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SELECTED ASPECTS OF THE ANTIBACTERIAL USE OF LACTIC ACID IN FOOD PROCESSING

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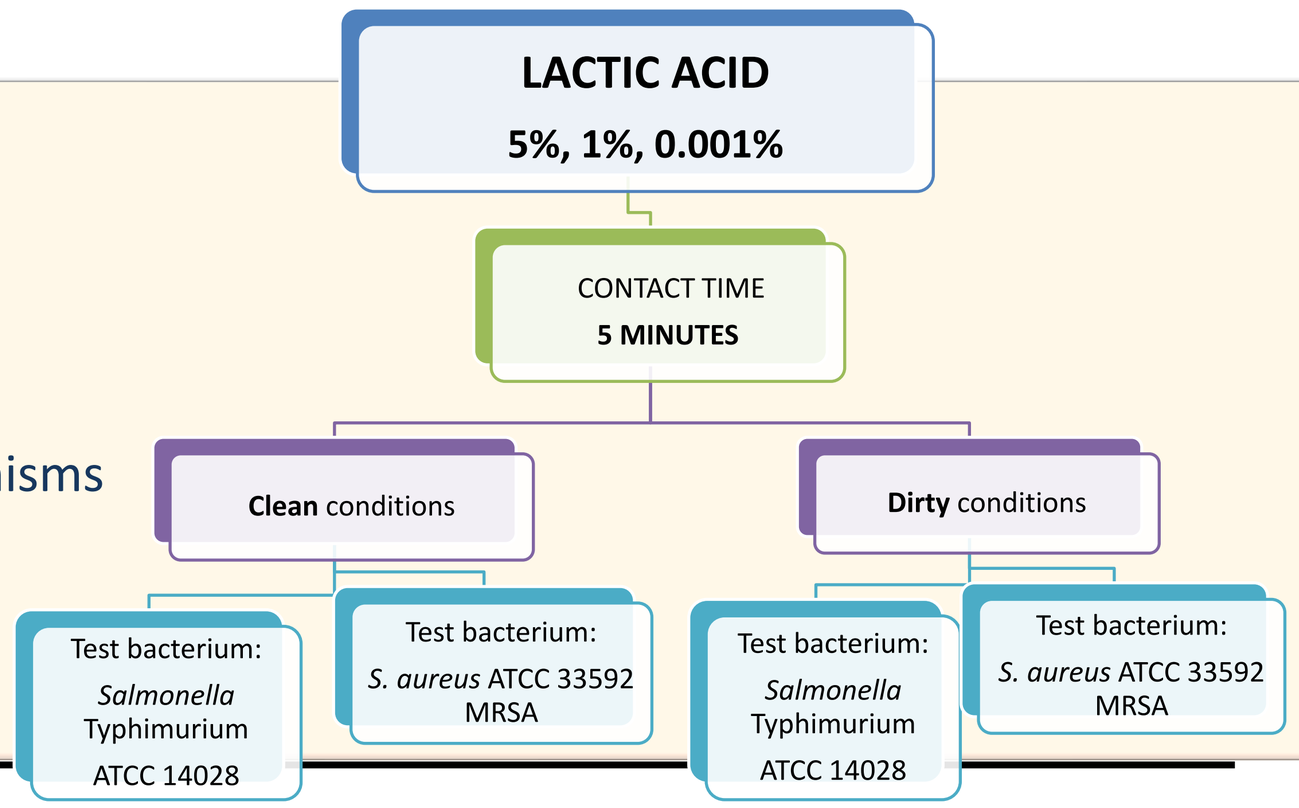
INTRODUCTION & AIM

- L(+)-lactic acid is authorised as an active substance for biocidal products, with applications in the fields of veterinary hygiene, food, and animal feed
- This study aimed to evaluate the bactericidal activity of **target concentrations: 5% (v/v) and 1% (v/v) lactic acid** on test bacteria: the Gram-negative strain *Salmonella enterica* subsp. *enterica* serovar Typhimurium (ATCC 14028) and the Gram-positive strain *Staphylococcus aureus* subsp. *aureus* (ATCC 33592) (resistant to gentamicin and methicillin, MRSA)

METHOD

- A dilution–neutralisation method was used, based on EN 1276, a quantitative suspension test for the evaluation of the bactericidal activity of chemical disinfectants and antiseptics used in the food, industrial, domestic, and institutional areas, modified in part of the obligatory test organisms
- Clean conditions – 0.3 gL^{-1} albumin bovine
- Dirty conditions – 3.0 gL^{-1} albumin bovine
- Temperature of test: 20 °C



RESULTS & DISCUSSION

Bacterium	Concentration of lactic acid in the product (% v/v)	Tested concentration of lactic acid in the product (% v/v)	Condition	Reduction *X_{sr}±SD (lg $CFUmL^{-1}$)
***Salmonella enterica* subsp. *enterica* serovar Typhimurium (ATCC 14028)**	6.25	5	clean	>5.18±0.04
	6.25	5	dirty	>5.18±0.04
	1.25	1	clean	>5.18±0.04
	1.25	1	dirty	>5.18±0.04
	0.001	0.0008	clean	<3.81±0.04
	0.001	0.0008	dirty	<3.81±0.04
***Staphylococcus aureus* subsp. *aureus* (ATCC 33592)**	6.25	5	clean	<3.82±0.03
	6.25	5	dirty	<3.82±0.03
	1.25	1	clean	<3.82±0.03
	1.25	1	dirty	<3.82±0.03
	0.001	0.0008	clean	<3.82±0.03
	0.001	0.0008	dirty	<3.82±0.03

*X_{sr}±SD – average value ± standard deviation

- The obtained results showed no difference in the results of the tests under simulated clean and dirty conditions
- Both tested concentrations of lactic acid showed a 5 lg reduction in *Salmonella* Typhimurium (ATCC 14028)
- For the tested strain *Staphylococcus aureus* (ATCC 33592), the required reduction of 5 lg was not achieved

CONCLUSIONS

✓ Bactericidal activity against *Salmonella enterica* subsp. *enterica* serovar Typhimurium (ATCC 14028)
❖ Absence of bactericidal activity against *S. sureus* (ATCC 33592) MRSA
➢ These results contribute to a better understanding and rational use of lactic acid for antibacterial purposes

FUTURE WORK

- Variation of test microorganisms: *Listeria monocytogenes*, *Shigellae flexneri*, *Proteus hauseri*,...
- Other contact times: 1 minute, 30 seconds
- Test product as a combination of lactic acid and surfactants