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インデックス	内 容	
レコード番号(AN)	15487108	PMID: 15468929
英文標題(TIEN)	[Detection method of injured Escherichia coli O157 in noodles and vegetables]	
著者名(AU)	Tanaka Keiko; Motoi Hirofumi; Hara-Kudo Yukiko	
出典(SO)	Shokuhin eiseigaku zasshi. Journal of the Food Hygienic Society of Japan (Japan) Jun 2004, 45 (3) p113-9, ISSN 0015-6426 Journal Code: 0142214	
資料の種類(DT)	Journal Article ; English Abstract	
発行国(CY)		言語(LA) JAPANESE
日本語抄録(AB)	An enrichment procedure and a polymerase chain reaction (PCR) method for the detection of injured Escherichia coli O157 in foods were examined. Freeze-injured E. coli O157 inoculated in boiled spaghetti could be detected in 6-h culture within 12 h by the PCR method. Cells injured by heating in boiled spaghetti and cells injured by chlorine treatment in raw lettuce and carrot did not grow sufficiently to be detected in 6-h culture but were detected in 18-h culture using selective agar media. The injured cells could be also detected in 18-h culture within 24h by the PCR method. Enrichment at 42 degrees C in trypticase soy broth (TSB) was more effective than that at 42 degrees C in modified EC broth with novobiocin. These results indicated that the usage of enrichment in TSB for 18 h at 42 degrees C in combination with the PCR method is suitable for screening for E. coli O157 in boiled or chlorinated foods, even if the O157 cells are injured.	
ディスクリプタ(CT)	*Escherichia coli O157--isolation and purification--IP; *Flour--microbiology--MI; *Food Microbiology; *Polymerase Chain Reaction --methods--MT; *Vegetables--microbiology--MI; Caseins; Chlorine; Culture Media; Freezing; Heat; Protein Hydrolysates; Temperature CAS Registry No.: 0 (Caseins); 0 (Culture Media); 0 (Protein Hydrolysates); 0 (trypticase-soy broth); 7782-50-5 (Chlorine)	
自由語(ST)		

D-23

インデックス	内 容	
レコード番号(AN)	14294757	PMID: 12108212
英文標題(TIEN)	Microbiological and sensory quality of stored croissant-type bakery products depending on external (sorbic acid) and internal (dough, aw value) conditions.	
著者名(AU)	Hozova B; Turicova R; Lenkeyova I	
出典(SO)	Department of Milk, Fats and Foods Hygiene, Slovak University of Technology, Radlinskeho 9, SK-812 37 Bratislava, Slovak Republic. Die Nahrung (Germany) Jun 2002, 46 (3) p144-50, ISSN 0027-769X Journal Code: 0142530	
資料の種類(DT)	Journal Article	
発行国(CY)		言語(LA) ENGLISH
抄録(AB)	The work presents some results from the evaluation of microbiological (total bacterial count, coliform bacteria, moulds and yeasts) and sensory (shape, odour, colour, taste, consistency, crust, soft inside, etc.) quality and of the aw value and pH during the 90-day storage (interval of 0, 30, 45, 60, 75 and 90 days) under laboratory conditions at 20 +/- 2 degrees C in eight types of the bakery croissant-type product with the nougat cream differing by the type of dough (brioche, croissant), aw value of the cream, and by the presence or absence of sorbic acid in the spirit spray applied onto the surface of products. The above-indicated parameters were examined also in the nougat cream samples (on the zero and 90th day of storage). The chosen quality parameters permitted the level of the durability influence of croissants depending on external (sorbic acid) as well as internal (recipe, aw) conditions to be estimated.	
ディスクリプタ(CT)	*Bread--standards--ST; *Food Handling--methods--MT; Bacteria --growth and development--GD; Bacteria--isolation and purification--IP; Bread--microbiology--MI; Colony Count, Microbial; Color; Food Microbiology; Food Packaging; Food Preservation; Fungi--growth and development--GD; Fungi--isolation and purification--IP; Hydrogen-Ion Concentration; Odors; Taste; Time Factors; Water CAS Registry No.: 7732-18-5 (Water)	
自由語(ST)		

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インデックス	内 容		
レコード番号(AN)	13418999	PMID: 10382654	
英文標題(TIEN)	Bacterial contamination of ready-to-eat foods and fresh products in retail shops and food factories.		
著者名(AU)	Kaneke K I; Hayashidani H; Ohtomo Y; Kosuge J; Kato M; Takahashi K; Shiraki Y; Ogawa M		
出典(SO)	Department of Veterinary Medicine, Faculty of Agriculture, Tokyo University of Agriculture and Technology, Japan. kanekok@cc.tuat.ac.jp Journal of food protection (UNITED STATES) Jun 1999, 62 (6) p644-9, ISSN 0362-028X Journal Code: 7703944		
資料の種類(DT)	Journal Article		
発行国(CY)		言語(LA)	ENGLISH
抄録(AB)	Raw vegetables cut for salad, cooked salad, cooked rice, boiled noodles, bean curd, and cooked Japanese foods were purchased in 27 retail shops in Tokyo. Intact vegetables before being processed and ready-to-eat fresh salad products were obtained from two food factories located in the suburbs of Tokyo. Two hundred thirty-eight retail samples, 137 samples of intact vegetables, and 159 samples of fresh products were examined for aerobic plate count (APC), coliforms, Escherichia coli, Listeria spp., Staphylococcus aureus, and Bacillus cereus. The APC of retail foods were 2.1 to 5.7 log CFU/g, and the range for the coliforms was 0.1 to 2.3 log CFU/g. The APC and coliform values showed that the raw vegetables cut for salad were the most heavily contaminated among the six kinds of ready-to-eat foods examined. Although L. monocytogenes was not detected, two samples of raw vegetables and five kinds of cooked foods yielded Listeria spp. S. aureus was detected in one sample of Japanese cooked food. The APC of the intact vegetables were 2.9 to 7.3 log CFU/g upon arrival and 2.2 to 7.2 log CFU/g after 3 days storage at 10 degrees C. The APC of the fresh products were 3.4 to 7.6 log CFU/g upon arrival and 4.7 to 8.7 log CFU/g after 3 days storage at 10 degrees C. The isolation rates for coliforms were 6.1 to 50% for intact vegetables and 50 to 66.7% for fresh products. E. coli was detected only in the fresh products. B. cereus was isolated from 20.1% (17 of 81) of the intact vegetables and 9.2% (8 of 87) of the fresh products.		
ディスクリプタ(CT)	*Bacteria--isolation and purification--IP; *Food Microbiology; *Vegetables--microbiology--MI; Colony Count, Microbial; Enterobacteriaceae--isolation and purification--IP; Food Handling; Tokyo		
自由語(ST)			

インデックス	内 容		
レコード番号(AN)	12397948	PMID: 9709198	
英文標題(TIEN)	Survival of Escherichia coli O157:H7 in full- and reduced-fat pepperoni after manufacture of sticks, storage of slices at 4 degrees C or 21 degrees C under air and vacuum, and baking of slices on frozen pizza at 135, 191 and 246 degrees C.		
著者名(AU)	Faith N G; Wierzb R K; Ihnot A M; Roering A M; Lorang T D; Kaspar C W; Luchansky J B		
出典(SO)	Department of Food Microbiology and Toxicology, Food Research Institute, Madison, Wisconsin, USA. Journal of food protection (UNITED STATES) Apr 1998, 61 (4) p383-9, ISSN 0362-028X Journal Code: 7703944		
資料の種類(DT)	Journal Article		
発行国(CY)		言語(LA)	ENGLISH
抄録(AB)	<p>Pepperoni batter was prepared with fat contents of about 15, 20, and 32% (wt/wt) and inoculated with a pediococcal starter culture and <math>\geq 2.0 \times 10^7</math> CFU/g of a five-strain inoculum of Escherichia coli O157:H7. The batter was fermented at 96 degrees F (ca. 36 degrees C and 85% relative humidity (RH) to pH <math>\leq 4.8</math> and then dried at 55 degrees F (ca. 13 degrees C) and 65% RH to a moisture/protein ratio of <math>\leq 1.6:1</math>. For storage, slices were packaged under air or vacuum and stored at 39 degrees F (ca. 4 degrees C) and 70 degrees F (ca. 21 degrees C). For baking, frozen slices were placed on retail frozen cheese pizzas that were subsequently baked at 275 degrees F (ca. 135 degrees C), 375 degrees F (ca. 191 degrees C), or 475 degrees F (ca. 246 degrees C) for 0 to 20 min. Appreciable differences related to fat levels were observed after drying; pathogen numbers decreased by 1.04, 1.31 and 1.62 log<sub>10</sub> units in sticks prepared from batter at initial fat levels of 15, 20, and 32%, respectively. During storage, the temperature rather than the atmosphere had the greater effect on pathogen numbers, with similar viability observed among the three fat levels tested. At 70 degrees F (ca. 21 degrees C), compared to original levels, pathogen numbers decreased by <math>\geq 5.56</math> and <math>\geq 4.53</math> log<sub>10</sub> units within 14 days in slices stored under air and vacuum, respectively, whereas at 39 degrees F (ca. 4 degrees C) numbers decreased by <math>\leq 2.43</math> log<sub>10</sub> CFU/g after 60 days of storage under either atmosphere. Baking, as expected, resulted in greater reductions in pathogen numbers as the temperature and/or time of baking increased. However, it was still possible to recover the pathogen by enrichment after baking frozen slices on frozen pizza at 475 degrees F (ca. 246 degrees C) for 10 min or at 375 degrees F (ca. 191 degrees C) for 15 min. The calculated D values for all three temperatures tested increased as the fat content of the batter increased from 15 to 20 to 32%. The present study confirmed that fermentation and drying were sufficient to reduce levels of E. coli O157:H7 in pepperoni sticks by <math>&lt; 2.0</math> log<sub>10</sub> CFU/g. Storage of slices for at least 14 days at ambient temperature under air resulted in a <math>&gt; 5.5</math>-log<sub>10</sub>-unit total reduction of the pathogen. Baking slices on frozen pizza for at least 15 min at 475 degrees F (ca. 246 degrees C) or 20 min at 375 degrees F (ca. 191 degrees C) was necessary to reduce pathogen numbers to below detection by both direct plating and enrichment.</p>		
ディスクリプタ(CT)	*Escherichia coli O157--growth and development--GD; *Food Handling--methods--MT; *Meat Products--microbiology--MI; Animals; Cold; Dietary Fats; Escherichia coli O157--isolation and purification--IP; Food Handling--standards--ST; Food Microbiology; Heat CAS Registry No.: 0 (Dietary Fats)		
自由語(ST)			

