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In the present study, the authors investigated the effects of Roundup on three food microorganisms.

**Environmental**

Effects of Roundup and Glyphosate on Three Food Microorganisms: Geotrichum candidum, Lactococcus lactis subspecies cremoris and Lactobacillus delbrueckii subspecies bulgaricus

2012-06-22

The aim of the present study was to shed light on the real impact on biodiversity and ecosystems of Roundup, a major herbicide used worldwide, and the glyphosate it contains. The authors investigated Roundup’s effects on growth and viability using microbial models, namely, three food microorganisms (Geotrichum candidum, Lactococcus lactis subspecies cremoris and Lactobacillus delbrueckii subspecies bulgaricus) widely used as starters in traditional and industrial dairy technologies. The presented results showed evidence that Roundup has an inhibitory effect on microbial growth and a micro biocide effect at lower concentrations than those recommended in agriculture. Interestingly, glyphosate at these levels has no significant effect on the three studied microorganisms. The authors concluded that the findings from this study are consistent with previous studies which demonstrated that the toxic effect of glyphosate was amplified by its formulation adjuvants on different human cells and other eukaryotic models. Moreover, these results should be considered in the understanding of the loss of microbiodiversity and microbial concentration observed in raw milk for many years.

Authors: Clair, Emilie; Linn, Laura; Travert, Carine; Amiel, Caroline; Seralini, Gilles-Eric; Panoff, Jean-Michel

Full Source: Current Microbiology 2012, 64(5), 486-491 (England)

From waste materials skin-friendly nanostructured products to save humans and the environment

2012-06-22

Waste material from the fishing industry disposed off-shore exceeds 250 billion tons per year, and it is considered hazardous due to its high perishability and polluting effect, both on land and sea. Considering the actual production of chitin, chitosan and oligosaccharides from crustaceans, it is understandable how difficult it is to eliminate all the waste material obtained from food industry, therefore the need for more innovation and creativity. With this in mind the authors proposed an industrial use of the natural chitin nanocrystals (known as chitin-nanofibrils-
CN] to produce innovative cosmetics, food supplements and protective films that can improve our way of living while saving the environment.
Authors: Morganti, Pierfrancesco; Li, Yuan-Hong
Full Source: Journal of Cosmetics, Dermatological Sciences and Applications 2011, 1(3), 99-105 (England)

MEDICAL

Lead acetate induces cell apoptosis and promotes caspase-3 expression in human liver cell line L-02
2012-06-22
The impact of lead acetate on cell apoptosis and caspase-3 expression in human liver cell line L-02 was investigated. L-02 cells were treated with different concentrations (0, 2.5, 40, 100, 200, 400 μmol/L) of lead acetate for 24 or 48 h. Compared to the normal control group, the proliferation of L-02 cells was significantly inhibited after treatment with different concentrations of lead acetate for 24 or 48 h. Significant morphological changes were noted in cells treated with lead acetate for 48 h. Compared to the normal control group, the levels of caspase-3 mRNA increased significantly in a dose-dependent manner in L-02 cells treated with lead acetate. Additional, the expression levels of caspase-3 protein also significantly increased after treatment with lead acetate. Lead acetate inhibits proliferation and induces apoptosis of L-02 cells possibly via a mechanism associated with the activation of caspase-3.
Authors: Xing, Wei; Li, Shenglian; Chen, Zhaoyi
Full Source: Shijie Huaren Xiaohua Zazhi 2011, 19(23), 2426-2431 (China)

Quantitative proteomic analysis on serum in patients with chronic benzene poisoning using 8-plex iTRAQ labelling coupled with 2D LC-MS/MS
2012-06-26
The aim of the present study is to compare the expression of serum proteins between patients with chronic benzene poisoning and healthy controls, and to screen the differentially expressed proteins for the study of molecular mechanisms and the development of biomarkers for treatment and prevention. Statistical differences were observed in 3 proteins including plasminogen (PLG), apolipoprotein B-100 (APOB100) and platelet basic protein (PBP). These 3 proteins can be functionally categorised into binding, catalytic activity, enzyme regulator activity and transporter activity, as well as being involved in biological processes of immunity, metabolism, stress, transportation and apoptosis. The authors
Differences in Susceptibility to Inactivation of Human Aldehyde Dehydrogenases by Lipid Peroxidation Byproducts

