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INCA
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Consorzio Interuniversitario Nazionale
“La Chimica per l’Ambiente”



Interuniversity Consortium
“Chemistry for the Environment”



Research, Education, and Laboratories

The **Scientific Board** formulates the Consortium's scientific policy guidelines providing the Directive Board with advice in relation to scientific management issues of the Consortium's activities. The Scientific Board nominates a Coordinator among its members, who will participate in the Boards' meetings with a consultative vote. This board:

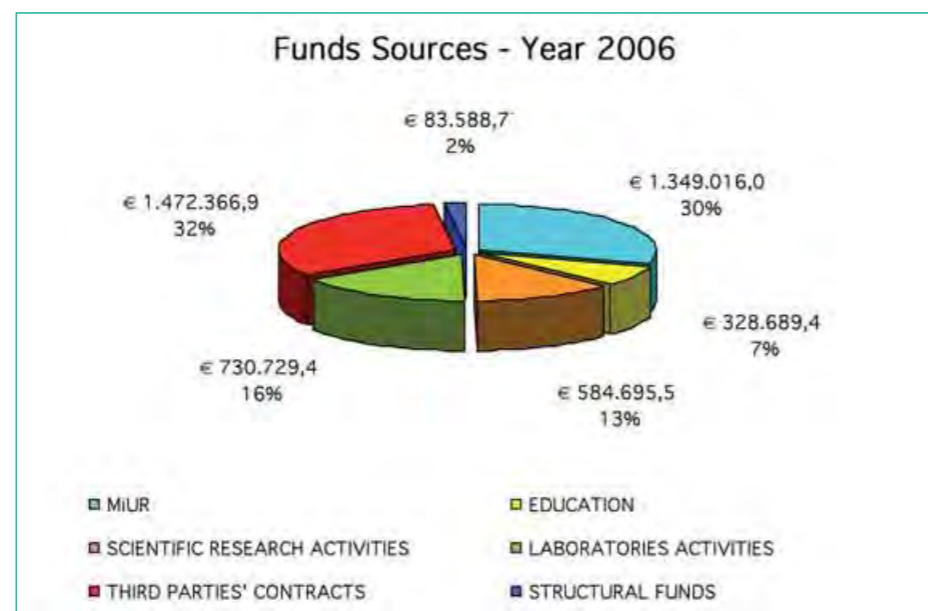
- predisposes the Long Term Activity Plans taking into account national and international research programmes in the field of environmental chemistry and submits them to the Directive Board's approval for financing;
- formulates operational proposals for the Consortium's scientific activities and gives technical and scientific advice on its activities;
- verifies the scientific significance of the Thematic Areas, Labs and Research Units' research in relation to the Consortium's objectives.

Administrative and accounting management audit is carried out by the **Board of Auditors** made up of three members. This board:

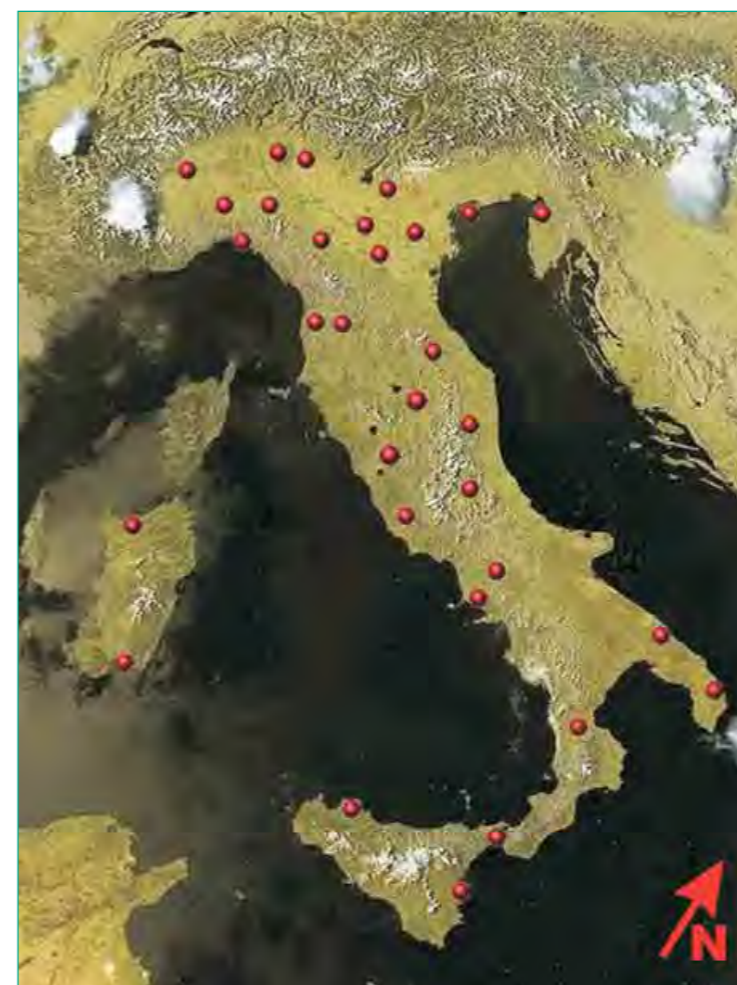
- elects the Board's President among its effective members;
- audits the Consortium's administration;
- verifies the implementation of the acts and ensures correct book-keeping and accounting;
- checks the budget and final balance, writes down the proper reports and carries out cash verification.

Sponsors and Funds

In order to finance its research activity, INCA Consortium relies on funds allocated by the Ministry of Education, University and Research (MiUR). In relation to international agreements, other funds come from the Ministry itself, other public administrations and public and private Italian organisations; funds and contributions are also allocated by several organisations working in cooperation with the Consortium to pursue its purposes and objectives (research activity and higher education, institution of laboratories and research structures). Finally, the Consortium also finances itself with revenues of the activities carried out by its Research Units and Labs concerning work orders, contracts and agreements with other organisations and national, international, public and private institutions.



History, Mission and Structure of the Consortium



In October 1993 five Italian universities - "Ca' Foscari" Venice, Lecce, Milano, Firenze, and "La Tuscia" Viterbo - signed the constitution act of the Interuniversity National Consortium "Chemistry for the Environment" (INCA). The main objective was to gather several competencies to create a coordinated network of chemists working in the field of environment protection. The Italian ex-Ministry for University, and Scientific and Technological Research (MURST) recognized the Consortium as a legal entity, with a decree on September 6th, 1994. Due to the quality of the network, in 1995 the number of member universities quickly increased to 21. Nowadays the Consortium is a non-profit organization which gathers 31 academies and about 80 research units:

Università degli Studi di Bari
 Università degli Studi di Bologna
 Università degli Studi di Cagliari
 Università degli Studi di Camerino
 Università degli Studi di Calabria
 Università degli Studi di Catania
 Università degli Studi di Ferrara
 Università degli Studi di Firenze
 Università degli Studi di Genova
 Università degli Studi di L'Aquila
 Università degli Studi di Lecce
 Università degli Studi di Messina
 Università degli Studi di Milano
 Politecnico di Milano
 Università degli Studi di Modena e Reggio Emilia
 Università degli Studi di Napoli "Federico II"

Seconda Università di Napoli
 Università degli Studi di Palermo
 Università degli Studi di Parma
 Università degli Studi di Pavia
 Università degli Studi di Perugia
 Università degli Studi di Piemonte Orientale
 Università degli Studi di Pisa
 Università degli Studi di Roma
 Università degli Studi di Sassari
 Università degli Studi di Torino
 Università degli Studi di Trieste
 Università degli Studi di Urbino
 Università degli Studi di Venezia
 Università degli Studi di Verona
 Università degli Studi di Viterbo



THE CONSORTIUM

The Consortium aims to a major involvement and commitment of chemists in scientific research for environment protection through the adoption of the principles of Green/Sustainable Chemistry. Valorisation and finalisation of intellectual resources and technological know-how of the Consortium's members are put into effect with research and educational activities in the following fields:

- a) Reactions and processes for:
 - the exploitation of renewable resources and energy saving;
 - the production of chemicals and commercial products compatible with the environment;
 - the deactivation/detoxification of dangerous chemicals;
 - the treatment, recycling, and final disposal of wastes.
- b) Formation and transformation mechanisms of natural and synthetic chemical compounds under natural conditions.
- c) Experimentally-validated chemical (and physical) models for comprehension and prediction of:
 - the distribution of chemicals and their transformation products;
 - the relationship between the structure and the properties of molecules in relation to their biological and toxicological activities.
- d) The development of advanced analytical methods for environmental monitoring.

