

JRC newsletter



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*Dainius Pavalkis,
Lithuanian Minister of
Education and Science*

During the period of the Presidency of the EU Council I was again reassured by the great number of European instruments at the disposal of the Member States, as well as of their citizens, that enable us – if properly used – to pursue the common goal of Europe being open, competitive and growing.

I see the activities of the Joint Research Centre as one such valuable instrument. As the Commission's in-house scientific service, the Joint Research Centre, with its strong scientific base and independence from national or corporate interests, is well placed to provide scientific support in the variety of research areas it covers.

I especially welcome the JRC initiatives to gather policy-makers, scientists, industries and other interested parties around the same table, seeking to promote dialogue on how scientific support can contribute to specific research issues.

“It is crucial not only for EU researchers and research policy bodies to work together but also to develop successful partnerships worldwide.”

Research has an essential role to play in supporting policy making in order to develop effective solutions to improve all aspects of life and economy. New global technologies do not progress either on scientific merit or infrastructure alone. The value chain for developing global technologies is complex. Significant political, financial and intellectual support is needed to advance new products through the stages of discovery and research; development of discoveries into usable products; regulatory processes to ensure product safety and licensure; introduction of new technologies to life; and scale-up and effective use of products by population.

Achieving the desired public and economic impact requires successful and timely progression through this value chain, which depends not only on financial commitment and political leadership from key stakeholders, but also on meaningful engagement with the concerned communities. Therefore strong collaboration between partners is critical at all steps.

The complexity of this challenge clearly demands a European level response. An appropriate European level of research and innovation with the involvement of all stakeholders can and should make a crucial contribution

addressing the challenges we face today and will be meeting in the future. Europe needs integrated technologies and applications, driven by consumer benefits, quality of life, health care, sustainable development and the strong industrial potential for achieving previously unavailable solutions.

Furthermore, the need to solve global challenges, through an integrated approach and widespread cooperation should never be underestimated. Living in a “global village” we always need to remember that global challenges need a global response. Therefore it is crucial not only for EU researchers and research policy bodies to work together but also to develop successful partnerships worldwide.



Paola Testori, Director-General of DG Health and Consumers, Minister Dainius Pavalkis and MEP Antonya Parvanova at JRC's Round Table on Scientific Support to Public Health, 14-15 November 2013.

Dainius Pavalkis,
Lithuanian Minister of Education and Science

New eco-friendly infrastructure inaugurated

New office space and research facilities on environment and health were inaugurated on 17 October at the JRC Ispra site in northern Italy. This more environment-friendly and energy-efficient infrastructure will replace many unsustainable scattered buildings and lead to a 6% energy saving. Bringing together around 450 scientists in one place, the new infrastructure will facilitate multi-disciplinary work and exchange of ideas. This marks an important milestone in the renewal of the European Commission's third biggest site after Brussels and Luxembourg.

The new buildings host a unique data base that keeps track of worldwide CO₂ emissions. The work carried out in the new labs deals with food security, sustainable agriculture, marine and maritime research as well as the bio-economy. The new structure is an example of the JRC's application of advanced environment-friendly methods and technologies. A heat pump integrated with the existing waste water

treatment plant and photovoltaic panels will contribute to the sustainability of the buildings.

The new facilities also strengthen the JRC's capability to deliver top-level scientific advice for policy-making and enhance the JRC's support to Horizon 2020, the new programme for research and innovation to be launched at the end of this year.



JRC Director-General Dominique Ristori, MEP Vittorio Prodi, Commissioner Máire Geoghegan-Quinn and Vice-President Maroš Šefčovič (from left to right) inaugurating the new science building at JRC Ispra.

Science in support of growth and jobs in the cultural and creative industries

At its first high-level conference on 24 October on cultural and creative industries (CCIs), the JRC brought together stakeholders to explore the role of science in supporting growth and jobs in this sector and related fields.

According to the 2010 European Commission's Competitiveness Report, CCIs accounted for 3.3% of GDP and employed 6.7 million in the EU. The aim of the initiative is to create a network of policy-makers, industry representatives, scientists and academics which can identify the scientific needs –

such as better metrics and stronger evidence – to exploit the potential of CCIs to the fullest.



Commissioner Androulla Vassiliou and JRC Director-General Dominique Ristori at the Round Table on cultural and creative industries.

PV Conference: Europe remains world leader in solar panel installations

Despite a crisis-driven decline in investment, global production of photovoltaic (PV) cells grew by 10% in 2012 in comparison to 2011. Europe remained leader in newly installed capacities with over half (51.7%) of the new worldwide capacity of 30 GW. These are some of the highlights of the 12th edition of the JRC PV Status Report, released at the opening of the 28th European PV Solar Energy Conference.

The conference, whose technical programme is co-ordinated by the JRC, is the biggest annual

event on solar energy worldwide. This year's edition was held from 30 September to 4 October in Paris.

According to the report, newly installed capacities brought the total solar PV systems capacity in Europe to 69 GW, enough to meet 2.4% of Europe's electricity demand or to power all Italian households. Within the EU, Germany tops the list with an additional 7.6 GW. Italy can now cover over 7% of its electricity demand thanks to 3.5 newly installed GW.

Read more:

PV Status Report 2013:
<http://iet.jrc.ec.europa.eu/remea/pv-status-report-2013>
 28th European PV Solar Conference and Exhibition:
<http://www.photovoltaic-conference.com/>

Building a Transatlantic Scientific Bridge on Eco-Industries

With the close cooperation of the US mission to the EU, the JRC organised a high-level meeting on 26 September, examining the scientific potential to support eco-industries and technologies on both sides of the Atlantic.

Eco-industries, including sectors such as air pollution management and control or waste collection and treatment, can play an important role in reconciling competitiveness and sustainability. With their potential for innovation and technological development, eco-industry companies can create and drive economic growth and jobs. Indeed, the global eco-technologies

market is estimated to account for €2,200 billion by 2020.