2012-06-26

Aldehyde dehydrogenases (ALDHs) are involved in the detoxification of aldehydes generated as byproducts of lipid peroxidation. In this work, it was detected that, among the 3 most studied human ALDH isoforms, ALDH2 showed the highest catalytic efficiency for oxidation of acrolein, 4-hydroxy-2-nonenal (4-HNE), and malondialdehyde. The results suggested that both binding sites, those for aldehyde and NAD+ in ALDH2, are targets for the inactivation by lipid peroxidation products. Thus, with the advantage of being relatively inactivation-insensitive, ALDH1A1 and ALDH3A1 may be actively participating in the detoxification of these aldehydes in the cells.

Authors: Yoval-Sanchez, Belem; Rodriguez-Zavala, Jose S.


Inhibition of genistein glucuronidation by bisphenol A in human and rat liver microsomes

2012-06-26

Genistein is a natural phytoestrogen of the soybean, and bisphenol A (BPA) is a synthetic chemical used in the production of polycarbonate plastics. Both genistein and BPA disrupt the endocrine system in vivo and in vitro. Growing concerns of altered xenobiotic metabolism due to concomitant exposures from soy milk in BPA-laden baby bottles has warranted the investigation of the glucuronidation rate of genistein in the absence and presence (25 μM) of BPA by human liver microsomes (HLM) and rat liver microsomes (RLM). The findings are significant because they suggest that BPA is capable of inhibiting the glucuronidation of genistein in vitro, and that the type of inhibition is different between HLM and RLM.

Authors: Coughlin, Janis L.; Thomas, Paul E.; Buckley, Brian

Full Source: Drug Metabolism & Disposition 2012, 40(3), 481-485 (England)
# Technical

## Comparative Assessment of Essential and Toxic Metals in the Blood of Rheumatoid Arthritis Patients and Healthy Subjects

**2012-06-26**

The present study deals with the comparative evaluation of essential and toxic metals in rheumatoid arthritis and healthy donors. Blood samples collected from rheumatoid arthritis patients and healthy subjects were analysed for selected essential and toxic metals (Ca, Mg, Fe, Zn, Cu, Co, Mn, Cr, Cd and Pb). Mean levels of Ca, Mg, Fe and Zn were significantly higher in the blood of healthy donors; however, elevated levels of Cd, Co, Cr, Cu and Pb were observed in blood of the patients. The correlation coefficients among the selected metals in the blood of arthritis patients were significantly different compared with the healthy counterparts. Multivariate cluster analysis revealed mutual apportionment of the essential and toxic metals in blood of the patients, whereas, in controls, the essential and toxic metals revealed diverse apportionment. Variations in the metal levels with gender, residence and smoking habits were also evaluated in both donor groups. Relative distribution, correlation and apportionment of the essential and toxic metals in the blood of the patients were significantly different than of controls.

**Authors:** Hashmi, G. M. Mujtaba; Shah, Munir H.

**Full Source:** Biological Trace Element Research 2012, 146(1), 13-22 (England)

## OCCUPATIONAL

### DNA damage, glutathione, and total antioxidant capacity in anaesthesia nurses

**2012-06-19**

The possibilities of a potential mutagenic/carcinogenic action of waste anaesthetic gases in occupationally exposed anaesthesia personnel have been previously reported in several studies. The aim of this study was to assess the DNA damage, reduced glutathione (GSH), and total antioxidant capacity (TAC) in anaesthesia nurses. DNA damage was detected with comet assay, GSH levels were measured spectrophotometrically, and TAC was detected by using Randox kit. The results demonstrated that anaesthesia nurses (n = 40) had increased DNA damage in terms of mean percentage of the total DNA in the comet tail compared to controls (n = 40) (p < .001). Mean TAC and GSH levels of the anaesthesia nurses were significantly lower than that of the controls (p < .001, p < .05, respectively).
In the present study, the authors evaluated inter-rater reliability of 7729 retrospective jobs reported in the National Birth Defects Prevention Study.

Technical

The authors concluded that the results of this study indicate that occupational exposure to anaesthetic gases induce DNA damage, which may lead to changes in TAC and GSH levels.