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インデックス	内 容		
レコード番号(AN)	11093440	PMID: 7664321	
英文標題(TIEN)	Isolation of Escherichia coli in foods.		
著者名(AU)	Simango C		
出典(SO)	Department of Medical Laboratory Technology, University of Zimbabwe Medical School, Avondale, Harare. Central African journal of medicine (ZIMBABWE) Jun 1995, 41 (6) p181-5, ISSN 0008-9176 Journal Code: 0372566		
資料の種類(DT)	Journal Article		
発行国(CY)		言語(LA)	ENGLISH
抄録(AB)	<p>This study was carried out to assess contamination of foods and drinks with Escherichia coli as well as to detect pathogenic strains of the organism associated with diarrhoea in a rural community. Cooked or prepared food and drink samples were collected from homes of families with children less than five years old. The samples were cultured for E. coli and the E. coli isolates were tested for enteropathogenic, enterotoxigenic and enterohaemorrhagic E. coli. The commonest cooked or prepared foods and drinks found in the homes were sadza (thick maize meal porridge), vegetables, mahewu (a non-alcoholic fermented cereal gruel), tea and home baked bread. Thirty seven pc of all the foods and drinks examined had E. coli, indicating faecal contamination. The foods with high percentages of faecal contamination were sadza (48 pc), mahewu (39 pc), home baked bread (27 pc) and vegetables (26 pc). Pathogenic strains of E. coli were rarely isolated despite the high isolation rate of E. coli in the foods and drinks. Sadza had the highest isolation rate of enterotoxigenic E. coli (7 pc). The community studied need to be educated on thorough reheating of stored food before it is consumed in order to reduce the transmission of bacterial enteric pathogens through contaminated food.</p>		
ディスクリプタ(CT)	*Diarrhea, Infantile—microbiology—MI; *Escherichia coli —isolation and purification—IP; *Escherichia coli Infections —microbiology—MI; *Food Microbiology; Child, Preschool; Diarrhea, Infantile—prevention and control—PC; Escherichia coli Infections —prevention and control—PC; Food Handling—methods—MT; Health Education; Humans; Infant; Rural Health		
自由語(ST)			

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インデックス	内 容		
レコード番号(AN)	06455910	PMID: 7137999	
英文標題(TIEN)	Microbiological quality of macaroni and noodle products obtained at retail markets.		
著者名(AU)	Swartzentruber A; Payne W L; Wentz B A; Barnard R J; Read R B		
出典(SO)	Applied and environmental microbiology (UNITED STATES) Sep 1982, 44 (3) p540-3, ISSN 0099-2240 Journal Code: 7605801		
資料の種類(DT)	Journal Article		
発行国(CY)		言語(LA)	ENGLISH
抄録(AB)	The microbiological quality of macaroni and noodle products was determined by a statistically based national survey at the retail level. Geometric means of aerobic plate counts for macaroni and noodle products were 520 and 1,400 per g, respectively. Means for yeast and mold counts were 72 per g for macaroni and 100 per g for noodles. Means for counts of coliforms and Staphylococcus aureus were less than 3 per g for both products. Escherichia coli was not found in macaroni but was present in 0.5% of the noodle samples and ranged from 3 to 93 per g.		
ディスクリプタ(CT)	*Bacteria--growth and development--GD; *Food Handling; *Food Microbiology; *Fungi--growth and development--GD; Enterobacteriaceae --growth and development--GD; Staphylococcus aureus--growth and development --GD; United States; Yeasts--growth and development--GD		
自由語(ST)			

インデックス	内 容	
レコード番号(AN)	0010699777	BIOSIS NO.: 199799333837
英文標題(TIEN)	Survey of the aerobic viable cell count, coliform, <i>Escherichia coli</i> , <i>Bacillus cereus</i> , and physical properties of the sweet dumpling food in Taiwan	
著者名(AU)	Du Shian-Jyue (Reprint); Shih Yang-Chih; Lin Shu-Yang	
出典(SO)	Journal of Food and Drug Analysis 4 (3): p247-256 1996 1996 ISSN: 1021-9498	
資料の種類(DT)	Article	
発行国(CY)		言語(LA) Chinese
抄録(AB)	<p>A total of 154 samples of sweet dumpling food (SDF), including 102 samples of the flour-packed SDF and 52 samples of the rice-packed SDF, were bought from the conventional markets, supermarkets, confectioneries, and temples throughout Taiwan. The microbiological quality was assessed by the assay of aerobic viable cell count, coliform, <i>Escherichia coli</i>, <i>Bacillus cereus</i>, and related pathogens. The physical properties including pH value, water activity (Aw), and Brix of SDF were also tested. A comparison of the flour-packed SDF with the rice-packed SDF showed significant differences in the detection of aerobic viable cell count and coliform. Incidence of <i>E. coli</i> was 9.80% in the flour-packed SDF and 11.53% in the rice-packed SDF. <i>B. cereus</i> was identified exclusively in the flour-packed SDF. Two strains of newly ascribed food poisons pathogens, <i>B. subtilis</i> and <i>B. pumilus</i>, were isolated. Among them, <i>B. subtilis</i> was detected in three samples of the rice-packed SDF and in one of the flour-packed SDF, while <i>B. pumilus</i> was found exclusively in the flour-packed SDF. One of the thermal resistant strains <i>B. stearothermophilus</i> and another strain of <i>B. laterosporus</i> were isolated from the rice-packed SDF, whereas <i>B. sphaericus</i> were identified in the flour-packed SDE Most of the SDF were examined with physical properties of pH ranged from 4.9 to 7.2, Aw 0.60-0.89, and Brix 35-40 degree. The variation in methods for preparation of filled sweet dumpling, precooked (i.e. the flour-packed SDF) and post-cooked (i.e. the rice-packed SDF) food, influenced the incidence of aerobic viable cell count and coliform. However, the incidence of coliform, <i>E. coli</i>, and <i>Bacillus cereus</i> were not affected by wrapping or by the physical properties of the SDF products.</p>	
ディスクリプタ(CT)	<p><b>MAJOR CONCEPTS:</b> Foods</p> <p><b>BIOSYSTEMATIC NAMES:</b> Endospore-forming Gram-Positives--Eubacteria, Bacteria, Microorganisms; Enterobacteriaceae--Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms</p> <p><b>ORGANISMS:</b> endospore-forming gram-positive rods and cocci (Endospore-forming Gram-Positives); <i>Bacillus cereus</i> (Endospore-forming Gram-Positives); <i>Bacillus laterosporus</i> (Endospore-forming Gram-Positives); <i>Bacillus pumilus</i> (Endospore-forming Gram-Positives); <i>Bacillus sphaericus</i> (Endospore-forming Gram-Positives); <i>Bacillus</i> <i>stearothermophilus</i> (Endospore-forming Gram-Positives); <i>Bacillus</i> <i>subtilis</i> (Endospore-forming Gram-Positives); coliform (Enterobacteriaceae); <i>Escherichia coli</i> (Enterobacteriaceae)</p> <p><b>COMMON TAXONOMIC TERMS:</b> Bacteria; Eubacteria; Microorganisms</p> <p><b>GEOGRAPHICAL NAME:</b> Palearctic region (Palearctic region); Taiwan (Asia) (Palearctic region)</p> <p><b>CONCEPT CODES:</b> 13510 Food technology - Cereal chemistry 13530 Food technology - Evaluations of physical and chemical properties 39002 Food microbiology - Food and beverage spoilage and contamination</p> <p><b>BIOSYSTEMATIC CODES:</b> 07810 Endospore-forming Gram-Positives 06702 Enterobacteriaceae</p>	
自由語(ST)	<p><b>MISCELLANEOUS TERMS:</b> AEROBIC VIABLE CELL COUNT; BRIX; FLOUR-PACKED SWEET DUMPLING FOODS; FOOD CONTAMINANT; FOODS; MICROBIOLOGICAL QUALITY; PH; PREPARATION METHODS; RICE-PACKED SWEET DUMPLING FOODS; WATER ACTIVITY</p>	

