EGAS MONIZ INTERNATIONAL SCIENTIFIC CONGRESS
JULY 2-4th 2025

EGAS MONIZ SCHOC of HEALTH & SCIENC

Isolation and characterization of environmental bacteria and susceptibility testing to disinfectants

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INTRODUCTION

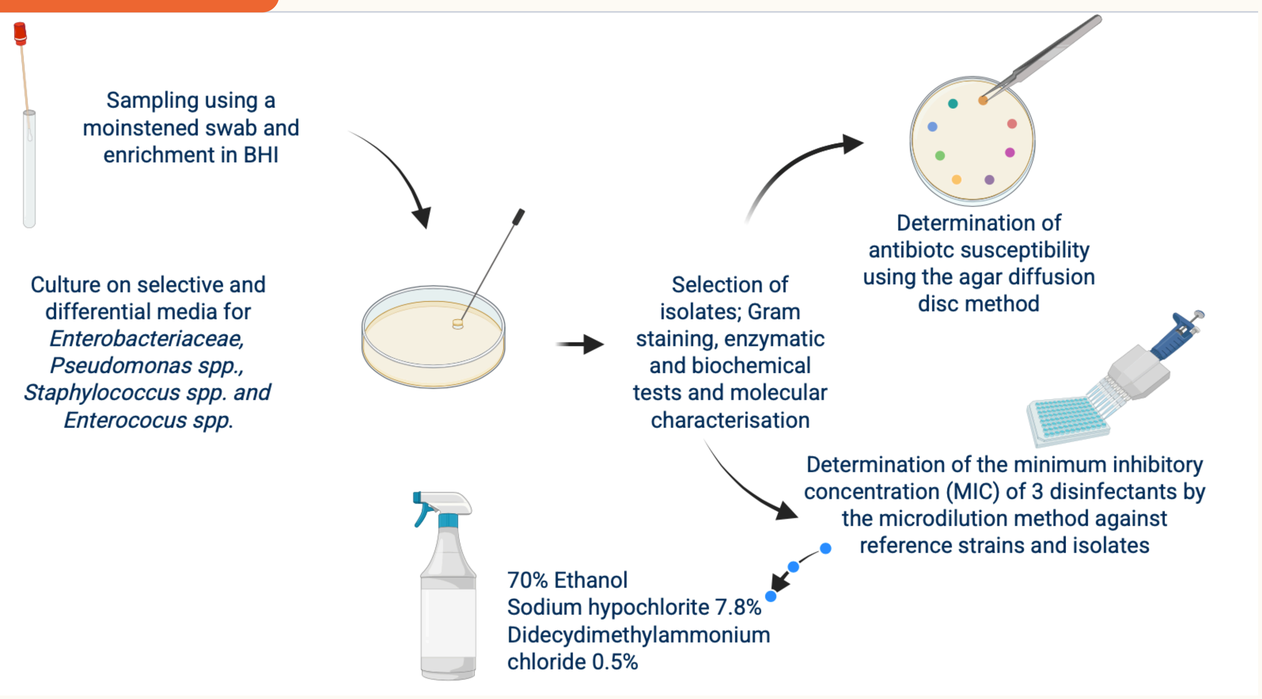
- The use of disinfectants on surfaces is crucial for controlling infections and preventing the spread of pathogens in various environments [1]
- Inappropriate or excessive use of disinfectants can promote antibiotic resistance, promoting the spread of resistant bacteria and increasing the risk of infections [1,2]

AIMS

1. Sampling surfaces at Egas Moniz School of Health & Science to isolate bacterial species and determine their antibiotic resistance profiles
2. Evaluate the antibacterial activity of three disinfectants used in the institution

MATERIALS AND METHODS

- The scheme illustrates the workflow and the methodology used in this study



RESULTS

- A **total of 24 isolates** were obtained, including strains of presumptive *E. coli* (n = 3), *P. aeruginosa* (n = 2), *Staphylococcus spp.* (n = 12; four of which were coagulase-negative) and *Enterococcus spp.* (n = 7)
- Definitive identification of selected isolates using the API biochemical gallery confirmed three as ***Escherichia coli*** and two as ***Enterococcus faecium***; identification of the remaining isolates is ongoing
- **A low level of antibiotic resistance was observed across isolates**, with no multidrug-resistant strains detected (Figure 1)

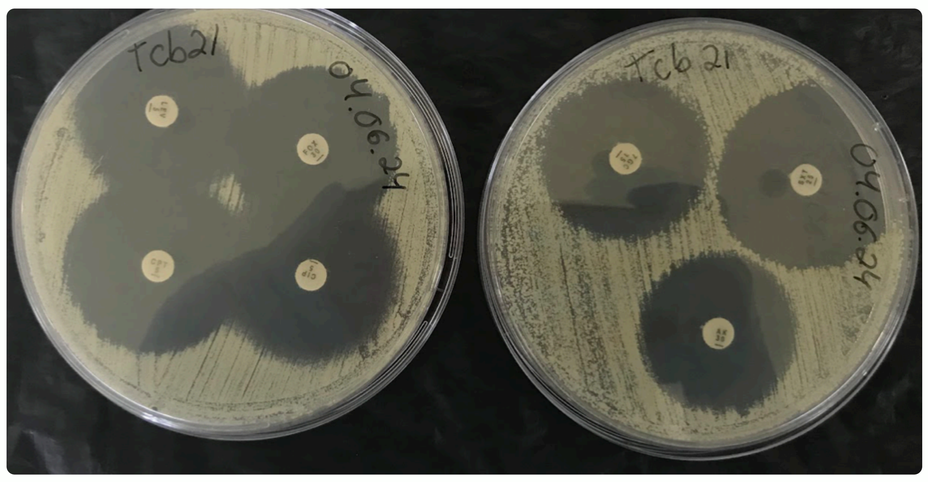


Figure 1. Representative image of the agar diffusion disc results for isolate Tcb21. The isolate was susceptible to all antibiotics tested.

- The antibacterial activity of 70% ethanol, 7% sodium hypochlorite, and 0.5% didecyldimethylammonium chloride was evaluated by determining the minimum inhibitory concentration (MIC) against both reference strains and environmental isolates (Table 1)

Table 1. Antibacterial activity (minimum inhibitory concentration - MIC) of 3 disifectants against *S. aureus* ATCC 6538 and *E. coli* ATCC 11105 and against some isolates.

Disinfectants	MIC values (mg/mL)				
	E. coli ATCC 11105	*S. aureus* ATCC 6538	Isolate Scb1	Isolate SB20	Isolate SB22
Ethanol 70%	200	100-200	50	>200	>200
Sodium hypochlorite 7.8%	0,0062	0,08	0,0062	0,08	0,016
Didecydimethylammonium chloride 0.5%	0,0031	0,0016	0,0031	0,00098	0,00049

- The isolates *E. coli* Scb1 and *Staphylococcus coagulase-negative* (SB20 and SB22) showed susceptibility to the disinfectants comparable to that of reference strains, suggesting no evidence of resistance to these agents (Table 1)

CONCLUSION

- Some species were potentially pathogenic, such as *E. coli* and *E. faecium*
- Most isolates were sensitive to the antibiotics and disinfectants tested
- Small variations in the efficacy of disinfectants indicate possible bacterial adaptations
- Despite the limitations, the study highlights the importance of microbiological surveillance and rotation in the use of disinfectants

REFERENCES

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