Authors: Izdes, Seval; Sardas, Semra; Kadioglu, Ela; Karakaya, Ali Esat
Full Source: Archives of Environmental & Occupational Health [online computer file] 2010, 65(4), 211-217 (Eng)

Inter-rater reliability of assessed prenatal maternal occupational exposures to solvents, polycyclic aromatic hydrocarbons, and heavy metals

2012-06-19

Because direct measurements of past occupational exposures are rarely available in population-based case-control studies, exposure assessment of job histories by multiple expert raters are frequently used; however, the subjective nature of this method makes measuring reliability an important quality control step. In the present study, the authors evaluated inter-rater reliability of 7729 retrospective jobs reported in the National Birth Defects Prevention Study. Jobs were classified as exposed, unexposed, or exposure unknown by two independent industrial hygienists; exposed jobs were further evaluated for intensity, frequency, and routes. Exposure prevalence ranged from 0.1-9.8%. Inter-rater reliability for exposure (yes/no), assessed by kappa coefficients, was fair to good for cadmium (κ=0.46), chlorinated solvents (κ=0.59), cobalt (κ=0.54), glycol ethers (κ=0.50), nickel compounds (κ=0.65), oil mists (κ=0.63), and Stoddard Solvent (κ=0.55); PAHs (κ=0.24) and elemental nickel (κ=0.37) had poor agreement. After a consensus conference resolved disagreements, an additional 4962 jobs were evaluated. Inter-rater reliability improved or stayed the same for cadmium (κ=0.51), chlorinated solvents (κ=0.81), oil mists (κ=0.63), PAHs (κ=0.52), and Stoddard solvent (κ=0.92) in the second job set. The authors concluded that based on the findings, inter-rater reliability varied by exposure agent and prevalence, demonstrating the importance of measuring reliability in studies using a multiple expert rater method of exposure assessment.

Authors: Rocheleau, Carissa M.; Lawson, Christina C.; Waters, Martha A.; Hein, Misty J.; Stewart, Patricia A.; Correa, Adolfo; Echeverria, Diana; Reefhuis, Jennita
Full Source: Journal of Occupational and Environmental Hygiene [online computer file] 2011, 8(12), 718-728 (Eng)
Development of a sampling patch to measure dermal exposures to monomeric and polymeric 1, 6-hexamethylene diisocyanate: a pilot study

2012-06-19

The purpose of this study was to develop and evaluate a patch sampler to monitor dermal exposures to monomeric and polymeric 1, 6-hexamethylene diisocyanate (HDI) in the automotive refinishing industry. Different patch materials were used to construct the patches, and patches impregnated with a derivatising solution were compared with those that were not impregnated. The authors found that impregnated felt patches measured significantly more HDI monomer (p < 0.04) than non-impregnated patches in a controlled experiment. Both impregnated and non-impregnated patches were compared with the tape-strip method by monitoring three spray painters’ dermal exposure to monomeric and polymeric HDI. Isocyanurate was the predominant species measured by all three sampler types with detectable levels in >86% of samples. Overall, tape-strips of exposed skin measured lower levels of monomeric and polymeric HDI than impregnated patch samplers at the same sampling site on the skin. Unlike tape-strips, impregnated patches are not as prone to evaporative or reactive losses or losses due to rapid penetration into the skin. The authors concluded that further investigations are warranted to evaluate these and other methods to measure dermal exposure to workers under occupational conditions to better understand the relationship between dermal exposure and internal dose.

Authors: Thomasen, Jennifer M.; Fent, Kenneth W.; Nylander-French, Leena A.

Full Source: Journal of Occupational and Environmental Hygiene [online computer file] 2011, 8(12), 709-717 (Eng)

Evaluation of neuropsychological symptoms and exposure to benzene, toluene and xylene among two different furniture worker groups in Izmir