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インデックス	内 容	
レコード番号(AN)	0010419911	BIOSIS NO.: 199699053971
英文標題(TIEN)	Microbial counts in fresh pasta with or without filling	
著者名(AU)	Meloni P (Reprint); Sau M; Schintu M; Contu A	
出典(SO)	Igiene Moderna 105 (1): p55-62 1996 1996 ISSN: 0019-1655	
資料の種類(DT)	Article	
発行国(CY)		言語(LA) Italian
抄録(AB)	<p>The influence of processing, storage and ingredients on the microbiological quality of different kinds of pasta produced by small industries were evaluated. One hundred and two samples of fresh pasta, with or without filling, were analysed for the microbiological parameters required by Italian law. Analyses were carried out according to the methods suggested by the Istituto Superiore Sanita handbook. The results show a strong relationship between microbiological parameters and water content of the pasta. Microbiological counts were lower in fresh pasta with lower water content with respect to pastas with filling.</p>	
ディスクリプタ(CT)	<p><b>MAJOR CONCEPTS:</b>  Foods; Infection; Toxicology; Vector Biology</p> <p><b>BIOSYSTEMATIC NAMES:</b>  Endospore-forming Gram-Positives--Eubacteria,  Bacteria, Microorganisms; Enterobacteriaceae--Facultatively Anaerobic  Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms;  Micrococcaceae--Gram-Positive Cocci, Eubacteria, Bacteria,  Microorganisms</p> <p><b>ORGANISMS:</b>  endospore-forming gram-positive rods and cocci  (Endospore-forming Gram-Positives); Bacillus cereus (Endospore-forming  Gram-Positives); Clostridium perfringens (Endospore-forming  Gram-Positives); Escherichia coli (Enterobacteriaceae); Salmonella sp.  (Enterobacteriaceae); Staphylococcus aureus (Micrococcaceae)</p> <p><b>COMMON TAXONOMIC TERMS:</b>  Bacteria; Eubacteria; Microorganisms</p> <p><b>GEOGRAPHICAL NAME:</b> Italy (Europe) (Palearctic region)</p> <p><b>CONCEPT CODES:</b>  13502 Food technology - General and methods  13530 Food technology - Evaluations of physical and chemical properties  13532 Food technology - Preparation, processing and storage  22502 Toxicology - Foods, food residues, additives and preservatives  31000 Physiology and biochemistry of bacteria  36002 Medical and clinical microbiology - Bacteriology  37060 Public health: disease vectors - Inanimate  37400 Public health: microbiology - Public health microbiology  39002 Food microbiology - Food and beverage spoilage and contamination</p> <p><b>BIOSYSTEMATIC CODES:</b>  07810 Endospore-forming Gram-Positives  06702 Enterobacteriaceae  07702 Micrococcaceae</p>	
自由語(ST)	<p><b>MISCELLANEOUS TERMS:</b>  food industry; CONTAMINATION; FOOD PROCESSING;  HEALTH HAZARD; INGREDIENT; STORAGE; WATER CONTENT</p>	

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インデックス	内 容		
レコード番号(AN)	0010226673		BIOSIS NO.: 199698694506
英文標題(TIEN)	Test of preservation of raw noodles or sandwiches using sugar-resistant yeast		
著者名(AU)	Suenaga Hikaru; Yamaguchi Tsuyoshi; Furuta Masanori; Ohta Shumei		
出典(SO)	Journal of the Japanese Society for Food Science and Technology 42 (5): .p332-337 1995 1995 ISSN: 0029-0394		
資料の種類(DT)	Article		
発行国(CY)		言語(LA)	Japanese
抄録(AB)	We tried to keep foods fresh using yeasts which consume oxygen in a food package and generate ethanol into it. Twenty-two sugar tolerant yeasts were isolated from foods and related materials, and 5 of them were ethanol resistant yeasts. As a result of examination, we obtained two strains, S-5 and S-22. They were immobilized in agar, locust bean gum, and xanthan gum with a growth medium. The immobilized medium was enveloped by a high gas permeable film. We incubated envelop-packed foods which inoculated Escherichia coli and Aspergillus oryzae and immobilized medium. As a result, the growth of inoculated E. coli and A. oryzae in foods was highly inhibited.		
ディスクリプタ(CT)	<b>MAJOR CONCEPTS:</b> Foods <b>BIOSYSTEMATIC NAMES:</b> Bacteria--Microorganisms; Enterobacteriaceae-- Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms; Fungi--Plantae; Fungi Imperfecti or Deuteromycetes-- Fungi, Plantae; Microorganisms--Microorganisms <b>ORGANISMS:</b> bacteria (Bacteria); Escherichia coli (Enterobacteriaceae); fungus (Fungi); Aspergillus oryzae (Fungi Imperfecti or Deuteromycetes) ; microorganism (Microorganisms) <b>COMMON TAXONOMIC TERMS:</b> Bacteria; Eubacteria; Fungi; Nonvascular Plants; Plants; Microorganisms <b>CONCEPT CODES:</b> 13510 Food technology - Cereal chemistry 13530 Food technology - Evaluations of physical and chemical properties 13532 Food technology - Preparation, processing and storage 39002 Food microbiology - Food and beverage spoilage and contamination <b>BIOSYSTEMATIC CODES:</b> 05000 Bacteria 06702 Enterobacteriaceae 15000 Fungi 15500 Fungi Imperfecti or Deuteromycetes 01000 Microorganisms		
自由語(ST)	<b>MISCELLANEOUS TERMS:</b> food industry; PACKAGING; SPOILAGE		

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インデックス	内 容	
レコード番号(AN)	0008971128	BIOSIS NO.: 199396135544
英文標題(TIEN)	Quantification and behavioral characterization of <i>Bacillus cereus</i> in formulated infant foods: I. Generation time	
著者名(AU)	Da Silva Sonia Maria (Reprint); Rabinovitch Leon; Robbs Paschoal Guimaraes	
出典(SO)	Revista de Microbiologia 24 (2): p125-131 1993 ISSN: 0001-3714	
資料の種類(DT)	Article	
発行国(GY)	言語(LA)	English
抄録(AB)	<p>The ability of <i>Bacillus cereus</i> to grow in three different types of reconstituted formulated food, and the growth rates of the bacterium in each food, were investigated. The foods tested were: caramel-flavored porridge, chocolate-flavored porridge and bean soup with noodles, all of which are commonly served in public institutions. Generation times (gt) were measured at 25 degree C, and 45 degree C, both for <i>B. cereus</i> that were naturally present in the products and for <i>B. cereus</i> that had been inoculated in the form <i>B. cereus</i> NCTC 2599 spores into sterilized and unsterilized food. The gt values were calculated from growth curves obtained by counting colony formation units (CFU) on selective indicator-agar medium (MYP). Intrinsic microflora were not observed to have an deleterious effect on the growth of <i>B. cereus</i> NCTC 2599 in any of the experiments at the indicated temperatures. In experiments using both caramel and chocolate-flavored porridge, naturally occurring <i>B. cereus</i> displayed similar characteristic to <i>B. cereus</i> that were inoculated, and where incubation temperatures were found to have a significant effect on growth rates: mean generation times of 54.20, 31.30 and 56.00 minutes were recorded at temperatures of 25 degree C, 35 degree C and 45 degree C, respectively. Our results demonstrate that <i>B. cereus</i> is able to multiply rapidly in all three foods, especially in bean soup with noodles, at temperatures around 35 degree C, in the presence or absence of indigenous microorganisms. We conclude that care should be taken to observe basic hygiene practices during the preparation (rehydration) and consumption of these products, especially will regard to storage times and temperatures.</p>	
ディスクリプタ(CT)	<p><b>MAJOR CONCEPTS:</b> Foods; Infection</p> <p><b>BIOSYSTEMATIC NAMES:</b> Aeromonadaceae--Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms; Endospore-forming Gram-Positives--Eubacteria, Bacteria, Microorganisms; Enterobacteriaceae--Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms; Gram-Negative Aerobic Rods and Cocci--Eubacteria, Bacteria, Microorganisms; Micrococcaceae-- Gram-Positive Cocci, Eubacteria, Bacteria, Microorganisms; Microorganisms--Microorganisms; Neisseriaceae--Gram-Negative Aerobic Rods and Cocci, Eubacteria, Bacteria, Microorganisms; Pseudomonadaceae --Gram-Negative Aerobic Rods and Cocci, Eubacteria, Bacteria, Microorganisms; Regular Nonsporing Gram-Positive Rods--Eubacteria, Bacteria, Microorganisms</p> <p><b>ORGANISMS:</b> <i>Aeromonas hydrophila</i> (Aeromonadaceae); endospore-forming gram-positive rods and cocci (Endospore-forming Gram-Positives); <i>Bacillus cereus</i> (Endospore-forming Gram-Positives); <i>Clostridium</i> <i>perfringens</i> (Endospore-forming Gram-Positives); <i>Enterobacter cloacae</i> (Enterobacteriaceae); <i>Escherichia coli</i> (Enterobacteriaceae); <i>Salmonella</i> <i>typhimurium</i> (Enterobacteriaceae); <i>Serratia liquefaciens</i> (Enterobacteriaceae); <i>Flavobacterium lutescens</i> (Gram-Negative Aerobic Rods and Cocci); <i>Staphylococcus aureus</i> (Micrococcaceae); microorganism (Microorganisms); <i>Acinetobacter calcoaceticus</i> (Neisseriaceae); <i>Pseudomonas aeruginosa</i> (Pseudomonadaceae); <i>Pseudomonas fluorescens</i> (Pseudomonadaceae); <i>Pseudomonas fragi</i> (Pseudomonadaceae); <i>Lactobacillus</i> <i>viridescens</i> (Regular Nonsporing Gram-Positive Rods); <i>Listeria</i> <i>monocytogenes</i> (Regular Nonsporing Gram-Positive Rods)</p> <p><b>COMMON TAXONOMIC TERMS:</b> Bacteria; Eubacteria; Microorganisms</p> <p><b>CONCEPT CODES:</b> 10614 External effects - Temperature as a primary variable 13502 Food technology - General and methods 13530 Food technology - Evaluations of physical and chemical properties 13532 Food technology - Preparation, processing and storage 36002 Medical and clinical microbiology - Bacteriology 39002 Food microbiology - Food and beverage spoilage and contamination</p> <p><b>BIOSYSTEMATIC CODES:</b> 06701 Aeromonadaceae 07810 Endospore-forming Gram-Positives 06702 Enterobacteriaceae 06500 Gram-Negative Aerobic Rods and Cocci 07702 Micrococcaceae 01000 Microorganisms 06507 Neisseriaceae 06508 Pseudomonadaceae 07830 Regular Nonsporing Gram-Positive Rods</p>	
自由語(ST)	<p><b>MISCELLANEOUS TERMS:</b> CONTAMINATION; FOOD PROCESSING</p>	