In his opening remarks, JRC Director-General Dominique Ristori underlined that eco-industries are a shared priority for the EU and the US, providing opportunities for joint actions in fields like sustainable manufacturing, the low-carbon economy and the water, waste, bio-economy and related standards. MEP James Elles, US Congresswoman Eddie Bernice Johnson and Robert Wood, Chargé d'Affaires ad interim at the US Mission to the EU, also addressed the participants at the conference opening.



From left to right: Robert Wood, Chargé d'Affaires ad interim at the US Mission to the EU, JRC Director-General, Dominique Ristori and James Elles, Member of the European Parliament.

Creating impact from excellent science – JRC conference



Transforming science into concrete results to underpin growth was the focus of the JRC conference “Scientific Governance: Excellence and Impact”, held on 15 October in Brussels. Harnessing scientific research to the benefit of innovation is also among the key priorities of Horizon 2020, the EU research programme to be launched in December this year.

High ranking experts and policymakers discussed how research activities could be optimised and prioritised, taking into account the international dimension, identifying best practices on scientific governance to advance the impact of research.

The conference focused on how to utilise scientific research to the benefit of innovation, which is one of the key priorities of Horizon 2020.

Climate change: the trouble ahead and the hope for falling emissions

The September announcement of the Intergovernmental Panel for Climate Change (IPCC), paints a grim picture of the Earth's future climate system. Global surface temperatures likely to exceed 1.5° C and pass beyond the threshold of 2° C, with the worst scenario projecting an increase of up to 4.8° C compared to 1986-2005. Sea level rise in the range of 0.26 to 0.82 m. Heat waves very likely to occur more frequently and last longer. Currently wet regions expected to receive more rainfalls and dry regions less.

The IPCC report looks into four possible scenarios and – due to a vast number of variables – abounds with “likely”, “very likely”, and “medium” or “high confidence” qualifications for its estimates. But it says that human influence on the climate system is clear. It concludes that most aspects of climate change will persist for many centuries even if CO₂ emissions are stopped, as cumulative emissions will largely determine the warming of the global surface.

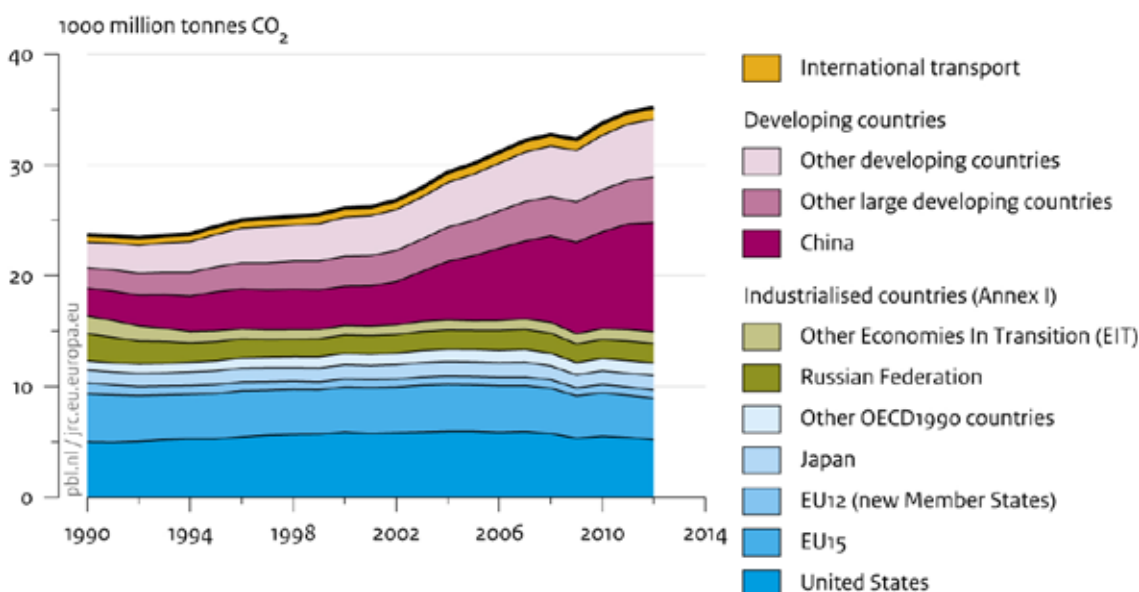
The JRC actively contributed to the IPCC Working Group I 5th Assessment Report through its research activities and its participation in projects dealing with climate change assessment and projections. The JRC's Emissions Database for Global Atmospheric Research (EDGAR), a global dataset of past and present greenhouse gas emissions and air pollutants, has been used for

common model analyses of past and future climate change drivers in several chapters of the assessment.

Tackling climate change becomes even more pressing following the deadly Typhoon Haiyan which struck The Philippines on 8 November, killing thousands of people and causing widespread destruction. It was an example of climate change and it should serve as a warning to mankind, the UN Head Ban Ki-moon said in a speech at the Tallin University in Estonia, before joining climate talks in Poland. Representatives of nearly 200 governments met from 11 to 22 November in Warsaw to discuss plans for a worldwide agreement to fight climate change. Such agreement should be reached by the end of 2015 and enter in force as of 2020.

EDGAR uses the latest scientific information and data from international statistics on energy production and consumption, industrial manufacturing, agricultural production, waste treatment/disposal and the burning of biomass, in order to model emissions of greenhouse gases and air pollutants for all countries of the world in a comparable and consistent manner. The EDGAR dataset is unique in that it provides emissions data as far back as 1970, 20 years prior to the

Global CO₂ emissions per region from fossil-fuel use and cement production



Source: EDGAR 4.2FT2010 (JRC/PBL, 2012); BP, 2013; NBS China, 2013; USGS, 2013; WSA, 2013; NOAA, 2012

Global CO₂ emissions per region from fossil-fuel use and cement production.