Particular attention is turned to the interaction with the industry, including the SMEs, to favour the transfer of the knowledge acquired from research. Particular objectives of the Consortium are:

- Organisation and administration of own Advanced Research Laboratories besides those of its Research Units which operate within Universities and public and private enterprises.
- Coordination and development of scientific collaborations between such Research Units and work groups of the public and private enterprises.
- Sharing instrumentation and laboratories necessary to support the activity of doctoral studies (i.e. Ph.D.) and development of related programs.
- Promotion, through grants and courses, of education and training of experts in Green Chemistry.
- Performance of scientific consulting, as an independent organisation, including the applications of UE norms (ecolabelling, environmental risk assessment, etc).

In order to foster the scientific bases of sustainable development in Italy, the Consortium became one of the main scientific contacts of Italian and European Union's institutions, of public and private agencies, and private enterprises. The Consortium represents the connection between theoretical achievement, technological applications, education and information. Among its objectives the Consortium wants to strengthen the Italian position in the scientific programs of the EU.



The INCA headquarters in Marghera, located at the Scientific and Technological Park of Venezia (VEGA).



THE CONSORTIUM

The Ruling Bodies of the Consortium

The ruling Bodies of the Consortium are:

- THE DIRECTIVE BOARD
- THE PRESIDENT
- THE EXECUTIVE BOARD
- THE SCIENTIFIC BOARD

The Directive Board is responsible for the Consortium's governance and is composed of one representative for each Member University. Two additional representatives are appointed by the Ministry for the Environment and by the Ministry of Education, University and Research, respectively. The Directive Board:

- elects the President of the Consortium, chosen among the members of the Directive Board and, upon the President's proposal, elects the Vice-President and the Executive Board;
- determines the budget, its relative modifications and the final balance;
- designates the members of the Scientific Board suggested by the President;
- designates, with the Scientific Board's advice, the Directors of the Laboratories;
- designates the members of the Board of Auditors;
- decides upon conventions, contracts, work orders and scholarships;
- determines, with the Scientific Board's advice, the participation and permanence of Research Units and the establishment and abolition of Laboratories;
- implements the Rules of Execution;
- determines any issue relative to the Consortium's management.

The President of the Consortium is nominated by the Directive Board and is chosen among its members, being highly qualified scientific experts in the Consortium's fields of interest. The Vice-President, who replaces the President in case of absence or impediment, is chosen among the Executive Board's members. The President:

- convokes and chairs the Directive Board, the Scientific Board and the Executive Board;
- ensures the implementation of the Directive Board's decisions;
- signs conventions, contracts on behalf of the Consortium;
- predisposes the acts of the Executive Board, the Directive Board and the Scientific Board;
- implements every provision and carries out any functions that are delegated by other competent Bodies.

The Executive Board is responsible for assisting the President in the implementation and management of the political guidelines in Scientific Research determined by the Consortium's Directive and Scientific Boards, within its field of competence. It is composed of the President, who chairs the Board, five members elected among the Directive Board and three members, by rights and voteless, of the Executive Board: the Past-President, the Representative of the Labs' Directors and the Scientific Board's Coordinator. The Executive Board:

- predisposes the acts of the Directive Board;
- implements the provisions delegated by the Directive Board;
- puts into effect the Directive Board's provisions in case of urgency and necessity.



The Scientific Board of INCA

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The President and the Directive Board of INCA

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The Executive Board of INCA

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INTERNATIONAL EXPERIENCES IN GREEN CHEMISTRY



In Russia, Green Chemistry is seen under two different aspects: clean production and decontamination. Decontamination problems such as soil remediation are extremely important for an expanding economy like the Russian. Numerous projects funded by INTAS (the International Association for the Promotion of Co-operation with Scientists from the New Independent States (NIS) of the Former Soviet Union) and the Green Chemistry Group, recently constituted at Moscow Lomonosov State University and at the Russian Academy of Sciences, are to be included in this context. These programmes were financed by the Italian Ministry of Foreign Affairs.



The Chinese Academy of Sciences has also been involved in this sector. In fact, they organise every year a series of international symposia on green chemistry in China (ISGCC); the 8th event was held in Beijing on May 21-24, 2007. People in China pay much attention to green chemistry, and many green chemistry laboratories or green chemistry centres have been established in China during the past ten years.



The Green & Sustainable Chemistry Network (GSCN) created in Japan in 1988 is officially operating since year 2000 for the promotion of research and development in the sector of environment and public health protection, focusing on innovations that can be generated by Green and Sustainable Chemistry. It develops networking activities aimed at encouraging international collaboration, the diffusion of information concerning Green and Sustainable Chemistry and training. As in most industrialised countries, the GSCN awards prizes to companies that have contributed successfully to the promotion of sustainable chemistry through their research activities and industrial application. In March 2007 the GSCN, together with Asian-Oceanic Network (AON), organised the First Asian-Oceanic Conference on Green & Sustainable Chemistry (GSC-AON 2007) in Tokyo.

The purpose of the conference is to promote the advancement of the concept and technologies of Green & Sustainable Chemistry in Asian and Oceanic region.



In Italy, the National Interuniversity Consortium "Chemistry for the Environment" represents what's best in the field of Green Chemistry. The Consortium pursues its mission of supporting the diffusion of Green and Sustainable Chemistry by an intensive scientific research activity (basic and applied) and higher education programmes, the creation of networked laboratories, the development of international partnerships, the promotion of scientific dissemination in schools, the awarding of prizes for best projects in Green Chemistry to the industrial sector and to students of secondary schools.

To demonstrate the international relevance of its scientific and educational activity in this sector, it is important to underline INCA's direct involvement in most of the above described initiatives.

Specifically, INCA:

- is the coordinator of the Educational Acts on Green Chemistry for OECD;
- carries out the activities of the Inter-Divisional Sub-Committee on Green Chemistry created within IUPAC, and has published several diffusion works on Green Chemistry. The Conference in Dresden (September 2006) is organised within this context, the next conference will be organised in Moscow/St. Petersburg in September 2008.
- is member of the SusChem Mirror Group, consisting of representatives of Member States and other stakeholder organisations that allows coordination with national initiatives and projects on Sustainable Chemistry;
- is the reference point for the Italian Ministry of Foreign Affairs (MAE) as for scientific cooperation projects on Green Chemistry, in which it developed research and mobility projects with researchers from Russia, Argentina, Central and South American countries and Mediterranean countries;
- has signed several Memorandums of Understanding with the most important universities in Argentina (Cordoba, La Plata, Rio Cuarto), with Monash University (Australia), with the Suez Canal University (Egypt). These agreements aimed at the development of research and higher education programs, including exchanges of scientific personnel. Other important partnerships include the Russian Academy of Sciences and the Lomonosov State University.
- is among the promoters and active subjects of the Mediterranean Countries Network on Green Chemistry (MEGREC);
- is the promoter and organiser of the Summer School on Green Chemistry co-financed by the European Commission, that gathers researchers from all over the world, in 2008 at its 10th edition;
- has dedicated one of the Consortium's network laboratories to Green Chemistry: the INCA Laboratory of Marghera. It is the first facility in Italy fully dedicated to Green Chemistry, hub of the International Green Network-IGN and centre of acknowledged international relevance.
- publishes INCA News, a journal about activities, projects, achievements, and publications from INCA, in Italian with abstract of articles in English.
- publishes the monthly magazine "Green. La Scienza al servizio dell'Uomo e dell' Ambiente", through a sponsorship by the Ministero della Pubblica Istruzione. It is the only national magazine, mainly addressed to students and teachers, which provides information on Green Chemistry topics.



INTERNATIONAL EXPERIENCES IN GREEN CHEMISTRY

International Experiences
in Green/Sustainable Chemistry

The present cultural change favouring the success of an environmentally-friendly and sustainable chemistry is the result of the commitment of international organisations such as the Environmental Protection Agency (EPA), the Organisation for Economic Co-operation and Development (OECD), the International Union of Pure and Applied Chemistry (IUPAC) and the European Commission, or scientific organisations that are applying the national governments' policies.

From the '90s, in respect with environmental issues, EPA focused on prevention by supporting the diffusion of Green Chemistry through the Programme "Benign by Design". In fact, Green Chemistry is recognised for its capability of reducing the negative impact on human health and environment, thanks to the study and application of clean chemical processes able to eliminate or reduce the production and use of toxic substances.