2012-06-19

This study was conducted to determine whether there was any exposure to toluene, xylene and benzene and to assess the health impact of these solvents on workers in furniture enterprises in Karabaglar, Izmir. This study was comprised of an exposed group consisting of workers engaged in painting and varnishing and therefore exposed either directly or indirectly toluene, xylene and benzene in the workplace and the non-exposed group engaged in other aspects of production. While a total
of 261 individuals completed questionnaires, 210 workers agreed to provide blood samples. Blood solvents levels were detected using gas chromatograph at Ege University, Intoxication Research and Application Centre. The modified EUROQUEST questionnaire was used to assess neuropsychological symptoms and neurological and general examinations were performed. Occupational and exposure history, demography and work-related information was collected. In this study of workers, blood toluene and benzene levels were found to be significantly higher among those engaged in painting and varnishing compared to those who perform other tasks. The average blood toluene and benzene concentrations among exposed workers were 6.95 times and 1.64 times respectively higher than those in the nonexposed groups. Smokers and participants who worked in excess of 8 h/day had higher blood toluene and benzene levels. The most frequently work-related health complaints were back pain, allergies and asthma. No differences were found in the average scores in the neuropsychological symptoms questionnaire between exposed and non-exposed groups. Neurological examination of two individuals with these complaints revealed a loss of reflexes. The workers were unaware that they were being exposed to solvents at work. Tobacco smoke is a major source of internal exposure to benzene. The authors concluded that improving working conditions in furniture work places is a priority.

Authors: Mandiracioglu, Aliye; Akgur, Serap; Kocabiyik, Nesrin; Sener, Ufuk
Full Source: Toxicology and Industrial Health 2011, 27(9), 802-809 (Eng)

Organochlorine Pesticide Residues in Blood Samples of Agriculture and Sheep Wool Workers in Bangalore (Rural), India

2012-06-19
In this study, the authors described the exposure level of organochlorine pesticides (OCP) among workers occupationally engaged in agriculture and sheep wool associated jobs. The study was undertaken in a rural neighbourhood of Bangalore city, India. Thirty participants were interviewed and obtained informed consent before blood sample collection. The results showed that higher concentrations of OCP were detected in the blood samples of agriculture workers compared to sheep wool workers. Among the metabolites of HCH and DDT, lindane (ç-HCH) and p,p’-DDE were the most contributed to the total OCP. There were no differences in pesticide residues found between sex and work groups. The authors observed that about 30% of samples exceeded the tolerance limits of 10 µg/L prescribed for HCH under the prevention of food adulteration act.

In this study, the authors described the exposure level of organochlorine pesticides (OCP) among workers occupationally engaged in agriculture and sheep wool associated jobs.
In this study, the authors investigated associations between ambient PM2.5 and immune status among 115 postmenopausal, overweight women in the greater Seattle, Washington, area.

Authors: Dhananjayan, V.; Ravichandran, B.; Rajmohan, H. R. ~sFull Source: Bulletin of Environmental Contamination and Toxicology [online computer file] 2012, 88(4), 497-500 (Eng)

PUBLIC HEALTH

Fine particulate matter (PM2.5) air pollution and immune status among women in the Seattle area

2012-06-19

Changes in immune status have been suggested as a possible biological mechanism by which particulate matter (PM) air pollution could lead to adverse health effects. The authors investigated associations between ambient PM2.5 and immune status among 115 postmenopausal, overweight women in the greater Seattle, Washington, area. In addition, they evaluated 3-day, 30-day, and 60-day average PM2.5 values in relation to inflammation markers (C-reactive protein, serum amyloid A, interleukin-6) and functional assays of cellular immunity (natural killer cell cytotoxicity, T-lymphocyte proliferation) at 3 time points for each woman during 1 year. The results showed that the three-day averaged PM2.5 was inversely associated with anti-CD3-stimulated lymphocyte proliferation. There were no notable associations between the inflammation markers and PM2.5. the authors concluded that if additional studies confirm these findings, then future health effect assessments for PM2.5 should consider changes in cellular immunity as an endpoint that may lead to overt clinical disease.

Authors: Williams, Lori; Ulrich, Cornelia M.; Larson, Timothy; Wener, Mark H.; Wood, Brent; Chen-Levy, Zehava; Campbell, Peter T.; Potter, John; McTiernan, Anne; De Roos, Anneclaire J.