Read more:

EDGAR website and “trends in Global CO₂ emissions: <http://edgar.jrc.ec.europa.eu/index.php>

Report “Impacts of the EU biofuel policy on agricultural markets and land use”: <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6559>

Projection of Economic impacts of climate change: <http://peseta.jrc.ec.europa.eu/>

reference year for the Kyoto protocol, 1990. The global past and present day anthropogenic emissions of greenhouse gases and air pollutants by country are publicly available through the EDGAR website.

Besides keeping track of worldwide CO₂ emissions, the JRC also studies climate change impacts on the European economy. PESETA and PESETA II (Projection of Economic impacts of climate change in Sectors of the EU based on bottom-up Analysis) provided consistent multi-sectorial assessments of climate impacts based largely on EU funded projects and JRC large biophysical models.

CO₂ emissions slowdown: a permanent shift on the horizon?

The latest study carried out by the JRC and PBL Netherlands Environmental Assessment Agency – notwithstanding record global CO₂ emissions in 2012 amounting to 34.5 billion tonnes – reveals an encouraging downturn in the rising trend. “Trends in global CO₂ emissions”, published on 31 October, relies on the EDGAR dataset for greenhouse gases per country and on a 0.1 per 0.1 degree grid for all anthropogenic sources identified by the IPCC.

Last year’s emissions grew by 1.1% compared to 2011, well below the average 2.9% annual increase since 2000. Key factors included the US shift from coal to shale gas, and China’s 23%

increase in hydropower use. According to the report, this is a remarkable shift and “may be the first sign of a slowdown in the increase of global CO₂ emissions, and ultimately of declining global emissions”. It signals a turn towards less fossil-fuel intensive activities, more use of renewable energy and increased energy saving.

However, for a stable decline of emissions, the report lists three conditions: China achieving its own energy targets for 2015 and 2020, the US continuing to increase its share of gas and renewables in the energy mix and the EU restoring the effectiveness of the Emissions Trading System to further reduce actual emissions.

Increases in fossil-fuel consumption in 2012 were 2.2% for natural gas (the United States is currently the world’s largest gas producer), 0.9% for oil products, and 0.6% for coal (China is still the world’s largest coal consumer) compared to 2011. In comparison to 2011 there were increases in coal consumption in Europe of 3% (mainly caused by Spain, the United Kingdom and Germany), which indicates that coal with relatively low prices (especially from cheap US coal imports) backs up the intermittent use of renewable energy, also compensating the reduced share of nuclear energy.

The share of the ‘new’ renewable energy sources (solar, wind and biofuel) increased with accelerating speed: it took 15 years from 1992 for the share to double from 0.5% to 1.1%, but only 6 more years to do so again, to 2.4% in 2012.

Food crop prices with or without biofuels

The use of biofuels is part of EU policies on deployment of renewable energies in the fight against growing CO₂ emissions. JRC research has addressed challenges related to the production and use of biofuels, such as greenhouse gas emissions (GHG) from indirect land use change (ILUC) and increase in food crops prices.

The latest JRC report on biofuels, based on model simulations, provides indications of the possible effects of different biofuel policy options for the period 2012-2022 through the development of a baseline (reference scenario) and counterfactual scenarios. As with all model exercises the results are subject to uncertainties of the economic, market and policy environment assumptions used.

If food-based biofuels in the EU were limited to 5% to meet the 10% renewable energy target, world prices would remain up to 3% below the

baseline, except for vegetable oils with a drop of about 7%. In terms of land use of potential biofuel feedstocks (cereals, oilseeds, sugar crops and palm oil) prospects under the 5% threshold proposal indicate a reduction compared to the baseline of 2.7 million ha worldwide (arable land in the world is 1,396 million ha, according to FAO data for 2011).

Under this modelling exercise, a no biofuel policy in the EU would result in a very low biofuel production (biofuels in fuel use 2.1%). The impact of such a policy scenario on world prices might be particularly significant for vegetable oils (almost 15% decrease), while other feedstock prices (wheat, maize and sugar) would be at most 5% below the base. About 6 million hectares less (0.7% of the world’s arable land dedicated to cereals, oilseeds, sugar crops and palm oil in 2020) would be harvested compared with the current scenario.

A new single innovation indicator measures the output of member states

A new single innovation indicator, which the JRC helped develop, was presented during the European Council Summit on 24 and 25 October. The indicator focuses on innovation output and measures the extent to which ideas from innovative sectors are able to reach the market,



The indicator will support policy-makers to remove bottlenecks which prevent innovators from translating their ideas into successful products and services.

providing better jobs and making the EU more competitive.

The JRC investigated the conceptual coherence and the statistical robustness of the indicator by using self-developed state-of-the-art statistical methodologies to perform the necessary simulations and validation tests aimed at improving the quality of the indicator. The indicator is based on the following four criteria: technological innovation as measured by patents, employment in knowledge-intensive activities as a percentage of total employment, competitiveness of knowledge-intensive goods and services, and employment in fast-growing firms of innovative sectors.

According to the proposed indicator, Sweden, Germany, Ireland and Luxembourg are the EU Member States getting the most out of innovation. A comparison with some non-EU countries shows that the EU as a whole does well. Switzerland and Japan have a clear performance lead, but the EU is more or less even with the United States on innovation output.

Without wild pollinators, yields of food crops dependent on pollination could fall by 25-32%

A recent article by JRC scientists published in the journal *Land* has mapped and assessed the pollination potential for food crops at European scale. This helps estimate the contribution of wild pollinator insects to crop production and identify landscape areas in Europe with a deficit in potential pollination. Assessing large-scale patterns of the availability of pollination services and identifying potential mismatches with the demand of agricultural crops could be used in EU and national agricultural and biodiversity policies.