In recent time the difference between Sustainable Chemistry and Green Chemistry is becoming more evident. Sustainable chemistry envisages an industrial involvement and promotion with the aim to achieve less pollutant processes and more valuable products, keeping at the same time the profit. Whilst Green Chemistry is more innovating since it is not necessarily connected to the profit, but it involves fundamental aspects and does not aim automatically to an industrial process. There is a great need to create a new type of chemistry focused on a new production system, in order to prepare the younger generation to reach a greener future. Besides, nowadays the globalization, induced by many factors (i.e. industrial development), pushes the chemistry community to adopt ethical issues. In this prospect Green Chemistry can achieve the approval of the society by teaching students to be confident in science and at the same time by convincing people that it is possible to achieve technological development respecting and having care of the environment in which we live. In order to achieve these objectives it is important that education and fundamental research are strictly connected.



In 1998 OECD Member countries endorsed the start of work on a new project called "Sustainable Chemistry" aimed at encouraging the development of environmentally benign chemicals. As a first step, a workshop, organised by INCA Consortium, was held in Venice (15-17 October, 1998) to focus on effective techniques and approaches in the field of sustainable chemistry and to identify activities that can further the development and use of sustainable chemistry programmes. This included dissemination of technical information, promoting the incorporation of sustainable chemistry principles into various levels of chemical education, promoting the research, discovery and development of innovative sustainable chemistry technologies. Italy was appointed leader of the Educational Acts; whereas USA and Japan were nominated co-leaders in the field of research and development. Work is underway on each of these approaches. In the 39th OECD Joint Meeting (February 2006) a Sustainable Chemistry Network was established for information exchange, review of new developments and further elaboration of incentives for Sustainable Chemistry.



In 1996, IUPAC promoted the creation of a "Working Party on Green Chemistry" aiming at developing actions in the Green Chemistry sector. With further effort, in 2001 IUPAC approved the establishment of the Interdivisional sub-Committee on Green Chemistry with the objective of promoting dissemination actions supporting Green Chemistry, by organising international workshops, symposia, and conferences in addition to preparing and disseminating numerous books (the Green Chemistry Series) on global topics related to green/sustainable chemistry, which are specifically aimed at university students. Current projects and activities include:

- projects related to publication, i.e. "Green Chemistry in Russia", "Green Chemistry in Latin America", "Green Chemistry in Africa";
- Global Climate Change - translation and dissemination of a monograph for secondary schools: Italian, English, Spanish and Portuguese versions are available, Russian and Arab versions are in press, Romanian version will be available soon;
- an online Green/Sustainable Chemistry Directory (IUPAC project 2002-029-1-300, jointly with INCA) www.incaweb.org/transit/iupacgdir/INDEX.htm.

IUPAC has dedicated two special issues of its publication Pure and Applied Chemistry (PAC) to Green Chemistry, one in 2000 (vol. 72) and the other in 2007 (vol. 79), an article on Green Chemistry has been recently published also in the journal Chemistry International (CI), vol. 29, n. 5.

IUPAC, in cooperation with INCA and the German Chemical Society, organised the first International Conference



INTERNATIONAL EXPERIENCES IN GREEN CHEMISTRY

on Green Chemistry that took place in Dresden in September 2006. The wide selection of topics offered at the conference attracted 450 participants from 42 countries among industrial researchers, representatives, university researchers, politicians, and students. The Second International IUPAC Conference on Green Chemistry will be held aboard a cruise-liner that will travel from Moscow to St. Petersburg in September 2008.



In 2005 the Carnegie Group (the biannual meeting of the G8 Ministers for Research) held in Victoria, Canada (June 2-3, 2005) and in New York (December 2-3, 2005), founded a research and training network on Green/Sustainable Chemistry; The International Green Network (IGN). The focus of the IGN is to provide coordination and sponsorship for scientific collaborations, training for the new generation of chemists, and support for sustainable use of chemistry in developing nations. Furthermore it will assist industrial production in G8 nations, fostering the development of novel competitive technologies, and address issues such as climate change, energy, and other environmental concerns from a chemical standpoint. The INCA Consortium was selected as IGN's hub. INCA organised the IGN kick-off meeting in Marghera-Venice (December 2005) and on 4th November 2006, at the NATO-ASI school, the IGN scientific representatives met in Galatina (Lecce, Italy) in the presence of delegates from China, the Arab Region, and Australia for the 2nd IGN board meeting.



The European Institutions are aware of the ongoing evolution too. One of the last events was the EU Workshop on "Sustainable Chemistry – Implementation of a Scientific Concept in Policy and Economy", organised by the German Federal Environment Agency (UBA) in Berlin, on 15-16 May 2007.

An important step in the history of green chemistry has been realized with the introduction of REACH (Registration, Evaluation and Authorisation of Chemicals), which was formally adopted on 18 December 2006 by the European Council of Environment Ministers. This new regulation aims to improve the protection of human health and the environment through improved assessment of chemical substances. Thus, the REACH Regulation gives greater responsibility to industry as manufacturers and importers will be required to compile information on the properties of their substances and to register the information in a central database. This regulation ultimately calls for a progressive substitution of the most dangerous chemicals when suitable and greener alternatives have been identified, which is the main goal of green chemistry itself. REACH was put into place on 1st June 2007.



The Seventh Framework Programme for research and technological development (FP7) is the European Union's main instrument for funding research in Europe, and applies to the years 2007-2013. FP7 is the successor to the Sixth Framework Programme (FP6). Sustainable chemistry is well represented in the programme, as developed with the input from scientific organisations such as SusChem, the European Technology Platform for Sustainable Chemistry, in which the German Chemical Society (GDCh) and the Royal Society of Chemistry (RSC) are major partners.



Another green chemistry network was founded in December 2005: the Mediterranean Countries Network on Green Chemistry (MEGREC). The network was created to further facilitate increasing collaboration between the European regions of the Mediterranean and North Africa on green chemistry issues, already set up within the Tempus Joint European Project "Sustainable Environmental Development, A Curriculum Development Project". The MEGREC founding institutions include the Suez Canal University, Ismailia (Egypt); University Institute of Science and Technology, (Barcelona, Spain); Fez University (Morocco); Belgrade University (Serbia); Athens University (Greece); and INCA, Venice (Italy). Tunisia and Algeria were officially admitted to MEGREC during the 2nd Board meeting held in Fez (Morocco) on April 28, 2006. The 4th MEGREC Board meeting took place on May 3, 2007, in Athens (Greece) and the next one will be held in Constantine (Algeria) in May 2008.



EuCheMS-European Association of Chemistry and Molecular Sciences promotes co-operation in Europe between non-profit-making scientific and technical societies in the field of chemistry whose membership consists largely of individual qualified chemical and molecular scientists and whose interests include the science and/or practice of chemistry. At the recently held EuCheMS General Assembly (Frankfurt, 4-5 October 2007) the formation of the Working Party on Green and Sustainable Chemistry, chaired by Professor Pietro Tundo, has been officially approved.



Spain's commitment for Green Chemistry is thoroughly represented by the activities of the Institut De Ciència i Tecnologia (IUCT), a centre for technological innovation and development, dedicated to scientific research, technological development, scientific services and education. The objective of IUCT is the development, implementation and promotion of new technologies and products for the Chemical, Pharmaceutical, Fine Chemicals, Environmental, Biotechnological and related sectors.



INTERNATIONAL EXPERIENCES IN GREEN CHEMISTRY



The Green Chemistry Network (GCN) was launched by the Royal Society of Chemistry (RSC) and it is based within the Department of Chemistry at the University of York. The main aim of the GCN is to promote awareness and facilitate education, training and practice of Green Chemistry in industry, commerce, academia and schools.

QUILL is the Queen's University Ionic Liquid Laboratories based in the School of Chemistry and Chemical Engineering at the Queen's University of Belfast. It was founded in April 1999 as an industrial consortium, with members from all sectors of the chemical industry. It is one of the largest and most active ionic liquid research centres in the world, with a staff which includes a number of world-renowned experts in the field.



Germany is involved in Green Chemistry mainly through The Gesellschaft Deutscher Chemiker (GDCh). The GDCh advances the chemical and molecular sciences in education and research and promotes the understanding of chemistry in the public. It was, together with INCA, one of the organisers of the First International Conference on Green Chemistry, held in Dresden in 2006.