D-203

インデックス	内 容		
レコード番号(AN)	0006163644	BIOSIS NO.: 198886003565	
英文標題(TIEN)	MICROBIOLOGICAL QUALITY OF COWPEA PASTE USED TO PREPARE NIGERIAN AKARA		
著者名(AU)	BULGARELLI M A (Reprint); BEUCHAT L R; MCWATTERS K H		
出典(SO)	Journal of Food Science 53 (2): p442-444 1988 ISSN: 0022-1147		
資料の種類(DT)	Article		
発行国(CY)		言語(LA)	ENGLISH
日本語抄録(AB)	Cowpea ( <i>Vigna unguiculata</i> ) paste used to prepare akara was collected from three Nigerian marketplaces and analyzed to determine populations and predominant types of bacteria, yeasts, and molds. Total aerobic microbial populations were initially high (106-108/g) and increased after 12 hr incubation at 30-32.degree. C to ca. 109/g. Initial coliform populations were 102/104/g and decreased slightly between 6 hr and 12 hr; yeast/mol populations remained constant at 104-105/g. The average initial pH of 6.0, declined to 5.1 and 4.5 after 6 hr and 12 hr incubation, respectively. Predominant bacteria consisted of <i>Enterobacteri</i> , <i>Klebsiella</i> , and <i>Lactobacillus</i> species; <i>Candida</i> species and <i>Aspergillus niger</i> were the predominant fungi isolated from the pastes.		
ディスクリプタ(CT)	<p>DESCRIPTORS:</p> <p>VIGNA-UNGUICULATA ENTEROBACTER KLEBSIELLA LACTOBACILLUS CANDIDA ASPERGILLUS-NIGER FOOD PROCESSING FOOD CONTAMINATION</p> <p>DESCRIPTORS:</p> <p>MAJOR CONCEPTS:</p> <p>Foods; Public Health--Allied Medical Sciences</p> <p>BIOSYSTEMATIC NAMES:</p> <p>Enterobacteriaceae--Facultatively Anaerobic Gram-Negative Rods, Eubacteria, Bacteria, Microorganisms; Regular Nonsporing Gram-Positive Rods--Eubacteria, Bacteria, Microorganisms; Fungi Imperfecti or Deuteromycetes--Fungi, Plantae</p> <p>COMMON TAXONOMIC TERMS:</p> <p>Bacteria; Eubacteria; Fungi; Microorganisms; Nonvascular Plants; Plants</p> <p>CONCEPT CODES:</p> <p>10010 Comparative biochemistry 10012 Biochemistry - Gases 10050 Biochemistry methods - General 10060 Biochemistry studies - General 10614 External effects - Temperature as a primary variable 13504 Food technology - Fruits, nuts and vegetables 13530 Food technology - Evaluations of physical and chemical properties 13532 Food technology - Preparation, processing and storage 29500 Microorganisms General 31000 Physiology and biochemistry of bacteria 32000 Microbiological apparatus, methods and media 36001 Medical and clinical microbiology - General and methods 36002 Medical and clinical microbiology - Bacteriology 36008 Medical and clinical microbiology - Mycology 37006 Public health - Public health laboratory methods 37400 Public health: microbiology - Public health microbiology 39002 Food microbiology - Food and beverage spoilage and contamination 51526 Plant physiology - General and miscellaneous</p> <p>BIOSYSTEMATIC CODES:</p> <p>06702 Enterobacteriaceae 07830 Regular Nonsporing Gram-Positive Rods 15500 Fungi Imperfecti or Deuteromycetes</p>		
自由語(ST)			

## 参考資料 5 海外の規格基準関連資料

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### (1) 調査協力依頼文

各国担当者に送付した調査協力依頼文を以下に示す。

#### A Letter of Request for Information about Frozen Food Standards

Mitsubishi Research Institute, Inc. is the leading think-tank in Japan. And it is carrying out a research, "Regulations and standards of frozen foods", commissioned by the National Institute of Health Sciences, to collect information on microbiological regulatory criteria for frozen foods and its contamination situations overseas.

In Japan, microbiological regulatory criteria for frozen foods were established under the Food Hygiene Law in 1973. Since then, variety of frozen foods has increased greatly due to rapid technological advance, globalization of food trade and expanded consumer demands, and now there are some indications that the current microbiological regulatory criteria do not follow these changes. This problem is specially indicated about the so-called "pre-baked frozen dough for bread", which was not available when the current microbiological criteria was established. The current microbiological regulatory criteria require "E.coli negative" for the foods classified as "frozen food consumed after cooking" which "pre-baked frozen dough for bread" is included. Now, a doubt has arisen about the practical feasibility to comply with this criteria for "frozen food eaten after cooking", and meaning of "E.coli negative" for the foods which must receive heat treatment (e.g. baking bread in an oven) before the human consumption.

Therefore, on behalf of the National Institute of Health Sciences, Japan, we are collecting information on regulation criteria for frozen foods overseas, especially focus on "pre-baked frozen dough for bread", and microbiological concentration and prevalence in such food in order to take them into account during the review process of the national microbiological regulatory criteria for this category of food in Japan.

We would be obliged if you could provide us with information listed below, on microbiological regulatory criteria for frozen food in your country. In addition, we would appreciate it very much if you could kindly share published/unpublished microbiological monitoring data for frozen food, especially wheat based products, such as "pre-baked frozen dough for bread" if possible.

List of information items of request:

1. Official documents of frozen food regulation, standards (or internet URL if it is on the web site).
  - Target food item of microbiological regulation or standard
  - microbiological criteria of each item
  - target organisms, test methods, sampling plan
2. Official documents of the inspection organization and management of unqualified food items
  - The organization which inspects the food items (Does the food processing company present examined data of the food product, or does the national inspection laboratory inspects and makes an approval?)
  - Management of unqualified food items
3. Microbiological data of frozen food

Please send data in way of email, post or fax.

We sincerely appreciate your understanding of the purpose of this research and look forward to your reply soon.