Insect pollination is necessary for up to 75% of global crops that are used as human food, and for 84% of European cultivated crop species. JRC scientists from the Institute for Environment and Sustainability developed an index of relative pollination potential (RPP), which is defined as the relative capacity of ecosystems to support crop pollination. For this, they applied data on European land cover, land use, and climate to the RPP index model and linked this to regional crop production statistics. RPP is found to be higher in warmer areas with high nesting suitability that offer abundant foraging resources such as nectar-carrying plants and flowers.

The article concluded that the yield of food crops pollinated by insects, such as wild bees, could fall by 25-32% if such pollination were no longer available. This finding strengthens the argument that biodiversity and ecosystem services are crucial to food security and human welfare, and must be protected.



Read more:

Communication "Measuring innovation output in Europe: towards a new indicator" http://ec.europa.eu/research/press/2013/pdf/indicator_of_innovation_output.pdf

Read the full article by JRC scientists: Linking Land Cover Data and Crop Yields for Mapping and Assessment of Pollination Services in Europe. <http://www.mdpi.com/2073-445X/2/3/472>

GBIO: a new platform uses ICT to share global biodiversity knowledge

Read more and contribute to the GBIO on its dedicated website: <http://www.biodiversityinformatics.org/>

A JRC co-authored report describes a Global Biodiversity Informatics Outlook (GBIO) platform which brings together and makes available harmonised and comprehensive information of the biodiversity of our planet, and how best to protect it.

The GBIO uses the latest information and communication technologies to share knowledge on biodiversity on a global scale. It intends to gather recognised global standards and practices and to organise past and developing information on biodiversity making it readily available in digital format. The JRC's Digital Observatory of Protected Areas (DOPA) is presented as one of the tools within the GBIO to assess the status, trends and impacts of potential changes in biodiversity.

The GBIO is intended to be a dynamic and interactive process and identifies four major focal areas – understanding, evidence, data and culture – each with a number of core components, to help coordinate efforts and funding. The 17 international contributors from a wide range of disciplines agree these are the essential elements

of a global strategy to harness biodiversity data for the common good.



The new GBIO platform will facilitate the exchange of information on biodiversity across the globe.

Read more:

JRC Technical Report: LUCAS Topsoil Survey: methodology, data and results by Tóth, G., Jones, A. and Montanarella L. (eds.), 2013 http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/EUR26102EN.pdf

A new baseline of organic carbon stock in European agricultural soils using a modelling approach by Emanuele Lugato*, Panos Panagos, Francesca Bampa, Arwyn Jones, Luca Montanarella <http://onlinelibrary.wiley.com/doi/10.1111/gcb.12292/abstract>

Survey looks into topsoil characteristics at a pan-European scale

A first ever, EU wide exercise on sampling topsoil – the top layer of 20 cm – has produced a harmonised and comprehensive dataset on topsoil properties. The findings of the exercise carried out by JRC researchers are described in the report LUCAS Topsoil Survey: methodology, data and results. It is the result of a monitoring project – Land Use/ Cover Area Frame Survey (LUCAS), started in 2009 and aimed at producing coherent, top-soil data set of the EU.

A comparative soil

assessment of European regions and countries and a series of maps show the variation of individual topsoil parameters across the EU, including the soil organic carbon (SOC) content of the EU's topsoil. The report describes significant variations in soil properties between different land cover types and different climatic zones. The database provides an excellent baseline against which to assess changes in topsoil characteristics across the EU, but full soil profile descriptions, deeper than 20 cm, would be essential to allow the assessment of the dynamics of soil resources in Europe.

The LUCAS survey has also served well to estimate the lack of soil organic carbon (SOC), especially in agricultural soils. SOC is an indicator of soil quality and a means to offset CO₂ emissions through soil carbon (C) sequestration. A comprehensive model platform has included also countries from the Western Balkans and Norway. Generally, higher soil respiration was offset by higher soil carbon input as a consequence of increased CO₂ atmospheric concentration and favourable crop growing conditions, especially in northern Europe.

The first ever EU-wide survey on topsoil is part of Land Use/ Cover Area Frame Survey (LUCAS), which will provide data on topsoil across the EU.

EU fishing fleet remains profitable

The 2013 Annual Economic Report (AER) on the European Fishing Fleet, produced by the JRC and independent experts finds that the economic performance of the EU fleet has improved gradually over recent years, from a net profit margin of 1% in 2008 to 6% in 2011. Less fish landed but higher market prices helped the EU fishing fleet stay profitable in 2011. While costs incurred by the fleet increased in 2011, income also increased proportionally. Subsequently, the fleet's economic performance showed improvements since 2010, with 6% of income retained as net profit.

Remarkably, this growth occurred despite rising fuel prices. Fuel costs together with labour costs are the major outlays for the EU fleet, which saw the average price of fuel increase by almost 30% compared to 2010. However, the amount of fuel consumed by the EU fleet decreased 6% in 2011, possibly in an attempt to counterbalance the increased costs, coupled with changing fishing behaviour and investment in more fuel efficient technologies.

While overall the EU fleet was profitable in 2011, the economic performance by Member State and fleet segment revealed mixed outcomes with six national fleets and around 45% of the fleet segments making net losses. For several fleets the total operating costs (including capital

costs) were higher than the total income, but on average they accounted for 94% of total income in 2011. This is an improvement compared to the situation in the three previous years: 2008 (99%), 2009 (96%) and 2010 (95%). Innovation projects and recovery of some stocks are some of the factors that might have led to a better economic performance.



Fishing activities are the main source of income and employment for many coastal communities.

