



Survival of Salmonella during storage and heating in chocolate

Haxgart, Sine Nygaard; Christensen, Nanna; Knøchel, Susanne; Rønsbo, M.; Nielsen, Dennis Sandris; Heimdahl, H.

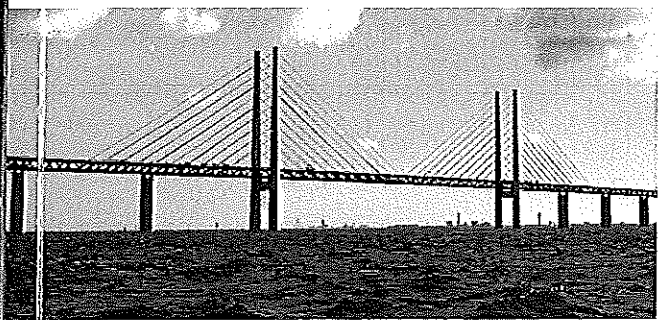
Published in:
22nd International ICFMH Symposium Food Micro 2010

Publication date:
2010

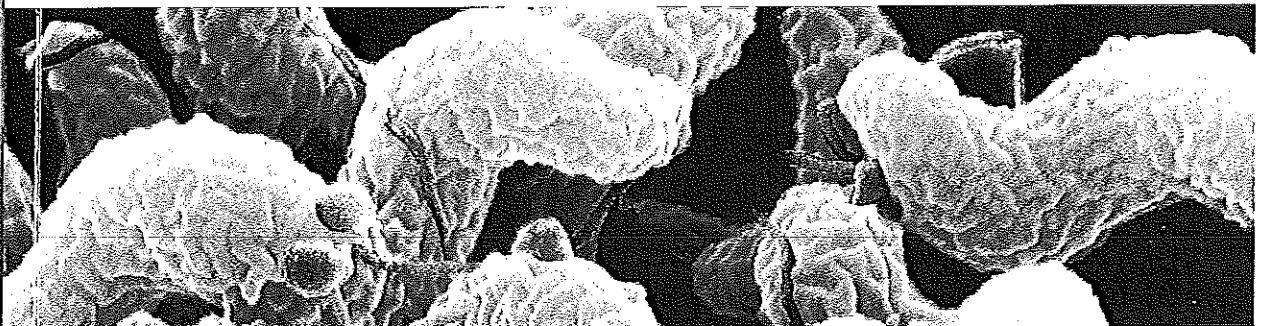
Document version
Early version, also known as pre-print

Citation for published version (APA):
Haxgart, S. N., Christensen, N., Knøchel, S., Rønsbo, M., Nielsen, D. S., & Heimdahl, H. (2010). Survival of *Salmonella* during storage and heating in chocolate. In *22nd International ICFMH Symposium Food Micro 2010* (pp. 293)

