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E. coli

Surface and internalized *Escherichia coli* O157:H7 on field-grown spinach and lettuce treated with spray-contaminated irrigation water

M.C. Erickson, C.C. Webb, J.C. Diaz-Perez, S.C. Phatak, J.J. Silvoy, L. Davey, et al.

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Significance: All spinach leaves tested negative for surface or internal contamination of *E. coli* O157:H7.

This study determined the sites of *Escherichia coli* O157:H7 contamination and its survival when the bacteria were applied through spray irrigation water to either field-grown spinach or lettuce. Leaves were treated with a surface disinfectant wash before the tissue was ground for analysis of *E. coli* O157:H7. Irrigation water containing *E. coli* O157:H7 at 10^2 , 10^4 , or 10^6 CFU/ml was applied to spinach 48 and 69 days after transplantation of seedlings into fields. *E. coli* O157:H7 was initially detected after application on the surface of plants dosed at 10^4 CFU/ml (4/20 samples) and both on the surface (17/20 samples) and internally (5/20 samples) of plants dosed at 10^6 CFU/ml. In a subsequent study, irrigation water containing *E. coli* O157:H7 at 10^8 CFU/ml was sprayed onto either the abaxial (lower) or adaxial (upper) side of leaves of field-grown lettuce. *E. coli* O157:H7 was detectable on the leaf surface 27 days postspraying, but survival was higher on leaves sprayed on the abaxial side than on leaves sprayed on the adaxial side.

Salmonella

Effect of enrichment medium on real-time detection of *Salmonella enterica* from lettuce and tomato enrichment cultures

L. Gorski, A.S. Liang

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Significance: An immunomagnetic separation method may be useful in enrichment cultures from buffered peptone water and universal preenrichment broth but not in tryptic soy broth.

Three enrichment broths commonly used for detection of *Salmonella* (buffered peptone water [BPW], tryptic soy broth [TSB], and universal preenrichment broth [UPB]) were compared for use in real-time SYBR Green PCR detection of *Salmonella* introduced into enrichment cultures made from store-bought lettuce and tomatoes. A qualitative assessment of the background microbiota that grew in the three enrichment broths cultures from tomato and lettuce samples revealed that different bacteria predominated in the different broths. Results obtained with five produce-related outbreak *Salmonella* strains and PCR primers directed toward three different *Salmonella* genes

suggest that the ability to detect *Salmonella* from these enrichment cultures by real-time PCR was 10 to 1,000 times better with TSB enrichment cultures. Detection levels were similar between the different enrichment media when an immunomagnetic separation method was used; however, the immunological technique did not enhance detection from TSB enrichment cultures.

Infant Formula

Development of an improved protocol for the isolation and detection of *Enterobacter sakazakii* (*Cronobacter*) from powdered infant formula

Y. Chen, K-Y. Song, E.W. Brown, K.A. Lampel

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Significance: The real-time PCR has bifunctional applications, including both screening and culture confirmation of *E. sakazakii* in powdered infant formula.

Enterobacter sakazakii causes severe maladies and, in some cases, is fatal among infants. Powdered infant formula (PIF) contaminated with *E. sakazakii* has been documented as a potential cause of several outbreaks involving infants. This study describes the development of a method for the isolation and detection of *E. sakazakii* from PIF. It combines Taqman real-time PCR, Brilliance *E. sakazakii* and R&F chromogenic agars, and RAPID ID 32E biochemical tests. This method provides an expedient analysis within 1 to 2 days depending on the amount and stress status of *E. sakazakii* organisms and competing microorganisms in PIF.

Bisphenol A

Bisphenol A in canned food products from Canadian markets

X-L. Cao, J. Corriveau, S. Popovic

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Significance: Concentrations of bisphenol A (BPA) in canned food products were below the specific migration limit of 0.6 mg/kg set by the European Commission Directive for BPA in food or food simulants.

A method based on solid phase extraction followed by derivatization and gas chromatography-mass spectrometry analysis was validated for the determination of bisphenol A (BPA) in 78 canned food products. Canned tuna products had the highest BPA concentrations in general, with mean and maximum values of 137 and 534 ng/g, respectively. BPA concentrations in condensed soup products were considerably higher than those in the ready-to-serve soup products, with mean and maximum values of 105 and 189 ng/g, respectively, for condensed soups and 15 and 34 ng/g, respectively, for ready-to-serve soups. BPA concentrations in canned vegetable products were relatively low; about 60% had BPA concentrations <10 ng/g. Canned tomato paste products had lower BPA concentrations (mean and maximum BPA were 1.1 and 2.1 ng/g, respectively) than canned pure tomato products (9.3 and 23 ng/g, respectively).