Read more:

JRC activities on maritime affairs:
<http://ipsc.jrc.ec.europa.eu/?id=63>

Two new certified milk powder reference materials released

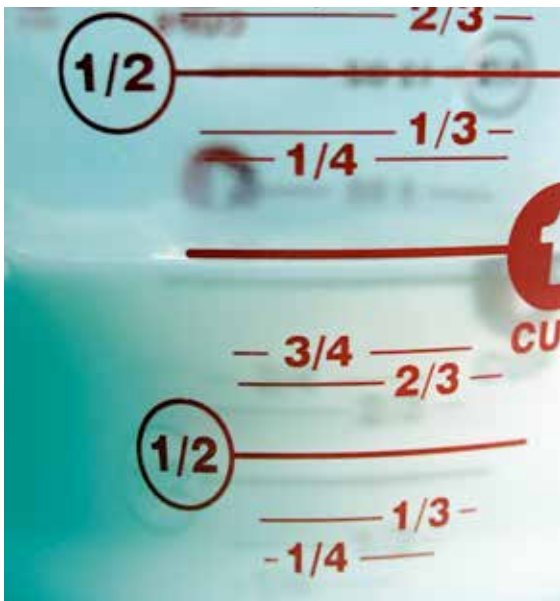
The JRC on 14 October launched two new certified milk powder reference materials, making the many measurements related to the

dairy sector trustworthy and thereby ensuring safety of food products on the market. These European Reference Materials, ERM[®]-BD150 and ERM[®]-BD151, are certified for essential nutrients at trace and major constituent levels, as well as potentially toxic contaminants. Both are capable of detecting 15 elements, including sodium, mercury, iron, lead, phosphorous, and calcium. This will support the dairy sector (producer and user) and food industry (user) to control the nutrient profile of their milk powder based products and to comply with limits set in European legislation for some of the trace elements.

In the EU, hundreds of millions of tonnes of milk are processed annually. Milk powder is used in a wide range of food products, and its stability and ease of transport makes it an important commodity for international trade and humanitarian aid. Reliable testing of milk powder is therefore essential both to assess its quality and to ensure its safety. The JRC is second largest producer of matrix certified reference materials worldwide.

Read more:

List of reference materials:
http://irmm.jrc.ec.europa.eu/reference_materials_catalogue/Pages/index.aspx



The certified reference materials for milk powder will ensure the safety of products on the market.

Studying the biodistribution and fate of nanoparticles: is radiolabelling the answer?

Read more:
Llop J, Gómez-Vallejo V, Gibson P. Quantitative determination of the biodistribution of nanoparticles: could radiolabelling be the answer. *NANOMEDICINE* 8 (7); 2013. p. 1035-1038. JRC81805

Nanoparticles of different types have a wide range of applications and are incorporated into a number of consumer products, including some foods and cosmetics. In nanomedicine, new applications are under study such as targeted drug delivery systems. However, the increased use of nanoparticles has also raised concerns related to potential toxicological effects derived from long term workplace, environmental or consumer exposure.

For both nanomedicine and nanotoxicology studies a method to quantitatively track the nanoparticles after incorporation or administration into animal models is highly desirable in order to study nanoparticle biokinetics, including nanoparticle passage across biological barriers and possible long term accumulation. In this context, the JRC - using its MC40 Cyclotron facility - collaborates with CIC biomaGUNE (San Sebastian, Spain) in researching methods for labelling nanoparticles with gamma emitting radioisotopes in order to facilitate such in vivo studies. A recently published article by scientists from both institutions discusses the advantages of nanoparticle radiolabelling, the various strategies by which radiolabelling might be

achieved, as well as the various difficulties and pitfalls of the technique.

The JRC's work on radiolabelling focuses on isotopes of a long enough half-life for tracing studies over several weeks or months, while CIC biomaGUNE up to now has focused on labelling with shorter-lived isotopes suitable for PET imaging of nanoparticle biodistribution over several hours. Radiolabelling of nanoparticles may also be used for sensitive and accurate in vitro studies, as well as for other tracing applications such as quantitative evaluation of the environmental transport of nanoparticles or for assessing their possible release from consumer products.



The article looks at advantages of nanoparticle radiolabelling, as well as the various difficulties and pitfalls of the technique.

Smart grids: the challenge of engaging the users

Read more:

Consumer engagement: An insight from smart grid projects in Europe:
<http://publications.jrc.ec.europa.eu/repository/handle/11111111/29167>

How involved are consumers in the future electricity system? What do they know about 'smart grids', electricity networks where electric power and communication not only flows from supplier to consumer, but also the other way round? The incorporation of new information and communication technologies into the electricity network will turn the consumers, traditionally passive end-users, into active players.

The search for innovative regulatory, technical and market solutions – such as anticipating the consumers' patterns and preferences or installing

Advanced Metering Infrastructure – to change the way consumers perceive commodity electricity is on the increase, according to a JRC overview of the current developments in strategies to engage consumers in Europe in smart grids. However, many energy providers still need to further explore the best ways of presenting information on smart grids to the consumers and to develop social marketing strategies in which information is tailored to the needs and perceived barriers of segments of the population.

The JRC study analyses which activities have been undertaken and what the obstacles are to gain deeper knowledge of consumer behaviour and to motivate consumers to become active energy customers. Some strategies included providing information about real-time energy consumption, or measuring behavioural change induced by feedback such as comparative monthly bills or in-home displays. As most of the obstacles had to do with a high-level of consumer scepticism and wariness, the key to successful strategies for consumer engagement lies in building trust and confidence among consumers.

The search for innovative ways to engage consumers in smart grids is on the increase, but more strategies still need to be further explored.



Fuel cell test procedures: an overview that eyes harmonisation

With their overview of international polymer-electrolyte fuel cell (PEMFC) test procedures, the JRC, together with the Argonne National Laboratory (ANL) of the US Department of Energy (DoE), made the first step towards global harmonisation of testing protocols.

PEMFCs and fuel cell stacks are being considered for automotive applications and it is important to understand how different organisations characterise their performance and durability. This way different test methods can be harmonised and standardised, facilitating information exchange and possibly accelerating their commercialisation.

The report 'Fuel Cell Testing Protocols: An International Perspective' lists two different ways to conduct performance tests (sequential and random polarisation curve measurements) and five load profiles (duty cycles) for durability

testing, including the DoE Dynamic Stress Test (DST) duty cycle and the new European driving cycle (NEDC) simulating vehicle power demand in a European city.