Full Source: Archives of Environmental & Occupational Health [online computer file] 2011, 66(3), 155-165 (Eng)

Indoor air pollution and health of children in biomass fuel-using households of Bangladesh: comparison between urban and rural areas

2012-06-19

Indoor air pollutants from biomass combustion pose a risk for respiratory diseases in children. It is plausible that distinct differences in the indoor air quality (IAQ) exist between urban and rural areas in developing
countries since the living environment between these two areas are quite different. In the present study, the authors investigated possible differences in IAQ in urban and rural Dhaka, Bangladesh and the association of such differences with the incidence of respiratory and some nonrespiratory symptoms in children of families using biomass fuel. Indoor air concentrations of carbon monoxide (CO), carbon dioxide (CO₂), dust particles, volatile organic compounds (VOCs), and nitrogen dioxide were measured once in the winter and once in the summer of 2008. Health data on 51 urban and 51 rural children under 5 years of age from 51 families in each area were collected once a week starting in the winter and continuing to the summer of 2008. Mean concentrations of CO, CO₂, dust particles, and major VOCs were significantly higher in urban kitchens than in rural ones (p < 0.05). The incidence rate ratio (IRR) suggests that compared to the urban children, the children in the rural area suffered significantly more from respiratory symptoms [IRR 1.63, 95% confidence interval (CI) 1.62-1.64], skin itchiness [IRR 3.3, 95% CI 1.9-5.7], and diarrhoea (IRR 1.8, 95% CI 1.4-2.4), while fewer experienced fever (IRR 0.5, 95% CI 0.4-0.6). No difference was observed for other symptoms. Lower IAQ was detected in the homes of urban biomass fuel-users compared to rural ones in Bangladesh but could not attribute the occurrence of respiratory symptoms among children to the measured IAQ. Other factors may be involved.

Authors: Khalequzzaman, Md.; Kamijima, Michihiro; Sakai, Kiyoshi; Ebara, Takeshi; Hoque, Bilqis Amin; Nakajima, Tamie
Full Source: Environmental Health and Preventive Medicine [online computer file] 2011, 16(6), 375-383 (Eng)

Indoor and outdoor particle number and mass concentrations in Athens Sources, sinks and variability of aerosol parameters
2012-06-19
In this study, the authors characterised PM mass and number concentration at typical residential microenvironments in the centre of Athens and examined the relative contribution of the indoor and outdoor sources. Three residential flats located in densely populated residential areas were studied, during a warm and cold period of 2002. PM10, PM2 and black carbon (BC) mass concentrations, as well as ultrafine and accumulation mode particle number size distributions were recorded indoors and outdoors simultaneously. Outdoor concentrations of all size fractions were significant, and indicative of urban sites affected by heavy traffic. Indoor levels were generally lower than the corresponding outdoor
This study investigated seasonal variations in mass concentrations of particulate matter (PM) and compositions of heavy metals in PM2.5 and PM10 collected from a typical urban residential area in Ulsan, Korea.

Seasonal variation and sources of heavy metals in atmospheric aerosols in a residential area of Ulsan, Korea

2012-06-19

This study investigated seasonal variations in mass concentrations of particulate matter (PM) and compositions of heavy metals in PM2.5 and PM10 collected from a typical urban residential area in Ulsan, Korea. PM measurements were conducted during spring and summer of 2009. Mean concentrations of PM2.5 in spring and summer were 23.2 and 18.1 μg/m3, respectively. Mean concentrations of PM10 in spring and summer were 45.9 and 33.2 μg/m3, respectively. The lower summer PM concentrations as compared to the spring ones are due to the increased rainfall precipitation. Airborne PM was analysed for these heavy metals: Fe, Zn, Cd, Mn, Pb, Cu, Cr and Ni. All of the metals in PM2.5 and PM10 had higher concentrations in spring than in summer, except Cr in PM10 which shows similar concentrations between spring and summer. Seasonal differences in the metal concentrations may be due to differences in wind directions with some winds passing through industry or traffic areas. Analysis of enrichment factors of heavy metals showed highly enriched Cd, Zn, Pb and Cu. Principal component analysis for the heavy metals in PM2.5

ones. Nevertheless, elevated indoor concentrations were recorded, caused by increased ambient air penetration in the indoor microenvironments and/or indoor particle generation. The mean 24-h indoor PM10 concentration at all residences was 35.0 (10.7 μg/m³ during the warm period and 31.8 (7.8 μg/m³ during the cold period. The corresponding PM2 concentration was 30.1 (11.1 μg/m³ and 27.2 (3.6 μg/m³ during warm and cold periods, respectively. Regression analysis of indoor and outdoor concentration data revealed that indoor BC may be considered mainly of outdoor origin. A large fraction of the outdoor-generated PM2 and ultrafine and accumulation mode particles also seems to penetrate indoors, causing elevated indoor levels. The authors concluded cooking was the strongest contributor to indoor particle generation in residential microenvironments.