Caffeine

Maternal caffeine intake from coffee and tea, fetal growth, and the risks of adverse birth outcomes: the Generation R Study

R. Bakker, E.A.P. Steegers, A. Obradov, H. Raat, A. Hofman, V.W.V. Jaddoe

American Journal of Clinical Nutrition, Vol. 91, No. 6; pp. 1691-1698, 2010

Significance: Caffeine intake of ≥ 6 units/d during pregnancy is associated with impaired fetal length growth and caffeine exposure might be preferentially adversely affect fetal skeletal growth.

The associations of maternal caffeine intake, on the basis of coffee and tea consumption, with fetal growth characteristics measured in each trimester of pregnancy and the risks of adverse birth outcomes were evaluated in a population-based prospective cohort study. Associations were studied in 7346 pregnant women from early pregnancy onward. Caffeine intake in the first, second, and third trimesters was on the basis of coffee and tea consumption and was assessed by questionnaires. No consistent associations of caffeine intake with fetal head circumference or estimated fetal weight in any trimester were observed. Higher caffeine intake was associated with smaller first-trimester crown-rump length, second- and third-trimester femur length, and birth length (P for trend < 0.05). Offspring of mothers who consumed ≥ 6 caffeine units/d tended to have increased risks of small-for-gestational-age infants at birth.

Advanced Glycation End Products

Advanced glycation end products in foods and a practical guide to their reduction in the diet

J. Uribarri, S. Woodruff, S. Goodman, W. Cai, X. Chen, R. Pyzik, et al.

Journal of the American Dietetic Association, Vol. 110, No. 6; pp. 911-916, 2010

Significance: The new dietary advanced glycation end products (dAGE) database provides a valuable instrument for estimating dAGE intake and for guiding food choices to reduce dAGE intake.

Dietary advanced glycation end products (dAGEs) are known to contribute to increased oxidant stress and inflammation. This report significantly expands the available dAGE database, validates the dAGE testing methodology, compares cooking procedures and inhibitory agents on new dAGE formation, and introduces practical approaches for reducing dAGE consumption in daily life. Based on the findings, dry heat promotes new dAGE formation by >10 - to 100-fold above the uncooked state across food categories. Animal-derived foods that are high in fat and protein are generally AGE-rich and prone to new AGE formation during cooking. In contrast, carbohydrate-rich foods such as vegetables, fruits, whole grains, and milk contain relatively few AGEs, even after cooking. The formation of new dAGEs during cooking was prevented by the AGE inhibitory compound aminoguanidine and significantly reduced by cooking with moist heat, using shorter cooking times, cooking at lower temperatures, and by use of acidic ingredients such as lemon juice or vinegar.

Food Allergy

Greater epitope recognition of shrimp allergens by children than by adults suggests that shrimp sensitization decreases with age

R. Ayuso, S. Sánchez-García, J. Lin, Z. Fu, M.D. Ibáñez, T. Carrillo, et al.

Journal of Allergy and Clinical Immunology, Vol. 125, No. 6; pp. 1286-1293, 2010

Significance: Children with shrimp allergy have greater shrimp-specific IgE antibody levels and show more intense binding to shrimp peptides and greater epitope diversity than adults.

This study identified the IgE-binding epitopes of the 4 shrimp allergens characterized epitope recognition profiles of 34 children and 19 adults with shrimp allergy. Study subjects and 7 nonatopic control subjects were tested by means of peptide microarray for IgE binding with synthetic overlapping peptides spanning the sequences of *Litopenaeus vannamei* shrimp tropomyosin, arginine kinase (AK), myosin light chain (MLC), and sarcoplasmic calcium-binding protein (SCP). The median shrimp IgE level was 4-fold higher in children than in adults (47 vs 12.5 kUA/L). The frequency of allergen recognition was higher in children (tropomyosin, 81% [94% for children and 61% for adults]; MLC, 57% [70% for children and 31% for adults]; AK, 51% [67% for children and 21% for adults]; and SCP, 45% [59% for children and 21% for adults]), whereas control subjects showed negligible binding. Seven IgE-binding regions were identified in tropomyosin. Three new epitopes were identified in tropomyosin (epitopes 1, 3, and 5b-c), 5 epitopes were identified in MLC, 3 epitopes were identified in SCP, and 7 epitopes were identified in AK.

