Effect of subinhibitory concentrations of four commonly used biocides on the conjugative transfer of Tn916 in Bacillus subtilis - DTU Orbit (01/04/2019)

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Objectives Large amounts of biocides are used to reduce and control bacterial growth in the healthcare sector, food production and agriculture. This work explores the effect of subinhibitory concentrations of four commonly used biocides (ethanol, hydrogen peroxide, chlorhexidine digluconate and sodium hypochlorite) on the conjugative transposition of the mobile genetic element Tn916.

Methods Conjugation assays were carried out between Bacillus subtilis strains. The donor containing Tn916 was pre-exposed to subinhibitory concentrations of each biocide for a defined length of time, which was determined by an analysis of the transcriptional response of the promoter upstream of tet(M) using β-glucuronidase reporter assays.

Results Ethanol significantly (P = 0.01) increased the transfer of Tn916 by 5-fold, whereas hydrogen peroxide, chlorhexidine digluconate and sodium hypochlorite did not significantly affect the transfer frequency.

Conclusions These results suggest that exposure to subinhibitory concentrations of ethanol may induce the transfer of Tn916-like elements and any resistance genes they contain.

General information
State: Published
Organisations: Comparative Microbial Genomics, National Food Institute, Division of Epidemiology and Microbial Genomics, National Veterinary Institute, University College London
Pages: 343-348
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Journal of Antimicrobial Chemotherapy
Volume: 69
Issue number: 2
ISSN (Print): 0305-7453
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 4.34 SJR 2.419 SNIP 1.568
Web of Science (2017): Impact factor 5.217
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.21 SJR 2.283 SNIP 1.521
Web of Science (2016): Impact factor 5.071
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.06 SJR 2.259 SNIP 1.516
Web of Science (2015): Impact factor 4.919
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.61 SJR 2.298 SNIP 1.765
Web of Science (2014): Impact factor 5.313
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.7 SJR 2.479 SNIP 1.824
Web of Science (2013): Impact factor 5.439
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.35 SJR 2.283 SNIP 1.718
Web of Science (2012): Impact factor 5.338