France is active in Green Chemistry as it is associated to the International Green Network-IGN through the Université Paul Sabatier in Toulouse, which is also involved in a CNRS interdisciplinary programme "Chimie pour le développement durable", for the years 2006-2009, aiming in increasing research and innovation in Green Chemistry.



U.S. Government has played a seminal role in promoting green chemistry research and development. The U.S. EPA and National Science Foundation (NSF) established the Green Chemistry Program in 1991. The Green Chemistry Institute (GCI) promotes the advancement and public awareness of green chemistry through research, education, conferences, and information dissemination. In the 1990s, increased attention to green chemistry within the American Chemical Society (ACS) resulted in joint programs with EPA and establishment of the Green Chemistry and Engineering Subdivision within ACS's Industrial and Engineering Chemistry Division. A strategic alliance was established in 2000 between ACS and GCI to work toward achieving their shared goals of developing and promoting green chemistry programs. ACS will provide significant financial and organizational support and make green chemistry a major focus of environmental programs within the society.



The Canadian Green Chemistry Network is a non-profit organization dedicated to promote green chemistry to protect human health and the environment. Its mission is to promote Green Chemistry research and education in Canada as well as international collaboration. Scientists from the participating universities have joined force to collaborate on the main areas in Green Chemistry, such as chemical synthesis using clean solvents and/or renewable energies, enzymatic catalysis, biomasses, green chemical processes and study of atmospheric chemistry.



In Australia, the "Centre for Green Chemistry" of Monash University, founded in 2000 by the Australian Research Council, is quite active in developing basic research on Green Chemistry and applied research in cooperation with the industrial sector, as well as promoting educational programmes in schools and universities on this topic. On April 20th 2005, at Canberra's Academy of Science, the first conference on Green Chemistry titled "Green Chemistry, An Australian Imperative" took place. The main objective of this initiative, besides illustrating the emerging activities on Green Chemistry, was to discuss topics such as the analysis of the impact of sustainable chemistry on companies' competitiveness and the analysis of strategies to attract external resources for Research & Development and Innovation investments. Australians intend addressing not only their country, but also the entire Pacific area and the south-east of Asia.



In Latin American countries, the scientific community focuses intensively on Green Chemistry's time of development. Within the bilateral agreement with the Italian Ministry of Foreign Affairs, Italy (INCA Consortium) and Argentina (Universities of Rio Cuarto, Cordoba, La Plata and Buenos Aires) developed a scientific collaboration programme on "Chemistry for Clean Reactions and Processes: Green Chemistry", generating joint research activity, scientific dissemination as well as exchanges of researchers and training with the participation of Argentinean students at the Summer School on Green Chemistry in Venice.

Of great interest is also the collaboration programme between Italy and Latin America promoted by INCA Consortium and the Ministry of Foreign Affairs concerning research and training on the use of natural resources for the development of new chemicals. This collaboration gave the opportunity to researchers from Chile, Argentina, Brazil, Uruguay, Costa Rica and Venezuela to operate in Italian universities. Such experiences will also increase and intensify the cooperation between countries of Latin America. INCA-IUPAC's publication of the book "Green Chemistry in Latin-America" is one of its many examples.



Research Projects covering the fields of interest of the Consortium, with priority being given to programs addressing the current activities of the INCA's Working Groups. The Info/Help Desk is designed for all INCA members but will also be accessible to interested external parties.

Organizer: Dott. Vincenzo Malatesta: email: malatesta_vincenzo@fastwebnet.it

Scientific Coordinators: Prof. Attilio Citterio e Angelo Albini.

Recent Research Projects (National and International)

FIRB Project "Specialisation, characterisation and photochemical properties of organic and inorganic substance in the sea water". This project was carried out from 2004 to 2006, it was aimed at studying speciation and photo-transformations, both of metallic ions and organic substances, in the sea water.

ECOMOS: "Advanced solutions for the abatement of pollutants in ship exhaust gases for the sea motorways" is a co-financed project by MIUR and it is aimed at realising an integrated system for the abatement of pollutants of exhaust gases in new and also in exercise merchant ships. INCA is one of the partners of the project, which has begun in 2007 and it will last three years.

Solvsafe (www.solvsafe.org), is an integrated and financed EU project for the period 2005-2008 in the VIth framework programme. The overall SOLVSAFE goal is to develop innovative solvents at reduced environmental impact and chemical risk to be used in various sectors, for example Active Pharmaceutical Ingredients (APIs), paints and agrochemical products. The project involves 19 partners from 7 different nations and engages industrial and academic competencies, including INCA Consortium. In order to develop scientific and technological skills for achieving the various objectives of the project, seven Workpackages (WPs) have been created: INCA is the leader of the WP2 "New high boiling point solvents for reduced VOC emission and inflammability".

In the area of "INTAS Collaborative Calls" with Uzbekistan a project "Structural effects of humic substances and some plant alkaloids on the degradation and detoxification of persistent organic pollutants in soils (HUMPOP)" was activated, moreover in the area of INTAS Young Scientist Fellowship, UdR of Venezia hosted for some months in 2006 and 2007, some researchers coming from the Moscow State University.

Research outsourcing

The Consortium gets additional funds from contracts and agreements signed with other Organisations and from national and international, public and private institutions, as well as from research work orders given to the Consortium by other Member Universities within projects. The most recent projects that have been carried out are:

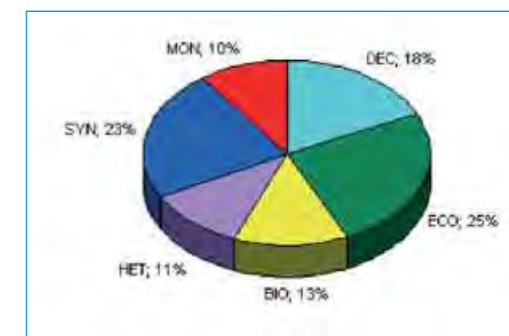
- Millennium – "Study on powders and monoliths samples for the fields of research entitled SCR Denox catalysis" (2001-2006).
- Promoplast – "Recycle of plastic material" (2000-2006).
- Recupera: "Treatment of urban wastes (biomasses) aimed at the production of biogas for the electrical and thermal energy generation", project for Recupera S.r.l.(2005-2007).
- Sartec: "Study of coast and sea floor of Cagliari's gulf", project for Saras Ricerche e Tecnologie S.p.A.(2005-2007).
- "Cleaner methods for alkylating aliphatic and aromatic substrates using dialkyl carbonates", project for Imperial Chemical Industries (2005-2007).
- "Exploitation of underground drinking water resources in the town of Carbonia (Cagliari)", customer: municipality of Carbonia (2005-2007)
- "Innovative heterogeneous catalysts for the reaction between aromatic amines and dimethylcarbonate to urethanes", project for Dow Poliuretani Italia S.r.l. (2006-2007).



Research at INCA

The Consortium carries out research activities through self-financed Long Term Plans, special projects co-financed by Public Authorities and work orders based on contracts assigned by organisations, institutions and enterprises. The scientific framework where INCA operates concerns all traditional Green Chemistry disciplines and includes the following thematic areas whose percentage contribution is also indicated in the picture below:

- BIO: Enzymatic biological and biomimetic techniques for the eco-sustainable synthesis and environmental decontamination;
- HET: Heterogeneous catalysis for the eco-sustainable synthesis and environmental decontamination;
- SYN: Eco-sustainable synthesis (solvent control, photochemistry, catalysis, recycling, etc.);
- DEC: Decontamination techniques (membranes, sonochemistry, photocatalysis, electrochemistry, etc.);
- ECO: Ecosystems Chemistry (soil, water and air chemistry, impact of synthetic materials on the environment)
- MON: New Monitoring Techniques



Research thematic areas

The Research Plans

The Consortium's research activities are coordinated by Working Groups (WGs). They arose with the objective of establishing within INCA integrated competences in the scientific area of Sustainable Chemistry, in agreement with the strategic addresses of VII Framework Program.

The WGs are open also to other interuniversity associations and provide the participation of international interlocutors together with national research groups. They are aimed at organising meetings abroad, in order to define research topics of priority interest, thus promoting the Italian participation to European research. The WGs have started up a common work in order to establish contacts with Excellence Centres, such as Crystal Faraday Association in UK or GDCh in Germany, for defining common and shared proposals.