Respectfully yours,

<参考：和文>

食品規格担当部局 御中

株式会社 三菱総合研究所

## 冷凍食品の規格・基準に関する情報のご提供の依頼について

現在、弊社では、国立医薬品食品衛生研究所（または厚生労働省）より「冷凍食品の規格・基準に関する調査」を受託し、海外の冷凍食品の規格基準ならびに汚染実態を調査しております。

我が国において、食品衛生法上、冷凍食品の規格基準が定まったのが1973年です。その後、冷凍技術の急速な進歩等により冷凍食品は多種多様となっており、これらの変化に現在の規格基準が合致しない部分があると指摘されています。この中で、特に指摘されているものがいわゆる「冷凍パン生地」に関するもので、冷凍パン生地が分類される「加熱後摂取冷凍食品」の規格基準中の「大腸菌陰性」という規格の実行可能性について疑義が生じております。

したがって、本調査は、冷凍パン生地を中心に、海外の冷凍食品の規格基準ならびに汚染実態を調査し、我が国の規格基準の見直しを図る上での基礎資料にすることを目的としています。

つきましては、突然で恐縮でございますが、貴国における冷凍食品の規格・基準について、以下の情報が記載されている資料をご提供いただければ幸いに存じます。また、政府として保有している汚染実態データについて、ご提供可能なデータがありましたら、ご提供いただければ幸いです。

### 【提供希望資料】

1. 冷凍食品の規格・基準に関する資料 (regulation や standard などの official documents)
  - ・ 病原微生物に係る対象品目
  - ・ 品目別規格基準
  - ・ 規格基準の試験方法・測定方法・サンプリング方法
2. 食品の検査主体と処理方法
  - ・ 検査を行う機関（メーカーがデータを提供し承認するのか、検査センターで検査を行うのか）
  - ・ 不適格品の処理方法
3. 冷凍食品の汚染実態データ

なお、データ等のご提供につきましてはemail、郵送、ファックスのいずれかの方法でお願いできればと存じます。

本調査の主旨をご理解いただき、宜しくご協力下さいます様お願い申し上げます。

## (2) 規格・基準

各国の規格・基準に関するメール問い合わせの返信及び公式文書を以下に示す。

### 1) イギリス

#### ①メール本文

Our Microbiological safety division is **not aware of any microbiological criteria or data on frozen foods that are intended to be processed prior to consumption**. The Institute of Food Science and Technology (IFST) published a book on Development and use of microbiological criteria for food in 1999 (ISBN 0 905367 16 2) which **does include criteria for frozen or chilled doughs and part baked products intended for cooking**. Although pathogens (e.g. Salmonella, Listeria monocytogenes) may occasionally be present in raw products at low levels they should be destroyed by baking/cooking. The IFST guidelines indicate maximum and GMP levels for the spore former *Bacillus cereus* (which will survive baking) and levels for indicator organisms *E.coli* and Lactic acid bacteria.

The Health Protection Agency's Centre for Infections may have some data from testing of frozen dough products but they may not hold a lot of data since these products are not ready-to-eat.

**The Quick Frozen Foodstuffs Regulations 1990** (as amended) (SI 1990 No 2815) concern the labelling, packaging and temperature monitoring of Quick-frozen food during transport, warehousing and storage and is **the only legislation specific to frozen foods**.

The definition of a Quick-frozen Foodstuff (QFF) is a product "**comprising food which has undergone a freezing process known as 'quick-freezing'** whereby the zone of maximum crystallisation is crossed as rapidly as possible, depending on the type of product, and which is labelled for the purpose of sale to indicate that it has undergone that process." **The Regulations only apply to products that are labelled or described as quick frozen**. If a product has not undergone a quick-freezing process and are not labelled as quick-frozen, the Regulations do not apply. **There are no microbiological regulatory criteria directly covered in the regulations.**

The Food Safety Act 1990 Code of Practice document also contains useful information on the enforcement of the Quick Frozen Foodstuffs Regulations, and can be downloaded from the web at <http://www.food.gov.uk/multimedia/pdfs/codeofpractice.pdf>.

All frozen food including quick frozen must be labelled in accordance with the **Food Labelling Regulations 1996** (as amended) (FLR). These regulations cover general food labelling and again do

not contain any specific microbiological regulatory criteria. Guidance notes to the FLR are available on our website at

<http://www.food.gov.uk/foodindustry/guidancenotes/>.

The relevant regulation titles are obtainable from our Food Law Guide at

<http://www.food.gov.uk/multimedia/pdfs/foodlaw.pdf>.

You can download the texts of the regulations (which will give you EU directive and regulation numbers) from <http://www.hms0.gov.uk>.

I hope that the above is helpful to you. However it is my personal opinion and the advice contained in this email should not be taken as an authoritative statement of the law or its interpretation. The opinion of your home authority or other enforcement authorities may differ. Only the courts can decide whether in particular circumstances an offence has been committed.

Consumer Choice Food Standards and Special Projects Division

0207 276 8154

<http://www.food.gov.uk/foodindustry/guidancenotes/>

②規格基準に係る公式文書

**Part 3 REGULATIONS ON THE COMPOSITION & LABELLING OF PARTICULAR FOODS**

**Q: QUICK-FROZEN FOODS**

SI Number	
1990 No 2615	<p><b>QUICK-FROZEN FOODSTUFFS REGULATIONS 1990</b> - implement Council Directive 89/108/EEC (OJ No. L 40, 11.2.89 p.34) of 21 December 1988 on the approximation of Member State laws relating to quick-frozen foodstuffs for human consumption.</p> <p>These Regulations set out conditions for the packing, labelling and temperature controls during manufacture to retail sale, of quickfrozen foodstuffs other than ice cream.</p> <p>The Regulations are as amended by:</p>
1992 No 2596 .	The Food (Forces Exemptions) (Revocations) Regulations 1992;
1994 No 298	<p>The Quick-Frozen Foodstuffs (Amendment) Regulations 1994 – implement Commission Directives:</p> <p>92/1/EEC (OJ No. L34, 11.2.92, p28) on the monitoring of temperatures in the means of transport, warehousing and storage of quick-frozen foodstuffs intended for human consumption;</p> <p>92/2/EEC (OJ No. L 34, 11.2.92, p30) laying down the sampling procedure and the Community analysis for the official control of quick-frozen foods intended for human consumption.</p>

**Note: Enquiries relating to quick-frozen foods should be addressed to the Food Standard Agency, Food Labelling and Standards Division, Standards and Authenticity Branch, Room 115 Aviation House, 125 Kingsway, London WC2B 6NH. (Telephone (0)20-7276 8154).**

資料: The Food Standard Agency, "FOOD LAW GUIDE", June 2004  
(<http://www.food.gov.uk/multimedia/pdfs/foodlaw.pdf>)

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## STATUTORY INSTRUMENTS

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1990 No. 2615

### FOOD

#### The Quick-frozen Foodstuffs Regulations 1990

*Made* 19th December 1990

*Laid before* 20th December

*Parliament* 1990

*Coming into force* 10th January 1991

The Minister of Agriculture, Fisheries and Food, the Secretary of State for Health and the Secretary of State for Wales, acting jointly, in relation to England and Wales, and the Secretary of State for Scotland in relation to Scotland, in exercise of the powers conferred by sections 4(1), 6(4), 16(1), 17(1), 26(1)(a) and (3) and 48(1) of the Food Safety Act 1990<sup>[1]</sup>, and of all other powers enabling them in that behalf, hereby make the following Regulations, after consultation in accordance with section 48 of the said Act with such organisations as appear to them to be representative of interests substantially affected by the Regulations:—

#### Title and commencement

1. These Regulations may be cited as the Quick-frozen Foodstuffs Regulations 1990 and shall come into force on 10th January 1991.

#### Interpretation and scope

2.—(1) In these Regulations, unless the context otherwise requires—

“the Act” means the Food Safety Act 1990;

“catering establishment” has the meaning which it bears in the Food Labelling Regulations 1984<sup>[2]</sup>;

“prepackaging” shall be construed in accordance with the definition of

“prepacked” in the Food Labelling Regulations 1984;

“quick-frozen foodstuff” means a product—

(a) comprising food which has undergone a freezing process known as “quick-freezing” whereby the zone of maximum crystallisation is crossed as rapidly as possible, depending on the type of product, and



(b) which is labelled for the purpose of sale to indicate that it has undergone that process,  
but shall not include ice-cream or any other edible ice; and  
“ultimate consumer” has the meaning which it bears in the Food Labelling Regulations 1984.

(2) These Regulations do not apply to any food—

- (a) which is not intended for sale for human consumption;
- (b) which is supplied under government contracts for consumption by Her Majesty's Forces or supplied for consumption by a visiting force; or
- (c) which is supplied by the service authorities of a visiting force and to a headquarters or to members of such a force or headquarters or to property held or used by such force or headquarters.

(3) For the purposes of paragraph (2) above—

- (a) “visiting force” (for the purpose of sub-paragraph (b)) and “service authority” (for the purpose of sub-paragraph (c)) shall have the meanings assigned to them, for the purposes of any provision in Part I of the Visiting Forces Act 1952<sup>[3]</sup>, by section 12 of that Act;
- (b) “visiting force” and “headquarters” shall for the purpose of sub-paragraph (c) have the meanings assigned to them by article 3(2) of the Visiting Forces and International Headquarters (Application of Law) Order 1965<sup>[4]</sup>.

#### Sale of quick-frozen foodstuffs

3. No person shall sell for human consumption a quick-frozen foodstuff unless it fulfils the conditions set out in the Schedule to these Regulations.  
Packaging of quick-frozen foodstuffs intended for supply to the ultimate consumer

4. No person shall sell any quick-frozen foodstuff to the ultimate consumer unless—

- (a) it has been packed by its manufacturer or packer in such prepackaging as is suitable to protect it from microbial and other forms of external contamination and against dehydration, and

(b) the quick-frozen foodstuff has remained in such prepackaging up to the time of sale.

**Labelling of quick-frozen foodstuffs**

5.—(1) The description “quick-frozen” or any other description listed in Article 8.1(a) of Council Directive 89/108/EEC<sup>[5]</sup> shall not be used in the labelling for the purpose of sale of any food other than—

- (a) a quick-frozen foodstuff,
- (b) a food which by virtue of that labelling becomes a quick-frozen foodstuff.