Early recovery from cow's milk allergy is associated with decreasing IgE and increasing IgG4 binding to cow's milk epitopes

E.M. Savilahti, V. Rantanen, J.S. Lin, S. Karinen, K.M. Saarinen, M. Goldis, et al.

Journal of Allergy and Clinical Immunology, Vol. 125, No. 6; pp. 1315-1321, 2010

Significance: Attaining tolerance to cow's milk is associated with decreased epitope binding by IgE and a concurrent increase in corresponding epitope binding by IgG4.

This study investigated differences in IgE, IgG4, and IgA binding to cow's milk (CM) epitopes over time between patients with early recovery or with persisting cow's milk allergy (CMA). Serum samples at the time of diagnosis were studied (mean age, 7 months), 1 year later, and at follow-up (mean age, 8.6 years) from 11 patients with persisting IgE-mediated CMA at age 8-9 years and 12 patients who recovered by age 3 years. IgE epitope-binding patterns were stable over time in patients with persisting CMA, whereas binding decreased in patients who recovered early. Binding patterns of IgE and IgG4 overlapped. Among patients who recovered early, the signal of IgG4 binding increased and that of IgE decreased over time. IgE and IgG4 binding to a panel of α s1-, α s2-, β -, and κ -casein regions predicted outcome with significant accuracy.

US prevalence of self-reported peanut, tree nut, and sesame allergy: 11-year follow-up

S.H. Sicherer, A. Muñoz-Furlong, J.H. Godbold, H.A. Sampson

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Significance: Peanut allergy, tree nut allergy, or both continue to be reported by more than 1% of the US population and appear to be increasingly reported among children over the past decade.

The US prevalence of self-reported peanut, tree nuts (TN), and sesame allergy in 2008 was determined and the results compared with comparable surveys using a nationwide, cross-sectional, random telephone survey. A total of 5,300 households (13,534 subjects) were surveyed (participation rate, 42% vs 52% in 2002 and 67% in 1997). Peanut allergy, TN allergy, or both was reported by 1.4% of subjects (95% CI, 1.2%-1.6%) compared with 1.2% in 2002 and 1.4% in 1997. For adults, the prevalence was 1.3% (95% CI, 1.1%-1.6%), which was not significantly different from prior surveys. However, the prevalence of peanut or TN allergy for children <18 years was 2.1% (95% CI, 1.6%-2.7%) compared with 1.2% in 2002 ($P=.007$) and 0.6% in 1997 ($P<.001$). The prevalence of peanut allergy in children in 2008 was 1.4% (95% CI, 1.0%-1.9%) compared with 0.8% in 2002 ($P=ns$) and 0.4% in 1997 ($P<.0001$). The prevalence of childhood TN allergy increased significantly across the survey waves (1.1% in 2008, 0.5% in 2002, and 0.2% in 1997). Sesame allergy was reported by 0.1%.

A population-based study on peanut, tree nut, fish, shellfish, and sesame allergy prevalence in Canada

M. Ben-Shoshan, D.W. Harrington, L. Soller, J. Fragapane, L. Joseph, Y. St Pierre, et al.

Journal of Allergy and Clinical Immunology, Vol. 125, No. 6; pp. 1327-1335, 2010

Significance: Disparities were found between perceived and confirmed food allergy that might contribute to the wide range of published prevalence estimates.

This study determined the prevalence of peanut, tree nut, fish, shellfish, and sesame allergy in Canada using a cross-Canada, random telephone survey. Food allergy was defined as perceived (based on self-report), probable (based on convincing history or self-report of physician diagnosis), or confirmed (based on history and evidence of confirmatory tests). Of 10,596 households surveyed in 2008 and 2009, 3666 responded (34.6% participation rate), of which 3613 completed the entire interview, representing 9667 individuals. The prevalence of perceived peanut allergy was 1.00% (95% CI, 0.80%-1.20%); tree nut, 1.22% (95% CI, 1.00%-1.44%); fish, 0.51% (95% CI, 0.37%-0.65%); shellfish, 1.60% (95% CI, 1.35%-1.86%); and sesame, 0.10% (95% CI, 0.04%-0.17%). The prevalence of probable allergy was 0.93% (95% CI, 0.74%-1.12%); 1.14% (95% CI, 0.92%-1.35%); 0.48% (95% CI, 0.34%-0.61%); 1.42% (95% CI, 1.18%-1.66%); and 0.09% (95% CI, 0.03%-0.15%), respectively. The prevalence of confirmed allergy was much lower.