At the moment the active WGs are:

- Green Chemistry WG (coordinator Prof. P. Tundo, Venezia). This WG is focused on eco-compatible processes, catalysis and non conventional reaction media. It is divided in three subcommittees:
 1. "Non conventional reaction media". Responsible Prof. C. Trombini, Bologna;
 2. "Eco-compatible processes". Responsible Prof. G. Cerichelli, L'Aquila;
 3. "Eco-compatible catalysis". Responsible Prof. G. Sartori, Parma;
- Biochemistry WG (coordinator Prof. P. Canepa, Genova). The objective of this WG is to set up new eco-compatible methodologies for the valorisation and reuse of residues from agrochemical industry which is included in a wider strategic frame of valorisation of biomasses exploitation through biotechnological and Green Chemistry processes. Its three subcommittees are:
 1. "Bio-technological and physico-chemical processes for the chemical and energetical valorisation of agroindustrial residues". Responsible Prof. E. Mincione, Viterbo;
 2. "Reactions, processes and products for the reuse, recycle and treatment of residues from wastes". Responsible Prof. L. Morselli, Bologna;
 3. "Biofuels". Responsible Prof. A. Converti, Genoa.
- GLOB-CHEM - Natural chemical transformations in the environment and global changes (coordinator Prof. A. Piccolo, Napoli). The objective of this WG is to create a research collaboration in order to improve the knowledge of the role of natural transformations, in soil and water, of natural and xenobiotic compounds, mediated by heavy metals, in the equilibrium of greenhouse gases between biosphere and atmosphere. Its three subcommittees are:
 1. "Speciation and role of heavy metals". Responsible Prof. E. Mentasti, Torino;
 2. "Natural organic substance and biomasses". Responsible Prof. A. Piccolo, Napoli;
 3. "Environmental processes". Responsible Prof. C. Minero, Torino.



Information System on Research: RISEt

Since October 2002, INCA Consortium is part of the RISEt system (Rete Informativa Scienza e Tecnologia – Science & Technology Information Network), organised by the Ministry of Foreign Affairs, through its General Department of Cultural Promotion and Cooperation.

The RISEt system provides final users with scientific and technological information on chemistry, biology, ecology and environment. This information is gathered and then sent to the Scientific Experts of Italian Embassies, Consulates and Cultural Institutes.

INCA elaborates RISEt's incoming messages and sends them periodically to the RU of Member Universities.

External Assessment of the Consortium's Scientific Products

INCA voluntarily underwent to the assessment of research by the 'Comitato di Indirizzo per la Valutazione della Ricerca – CIVR' (MIUR's Committee for Evaluation of Research).

The objectives of the assessment were:

- to assess the added value of INCA as a network to the improvement of university-based research in the field of chemistry for the environment ;
- to assess the individual units belonging to INCA with respect to their scientific quality and their contributions to the INCA research programmes;
- an additional aim was to verify if and how the Consortium responds to the needs of the Italian scientific organization.

The first assessment of the INCA Consortium for the 1994-1996 scientific research activities was performed in 1998. The second assessment of the INCA Consortium for the period 1997-2001 ended on October 2003.

The third and most recent assessment of INCA's scientific activities was carried on by CIVR itself in 2005 and it concerned activities of the period 2001-2003. The following parties took part in the evaluation: 44 Research Units (RU) of 19 Universities (8 in Northern Italy, 5 in Central Italy and 6 in the South, with a homogeneous territorial distribution), together with 6 labs. In percentage, the proportions are 68% (Universities) and 59% (Research Units), respectively. This emphasizes the fact that the Consortium's fundamental structures are indeed the universities rather than the single Research Unit, which are the expression of a different thematic interest.

Many scientific products such as books (or chapters), articles in reviews, deposited patents and results from applicative valorisations were submitted for evaluation. Each RU had the possibility of presenting a maximum of five scientific products; an overall total of 228 products were presented (with an average distribution of 3 to 5 products for each RU), of which 73 were chosen for the evaluation.

Selection modalities of scientific research to be submitted to the CIVR were developed by taking into account:

- the quality and relevance of scientific production;
- the originality and innovation;
- the internationalisation;
- the capability of managing resources and enhance results.

The main selection criterion of the works was the impact factor (IF). However, even though less innovative, but consistent with the Consortium's institutional themes, other works were chosen as representatives for the major aspects of INCA's scientific activities, linked to environmental monitoring and elaboration of wastes and polluted area reclamation.

Finally, the results of each 6 INCA labs were presented as an applicative valorisation.

The distribution of products, based on the expressed criteria, brought forward a selection of products from 15 universities (based on 19 participating), suggesting that most of the assembled universities produce scientific works of good quality. 28 Research units out of 44 were selected. Certain themes, chosen according to the IF, displayed a greater scientific performance. These themes are: (in decreasing order) Clean Combustion, Environmental Catalysis, Detoxification, Green Chemistry, Cultural Heritage, Biochemistry, Natural Processes, Exploitation of natural sources, Analytics, Material renewal/recycle, Environmental Toxicology. The production of cultural interest for the Consortium is spread and of a good level, with peaks of excellence in the University of Venice, University of Turin, University of Trieste, University of Palermo, University of Catania and in the Polytechnic of Milan.

The Structure is active in 6 scientific Areas as categorized herein. Within the Structure is one large sized Area (Chemistry); one medium sized area (Sciences and technologies for the sustainable development and governance) and 4 small sized areas within the Structure (Biology, Industrial and information engineering, Sciences and technologies of nano/Microsystems, Sciences and technologies for evaluating and upgrading cultural goods). In the

other 4 areas (Physics, Medical Sciences, Agronomy and Veterinary Sciences, Economics and Statistics) the Structure highlights the presence of researchers, however is not yet represented by products.

Excellent products are present in 4 Areas; in one Area there are also limited products. The Area 15e "Sciences and technologies for sustainable development and governance" is placed in an important position in the segment of affiliation with a property degree of excellent products upwards of the national average of the Area, suggesting a possible leadership in the same Scientific Area.

The fourth assessment, regarding the three-year period 2004-2006, is going to be performed starting from November 2007.

Area	Placement	Rating	Calculated products ²	Merit Judgements ³							Products	ETP Researchers	Property degree (average) ⁴			Average IF ⁵	Products with IF ⁶
				E%	E	B	A	L	NV ⁴	of products			of excellent products				
													of structure	average of the area			
03 - Chemistry	10/12 large	0.73	37.20	18	9	21	18	3	0	±1	120.00	0.88	0.71	0.64	3.95	41	
05 - Biology	11/22 small	0.80	2.40	33	1	1	1	0	0	±	3.83	1.00	1.00	0.60	2.80	3	
09 - Industrial and information engineering	18/18 small	0.55	2.20	0	0	1	2	1	0	±	10.50	1.00	0.00	0.75	0.00	0	
15c - Sciences and technologies of nano/Microsystems	11/29 small	0.85	3.40	50	2	1	1	0	0	±	1.50	0.42	0.37	0.50	3.87	4	
15e - Sciences and technologies for sustainable development and governance: economic, social, energetic and environmental aspects	1/5 medium	0.86	8.60	40	4	5	1	0	0	±0	3.00	0.94	0.96	0.64	4.62	9	
15f - Sciences and technologies for evaluating and upgrading cultural goods	9/26 small	0.80	0.80	0	0	1	0	0	0	±	0.50	1.00	0.00	0.64	15.90	1	

Evaluation of scientific production assessed by CIVR (2001-2003)

The Agreement between INCA and the Italian Ministry of Foreign affairs: Scientific International projects

The substantial scientific cooperation partnership between INCA and the Italian Ministry of Foreign Affairs aims at improving research and training in developing countries. Besides its role of a co-financing institution, INCA is also the technical and scientific supervisor, often hosting in its premises foreign personnel in order to provide know-how transfer.

Actually, INCA has signed an agreement with the General Department for Cultural Promotion and Cooperation to promote scientific and technological cooperation in many countries of the Mediterranean (Algeria, Egypt, Libya, Morocco and Tunisia), South America (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala and Peru) and Russia.

Two projects for the exchange of researchers are in progress with Egypt in the frame of bilateral program of scientific and technological cooperation 2004-2006, "Analysis, training and establishing laboratory facilities for Persistent Organic Pollutants (POPs) determination at Suez Canal University, Ismailia, Egypt" and "Characterisation and identification of single active components in Sinai endemic plants - structure-action relationships".

At the end of November 2006 the preliminary relevant project "Technologies avancées dans le domaine de la Chimie Verte" was approved, which is included in the programme of bilateral collaboration Italy-Algeria "Premier protocole executive scientifique et technologique de l'accord de cooperation culturelle, scientifique et technologique entre la republique italienne et la republique algerienne democratique et populaire pour les annees 2006-2009".

