Attachment behaviour of pathogenic bacteria on food and food contact surfaces in container transport

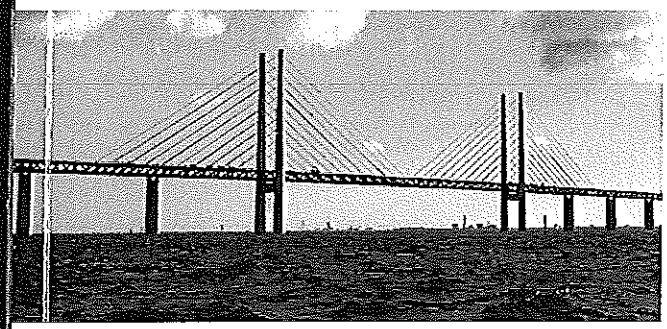
Abban, Stephen; Jespersen, Lene

Published in:
22nd International ICFMH Symposium Food Micro 2010

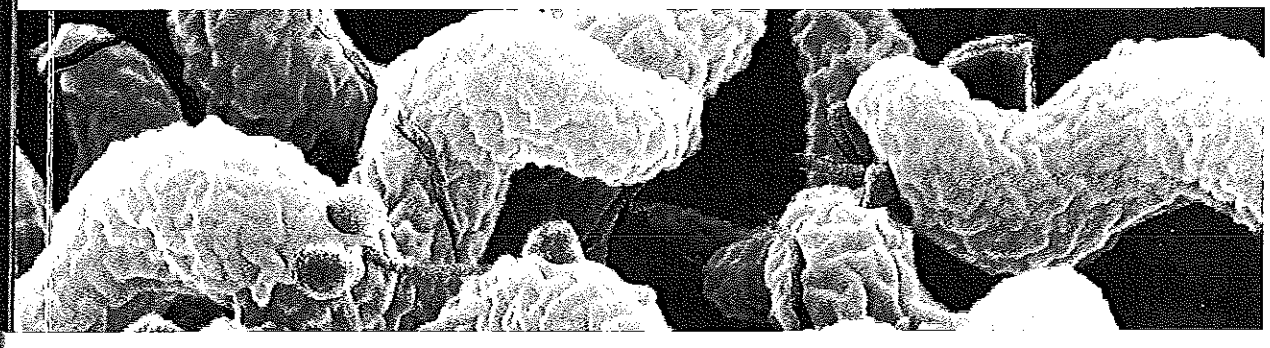
Publication date:
2010

Document Version
Early version, also known as pre-print

22nd International ICFMH Symposium Food Micro 2010



Copenhagen 30th August – 3rd September



Final Programme & Abstract Book

FOOD MICRO 2010
Microbial Behaviour in the Food Chain

www.foodmicro.dk

Author index

PSD1.03 **Attachment behaviour of pathogenic bacteria on food and food contact surfaces in container transport**

Stephen Abban (1), L Jespersen (1)
(1) Department of Food Science, Faculty of Life Sciences, University of Copenhagen, Denmark

Transportation is one link in the food chain that is often overlooked with regards to cross contamination and safety, even in risk models. Coupled to this is the very low amount of information in this link of the food chain with regards to cross contamination. However, foreseeable scenarios show that this could be an important source of food contamination. Such scenarios include the smearing of container linings during food cargo loading and unloading, as well as dripping of condensates in containers with poorly regulated internal temperatures. The aim of this ongoing research is to understand the behaviour of pathogenic bacteria on different food contact construction materials as well as selected foods. In the present study 1cm² chips of 3 surfaces- aluminium, stainless steel and a re-enforced polymer are coated with suspensions of *Escherichia coli* K12 in the presence of chicken extracts or Luria-Bertani broth to mimic smearing. The surfaces have also been coated with buffered suspension of bacteria for 5, 10, 15 and 30 minutes to explore the time needed for maximal initial attachment. The surfaces have been characterized by R_a and R_z measurements. Apples were also coated with bacteria both in the presence and absence of chicken extract. Different cleaning set-ups mimicking processes typical for containers have been established to study the ease of detachment of the bacteria. Residual bacteria on the material surfaces are assessed by fluorescence microscopy using acridine orange stain followed by image analysis, and by plating and colony counting. Initial result trends show that the presence of food residue of animal origin has the effect of reducing the attachment ability of bacteria to the abiotic surfaces tested. The presence of chicken residue also caused about a log unit less attachment to the apple surfaces compared to bacteria in water. However bacteria that attach to and dry on surfaces with extracts were more difficult to detach compared to those attached without the extract. Adherence of bacteria cells and cleanability was related to the R_a and R_z of the surfaces. These initial trends show that the behaviour of bacteria on food and food contact surfaces during transport can be very complex and more research is needed in this link in the food chain to allow more accurate modelling.

PSD1.04 **Irrigation quantity and timing impact microbial risk of fresh-cut lettuce**

A Allende (1), F López-Gálvez (1), M Moreno-Candel (1), D Beltran (1), A Martínez-Sánchez (1), JA Tudela (1), María I Gil (1)
(1) CEBAS-CSIC, Spain

An unequivocal consequence associated to climate change is global warming. Among other climate effects, global warming can be also associated with extended dry periods. In fact, climate change is exacerbating water scarcity problems, which is an increasingly frequent phenomenon in the south of Europe, where most crop production of leafy greens takes place. Water scarcity is likely to reduce the water availability for irrigation in dry areas, which might have an impact on the microflora of vegetable products such as leafy greens. Additionally, the use of an excess irrigation quantity has been related to an increased in yield production. However, this might also have an impact on the quality and safety of leafy greens as it has been hypothesized that an increase of water availability increases the microbial population in plant due to a moisture accumulation on the leaves surfaces. In the present study we have evaluated the impact on the physiology and microbiological quality of deficit (-50% and -25%) and excess (+50% and +25%) of irrigation quantities during Iceberg and Romaine lettuce production as well as the irrigation termination at T1, T3 and T5, which refers to the days (1, 3 and 5) of the last irrigation before harvest. Additionally, the potential infiltration of *Salmonella enterica* serovar *Typhimurium* in the stress tissue during washing was also evaluated. The obtained results showed a reduction of about 25% and 50% of the irrigation quantities regularly applied to Romaine lettuce during cultivation reduced the microbial load, including total coliforms when compared to excess water irrigation. However, variation in the irrigation termination seemed not to have an effect on the natural microflora. These preliminary results show the intrinsic vulnerability of the fresh produce chain to potential emerging microbial hazards associated with climate change. Thus, the risk evaluation of newly identified threats associated with the anticipated climate change is very important to determine risk management strategies.