Engineering. Special effort is made to give practical examples of the applicability of concepts to the real world. On-going research activities foster a new philosophy in the industry, instilled alongside chemical reactions and processes. The methodology includes the co-supervision of Masters and PhD students developing collaborative projects with national companies.

### The Green Chemistry Centre of Excellence, University of York, UK

In addition to the successful Masters course in Green Chemistry & Sustainable Industrial Technology that has been running at the University of York for the past 15+ years, green chemistry will now be incorporated in the undergraduate chemistry curriculum at York, in both taught and practical material.

The Greener Reagents and Sustainable Processes (GRASP) project has been running for the past 2 years with the aim of addressing the use of hazardous/unsustainable chemicals in teaching labs and providing chemistry undergraduates with the requisite skills and knowledge to prepare them for future careers in the chemical industry.

The The Green Chemistry Centre of Excellence (GCCE) recently launched the RenewChem initiative, which incorporates graduate training as one of its core activities. The training will be specifically aimed at equipping future employees of the chemical industry with the requisite skills and knowledge to make an immediate impact on the transition to green manufacturing and circular economy within the chemical industries.

A bespoke e-learning platform has been developed with the aim of promoting the uptake of green and sustainable methodologies, with a particular focus on the synthesis of pharmaceuticals. The CHEM21* online learning platform comprises a range of free, shareable, and interactive educational and training materials that have been created in collaboration with industry.

Also via the CHEM21* project, the GCCE, in collaboration with other CHEM21* academic and industry partners, have organised a series of face-to-face training workshops aimed at graduates, PhDs, and post-docs covering topics such as metrics, route selection, safety, and biocatalysis, to name but a few.

We continue to engage Masters-level students and provide them with hands-on experience organising and delivering public engagement activities to a wide range of audiences, from primary school children to members of the general public. Many of the experiments and exhibitions have focused on obtaining chemicals from food waste in order toof introduce green chemistry principles in a way that is directly relevant to a non-technical audience. The GCCE also continues to engage with our international partners to share knowledge and examples of best practice, in particular through the Global Green Chemistry Centres or G2C2 network (http://g2c2.greenchemistrynetwork.org).

## NUTRIAGEING: Combining Chemistry, Cooking, and Agriculture

The website NUTRIAGEING was created to bring chemistry to the general public by demonstrating how chemistry offers unique solutions for society's needs in terms of healthy living and better ageing. It is now open to academic partners and the general public at **http://nutriageing.fc.ul.pt**. Offering modules to promote healthier nutrition, and showing the contribution of food chemistry to health, the website educates, not only on how to improve eating habits, but also on how to grow vegetables and condiments, demonstrating the added value of their chemical activity. In addition, games on the site offer entertainment and allow the user to confirm the knowledge acquired.

Developed within the scope of the IUPAC project "Healthy life and active ageing–the contribution of functional food ingredients" (2013-054-2-300) and the EU Project "Personalized ICT Supported Service for Independent Living and Active Ageing" (GA 610359), this new platform was built for the transfer of scientific knowledge into usable personal advice, with a clean, easy-to-use, "app-like" interface with minimal menus. The responsive layout ensures device-independent accessibility and a good viewing experience for the user.

The website is structured around three major themes: (1) Healthy eating, (2) Recipes and videos, and (3) Vegetable gardens.

The **Healthy eating** section, developed by chemists, biochemists, and nutritionists, is mainly focused on nutritional literacy, supported by chemical and biochemical science. The How much should I eat subsection covers macronutrients and micronutrients, but also answers questions, such as "what type of fat should I choose for eating and cooking", "what about fiber", and "how much water should I drink". Further information covers calcium and salt intake, antioxidants, and functional ingredients, the latter also reporting findings that are the outcome of lab work to illustrate the importance of chemistry for the discovery of the active principles isolated from natural resources. Clinical nutrition focuses on the importance of an integrated approach for the nutritional evaluation of subjects. Nutritional risk factors, clinical nutrition evaluation, nutritional intake, anthropometric measurements, and nutritional status classification, and dietary plans are included in this subsection. Nutritional labelling, another subsection, aims to give the user concepts for informed choices when buying food products, covering the type of information available on the package, mandatory food information, how to understand it, reference intakes, *etc.* Finally, the Enjoy subsection is interactive, with quizzes that allow the user to evaluate if he/she knows how to make a balanced diet and word puzzles. Gaining knowledge with pleasure!

A **Recipes and videos** section is an innovation of this website. It includes 15 videos of recipes developed by the famous Portuguese chef, Hélio Loureiro. While cooking a recipe, he chats with two experts and a young researcher, discussing the chemical principles of recipe components and their benefits. Overall, about 23 experts in various areas of chemistry (*e.g.* organic, analytical, food chemistry, *etc.*) and biochemistry participated in the videos. Scientific discussions were conveyed to the public in a simple and understandable manner.

Finally, the **Vegetable gardens** section is another innovative area. The user may wish to produce some of the recipe ingredients in his/her garden. A landscape architect teaches users how to plan a vegetable garden in a variety of settings, from the backyard to the balcony or even small pots on the kitchen window. By accessing the recipe, *e.g.* one with peppermint, and clicking on the icon that appears on the word "peppermint", the user is taken to the vegetable garden section, where the information on how to grow this herb is given.

Enjoy, learn, cook, and eat with Nutriageing, and take part in some of the great pleasures of a healthy life!

*Lívia Sarkadi (Department of Food Chemistry and Nutrition, Szent István University) and Amelia Pilar Rauter (Universidade de Lisboa) (left) in the session dedicated to functional ingredients*

*Chef Hélio Loureiro, cooking and talking....*

*The Portuguese team standing on the periodic table at DQB-FCUL. From left to right: Antonio Ferreira, Marta Sousa Silva (FCUL), Helena Soares da Costa (INSA), Amelia Pilar Rauter, Antonia Turkman, Marília Antunes, Feridun Turkman (FCUL), and Tania Albuquerque (INSA). Absent: Alice Martins*

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**www.iupac.org/project/2013-054-2-300**