INCA Europe Info Desk

INCA Consortium is implementing and will make available soon the services of a central Info/Help Desk that will provide practical information, guidance and assistance on all aspects of participation in EU, international, and national research programs. The Help Desk will support the preparation and coordination of



"Green" is a dossier where topical subjects, like energy, environment, sustainable development, etc., are examined in-depth, where articles on innovation, research and everyday life, news from world in collaboration with Ministry of Foreign Affairs, initiatives in school and university are reported. The first issue of the magazine aroused a big interest within the schools, in fact a lot of teachers sent their appreciation to the editorial staff, and also the institutional sector was congratulatory on the high didactic work of the initiative aimed also to raise the awareness of young students in environmental issues and possible positive solutions given by the employment of Green Chemistry. A free copy of "Green" is sent to all Italian secondary schools, universities, national and local institutions and research corporations, it is also available to the public with subscription (www.green.incaweb.org).

Master's Degree on "Dissemination of the scientific culture"

In the academic year 2007/2008, at the "Ca' Foscari" University, Venice, the first level Master's Degree in "Diffusion of the scientific culture: "Science in the service of mankind and environment", born from the initiative of INCA Consortium in partnership with Vega, Scientific and Technological Park in Venezia, is getting under way. This initiative is new in the panorama of Italian Master's Degrees, as it is characterised by the peculiar formative path, needed for calling for a new strategy in teaching proposals in the field of scientific information. It is directed at graduates and journalists. The Master's Degree is aimed to the training of experts in scientific communication, able to disseminate knowledge in a rigorous and comprehensible way, in order to improve the understanding of scientific aspects which are on the basis of phenomena, thus contributing to the cultural and technological growth of a society which needs to be rightly informed in fundamental topics of nowadays life such as energy, environment, health, atmospheric pollution, climate changes. The Master's Degree is training flexible professional people who can meet the needs of scientific communication for companies, museums, newspapers and magazines, press offices and public relationship offices, local and public bodies, scientific and naturalistic parks. The course is organised with lectures, seminars, laboratories, training in editorial structures and stages at companies, as well as direct testing with the magazine "Green. La scienza al servizio dell'uomo e dell'ambiente", edited by INCA Consortium. One of the main objectives of the Master's Degree is to have produced, at the end of the course, professional people able to generate multimedia communication and elaborate projects for specific scientific and business dissemination. The presentation of the Master's Degree took place in Venezia, Ca' Foscari, on July 17th, 2007, wherein also participated Prof. Luigi Berlinguer, President of the Interministerial Working Group for the development of scientific and technological culture, who introduced the Master as a "real example of how the third mission of University is catching on: beside research and education, the dissemination of results in research to every citizen".

Master's Degree on "Environmental chemical engineering: industrial water treatment and biotechnologies of renewable resources"

This Master's Degree is aimed to train experts in industrial water treatment and biotechnology of renewable resources able to operate in positions of responsibility in public and private structures, as companies for environmental services, supervisory bodies, local administrations dealing with treatment of waste water and biomasses, private companies and plants. The course is organised with lectures, laboratories and stages.

The Master's degrees is carried out in collaboration with Universities of Verona, Padova, Udine, Trieste, "Ca' Foscari" University in Venice, the University Consortium of Treviso and the Interuniversity Consortium INCA.

CHISS Project – Chemistry for Sustainable Development

In the frame of Project "Chemistry for Sustainable Development", the Universities of Napoli "Federico II", Cagliari and Venezia "Ca' Foscari", together with partners INCA Consortium and the Technical School "Nino Bixio" of Piano di Sorrento, is going to start training teachers in scientific matter of secondary schools, providing scientific knowledge and competence on some topics related to Sustainable Chemistry. The course's main objectives will be:

- supply useful instruments for addressing school programs towards innovative topics like the application of Chemistry in environment conservation and prevention;
- valorising the teacher's role in order to support and steer students into study and a professional career in the area of Chemistry for Sustainable Development.

The course will be addressed to 60 teachers in secondary schools in Campania and 60 in the Sardinian Region.



Training and education are relevant to INCA's mission. During the last years the Consortium has been organizing a significant number of training and educational activities aimed at increasing the professional skills of current and future scientific institutions employees.

Training at INCA is characterised by a vast typology of beneficiaries: research personnel in national and international scientific organisations, graduates, employees, researchers etc.

This differentiation corresponded to numerous objectives set by the Consortium itself: a) enhancing the importance of human resources seen as a leverage for the growth of the scientific system's competitiveness;

b) attesting equal opportunities; c) favouring young people's first employment; d) providing employed people with training for the long term. According to its statute, the Consortium promotes and coordinates research works and other scientific and applicative activities in the field of Chemistry for the Environment within its Member Universities, favouring cooperation between them and other research centres. To this end, the Consortium invested in the sole year 2006 about 600.000 Euros to finance (or co-finance) grants, PhD courses, scholarships, and temporary employment contracts for junior researchers.

International Projects

IUPAC-ICGC-1: First International IUPAC Conference on Green-Sustainable Chemistry

This meeting was held in Dresden, Germany, from September 10 to 15, 2006. The Conference took place under the auspices of IUPAC, the Gesellschaft Deutscher Chemiker (GDCh, German Chemical Society), Consorzio Interuniversitario Nazionale "La Chimica per l'Ambiente" (INCA), Italian Ministry of Research, Federal Ministry for Environment, Nature Conservation and Nuclear Safety and the German Federal Environmental Foundation; it was organised by GDCh and INCA. It was the first one of the IUPAC Series Conference dedicated to Green Chemistry. The aim was to attract academic and industrial researchers and representatives as well as politicians and students interested in Green and Sustainable Chemistry.

Strong attention was paid to the interdisciplinary synergisms of the selected topics. Highly distinguished and worldwide recognized researchers and industrial representatives presented plenary and key note lectures. The program also included oral presentations and two poster sessions. About 120 oral presentations were organised in two parallel sessions, and the five main themes, each one including different sessions, were:

1. Sustainable synthesis,
2. Future sources for sustainable energy,
3. Employment of renewable resources,
4. Sustainable processes,
5. Education.

The guest of honour at the conference was the Nobel Prize in Chemistry 2001 Prof. R. Noyori (Nagoya University, Japan) who illustrated chemical synthesis and particular attention was made to asymmetric hydrogenation reactions as a valuable instrument for sustainable chemistry.

The Summer School on Green Chemistry

(Prof. Pietro Tundo – Università di Ca' Foscari di Venezia)

The Summer School on Green Chemistry is promoted and realised by INCA Consortium was firstly established within the EC programme "Training and Mobility of Researchers". It aims at training junior researchers to the use of clean chemical methodologies (new reagents, solvents, catalyses, etc.) for solutions to synthetic and environment polluting problems.



IUPAC-ICGC-1, Dresden 2006



The 8th edition was held in Venice, September 2005. The 9th event, called NATO-ASI (Advanced Study Institute) International School on "New Organic Reactions and Methodologies for Green Production", was held for two weeks, from October to November 2006, in Lecce and Otranto. It was dedicated to students and young researchers coming from NATO countries, Partner or Mediterranean Dialogue countries and it gathered about 60 students coming from different countries.

The five main areas, dealt with during the school were:

1. Alternative synthetic pathways, based on atom (and mass) economy, achievable through catalysis, biocatalysis and natural processes, such as photochemistry, electrochemistry and biomimetic synthesis.
2. Alternative reaction conditions, based on the use of solvents having a reduced impact on human health and environment, increased selectivity and reduced wastes and emissions.
3. Design, use, and production of chemicals that are less toxic than current alternatives and inherently safer with regard to accident potential.
4. Alternative feedstocks and safe reagents to reduce the dependency on fossil fuels.
5. Evaluation of the risk connected to chemical processes, their by-products and to the use of products and reagents.

The invited speakers were both academic professors and representatives of the industrial research area in order to provide students with a complete overview of this sector: David Black (IUPAC Secretary general, UNSW - Sydney), Buxing Han (Chinese Academy of Sciences), Rainer Busch (DOW, Germany), Janet Scott (Unilever, UK), Kenneth Seddon (Queen's University of Belfast), Howard Alper (University of Ottawa), Mohamed Tawfic (Suez Canal University), Wolfgang Hoelderich (RWTH - Aachen; Germany), Karol Grela (Polish Academy of Sciences), Teodor Ast (University of Belgrade), Valery Lunin (Moscow State University), Pietro Tundo (INCA - University of Venice; Italy).