Some approaches impacted the data and data quality, others did not. Two methods for measuring polarisation curves showed minimal result differences. The magnitude of the differences between the various ageing duty cycles – some reflected vehicle power demands of a typical European city, others those of an average US city with a higher average speed – needs to be further examined.



Read more:

Fuel Cell Testing Protocols: An international perspective: <http://publications.jrc.ec.europa.eu/repository/handle/111111111/28594>

Fuel cell stack undergoing testing at the JRC facility in Petten, The Netherlands

First EU e-Inclusion map measures the potential for improved digital literacy

A EU-27 survey of intermediary organisations operating on the education, social and employment sectors and providing IT training has produced a first ever assessment of the e-Inclusion intermediary sector. It accounts for a total of 250,000 organisations, or one e-Inclusion actor per every 2,000 inhabitants. One in two employs 10 staff or less and operates on a budget smaller than €100,000. Half of the e-Inclusion actors go further and offer employment-related training. And for two out of three, local government funding is the main financial resource.

Using a computer and common office software has almost become a necessary skill to access the job market in the 21st century. Understanding the sector which provides digital training outside

formal education can help policymakers to shape guidelines for a more inclusive labour market, one of the main goals of the European Commission's Europe 2020 Strategy for smart, sustainable and inclusive growth.

The study "Mapping e-Inclusion actors in EU27" was carried out in co-operation with Telecentre-Europe and the University of Washington Information School. It surveyed nearly 3,000 organisations from the public, third and private sector, which play a central role in fighting digital exclusion and developing employability. The study examined the way e-Inclusion actors operate, looking at programmes and the services they provide, their funding, target groups and users data collection.

Read more:

MIREIA research project: <http://is.jrc.ec.europa.eu/pages/EAP/einclusion/MIREIA.html>

Read more:

DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=6359>

Project information: <http://is.jrc.ec.europa.eu/pages/EAP/DIGCOMP.html>

Developing and understanding digital competence in Europe

In co-operation with the European Commission's Directorate General Education and Culture, the JRC has designed a Framework for Developing and Understanding Digital Competence in Europe. The project aims at providing a better insight in the Europeans' digital prowess, declared by the EU one of the eight key competencies for lifelong learning. The framework is the output of the review of existing information and a wide stakeholder consultation. It consists of detailed descriptions of all competences

that are necessary to be proficient in digital environments and describes them in terms of knowledge, skills, and attitudes. The project identifies five competence areas – information, communication, content creation, safety and problem solving, each of them consisting of several competences (21 all together). The report also provides a self-assessment grid for mapping digital competence levels, and distinguishes between three proficiency levels (foundation level, intermediate level and advanced level).

Study designs low level radioactivity capacitor for more sensitive detectors

Read more:

The European Physical Journal C, High voltage capacitors for low background experiments, C. O'Shaughnessy, E. Andreotti, D. Budjáš, A. Caldwell, A. Gangapshev, K. Gusev, M. Hult, A. Lubashevskiy, B. Majorovits, S. Schönert, A. Smolnikov, Eur. Phys. J. C (2013) 73:2445

DOI 10.1140/epjc/s10052-013-2445-3
http://download.springer.com/static/pdf/471/art%253A10.1140%252Fejpc%252Fs10052-013-2445-3.pdf?auth66=1379668393_d01b63793039e195ed7489aad5d2074b&ext=.pdf

A radiopure capacitor (a fundamental electronics component) that is suitable for use in gamma-ray detectors operating underground has been developed during a recent study, which featured the contributions of scientists from the JRC. This new 'radiopure' capacitor has much less radioactivity compared to what is naturally present in a normal capacitor, and fills a gap in equipment needed to measure low radioactivity levels. Low-level radioactivity measurements are becoming increasingly important in many



fields, from tracing radionuclides from Fukushima around the world and detecting illegal nuclear activities, to developing reference materials for food monitoring.

The best gamma-ray spectrometry measurements are performed underground in order to avoid the background of cosmic rays. Specially designed detectors made from selected radiopure materials are fundamental to guarantee accurate results and reliable measurements since signals from electronics (capacitors, transistors, etc.) can swamp the weak signal from a sample. The activities of uranium and thorium, for example, are more than 100 times reduced in this new capacitor compared to a conventional capacitor sitting in a TV or a radio.

Natural radioactivity is present everywhere. Even the human body contains about 6000 Becquerel (Bq) of radiation. It is important to be able to measure very low activity levels (10 million times lower than what is naturally present in the human body) in order to trace certain processes in nature or industry. Since radiation-detectors also contain natural radioactivity, detectors from radiopure materials are needed to detect low-levels of radioactivity.

A JRC scientist testing underground gamma-ray spectrometers.

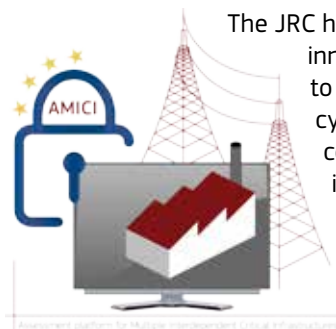
DISCOVER JRC'S SCIENTIFIC TOOLS AND DATABASES

JRC software to assess impact of cyber-threats against physical infrastructures

Read more:

The AMICI site :
<http://ipsc.jrc.ec.europa.eu/?id=692>

The AMICI software:
<http://sourceforge.net/projects/amici/>



The JRC has developed innovative software to assess the cyber-security of connected critical infrastructures (CIs), such as railway systems, energy networks or power plants. The AMICI software, which stands for Assessment platform for Multiple Interdependent Critical Infrastructures, provides a novel experimental approach as it takes into account both the virtual and the physical aspects of modern interconnected CIs.