22nd International ICFMH Symposium Food Micro 2010



Copenhagen 30th August - 3rd September



Final Programme & Abstract Book



www.foodmicro.dk

PED2.04	Kanno S	PEB1.13	Kocevski Dragana	PED2.53	La Storia, A	PSA2.04
PED2.01	Kantikova M	PEA1.78	Kocharunchitt Chawalit	PEB2.53	Labbe A	PED1.07
PED1.33	Kapetanakou A	PEB2.50	Koike ST	PED1.10		PED1.08
PED1.23		PEC2.46	Komura Tomomi	PEE2.07		PED1.22
PEE2.22	Kapetanakou, Anastasia	PSB1.06	Kondili A	PEC1.96	Lacour, B	PSD2.04
PEB2.45	Karamad Dina	PEA1.64	Konrad R	PEE2.11	Lacroix C	PEA1.23
PSE1.02	Karbancýglu-Guler F	PED1.32	Koo MS	PED1.34		PEA1.25
PED1.34	Karbancýglu-Güler Funda	PEB1.15	Kopečný J	PEE2.23		PEA2.25
PED2.52	Karbassi A	PEA1.64	Korenova J	PEB2.32		PEA2.26
PEA1.36	Karlsen H	PEA1.57	Korkeala H	PEB2.11		PSE1.01
PEA1.37		PED1.31		PEB2.13	Laghi L	PEA1.69
PEA1.40	Karpiskova R	PEA1.09		PEB2.14	Laghi L	PEB2.67
PEA1.41		PEB1.05		PEB2.54	Laghi, L	PSA2.04, PSE1.05, PSE1.06
PEB1.32		PEC1.10		PEB2.60	Laht T-M	PEA1.15
PEE2.15	Kashi Y	PEE2.04		PEC2.52	Lahti E	PEC1.92
PEE2.24	Kashi Yechezkel	PEA1.67	Korkeala, H	PSB2.01, PSD1.02	Lahti, E	PSD1.06
PEA1.10		PEA1.66	Korošec Ž	PED2.52	Lahtinen S	PEE2.24
PSD1.03		PSE2.03,	Kostelanska M	PEA2.10	Laine P	PEA2.28
PEE2.21	Kasimoglu Dogru A	PEB1.01	Kostic Tanja	PEC1.99	Lamalian J	PEA1.64
PEE2.20	Katz T	PEA1.66	Kostrzewa Markus	PEA2.29	Lamberti C	PEA2.36
PED1.34	Katz T	PEA1.67	Kot, WP	PSD2.03	Lamprecht C	PEC1.18
PEB2.40	Keller D	PEB1.24	Kouete Kongni V	PED1.28	Lanciotti R	PEA2.43
PEC1.56	Kentish S	PEE2.02	Koutsoumanis Kostas	PEC1.43		PEB2.67
PEC1.86	Khamisse Elissa	PEB2.49	Koutsoumanis KP	PEA2.24		PED2.17
PEB1.26	Khan Nazer AH	PEA1.02		PEB2.41		PED2.58
PEB1.06	Khen B	PEC2.58		PSA2.05,		PEE2.08
PEA1.55		PEC2.59	Kovač K	PEC2.32	Landgraf M	PEC2.22
PEB2.57	Killer J	PEE2.23	Kowalczyk Magdalena	PEA1.46	Laniewska L	PEB2.24
PEB2.16	Kim D-H	PEC1.39	Kowalik J	PEC1.28	Laroche M	PED1.04
PEC2.06	KIM H-n	PEE2.20	Kowalik Jaroslaw	PEC1.27	Larsen M	PEB1.21
PED1.29	Kim H-n	PEE2.21	Kozlinskis Emils	PEA1.48	Larsen Marianne H	PEB1.23
PED1.37	Kim H-Y	PEC2.03	Kriščiunaite T	PEC1.24	Larsen Nadja	PEE2.14
PEC2.01	Kim Hyun Jung	PED1.34	Kristek S	PED2.25	Larsen, Nadja	PSE1.03
PEC1.11	Kim Y	PED1.34		PED2.53	Larsson J	PEC1.11
PSC1.06,	Kim YG	PEC1.42	Kristensen NB	PEA2.44	Lassen J	PEC2.08
PSA1.04	Kim Y-G	PEC1.39	Kron Morelli R	PEA1.29	Laukkanen, R	PSD1.02
PEB2.10	Kim Yungyeong	PEC1.38	Kuchta Tomas	PEA1.05	Lavaud A	PEC1.09
PEA1.61	Kinèiè A	PED2.52	Kuchta Tomas	PEB2.32	Lazzi C	PEA2.09
PEC2.52	Kirezieva K	PEC2.34	Kudirkienē Eglē	PEB2.38		PEE2.09
PEC1.24	Kirilov N	PEA2.17	Kuijper E	PEC2.05	Le Bihan Y	PEC1.31
PEA2.12	Kita T	PEB1.02	Kumar, Rajesh	PSA2.02	Le Bivic, P	PSA1.06
PED2.05	Kjeldgaard Jette	PEC1.68	Kunkulberga D	PEA1.48	Le Doeuff C	PEC2.44
PEA2.19	Klanènik A	PED2.52	Kwak H	PEC1.38	Le Gall, G	PSC1.02
PEA1.47	Klinder A	PEE1.02	Kwak HS	PEC1.42	Le Marc Y	PEC1.49
PEA1.52		PEE2.25	Kwon JH	PEB2.10	Lebeau, B	PSC2.03
PEA1.60	Klinder Annett	PEE2.26	Kwon YK	PEB2.10	Lebecque A	PEA2.04
PEB2.33	Klinder, A	PSE2.05	Kümmel J	PEC1.95	LEE H-J	PEE2.20
PEA2.33	Knauder E	PED2.52	Kümmel J	PEC1.98	Lee H-J	PEE2.21
PEB1.02	Kneifel W	PEC1.88	Kütt Mary-Liis	PEB1.03	LEE J-e	PEE2.20
PEB1.13	Kneifel W	PEC1.89	König M	PED1.15	Lee J-e	PEE2.21
PEC1.26	Knockaert D	PEA2.47	La Gioia F	PEA1.30	Lee J-W	PEC2.03
PEA1.67	Knudsen, GM	PSC1.04	La Storia A	PED2.20	Lee N	PED1.34
PEB2.10	Knøchel S	PEB2.36		PED2.31	Leguerinel I	PEB2.15
PEB1.26		* PED2.10	La Storia Antonietta	PEA2.15	Leguerinel, I	PSC1.01
PSC1.01	Kocevski D	PED2.25		PED2.23	Lehner D	PEC1.89