Authors: Diapouli, Evangelia; Eleftheriadis, Konstantinos; Karanasiou, Angeliki A.; Vratolis, Sterios; Hermansen, Ove; Colbeck, Ian; Lazaridis, Mihalis

Full Source: Aerosol and Air Quality Research 2011, 11(6), 632-642 (Eng)
Air pollution and health studies in China policy implications
2012-06-19

During the rapid economic development in China, ambient air pollutants in major cities, including PM10 (particulate matter with aerodynamic diameter ≤10 μm) and SO₂ have been reduced due to various measures taken to reduce or control sources of emissions, whereas NO₂ is stable or slightly increased. However, air pollution levels in China are still at the higher end of the world level. Less information is available regarding changes in national levels of other pollutants such as PM2.5 and ozone.

The Chinese Ministry of Environmental Protection (MOEP) set an index for “controlling/reducing total SO₂ emissions” to evaluate the efficacy of air pollution control strategy in the country. Total SO₂ emissions declined for the first time in 2007. Chinese epidemiological studies evidenced adverse health effects of ambient air pollution similar to those reported from developed countries, though risk estimates on mortality/morbidity per unit increase of air pollutant are somewhat smaller than those reported in developed countries. Disease burden on health attributable to air pollution is relatively greater in China because of higher pollution levels. Improving ambient air quality has substantial and measurable public health benefits in China. It is recommended that the current Chinese air quality standards be updated/revised and the target for “controlling/reducing total SO₂ emissions” be maintained and another target for “reducing total NO₂ emissions” be added in view of rapid increase in motor vehicles. The authors concluded that continuous and persistent efforts should be taken to improve ambient air quality.

Authors: Chen, Bingheng; Kan, Haidong; Chen, Renjie; Jiang, Songhui; Hong, Chuanjie
Full Source: Journal of the Air & Waste Management Association 2011, 61(11), 1292-1299 (Eng)

Chinese epidemiological studies evidenced adverse health effects of ambient air pollution similar to those reported from developed countries, though risk estimates on mortality/morbidity per unit increase of air pollutant are somewhat smaller than those reported in developed countries.
The purpose of this study was to determine the Cr bioaccessibility from chromite ore processing residue (COPR) using the in vitro gastrointestinal (IVG) procedure. The bioaccessible Cr(VI) was 53.8 and 42.9%, respectively, in the gastric and intestinal phases from a total of 19,490 mg/Kg Cr(VI) in COPR. Food intake including milk, dough, and ascorbic acid resulted in a significant decrease in Cr(VI) bioaccessibility. Some organic acids such as lactic, malic, and citric acid moderately reduced Cr(VI), while acetic acid exhibited no capacity for Cr(VI) reduction curve (AUC) of the IVG extension was used to calculate bioaccessibility. Compared with the bioaccessibility conventionally estimated using concentrations at the end of the extension (CEP), the AUC technique should be implemented to confirm the accuracy of the IVG method when reduction of Cr(VI) occurs during the extension. The absence of Cr(VI) phases in extended residues as evidenced by XANES and XRPD analysis confirmed the Cr(VI) release and Cr(VI) reduction by food and ascorbic acid. With readily bioaccessible Cr(VI) and rapid human uptake, reduction of Cr(VI) might not be as effective a detoxification pathway as initially thought.

Authors: Yu, Siwu; Du, Jingjing; Luo, Ting; Huang, Yuying; Jing, Chuanyong

Are classical process safety concepts relevant to nanotechnology applications?

The answer to the question posed by the title of this paper is yes - with adaptation to the specific hazards and challenges found in the field of nanotechnology. The validity of this affirmative response is demonstrated by relating key process safety concepts to various aspects of the nanotechnology industry in which these concepts are either already practised or could be further applied. This is accomplished by drawing on the current author’s experience in process safety practice and education as well as a review of the relevant literature on the safety of nanomaterials and their production. The process safety concepts selected for analysis include: (i) risk management, (ii) inherently safer design, (iii) human error and human factors, (iv) safety management systems, and (v) safety culture.

Author: Amyotte, Paul R.
Full Source: Journal of Physics: Conference Series 2011, 304, 012071/1-012071/10 (England)