Adjustment of pH of enrichment media might improve selective isolation of MRSA from pig samples

Methicillin resistant Staphylococcus aureus (MRSA) have emerged in livestock in several countries worldwide in recent years. MRSA may colonise in low numbers which makes both epidemiological studies and the implementation of control programmes difficult. Methods for selective isolation of MRSA from animal samples have been developed. However, obtaining sufficient sensitivity has been a challenge. Staphylococcus aureus is normally found on the skin, surviving and growing under extreme conditions: dry environment with high salt and low pH. In the selective isolation so far used high salt concentrations has been the main selection. We hypothesised that also pH adjustment could be used for selection of this species. In this study we compared the growth of MRSA and back ground flora in enrichment media at several different combinations of salt and pH. Background flora isolates were obtained from pig swabs. Initially a total of seven strains, including: two MRSA, two enterococci, two CNS one Aerococcus viridans and one Proteus spp. strains, were tested for growth in Mueller Hinton II broth with pH ranging from 4 to 5.5 and salt addition of 4% to 7%. In the next step, these strains were tested for growth in 12 different combinations of salt (5%- 6.5%) and pH (4.5-5.5). For assessment of the growth of S. aureus in pH adjusted media, further 14 MRSA and 13 MSSA were tested in a similar way. In a preliminary study using reference strains (data not shown) it was observed that pH ≤5.5 as well as salt concentrations ≥4% did allow growth of S. aureus but was inhibiting the growth of enterococci. Subsequent growth experiments with isolates from background flora showed an inhibitory effect of pH below 5 for Aerococcus spp and enterococci, whereas less effect was observed on CNS and Proteus spp. In the assays using different combinations of pH and salt, the pH showed, in general, a larger effect than the salt concentration on growth. MRSA and MSSA strains were partially inhibited by pH below 4.5 and grew with a moderate growth rate at pH 5.5 with lower salt concentration (5%). The growth of enterococci strains was completely inhibited by pH ≤5.5 at any salt concentrations tested (5- 6,5%), whereas the growth of Proteus spp. was only inhibited totally at pH of 4.5, but the growth rate could be reduced combining pH at 5 or 5.5 with high salt concentrations. In conclusion, pH adjustment of enrichment media might improve sensitivity of methods for detection of S. aureus by reducing background flora growth. Moreover, the combination of pH adjustment with reduction of the currently used salt enrichment concentration might increase the sensitivity of the detection of MRSA. For screening purposes it will still be necessary to have further steps for the selective enrichment and isolation of MRSA. Further studies are underway to evaluate the value of this under field conditions.

General information
State: Published
Organisations: Division of Microbiology and Risk Assessment, National Food Institute
Contributors: Cavaco, L., Agersø, Y., Mordhorst, H., Aarestrup, F. M.
Number of pages: 85
Pages: 48-49
Publication date: 2011

Host publication information
Title of host publication: 2nd ASM-ESCMID Conference on Methicillin-resistant Staphylococci in Animals: Veterinary and Public Health Implications : Abstract Book
Place of publication: USA
Publisher: American Society for Microbiology
ISBN (Print): 978-1555817251
Electronic versions: 49F3Cd01.pdf

Bibliographical note
Poster presentation
Source: orbit
Source-ID: 314447
Research output: Research - peer-review › Conference abstract in proceedings – Annual report year: 2011