(2) A quick-frozen foodstuff intended for supply, without further processing, to the ultimate consumer or to a catering establishment shall, in addition to the description “quick-frozen” (and, as the intending supplier may see fit, any other description listed in Article 8.1(a) of Council Directive 89/108/EEC) added to its sales name, be marked or labelled on its packaging, container or wrapping, or on a label attached thereto with—

- (a) an indication of the date of minimum durability;
- (b) an indication of the maximum period during which it is advisable to store it;
- (c) an indication of one or other, or both, of—
  - (i) the temperature at which, and
  - (ii) the equipment in which,

it is advisable to store it;

- (d) a reference allowing identification of the batch to which it belongs;
- (e) a clear message of the type “do not refreeze after defrosting”.

(3) Any other quick-frozen foodstuff shall, in addition to the description “quick-frozen” (and, as the supplier may see fit, any other description listed in Article 8.1(a) of Council Directive 89/108/EEC) added to its sales name, be marked or labelled on its packaging, container or wrapping, or on a label attached thereto with—

- (a) a reference allowing identification of the batch to which it belongs;
- (b) the name or business name and address of the manufacturer or packer, or of a seller established within the European Economic Community.

(4) No person shall sell any food to the ultimate consumer or any catering establishment where its labelling or marking contravenes paragraph (1) or (2) of this regulation, and no person shall sell it to any other person where its labelling or marking contravenes paragraph (1) or (3) of this regulation.

#### **Equipment**

6. Each manufacturer, storer, transporter, local distributor and retailer of any quick-frozen foodstuff intended by him for sale for human consumption shall ensure during each stage during which such foodstuff is within his care and control that the equipment used in respect of that foodstuff is such as to ensure that no act or omission on his part would cause a sale of the foodstuff for human consumption to contravene these Regulations.

#### **Penalties and enforcement**

7.—(1) If any person contravenes or fails to comply with any of the foregoing provisions of these Regulations he shall be guilty of an offence and shall be liable on summary conviction to a fine not exceeding level 5 on the standard scale.

(2) Each food authority shall enforce and execute these Regulations within its area.

(3) In this regulation "food authority" does not include the appropriate treasurer referred to in section 5(1)(c) of the Act (which deals with the Inner Temple and the Middle Temple).

#### **Application of various provisions of the Food Safety Act 1990**

8. The following provisions of the Act shall apply for the purposes of these Regulations as they apply for the purposes of section 8, 14 or 15 of the Act and, unless the context otherwise requires, any reference in them to the Act shall be construed for the purposes of these Regulations as a reference to these Regulations—

- (a) section 2 (extended meaning of "sale" etc.);
- (b) section 3 (presumption that food is intended for human consumption);
- (c) section 20 (offences due to fault of another person);
- (d) section 21 (defence of due diligence);
- (e) section 30(8) (which relates to documentary evidence);

- (f) section 33 (obstruction etc. of officers);
- (g) section 36 (offences by bodies corporate);
- (h) section 44 (protection of officers acting in good faith);
- (i) section 58(1) (which relates to territorial waters).

In witness whereof the Official Seal of the Minister of Agriculture, Fisheries and Food is hereunto affixed on  
19th December 1990.

*John Selwyn Gummer*

Minister of Agriculture, Fisheries and Food

*Stephen Dorrell*

Parliamentary Under Secretary of State for Health

19th December 1990

*David Hunt*

Secretary of State for Wales

19th December 1990

*Strathclyde*

Parliamentary Under Secretary of State, Scottish Office

18th December 1990

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*Notes:*

[1] 1990 c. 16 back

[2] S.I. 1984/1305, to which there are amendments not relevant to these Regulations. back

[3] 1952 c. 67; the definition of "visiting force" in section 12 was amended by the Criminal Justice Act 1988 (c. 33), section 170 and Schedule 15, paragraph 14. back

[4] S.I. 1965/1536, amended by the Pakistan Act 1973 (c. 48), section 4; relevant amending instruments are S.I. 1987/ 928, 1989/1330 back

[5] OJ No. L40, 11.2.89, p.34. back

## 2) スイス

### ①メール本文

In Switzerland, microbiological criteria for foods are written down in the Ordinance on Hygiene (enclosed, please find an English translation of this document). As you can see, the ordinance has two annexes. Annex 1 contains so called limits for pathogenic and toxigenic microorganisms. Basically, these limits can be applied on frozen foods. I give you two examples:

***Ice-cream:*** ice-cream is a ready to eat food and *Salmonella* are not allowed to be detected in 25 grams.

***Prebaked, frozen dough for bread:*** this product is not ready-to-eat. For example, the limit for *Bacillus cereus* would be  $10^5$  per gram.

I think, the examples show how the limits have to be applied. In article 3 of the ordinance, you can read what an exceeded limit means.

Annex 2 of the ordinance contains the so called tolerance values (please see the definition of this type of criterion in article 3). We have values for specific food-types or groups of foods. There are only two frozen foods which have a specific regulation. It is ice-cream and ice as admixture to foods and beverages. List C of annex 2 allows to estimate frozen foods in some other cases. I give you an example:

***Frozen raspberries:*** This product would belong to category C1 "Raw foods which are considered as ready-to-eat".

***Prebaked, frozen dough for bread:*** This product cannot be assigned to a food category in list C. The reason is that tolerance values are only valid for ready-to-eat foods and not for raw materials. It is mentioned in the explanations before, that there are some exceptions in the context of limits. Some limits can be applied on raw materials. This makes sense because certain bacteria produce heat stable toxins which are not eliminated by cooking or baking.

### Comment

As you can see, in Switzerland we don't have an *E. coli* tolerance value for prebaked, frozen dough for bread. Such a value makes probably no sense. The obvious supposition is that *E. coli* does not survive the baking process. You can verify this statement with a simple experiment. Starting from the frozen dough, you prepare a bread according to the producers instructions. Then, you measure the

temperature in the core of the bread. In the literature you find plenty of data about the thermal inactivation of *E. coli* which allows you to take conclusions.

### **Duties of the producers in Switzerland**

In Switzerland, the food producers have to work according to the Ordinance of Hygiene. They need a safety system based on the principles of HACCP (see article 11). The products must also meet the microbiological criteria of the Ordinance on Hygiene. This has to be verified with self-controls.

### **Inspection**

The food control is done by the so called county chemists. They have a laboratory and inspection system available. The inspectors verify whether food producers and handlers (also restaurants) meet the requirements of the food law or not. The inspectors can take samples for chemical, physical and microbiological analysis. If a limit or tolerance value is exceeded, the responsible of a food-business is fined and he has to show to the authorities how he improves the weak point. Depending on the degree of a problem, the taken measures can be more severe (for example destruction of foods or closing of a business).

I hope that the given statement is of some help to solve your problem.

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Bundesamt f. Gesundheit  
Facheinheit "Lebensmittelsicherheit"  
Stv. Leiter Sektion "Mikrobiologie und Biotechnologie"  
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②規格基準に係る公式文書

Ordinance

on the Hygienic and Microbiological Standards on Foods,  
Utility Articles, Premises, Facilities, and Personnel

(Ordinance on Hygiene)

of 26<sup>th</sup> June 1995

Last amendment: 27<sup>th</sup> January, 2004

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*The Federal Department of the Interior*

based on article 10, paragraph 2 and article 17, paragraph 4 of the Ordinance on Food  
Stuffs (OFS) of March 1, 1995 and article 2, paragraph 2 of the Ordinance on Utility  
Articles (OUA) of March 1, 1995  
*decrees:*

Section 1: General directions

Art. 1 Matter of principle

<sup>1</sup>Those persons who produce, store, transport or deliver foods or utility articles have to  
make sure that the handled products are not adversely affected by microorganisms.

<sup>2</sup>If infectious or toxigenic microorganisms, which could endanger food safety (article 11),  
are detected during handling of foods, appropriate measures have to be taken in order  
to eliminate or isolate the source of contamination.

Art. 2 Categories of products

For a hygienic and microbiological assesement, the following groups of products are  
categorised:

a. Ready-to-eat products:

1. Foods which are ready-to-eat as such:

2. Foods which are converted into ready-to-eat products by cleaning, washing,  
peeling, air drying, cutting, acidulating, fermentation, ripening or other  
biological, chemical or physical process steps, but without final heat  
treatment;

3. Foods which are converted into ready-to-eat products by a heat treatment  
according to article 13 OFS or treatments such as cooking, roasting, frying,  
dissolving in boiling water et cetera.

b. Not ready-to-eat products:

Foods which are not edible for reasons of hygiene, toxicology or physical make up

and which can become only ready-to-eat when treated as laid down under a.

c. Utility articles such as cosmetics, packing materials, toys and other products for babies and infants.

#### Art. 3 Limits and tolerance values for microorganisms

<sup>1</sup>The limits laid down in appendix 1 define the number of microorganisms where, when exceeded, a product has to be considered as a health hazard.

<sup>2</sup>The tolerance values laid down in appendix 2 define the number of microorganisms which should not be exceeded in a product if raw materials are carefully selected, if good manufacturing practice is followed and if products are stored under proper conditions. In case of an exceeded tolerance value, a product is considered to be devalued.