PED2.09 Efficacy of acidified sodium chlorite against *Listeria monocytogenes* attached to poultry skin during refrigerated storage

Elena Gonzalez-Fandos (1), B Herrera (1), N Moya (1), C Iñiguez (1)
(1) University of La Rioja, Spain

Raw poultry is a well-recognized source of *Listeria monocytogenes* and many surveys have confirmed the presence of this pathogen on fresh poultry. Some authors have associated cases of listeriosis with the consumption of undercooked chicken. There is a great interest in reducing surface microbial contamination of poultry, with particular regard to reducing the levels of pathogens.

The aim of this study was to evaluate the effect of acidified sodium chlorite washing on the growth of *Listeria monocytogenes* on poultry legs stored at 4°C for 8 days.

Fresh chicken legs were inoculated with *Listeria monocytogenes*. After the inoculation, the chicken legs were dipped into either a 0.8 g/l, 1 g/l or 1.2 g/l acidified sodium chlorite solution or distilled water (control).

Surface pH values, sensorial characteristics and *L. monocytogenes* and mesophiles counts were evaluated after treatment (day 0) and after 1, 3, 6 and 8 days of storage at 4°C. Significant differences ($p < 0.05$) in mesophiles counts were found between the legs treated with acidified sodium chlorite and the control legs. Legs washed with a 1.2 g/l acidified sodium chlorite solution showed a significant ($p < 0.05$) inhibitory effect on *L. monocytogenes* compared to control legs, being about 1.05 log units lower in the first ones than in control legs after treatment.

After 8 days of storage, *L. monocytogenes* counts were 1.3 log cycles lower in legs treated with 1.2 g/l acidified sodium chlorite than in control ones. Significant reductions in the *L. monocytogenes* populations were also observed on legs treated with 0.8 or 1 g/l of acidified sodium chlorite compared to the control samples.

In conclusion, immersion of chicken legs in a 1.2 g/l acidified sodium chlorite solution can reduce *L. monocytogenes* populations on fresh poultry.

Acknowledgements: The authors thank the Regional Government of La Rioja (Spain) for its financial support (Project Reference ANGI 2005/06).

*** PED2.10 Survival of *Salmonella* during storage and heating in chocolate**

S Høxgaard (1), Nanna Christensen (1), S Knøchel (1), M Rønsbo (2), D Nielsen (1), H Heimdal (3)
(1) KU LIFE, IFV, Food Microbiology, Frederiksberg, Denmark
(2) Gate Gourmet, Kastrup, Denmark
(3) Toms Confectionary Group, Ballerup, Denmark

A number of outbreaks caused by *Salmonella* have been linked to food products with low moisture content, including chocolate. This study evaluated the survival of different *Salmonella* in four types of chocolate during conching (a heat-processing step in the manufacture of dark chocolate) and storage for 5 months at 22 ± 1 and 10°C , respectively. A $\Delta rpoS$ mutant was included in order to evaluate the importance of rpoS for survival under these conditions, and *Salmonella* was inoculated at a level of $2 \cdot 10^7$ CFU/g. The study was conducted in collaboration with the major Danish chocolate manufacturer Toms Confectionary Group. Survival of *Salmonella* Typhimurium C5 and C5 rpoS was examined in white, milk, 57%, and 72% chocolate at 22 ± 1 and 10°C and during conching of 72% chocolate at 75°C for 22 hours. The survival of *S. Typhimurium* 365, *S. Oranienburg* and *S. Nigeria* (isolated in association with published outbreaks) was examined during storage in milk and 72% chocolate at both storage temperatures. The moisture content was measured for the chocolates. Survival of *Salmonella* during storage was found to be similar regardless of strain and deletion of rpoS. A difference in the log reduction (approx. 0.6 after 5 months) was observed between storage at 22 ± 1 and 10°C , with the latter being the least inhibiting. In all cases the greatest relative log reduction (approx. 2 log) was observed in white or milk chocolate, which also had the highest water content. The moisture content was also found to influence the survival on *Salmonella* during conching. A reduction of 3 log was seen, when *Salmonella* was inoculated at a level of 2×10^7 CFU/g into 72% chocolate and heat treated at 75°C for 22 hours. The inactivation curves of *Salmonella* during conching showed an initial decrease followed by tailing indicating greater persistence of *Salmonella* as the water evaporates. The C5 rpoS was more susceptible to heat than the parent strain.