The European Summer School "Production of fuels, specialty chemicals and biobased products from agro-industrial wastes and surplus"

(Prof. Fabio Fava – Università di Bologna)

In September 2006 the European Summer School on Bioremediation was held on the theme "Production of fuels, specialty chemicals and biobased products from agro-industrial wastes and surplus". It was coordinated by the Universities of Bologna and Genova and co-financed by INCA Consortium and Alma-Mater Studiorum-University of Bologna. The participants were 32 young graduates working in universities, research centres, audit organisations, public and private institutions from 9 different countries, among which, 8 from the European Union (Italy, Greece, Spain, France, The Netherlands, Poland, Hungary, Croatia) and also Turkey. Teaching was entirely focused on the most recent approaches of biotechnology and physical chemistry to the valorisation of by-products from the Italian and European agrochemical industry. There were 27 speakers invited, 11 of them coming from foreign research centres, companies and universities. Considering the great relevance for the matter and the high scientific competence of the speakers, the initiative met with great interest at a national and an international level.



IUPAC-ICGC-1, Dresden 2006

"Sustainable Environmental Development, A Curriculum Development Project" (SEDC) -Tempus and MEGREC Network.

(Dr. F. Zecchini)

In Egypt there is an urgent need to improve environmental practices and norms, the first step to tackle the problem is to provide adequately trained graduates. This need of formation and training well fitted to the

objectives of the Tempus Programme of the European Community. The Tempus Joint European Project named "Sustainable Environmental Development, A Curriculum Development Project (S.E.D.C.)", website www.tempus-sedc.org, was approved and activities started in September 2003. Partners are the Interuniversity National Consortium "Chemistry for Environment" (INCA., project contractor; Venice, Italy), Centre of Environmental Science (Leiden University; The Netherlands), Green Chemistry Section at Institut Univ Ciencia i Tecnologia (IUCT; Barcelona, Spain), the Department for Sanitary Engineering and Water Pollution Control, University of Natural Resources and Applied Life Sciences (Vienna, Austria), and the Environmental Impact Assessment Unit at Suez Canal University (SCU, project co-ordinator; Ismailia, Egypt). The main goal is to design and run upgraded courses at SCU, introducing a number of topics regarding environment protection and sustainable development, for graduates coming from a variety of backgrounds, including agriculture, science, engineering, and other disciplines. The second goal of the project is to start the establishing of a "Centre of Excellence" for consultation and services to industry and private companies in the field of environment protection and sustainable development. The project ended in February 2007, however the activities of this project will keep on running and extend to other Mediterranean countries through the Mediterranean Countries Green Chemistry (MEGREC) Network.

The MEGREC Network was founded in Belgrade (Serbia and Montenegro) on Friday December 9, 2005 and it is included in the UNESCO's UNITWIN Programme (excellence scientific networks).

The MEGREC founder institutions are:

- Interuniversity Consortium 'Chemistry for the Environment' (INCA Consortium)
- Suez Canal University - Ismailia, Egypt.
- Institut Univ Ciencia i Tecnologia IUCT - Barcelona, Spain.
- Fez University - Morocco.
- Belgrade University - Serbia.
- Athens University - Greece.

The hub of MEGREC is located at the INCA Consortium's headquarters in Marghera (Venice, Italy). Through collaboration in research and education and mutual financial support the partners will strengthen the links among the Mediterranean countries, particularly fostering the collaboration between the European and the Arab countries facing the Mediterranean Sea. The prime planned actions of MEGREC are the creation of a university Master Course (2nd level) on Green Chemistry and the recruitment of young researchers who will carry on scientific activities in the labs of the partner institutions thanks to the financing programs of the European Union and United Nations.

The 2nd Board meeting of the Network was held in Fez (Morocco) on April 28, 2006. During this meeting Tunisia and Algeria were officially admitted to MEGREC.

National Projects

"Green. La scienza al servizio dell'Uomo e dell'Ambiente", a new magazine for students and teachers.

In November 2006 the first issue of the new monthly magazine "Green. La scienza al servizio dell'Uomo e dell'Ambiente", was published by INCA Consortium. The initiative was presented in Milan on November 26th, 2006 in a press conference held in the seat of the Regional Direction of Ministry of Public Education, by Prof. Pietro Tundo, President of Inca Consortium and director of the magazine.

"Green" is the only national magazine which provides information, in a simple language and in the meantime strictly scientific, on Green Chemistry, on research in this field and on impact of the research on products and everyday life. The magazine is addressed first of all to young people, particularly to students of the last years of secondary school or to undergraduates who attend first courses in chemistry. Moreover it is dedicated to teachers who, together with students, share a path where learning and education are tightly linked and to whom are stimulated by curiosity in Chemistry and scientific subjects.

"Green", other than providing correct information, has the specific purpose to orient the choices of students after the end of the secondary school towards Chemistry, a discipline that nowadays suffers because a lowered interest, informing them in particular to big perspectives offered by the Green Chemistry.



tation of the 7th CIND, Auditorium Santa Margherita, Università Ca' Foscari, Venice, March 22nd, 2007;

- 9th Annual Congress of the Interuniversity Consortium Chemistry for the Environment: "Towards the VII EU Program", Pisa, March 1-2, 2007.
- Seminar on "Microinquinanti, sistemi di monitoraggio (manuali ed in continuo) per diossine e articolato fine (PM1-PM2.5-PM10), Parco VEGA, Marghera (VE), February 27th, 2007.
- INCA Colloquia - Green Chemistry at Marghera: "Reagenti e Prodotti Puliti, Parte II", Università Ca' Foscari, Faculty of Science, Aula Consiglio, Venezia, December 11th, 2006.
- Press Conference: Presentation of the new magazine "Green, la scienza al servizio dell'uomo e dell'ambiente", edited by INCA, Milan, Novembre 23rd, 2006.
- NATO-ASI: "New organic chemistry reactions and methodologies for green production", continuation of the "Summer School on Green Chemistry", ninth event, Lecce-Otranto, October 29th-November 10th, 2006.
- INCA Colloquia - Green Chemistry at Marghera: "Reagenti e Prodotti Puliti, Parte I", Università Ca' Foscari, Aula Magna Ca' Dolfin, Venezia, October 2nd, 2006.
- First International IUPAC Conference on Green Chemistry, Dresden, Germany, Organized by IUPAC, in collaboration with GDCh and INCA, September 10-15, 2006.
- European Summer School "Production of fuels, specialty chemicals and bio-based products from agro-industrial wastes and surplus", Faculty of Engineering, Alma Mater Studiorum-University of Bologna, Bologna - September 4-9, 2006.
- ESOF-2006: "Green chemistry: a tool for socio-economic development and environmental protection". A seminar organized by INCA in the framework of the Euroscience Open Forum 2006. Munich, July 16th, 2006.
- MISA meeting: GIMAMP-Italian group "Microwaves applied in materials and processes", Palermo, May 24-26, 2006.
- INCA Colloquia - Green Chemistry at Marghera: "Solvents Innovation in Chemical Industry", Università Ca' Foscari, Faculty of Science, S. Marta, Venice, - May 10th, 2006.
- 8th Annual Congress of the Interuniversity Consortium Chemistry for the Environment "Sustainable Chemistry & Environmental Technologies: perspectives and state of the art"- University of Bologna, Faculty of Engineering: March 23-24, 2006.
- Results of the 5th CIND - Circuito di Intercalibrazione Diossine (Dioxins Intercalibration Circuit), Auditorium Santa Margherita, Università Ca' Foscari, Venice, March 22nd, 2006;



Dissemination of Scientific Culture in Schools

INCA's 2004 scientific dissemination activities dedicated to secondary schools were structured as follows:

- a) publishing;
- b) awards for schools and conferences;
- c) direct cooperation with the Uffici Scolastici Regionali (UU.SS.RR - Regional School Boards) and every single school.

Awards

In the framework of its scientific culture diffusion activities, INCA Consortium organised a competition addressing secondary schools consisting in the presentation of projects in the Green Chemistry sector. The competition, named "Concorso di Chimica Verde per le Scuole Secondarie di Secondo Grado" (Green Chemistry Competition for Secondary Schools), was created in 2004. Its objective was to attract students and professors' attention towards chemistry by assigning them an active role as far as chemistry for the environment is concerned. The initiative met with a great success in terms of participation and quality of the submitted papers.