#### Art. 4 Analytical methods

Testing has to be performed with the reference methods given in chapter 56 „Microbiology“ of the Swiss Food Manual. Alternative test procedures are permitted under the reservation that results do not lead to divergent judgements of a analyzed food with regard to microbiological criteria laid down in this ordinance.

### Section 2: Hygienic requirements on the handling of foods

#### Art. 5 Rooms and facilities

Premises and facilities which are used for production, processing, storage, delivery and sale of foods and vehicles used for transporting foods, have to be kept clean and to be maintained in good repair and condition. The layout, design, construction and size of these premises must:

- a. make possible adequate cleaning and, where necessary, disinfection;
- b. be constructed in a way that temperature conditions are suitable and controllable;
- c. have suitable and sufficient means of natural or mechanical ventilation. In case of mechanical ventilation, the flow of air from contaminated areas to clean areas must be prevented;
- d. have only ventilation systems where filters and other parts requiring cleaning or replacement are easily accessible;
- e. be equipped everywhere with adequate natural or artificial lighting;
- f. have windows that prevent the entry of dirt and of animals;
- g. prevent condensation of water and the growth of moulds on walls and ceilings;



- h. have only walls and working surfaces, which come in contact with foods, that are smooth and free of cracks;
- i. have sufficient handwashing facilities provided with mixable hot and cold running water, soap dispensers and a system allowing a hygienic way to dry hands;
- k. prevent any possible contamination between the different working stages due to the equipment, ventilation, personnel or extraneous influence, for example insects, rodents or other animals.

#### Art. 6 Vehicles for the presentation of foods

For market stands and similar vehicles, the following requirements have to be met:

- a. Suitable instruments to hand out products and, if necessary, a washing facility and a waste-disposable unit have to be in place.
- b. Working and selling surfaces shall:
  - 1. be made of smooth, easy to clean materials;
  - 2. have suitable protective devices in order to prevent detrimental influence on the products through humans, animals and environment.
- c. If easily spoilable foods are stored or such which have to be mandatorily refrigerated, a cooling system has to be in place.

#### Art. 7 Cold storage rooms

Refrigeration and deep-freezing of foods has to be assured at any time by suitable cooling equipment and temperature measuring devices. Controls have to be done within the scope of article 23 „Selfcontrol“ of the Federal Law on Foods and Utility Articles (SR 817.02).

#### Art. 8 The holding and taking-along of animals

It is prohibited to hold or to have animals in rooms where foods are processed, prepared, stored or handled. Exceptions are:

- a. Guide dogs for the blind;
- b. Dogs in taprooms of restaurants if it is allowed by the responsible manager.

#### Art. 9 Apparatuses, devices and vending machines

<sup>1</sup>Apparatuses, devices and accessory parts which come in contact with products or which could cause contaminations have to be so constructed to be easily cleaned and disinfected. Furthermore they have to:

- a. be made of corrosion-resistant materials if possible and to be built, constituted and

maintained in a way that they can be kept completely clean and that microbial contaminations can be avoided;

b. be installed in a way that they can be appropriately cleaned and that the surroundings remain accessible for cleaning as well. If necessary, suitable devices for cleaning and disinfection have to be installed.

<sup>2</sup>Vending machines are to be constructed and to be placed in a way that contaminations of products or the invasion by vermin can be avoided.

#### Art. 10 Generation of steam and process water

<sup>1</sup>Steam, which is fed directly into foods or which comes in contact with foods in some other way, has to meet the standards for drinking water.

<sup>2</sup>Process water used for the generation of steam, cooling, fire fighting or other purposes with no connections to the preparation of foods is to be supplied and drained off separately. The separate pipe systems must be easily identifiable and any connection to drinking water pipe systems, or backflows of processing water into drinking water must be avoided.

### Section 3: Food safety, hygiene of raw materials and final products

#### Art. 11 Food safety

<sup>1</sup>The definition of critical control points with regard to microbial risks (OFS, art. 17, para. 3) and the execution of safety measures are to be ensured as follows:

a. Identification and assesment of possible health hazards which could occur during the production of foods. To be considered in this case are raw materials, processing technologies, storage and the intended use of end products;

b. Definition of areas, working stages or processing steps where health hazards can be excluded or reduced (Critical Control Points = CCP's);

c. Definition of standard parameters and tolerance ranges which have to be kept to and which are binding in the surveillance of CCP's;

d. Setting up of a monitoring system for the control of the defined CCP-parameters;

e. Definition of measures to be taken if the monitoring system detects deviations from the given CCP-parameters;

f. Definition of procedures for checking the working order of the monitoring system (verification);

g. Documentation of the measures taken according to the points a - f.

<sup>2</sup>The control system according to paragraph 1 of this article is to be designed and

carried out in a way which is adaptable to the extent of possible health hazards and the scale of production.

<sup>3</sup>The internal directions to ensure food safety must be known by the personnel. The compliance with the directions has to be enforced and controlled by the person who is responsible for the enterprise.

#### Art. 13 Sterilized products

Sterilized products have to be considered as spoiled or hazardous if:

- a. the package (jar, bag, can et cetera) shows a visible leak;
- b. the vacuum of preserving jars is incomplete;
- c. they show deformation such as soft swells, hard swells, buckled panelling et cetera when packed in cans;
- d. they show swelling when packed in bags;
- e. the sensorial characteristics such as smell, flavour, colour et cetera are atypical.

#### Art. 14 Temperatures of foods

<sup>1</sup>Foods and dishes subjected to refrigeration regulations and such, where unwanted microorganisms could rapidly multiply under unrefrigerated conditions, are considered to be perishable and have to be refrigerated.

<sup>2</sup>Refrigeration can be abandoned for a limited period of time (for example during preparation, service, transport or exhibition for sale) as long as no multiplication of microorganisms to a level hazardous for health occurs.

<sup>3</sup>Warmholding of dishes has to be done at temperatures where growth of unwanted and hazardous microorganisms is excluded.

#### Art. 15 Storage and transport

Foods have to be stored and transported in a way that contaminations are prevented as much as possible. In containers, which are also used for goods other than foods, transport and storage is only allowed if every contamination or unfavourable effect is excluded.

#### Art. 16 Display and sale

Unpacked foods, which are to be sold as self service products in selling units or restaurants or which are accessible to consumers in any other way, may not be adversely affected. For self service, suitable instruments and packing materials have to be available. Self service facilities have to be under surveillance of the sales personnel.

#### Art. 17 Disposal of waste

<sup>1</sup>In rooms, where foods are processed or handled, no leftovers or other waste may be stored with the exception when this is unavoidable during the regular course of operations.

<sup>2</sup>For waste, suitable and well marked containers have to be on hand. Foods, drinking water, equipment and working surfaces have to be protected from contaminations through waste.

<sup>3</sup>Waste storage rooms have to be clean and free from vermin and they have to be refrigerated if necessary.

#### Section 4: Personal hygiene and hygiene training

##### Art. 18 Personal hygiene

<sup>1</sup>People working in a food business have to pay attention to their personal hygiene when handling food products. Working clothes have to be appropriate and clean.

<sup>2</sup>A food business must have changing rooms and facilities allowing the maintenance of personal hygiene. Particularly, the following applies:

- a. Toilets have to be equipped with a natural or artificial ventilation. They may not open into rooms in which foods are produced, processed or stored.
- b. Those responsible in a food business have to ensure that the staff practice personal hygiene with regard to hands, body and clothes.

##### Art. 19 Training

The person who is responsible for a food business has to initiate that the personnel is adequately trained on the topic of hygienic handling of foods.

Please note:

„ This is a translation for your convenience. Legal standards are the officially published German, French and Italian versions.“

Limits for microorganisms

# Appendix 1

(Art. 3, para. 1)

Legend:           nd = non detectable  
                  cfu = colony forming unit

Methods:           Swiss Food Manual, Chapter 56 „Microbiology“

Microorganisms	Processing stage / Product	Limit cfu
<i>Bacillus cereus</i>	- Foods not ready-to-eat	10 <sup>5</sup> per g
	- Foods ready-to-eat, except spices	10 <sup>4</sup> per g
	- Baby- and infant foods ready- and not ready-to-eat	10 <sup>3</sup> per g
Thermotol. <i>Campylobacter</i> spp.	- Drinking water	nd in 5 L
	- Foods ready-to-eat	nd in 25 g
<i>Clostridium perfringens</i>	Foods not ready-to-eat	10 <sup>5</sup> per g
	- Foods ready-to-eat	10 <sup>4</sup> per g
	- Baby- and infant foods ready- and not ready-to-eat	10 <sup>3</sup> per g
<i>Listeria monocytogenes</i>	Foods ready-to-eat	10 <sup>3</sup> per g
	- Milk and milk products ready-to-eat	nn in 25 g
	- Baby- and infant foods ready- and not ready-to-eat	nn in 25 g
<i>Pseudomonas aeruginosa</i>	Baby cosmetics and cosmetics applied in the region of the eyes	10 per g
<i>Salmonella</i> spp.	- Drinking water	nd in 5 L
	- Baby- and infant foods ready-to-eat	nd in 50 g
	- Foods ready-to-eat	nd in 25 g
Coagulase positive staphylococci	Foods not ready-to-eat	10 <sup>5</sup> per g
	- Foods ready-to-eat	10 <sup>4</sup> per g
	- Baby- and infant foods not ready-to-eat	10 <sup>3</sup> per g
	- Baby- and infant foods ready-to-eat	10 <sup>2</sup> per g