These CIs are strongly interdependent and the dependencies often work both ways. Railroads, for example, depend on electrical power supply which

in turn depends on ICT networks, which again depend on electric power. AMICI can capture the complexity of these interactions entirely and can fully analyse the vulnerabilities of such complex systems, in contrast to traditional methods, such as software simulators or ad-hoc platforms equipped with instruments for testing and experimentation (test-beds).

The traditional approaches rely either on pure simulation or on experiments with real components only and can therefore only be used to test individual infrastructures but not their interactions. In addition, recent malware, such as Stuxnet - the first computer malware able to physically damage industrial systems has highlighted the lack of an efficient methodology to conduct experiments measuring the impact of cyber-threats against both the physical and virtual dimensions of CIs.

Scientific support to blue growth



Alessandra Zampieri, head of the JRC's Maritime Affairs Unit.

Who could be better placed for heading JRC's Maritime Affairs Unit than Alessandra Zampieri? A passion for the sea runs in her blood. She was born in Genoa and her father worked in the maritime sector of this busy Italian port. After her studies in maritime economics at Genoa's University, she moved to Brussels to board the Commission's Directorate-General for Transport. She started to dedicate her long working hours to maritime safety and continued to spend every possible minute of her free time near the sea.

In July 2009, she was nominated Unit Head of 'Maritime Affairs' at the JRC's Institute for Protection and Security of the Citizen (IPSC) and moved back to Italy. After many years on the policy side she was ready to face this new challenge, remembering: "I was tasked to support my former Brussels colleagues' decisions relating to marine and maritime issues with enhanced scientific evidence". Alessandra Zampieri's unit with some 70 staff members contributes to safe and resource efficient oceans and seas. It supports Europe's blue growth strategy with novel methods and scientific information for the sustainable management of activities at sea.

With her team she provides direct scientific back-up for all technology relevant questions that Commission services in charge of border control, maritime affairs as well as space and security policies are facing, to improve the safety at sea for all. Among many other innovative approaches, they developed the Piracy, Maritime Awareness and Risks (PMAR) system. This software identifies ship positions in real time and supports the fight against piracy.

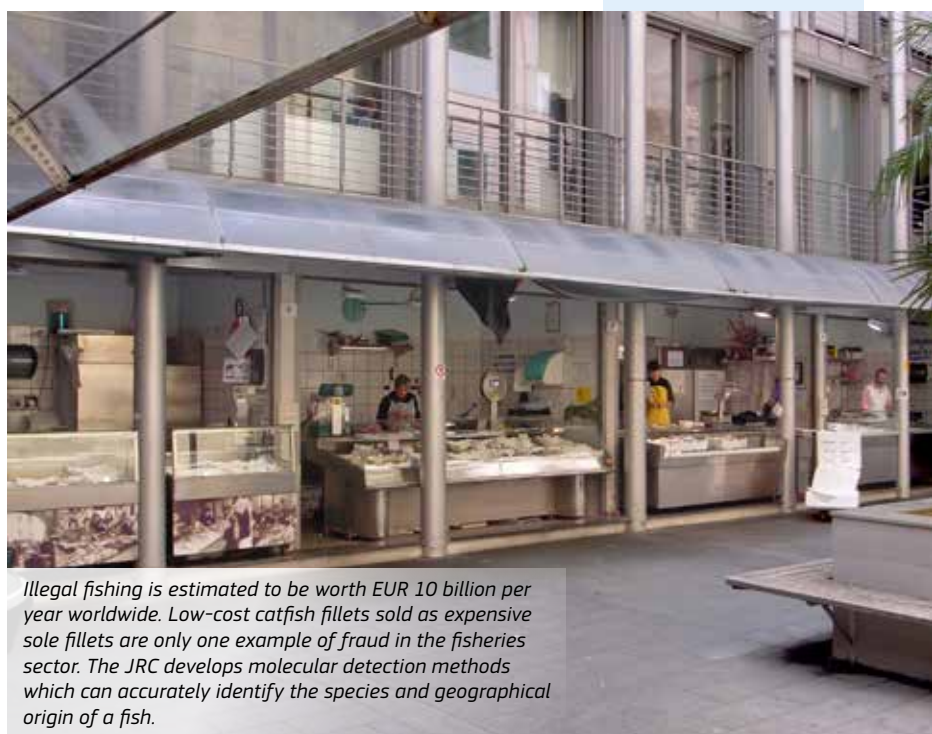
"Being able to offer immediate assistance to a Member State in need and to bring Europe closer to the citizen" is how Zampieri describes

a highlight of the recent past. Immediately after the Costa Concordia accident beginning of 2012, Zampieri's team deployed their portable tool MELISSA at the Giglio Island to support the Italian authorities in the monitoring of movements of the grounded cruise ship. The advanced radar system MELISSA made a fundamental contribution to ensuring the safety of search and rescue operations on and around the shipwreck.

Recently, the team published a study on the potential of strikes between whales and ships in the Mediterranean. They found that a speed limit for ships would drastically reduce the risk of fatal collisions in whale-rich areas. If Zampieri's unit was a two-masted vessel sailing at the interface of science and policy, maritime safety and security would be one mast and sustainable management of fisheries the other one.

Sustainable exploitation of fish stocks and the fight against illegal fishing are key issues to economic growth from the oceans, seas and coasts. Zampieri and her team provide information on fisheries economics, fisheries management and the fight against fraud at sea. "With my long experience in the policy sector I feel in the ideal position to direct the scientific work to provide the right support and reference that is needed".

Asked about her plans for the future, Zampieri adds: "I am as open as the wide ocean towards new challenges that may come up on the horizon."



Illegal fishing is estimated to be worth EUR 10 billion per year worldwide. Low-cost catfish fillets sold as expensive sole fillets are only one example of fraud in the fisheries sector. The JRC develops molecular detection methods which can accurately identify the species and geographical origin of a fish.

