

# Savasana and Staph Infections: An examination of the effectiveness of 'natural' and commercial cleaners against *Staphylococcus carnosus* on yoga mats

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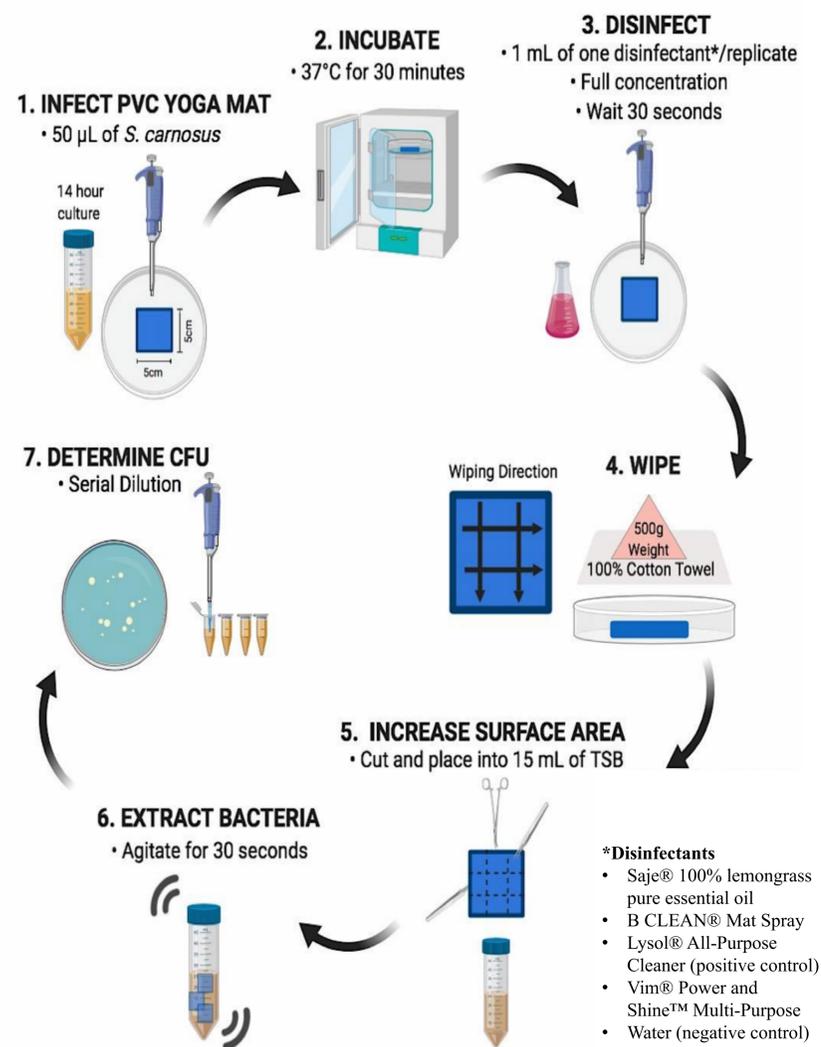
## Introduction

- In community fitness centres in the United States, one of the most common bacterial strains found is *Staphylococcus aureus* [1].
- Recent studies have found a link between methicillin-resistant *S. aureus* (MRSA) infections and shared fitness equipment that retains sweat, such as yoga mats [2].
- Improperly sanitized yoga mats provide a suitable environment for bacterial growth, therefore effective disinfectant methods are crucial for the prevention of bacterial transmission [2-3].
- As opposed to commercial cleaners, 'all-natural' or 'organic' cleaners have been favoured by the yoga community, however, there is very little information on their effectiveness as disinfectants [3].
- Our research examined the effectiveness of two 'natural' cleaners on a yoga mat infected with *Staphylococcus carnosus*.
- The first chosen 'natural' cleaner was lemongrass essential oil, which previous studies have demonstrated has antibacterial properties [3]. The second was B Clean, a 'natural' antibacterial yoga mat spray. They were compared to Lysol, a Health Canada certified disinfectant, and Vim, a commercial disinfectant containing bleach used at the SFU Fitness Centre [4].

## Acknowledgements

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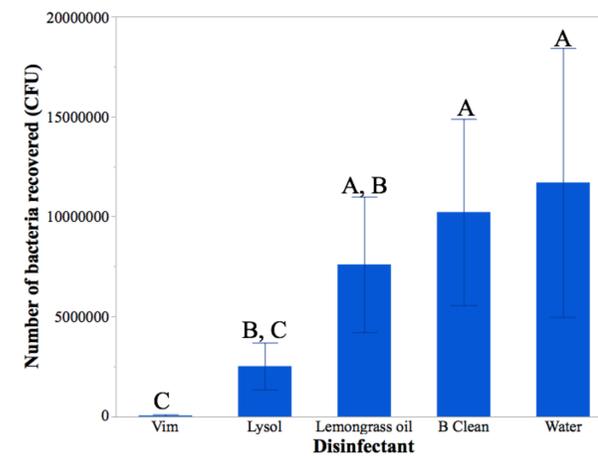
## Methods



**Figure 1. Process of inoculation with *S. carnosus* and disinfection of yoga mat pieces.** Post-infection incubation time and temperature were chosen to simulate a hot yoga class. Upon serial dilutions, the plates were incubated at 37°C for 24 hours. The *S. carnosus* colonies on each plate were individually counted to calculate Colony Forming Units (CFU). This method was replicated 13 times for each disinfectant. Image created with BioRender.com.

## Results

The mean number of bacteria present on the yoga mat pieces after disinfection varied between the disinfectants (Fig. 2;  $F(4, 55) = 7.1648, p = 0.0001$ ). Lysol and Vim were equally effective; however, Vim was significantly more effective than the 'natural' cleaners. Lysol was equally as effective as lemongrass oil. B Clean was equally as effective as water.



**Figure 2. Mean number of *S. carnosus* present (CFU) on yoga mat after incubation at 37°C and disinfection with Vim Power and Shine, Lysol All Purpose, Saje Lemongrass Oil, B Clean Mat Spray, and Water.** Means that do not share a letter are statistically significant according to Tukey's HSD MCT. Error bars represent 95% confidence intervals,  $\alpha = 0.05$ .

## Discussion

- Our results suggest that Lysol was equally effective as lemongrass oil. This contrasts with a previous study investigating the effectiveness of 'natural' cleaners against *S. aureus* which found no 'natural' cleaner to be more effective than Lysol due to their lack of common disinfectant chemicals [3].
- We also found that Lysol, our positive control, was equally effective as Vim. This could be a result of Vim's primary active ingredient sodium hypochlorite, which is known for its antibacterial properties [5].
- B Clean was found to be equally as effective as water, yet this product claims to prevent bacterial growth and is significantly more expensive than water [6].

## Conclusion

- This study yielded results consistent with other studies that have evaluated the antimicrobial activity of natural ingredients, but at present, this study was the first to test disinfectants on yoga mats [7].
- Further research is needed to better comprehend how disinfectants work on PVC yoga mats.
- Different concentrations and combinations of essential oils and natural ingredients, as well as contact time before wiping, could all be investigated [3].
- All in all, equipment specific studies, such as ours, are important to help determine the most effective ways to reduce bacterial transmission in fitness facilities.

## References

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