**Supplementary Material**

**Test methods details**

*Size, weight, thread count, and thread thickness*

Measurement of the surgical drape size was performed using a ruler with 1 mm accuracy. The weight per unit of fabric area (g/m2) was obtained weighting a 15×15 cm2 specimen, with an electronic scale (EdutecTM, Brazil) having a resolution of 0.001 g. The thread count was evaluated using a five-fold magnifying glass (Foldable MagnifierTM, Brazil).

The thickness of the single fabric thread was evaluated at a microscopic level, in warp and weft directions, using a Scanning Electron Microscope (SEM) (FEITM Quanta 200 F, US). A circular fabric specimen was obtained from each sample and imaged at 100× applying a 5kV beam voltage of low vacuum (0.45 Torr).

*Linting test*

Double-sided adhesive carbon tape disks (TAAB Laboratories Equipment Ltd, Berks, UK), were mounted on 12 mm circular aluminum stub. The exposed adhesive side was put in contact for 60 s with the surface of the fabric sample after applying a weight of 5.9g. The adhesive disk was then observed for remaining fibers at the SEM (high vacuum, 30kV). Six fields of view at 100× (about 46 mm2) were collected for each sample. Released fibers were quantified by analyzing the digital images using a semi-automated routine adapted from Bressan et al. [10](#_ENREF_10).

*Water absorption test*

The water absorption behavior of fabric specimens (strips 8 cm long and 1.5 cm wide) was evaluated using high purity water (0.2 µS/cm, 72.8 mN/m) and a Wilhelmy Microbalance (DCA 322 CahnTM, Netherlands). The fabric strip was hanged to the microbalance hook and the free end was put contact with water. The weight increase with time of the specimen due to water absorption was recorded. The modified Washburn equation [11](#_ENREF_11) was used to fit the linear dependence of the square of water mass versus time.

This approach allowed to calculate a linear coefficient describing the water absorption characteristics of the sample that can be affected by use and reprocessing due to changes in fabric wettability and in capillary structure.

*Microbial penetration semi-quantitative test*

DIN 58.953 methodology [12](#_ENREF_12) was used to assess semi-quantitatively the microbial penetration through the cotton fabric specimens (both tested in single and double layer) from surgical gowns and drapes. A 10×10 cm2 specimen of cotton fabric was positioned on a sterile Petri dish and five areas (circles about 20 mm in diameter) were identified. A 100 µL aliquot from a 106 CFU/mL *Staphylococcus aureus* ATCCTM 25923 suspension in sterile saline, was dropped on each. After 6 h, the back of the fabric specimens were pressed for 5 s on nutrient agar. Agar plates were incubated at 35°C for 72 h. Colony forming units (CFUs) were enumerated every 24 hours. The test was passed for < 5 CFU per plate. Each fabric sample was tested in triplicate.

*Microbial penetration quantitative test*

A 100µL aliquot of 108 CFU/mL *S. aureus* ATCCTM 6538 suspension in sterile water was dropped on the external surface of a double-layer fabric specimens, previously cut into 24 mm diameter disk. After 30 minutes, specimens were observed at SEM on the back of the second layer using the low vacuum modality (0.68 Torr) and a 5kV beam voltage. Specimens were inspected at 6,000× three images per sample were collected at random locations. Coccoid cells were enumerated for each field of view and the amount of bacterial cells per field of view(2130 µm2) was calculated.

*Blood penetration tests*

An aliquot of 100 µL from a solution containing 9 mL of 0.1 M phosphate buffer with 2.5% glutaraldehyde and 1 mL of fresh human blood was dropped at the external surface of a double-layer fabric specimens cut into a 24 mm diameter disk. After 30 minutes, red blood cell penetration was assessed by SEM using 0.45 Torr water pressure and a 5kV beam voltage. Specimens were inspected on the back side, at 2,000× and three images per specimen were collected at random locations. Red blood cells (RBCs) were enumerated and the amount of RBCs per field of view (19200 µm2)was calculated.

*Data analysis and statistics*

Categorical variables were expressed as percentages. The results for continuous variables were expressed as median and Inter-Quartile Range (IQR). The median values obtained from the different study groups were qualitatively compared to elicit potential trends (increase, decrease or no change) of the variables of interest. Significance of differences between each test group and the control group was assayed with Mann-Whitney U test for continuous variables and Fisher-exact test for dichotomous variables. Bonferroni-Holms post-hoc correction was considered for multiple comparisons. Two-sided tests with a significance level of p<0.05 were considered.

**Supplementary table**

**Table A.** Washing and sterilization protocol used for reprocessing the surgical gowns and drapes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Reprocessing phase** | **Subphase** | **Duration** | **Physical or chemical agents** | **Temperature** |
| Automated Washing | Wetting | 6 mins | - | Cold water |
| Wetting | 10 mins | Alpha Lav ADT, Alpha Lav Power N | Cold water |
| Rinsing | 6 min | - | Cold water |
| Prewashing | 15 mins | Alpha Lav ADT, Alpha Lav Power N | Cold water |
| Rinsing | 3 mins | - | Cold water |
| Bleaching | 20 mins | Alpha Lav Power N, Alpha Lav Prox | Cold water |
| Rinsing | 6 mins | - | Cold water |
| Neutralization | 3 mins | Alpha Lav Sour L | Cold water |
| Softening | 3 mins | Alpha Lav Soft RB | Cold water |
| Steam sterilization | Exposure phase | 4 mins | Saturated steam | 134°C |

Note: all chemicals were from Alpha Centauro – Química, Barretos, Brazil.