JRC signs cooperation agreement with IASS

The JRC and the Potsdam based Institute for Advanced Sustainability Studies (IASS) agreed to foster cooperation in the field of sustainable soil management. The five year long Collaboration Agreement was signed on 30 October in Berlin,

during the Global Soil Week, which gathers international stakeholders for a knowledge sharing about soil, land use, access and ecosystems with the aim to influence land and soil policies for sustainable development.

JRC signs Memorandum of Understanding with ACEA

JRC and the European Automobile Manufacturers' Association (ACEA) agreed on 16 October to closer cooperation related to pre-normative research in the automotive and mobility fields. The Memorandum of Understanding (MoU)

outlines coordination of technical activities in the fields of e-mobility and interoperability, hydrogen fuel cell and battery electric vehicles, as well as CO₂ and pollutant emissions from light- and heavy-duty vehicles.

EXTERNAL RECOGNITION

Three JRC researchers awarded for excellence in science

JRC Director Elke Anklam received in September the Joseph-Koenig-Gedenkmuenze, a prestigious award from the Food Chemistry Division of the German Chemical Society (GDCh). Ms Anklam was awarded for her engagement in scientific support to EU food policy and European Member States for implementation thereof.

Emons was conferred a Certificate of Appreciation from the Association of Official Analytical Chemists (AOAC) for his outstanding contributions as a member of the Technical Division of the Reference Materials (TDRM) Executive Committee. Christoph von Holst and a team of scientists were granted the AOAC International Achievement in Technical and Scientific Excellence Award for developing guidelines to validate qualitative testing methods.

In two separate developments, two other JRC researchers were praised for their work. Hendrik

ISESS 2013 Best Scientific Paper Award to JRC author

JRC scientist Carlos Granell Canut was among the authors granted the Best Scientific Paper Award at the International Symposium on Environmental Software Systems (ISESS) 2013. Granell Canut was awarded for the paper 'The Future Internet Enablement of the Environment Information Space', which addresses the enablement of the Future Internet as a platform for software application in the Environmental Information Space.

The paper describes how the building blocks (the Generic Enablers, GEs) of an ICT core platform can fill the standardisation gaps in the use of environmental data and the creation of Future Internet environmental applications, but also points out that GEs need to be better harmonised and integrated, and that GE functionality needs to be extended to better support standardised geospatial data and processing.

JRC team wins award for best poster

A research conducted by the JRC in collaboration with the University of Milan was awarded with the "Vito Distante and Stefano Ciatto prize" as the best poster presented by an author younger than 35 during the annual conference of the Italian Society for Mammography Screening (GISMa) held on September 24-26 in Turin, Italy. The JRC Public Health Policy Support team who won the award included Silvia

Deandrea, Crystal Freeman, Jesus Lopez-Alcalde, Donata Lerda, Ciaran Nicholl and Asli Uluturk.

The title of the awarded presentation is "Tools to assess women's satisfaction and perception of organised breast cancer screening programmes: a systematic review with a special focus on the Italian perspective".

3rd Round Table on Energy Transition from a European Perspective “Scientific support to the energy mix”

In close cooperation with the European Commission’s Directorate General for Energy and with the support of the German Federal Ministry for Economy and Technology (BMWi), the JRC on 8 November welcomed at this roundtable stakeholders from European and Member State authorities, energy utilities, transmission and distribution system operators, industry, financial services and consumers.



Christian Buchel, Deputy Director General of ERDF, and Vice-President of EDSO, Dieter Kühnenn, Head of Division, German Ministry for Economics and Technology, Edit Herczog, MEP, and Dominique Ristori, JRC Director-General.

UPCOMING EVENTS

JRC celebrates 50 years of its Institute for Transuranium Elements

Over the last five decades, the JRC has been providing world class scientific support in the nuclear research with its Institute for Transuranium Elements (ITU). On 21 November 2013, the JRC will mark this important milestone with a high-level workshop on “Nuclear Security

and Safety” organised in Karlsruhe, Germany. This will be the occasion to celebrate 50 years of outstanding achievements, but also to reflect on the future challenges in nuclear security and safety on the basis of the long term strategic work programme priorities for Horizon 2020.

Scientific support to efficient buildings

A roundtable on scientific support to energy efficient buildings will be held on 29 November in Brussels. The event will build upon the JRC conference on energy efficiency of vehicles and buildings that took place in March. The building sector and its related service industries are at the

core of Europe’s economy. They represent 10% of EU’s GDP, 22% of the industrial employment and 50% of all materials extracted from earth. The building stock represents 40% of the Union’s final energy consumption.

Scientific support to financial stability

On 16 December, the JRC will hold its 3rd roundtable on scientific support to financial stability. It will consider the open issues of the construction of a Banking Union and structural reforms of the EU banking sector. The event will gather

high-ranking financial experts, representatives of the research community, academics, heads of industry associations and policy makers to discuss the role that science can play for financial and economic issues.

Scientific support to energy markets

The 4th JRC-organised roundtable on Energy Transition from a European Perspective will take place on 18 December. The event will be held in the context of the European Forum for Science and Industry and gather policymakers and industry representatives alike, as well as

academia. As the deployment of renewable energies increases, creating new challenges for the power grids and energy markets, high-level stakeholders will meet to discuss the scientific support to capacity markets and the integration of renewables.

Jobs at the JRC:
<http://www.jrc.ec.europa.eu/jobs>

Jobs at the JRC

Recently published – Applicants must submit their application no later than the indicated deadline.

Ispra, Italy:

Trainee

- EASIN – European Alien Species Information Network - 28 November

Senior researcher (Cat.40)

- Scientific advice to the Common Fisheries Policy – 9 December

Karlsruhe, Germany:

Ph.D. student (Cat.20)

- Contrasting the mechanisms of conventional and spark plasma sintering of nuclear fuels – 4 December

The JRC Newsletter is a bi-monthly publication intended to provide JRC customers, stakeholders and other interested parties with an overview of recent highlights from the JRC's scientific achievements, policy support, contributions to events and other news.

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Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