# A. Tolerance values for products

Appendix 2

(Art. 3, para. 2)

Legend: nd = non detectable  
cfu = colony forming unit

Methods: Swiss Food Manual, Chapter 56 „Microbiology“

Products	Analytical criteria	Tolerance value cfu
1 Pasteurized milk	Aerob. mesophil. microorg. Enterobacteriaceae	100 000/g 10/g
2 Buttermilk, whey, milk, buttermilk and whey- beverages	Aerob. mesophil. microorg. Enterobacteriaceae	100 000/g 10/g
In case of acidulated products, the tolerance value for aerob. mesophil. microorg. is not applicable		
3 Sour milk, yoghurt (set, stirred, liquid, with or without admixtures)	Enterobacteriaceae Yeasts	10/g 1 000/g
4 Kefir	Enterobacteriaceae	10/g
5 Powdered milk	Aerob. mesophil. microorg. Enterobacteriaceae	50 000/g 10/g
6 Cream		
61 - liquid (pasteurized)	Aerob. mesophil. microorg. Enterobacteriaceae	100 000/g 10/g
62 - whipped (pasteurized)	Aerob. mesophil. microorg. <i>Escherichia coli</i> Coagul. pos. staphylococci	1 mio./g 10/g 100/g
63 - whipped (flash pasteu- rized, UHT-sterilized)	Aerob. mesophil. microorg. Enterobacteriaceae	100 000/g 10/g
7 Cheese		

71	- extrahard and hard cheese, grated cheese and mixtures from hard cheese	<i>Escherichia coli</i> Coagul. pos. staphylococci	10/g 100/g
Grated cheese and „Fondue“ cheese mixtures: see also art. 57OFS.			
72	- semihard cheese, grated cheese and mixtures with components from semihard cheese	<i>Escherichia coli</i> Coagul. pos. staphylococci	1 000/g 1 000/g
Grated cheese and „Fondue“ cheese mixtures: see also art. 57OFS.			
73	- Soft cheese, including the rind when eatable	<i>Escherichia coli</i> Coagul. pos. staphylococci	1 000/g 1 000/g
74	- Fresh cheese	Enterobacteriaceae Coagul. pos. staphylococci	1 000/g 100/g
75	- Process cheese, spreadable process cheese, process cheese preparations	Enterobacteriaceae Coagul. pos. staphylococci	10/g 100/g
8	Butter		
81	- from pasteurized cream	Aerob. mesophil. microorg. <i>Escherichia coli</i> Yeasts	100000/g 10/g 50 000/g
For ripened cream butter (Art. 65, para. 2, sub-para. b OFS), the tolerance value for aerob. mesophil. microorg. is not applicable.			
82	- from unpasteurized cream	Aerob. mesophil. microorg. <i>Escherichia coli</i> Coagul. pos. staphylococci	1 mio./g 10/g 100/g
9	Meat products		
91	- minced meat for beefsteak Tatar or similar ready-to-eat meat products eaten raw	<i>Escherichia coli</i>	100/g
92	- ripened meat products for eating raw (cured products and ripened, fermented sausages)	Enterobacteriaceae <i>Clostridium perfringens</i> Coagul. pos. staphylococci	100/g 100/g 1 000/g
93	- partially ripened, meat	Enterobacteriaceae	10 000/g

	products for eating raw (partially ripened, fermented sausages)	<i>Clostridium perfringens</i> Coagul. pos. staphylococci	100/g 1 000/g
94	- meat products, cooked	Aerob. mesophil. microorg. Enterobacteriaceae	1 mio./g 1000/g
	without curing agents	<i>Clostridium perfringens</i>	100/g
95	- products pasteurized in package	Aerob. mesophil. microorg. Enterobacteriaceae	10 000/g 10/g
	without curing agents	<i>Clostridium perfringens</i>	10/g
96	- smoked fish	Aerob. mesophil. microorg. Enterobacteriaceae Coagul. pos. staphylococci	1 mio./g 1 000/g 1 000/g
97	- cooked fish, shrimps, prawns and molluscs	Aerob. mesophil. microorg. Enterobacteriaceae Coagul. pos. staphylococci	100 000/g 100/g 1 000/g
10	Soups		
101	- ready-to-eat	Aerob. mesophil. microorg. <i>Escherichia coli</i> Coagul. pos. staphylococci	100 000/g 10/g 100/g
11	Pasta, uncooked		
111	- dry	Aerob. mesophil. microorg. Enterobacteriaceae Coagul. pos. staphylococci	100 000/g 1 000/g 10 000/g
112	- wet	Aerob. mesophil. microorg. Enterobacteriaceae Coagul. pos. staphylococci	1 mio./g 10 000/g 1 000/g
113	- wet with filling meat-filling: vegetable-filling:	As 112 and: <i>Clostridium perfringens</i> <i>Bacillus cereus</i>	100/g 1 000/g

The tolerance value for aerob. mesophil. microorg. cannot be applied to products containing fermented admixtures.

12	Eggs and egg products	Aerob. mesophil. microorg. <i>Escherichia coli</i> Coagul. pos. staphylococci	100 000/g 10/g 100/g
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### 13 Baby and infant foods

131 ready-to-eat	Aerob. mesophil. microorg.	10 000/g
	Enterobacteriaceae	10/g

The tolerance value for aerob. mesophil. micro- org. cannot be applied to products containing fermented admixtures.

132 not ready-to-eat	Aerob. mesophil. microorg.	100000/g
	Enterobacteriaceae	100/g

The tolerance value for aerob. mesophil. micro- org. cannot be applied to products containing fermented admixtures.

14 Pastries, confectionery	Aerob. mesophil. microorg.	1 mio./g
	<i>Escherichia coli</i>	10/g
	Coagul. pos. staphylococci	100/g

The tolerance value for aerob. mesophil. micro- org. cannot be applied to products containing fermented admixtures.

15 Ice cream	Aerob. mesophil. microorg.	100 000/g
	Enterobacteriaceae	100/g
	Coagul. pos. staphylococci	100/g

16 Beverages poured out by vending machines	Aerob. mesophil. microorg.	100 000/g
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## B. Tolerance values for drinking water, mineral water, spring water and ice

Legend  
 nd = non detectable  
 cfu = colony forming unit

Methods Swiss Food Manual, Chapter 56 „Microbiology“

Products	Tolerance value	Comments	Analytical criteria
			cfu
1 Untreated drinking water			
11 - at the source		Aerob. mesophil. microorg. <i>Escherichia coli</i> Enterococci	100/mL nd/100 mL nd/100 mL
12 - in water system		Aerob. mesophil. microorg. <i>Escherichia coli</i> Enterococci	300/mL nd/100 mL nd/100 mL
13 - bottled		<i>Escherichia coli</i> Enterococci <i>Pseudomonas aeruginosa</i>	nd/100 mL nd/100 mL nd/100 mL
2 Treated drinking water			
21 - after treatment		Aerob. mesophil. microorg. <i>Escherichia coli</i> Enterococci	20/mL nd/100 mL nd/100 mL
22 - in water system		As 12	
23 - bottled		As 13	
3 Mineral water			
31 - at the source		Aerob. mesophil. microorg. <i>Escherichia coli</i> Enterococci <i>Pseudomonas aeruginosa</i>	100/mL nd/100 mL nd/100 mL nd/100 mL
32 - bottled		<i>Escherichia coli</i> Enterococci <i>Pseudomonas aeruginosa</i>	nd/100 mL nd/100 mL nd/100 mL
4 Ice as admixture to foods and beverages		Aerob. mesophil. microorg. <i>Escherichia coli</i> Enterococci <i>Pseudomonas aeruginosa</i>	3 000/mL nd/100 mL nd/100 mL nd/100 mL

### C. Tolerance values for food categories

Legend                      cfu = colony forming unit

Methods:                      Swiss Food Manual, Chapter 56 „Microbiology“

Food category	Analytical criteria	Tolerance value cfu
1    Raw foods which are considered as ready-to-eat (Art. 2, para. b1 and b2)	<i>Escherichia coli</i> Coagul. pos. staphylococci	10/g 100/g
Excluded are those products where particular tolerance values are laid down in appendix 2, list A „Tolerance values for products“.		
2    Heat treated foods which are ready-to-eat either hot or cold (Art. 2, para. b3)	Aerob. mesophil. microorg. Enterobacteriaceae Coagul. pos. staphylococci	1 mio./g 100/g 100/g
as under 1		
3    Ready-to-eat foods, which cannot be assigned to C1 or C2 (mixed products)	Aerob. mesophil. microorg. <i>Escherichia coli</i> Coagul. pos. staphylococci	10mio./g 10/g 100/g
as under 1 The tolerance value for aerob. mesophil. micro- org. cannot be applied to products containing fermented admixtures		
4    Ready-to-eat foods with the exception of mould-ripened products	Moulds	Non detectable by eye