



The Nuffield Research Project Celebration
Event
15.10.2014
M Shed
Bristol

Introduction



Food Production Line

Salmonella and Listeria are human pathogens and a leading cause of foodborne infections ranging from mild gastroenteritis to life-threatening typhoid fever. In response, appropriate sampling and control measures should be implemented in order to minimize potential contamination within the food industry.

This is vital to reduce and/or eradicate the possibility of contracting foodborne infections. Salmonella and Listeria isolation swabs with a semi-solid gel formulation have been used for years. However, microbiological laboratories are beginning to shift towards automation in order to improve workflow. Therefore liquid versions of Salmonella and Listeria isolation swabs should be developed.



Listeria Isolation Transwab

The project will contribute to the design and development of new products for bacterial identification in order to monitor hygiene within the food industry.

Aims

The scope of the study was to develop a liquid version of the Salmonella and Listeria isolation swabs in order to make them readily available to process using automated readers able to detect the

Methods

Salmonella and *Listeria* isolation swabs were inoculated with different concentrations of bacteria and incubated for 24 h and 48 h at 37°C. After the incubation period the swabs were assessed based on the colour change of the liquid medium. The presence of *Salmonella* was indicated by colour change from red to black and the presence of *Listeria* was indicated by the colour change from brown to black. In addition the swabs were inoculated with other microorganisms (*Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecalis*) as a control to evaluate the potential error of false positive results.

Results

All of the swabs inoculated with *S. typhimurium* indicated a positive reaction after 24 h with 10⁶ cfu/ml (10⁻² dilution) and 10⁴ cfu/ml (10⁻⁴ dilution) bacterial concentrations. Swabs inoculated with a very low concentration of bacteria 10² cfu/ml (10⁻⁶ dilution) turned black after 48 h of incubation

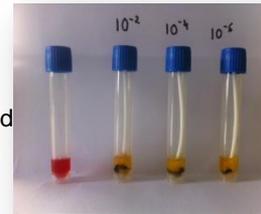
All *Listeria* liquid isolation swabs inoculated with *Listeria* gave a positive reaction after 48 h with 10⁶ cfu/ml and 10⁴ cfu/ml bacterial concentrations and most of them after 24 h of incubation. Furthermore there were no false positive results observed.



Listeria Medium

Conclusions

The Salmonella liquid swabs changed colour after 48 h. Ideally, the positive reaction should be achieved within 24 h of incubation thus the medium needs to be developed further in order to achieve this. The *Listeria* liquid swab gave a positive reaction after 24 h of incubation for most *Listeria* strains, which is very promising especially because it did not give false positive results with bacteria other than *Listeria*.



Salmonella Medium

Acknowledgements

I would like to express a special thanks to my project supervisor, Dr Monika Stuczen for guiding me through this project, giving me valuable experience and taking the time to help me with editing this report. Monika is a very inspiring person, of whom has helped me set out a much clearer path of what I would like to do for my future career.

I would also like to thank Nuffield Research for helping me gain such valuable work experience. My special thanks are also extended to the staff of MWE. I am deeply grateful for all their patience and support in making this report possible.