Extracorporeal therapy in the treatment of sepsis: *in vitro* assessment of the effect of an absorbent cartridges on the circulating bacterial concentration and its interaction with the antibiotic therapy

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Background: Sepsis is one of the major causes of death worldwide. In its physiopathological process a broad spectrum of pro- and anti-inflammatory mediators play a strategic role, leading to a sepsis-induced state of immunoparalysis. The rationale behind the employment of extracorporeal purification techniques as a complement to therapy for sepsis is based on their ability to remove the mediators involved.
So far, attention was focused on the immunomodulation allowed by purification therapies. However, the focus of studies on the application possibilities that these techniques offer as a supplement to antimicrobial therapy and resuscitation of critically ill patients must be extended.

Methods: In this study, the possible removal by adsorption that the Jafron® HA330 cartridge operates against bacteria (in particular towards S. aureus ATCC® 25923 ™) was evaluated *in vitro*.
Subsequently, it was evaluated whether the adsorptive capabilities toward bacteria were maintained by using a cartridge functionalized with Vancomycin and whether the latter maintains its bactericidal activity.

Results and Conclusion: A significant reduction in circulating bacteria can be observed after 120 minutes.
The removal of the HA330 cartridge against circulating bacteria is described by the percentage removal rate (RR, i.e. the Removal Ratio). This was confirmed by ANOVA test that detects a significant difference between the sampling points "PRE" and "CTR" ($p < 0.05$) and between "POST" and "CTR" ($p < 0.05$).

This study showed that HA330 significantly reduces the circulating bacterial load, even in the presence of pre-adsorbed Vancomycin.

ΔT	RR%
5'	69.75
30'	90.12
60'	94.40
120'	100.0

Removal Ratio of HA330