The third edition, for the school year 2006-2007, was entitled "Prodotti 'verdi': dalle materie prime naturali al consumatore - I beni che usiamo nella vita quotidiana prodotti a partire da materie rinnovabili, attraverso processi a basso impatto ambientale" (Green Products - from natural raw materials to the consumer - everyday consumer goods produced from renewable materials by low environmental impact processes). The award ceremony of the competition was held on 29th May 2007 at the Ministry for Public Education in Rome; during the event Prof. Luigi Berlinguer, President of the Interministerial Working Group for the development of scientific and technological culture, also awarded to the winners a medal from the President of the Italian Republic.

The awarded schools and works of the third edition are listed below:

- 1st Prize: Istituto Tecnico Industriale "S. Canizzaro"-Catania, with the work "Le Bioplastiche: una scelta economica e sostenibile" (Bioplastics: an economical and sustainable choice);
- 2nd Prize: "Istituto Tecnico Industriale "Luigi di Savoia"-Chieti with the work: "Lo sapevi Ke...Naf?" (Did you know Ke...Naf? (on the vegetal textile fibre obtained by kenaf);
- 3rd Prize (tie): Liceo Scientifico Statale "Leonardo da Vinci"-Pescara with the work: "Biodiesel e bioetanolo: un'energia pulita"(biodiesel and bioethanol: a clean energy);
- 3rd Prize (tie): Istituto Tecnico Industriale "F. Giordani"-Napoli with the work "Produzione di biodiesel"(biodiesel production).

Moreover, the Liceo Artistico Statale-Crema was mentioned for the originality of its work "Vernici per Liuteria"(varnishes for lute manufacture).

Cooperation with schools.

Continuous collaboration with schools concerning the diffusion of scientific culture and especially with reference to subjects linked to chemistry (and biology) for the environment made its debut in 2004. Until now, some memorandums of understanding have been signed with Veneto's and Tuscany's Regional School Board and with the Technical School "N.Bixio" of Sorrento, Naples.



Publishing

The editorial activities of INCA comprise the 'Green Chemistry Series', the 'Soil Remediation Series', the magazine "Green. La scienza al servizio dell'Uomo e dell'Ambiente", widely described in the first pages as national education project and 'INCA News', the newsletter of INCA. Moreover a book on Green Chemistry, which is the result of eight editions of the Summer School on Green Chemistry, has been recently published.

Currently the Green Chemistry Series comprises 12 volumes focusing on dissemination of Green Chemistry worldwide. The 8 issues of the Soil Remediation Series are dedicated to several aspects of the chemical, biological, and physical remediation of polluted sites. Finally, 'INCA News' magazine deals with the latest activities, projects, achievements, and publications; it is published in Italian with English abstracts (13 issues up to date). These publications are downloadable from the INCA's website (<http://www.incaweb.org/publications/index.php>).

Green Chemistry Series (GC)

- GC1) First edition: "Collection of lectures of the Summer School on Green Chemistry, 1998-1999-2000" – Editor P. Tundo, Co-editors L. Clemenza, A.Perosa, Consorzio Inca, Venezia 2001. (Green Chemistry Series n. 1). Second edition: Collection of lectures of the Summer School on Green Chemistry, 1998-1999-2000-2001 – Editor P. Tundo, Co-editors L. Clemenza, A.Perosa, Consorzio Inca, Venezia 2001.
- GC2) "Premi per processi e Prodotti Chimici Puliti, 1999-2000-2001" – Editor P. Tundo, Co-editors P. Maggiorotti, M.Cici, Consorzio Inca, Venezia 2002. In English and Italian. (pdf version at page Dissemination-Industry Awards)
- GC3) "IUPAC Workshop on Green Chemistry Education, Report" – Editor P. Tundo, Co-editors T. Patti, Consorzio Inca, Venezia 2002.
- GC4) "Green Chemistry In Italy", Co- Editors A. Albin, P. Tundo, Venezia 2002.
- GC5) "Green Chemistry in Africa", – Editors P. Tundo, L. Mammìno, Venezia 2002.
- GC6) "Hazardous halo-aromatic pollutants: detoxification and analysis" – Editor P. Tundo, V.Lunin, Assistant editors SA. Zinovyev, A.Perosa, E. Lokteva, Venezia 2002. Co-sponsored by the Italian Ministry of Foreign Affairs.
- GC7) "Italian North Africa Workshop on Sustainable Chemistry" – Editors: L. Palmisano, G. Sartori, Mohamed Tawfic Ahmed and P. Tundo, Venezia 2002. Co-sponsored by the Italian Ministry of Foreign Affairs.
- GC8) "First Italia – Argentina Workshop on Green Chemistry – Venice 16-17 September 2002" – Editors G. Cerichelli and P. Tundo, Venezia 2003.
- GC9) Green Chemistry Series n. 9: "Introduzione alla Chimica Verde (Green Chemistry) – Libro per le scuole superiori" Green Chemistry Series n° 9 (2005; in stampa) Coordinator: Pietro Tundo. Editors: Stefano Paganelli and Lara Clemenza. ISBN: 88-88214-12-7. In Italian.
- GC10) "Master Movaima – Monitoraggio e Valutazione dell'Impatto ambientale nelle Imprese agroalimentari – Progetti di Fattibilità" – Co-editors A. Corsaro, G. De Guidi, Venezia 2003. In Italian.
- GC11) "Química verde en Latino América" Editor Pietro Tundo, Rita Hoyos de Rossi. 2004. In Spanish.
- GC12) "Green Chemistry in Russia". Co-Editors Valery V. Lunin, P. Tundo, Ekaterina S. Lokteva. In Russian (2004) and English (2005).

Soil Remediation Series (SR)

This series focuses on several aspects of the chemical, biological, and physical remediation of polluted sites.

- SR1) "Progetto Sisifo" – Editor P. Canepa, Consorzio Inca, Venezia 2001. In Italian.
- SR2) "Workshop U.S. – Italy on Sediment Management research; a CLEANER Scenario" – Co- Editors Richard G. Luthy and P. Tundo, Consorzio INCA, Venezia 2002. Co-sponsored by the Italian Ministry of Foreign Affairs.



- SR3) "Summer School I anno – Ricerca, sperimentazione e sviluppo di tecnologie di bonifica di siti contaminati – Savona, 8-13 settembre 2003. Editors: P. Canepa e F. Fava, Genova 2004. Con il Patrocinio del Ministero della Ricerca Scientifica, Ministero dell'Ambiente, Provincia di Savona. In Italian
- SR4) "Progetto Sisifo - Risultati II anno di attività 2002-2003". Editor P. Canepa. Venezia 2004. In Italian.
- SR5) Soil Remediation Series n. 5: "Summer School II anno - Ricerca e sviluppo di tecnologie di bonifica di siti contaminati". Editors P. Canepa and F. Fava, Genova 2004. In Italian.
- SR6) European Summer School "Innovative Approaches to the Bioremediation of Contaminated Sites". Editors: Fabio Fava and Pietro Canepa, Bologna 2004.
- SR7a) International Summer School "Innovative approaches to the management and physical & chemical remediation of contaminated sediments"
Editors: P. Canepa – F. Fava and in collaboration with SEDNET, Genova 2005.
- SR7b) "Biomonitoring, bioavailability and microbial transformation of pollutants in sediments and approaches to stimulate their biodegradation". Editors: P. Canepa – F. Fava, in collaboration with SEDNET, Genova 2005.



Other publications

- Book: "Methods and Reagents for Green Chemistry: An Introduction". Pietro Tundo, Alvise Perosa, Fulvio Zecchini, July 2007, Wiley.
- "Il Cambiamento Globale del Clima - estratto da: Introduzione alla Chimica Verde" Curator: F. Zecchini. Co-ordinatore: P. Tundo. Consorzio INCA, Venezia 2004.
- "The Global Climate Change" English version of the original version in Italian. IUPAC project no. TGC 2005-015-1-300. Chairmen: P. Tundo and F. Zecchini. INCA & IUPAC, July 2007.
- "El Cambio Climático" (The Global Climate Change) Spanish version of the original version in Italian. IUPAC project no. TGC 2005-015-1-300. Chairmen: P. Tundo and F. Zecchini. INCA & IUPAC, July 2007.
- "A Mudança do Clima Global" ("The Global Climate Change) Portuguese version of the original version in Italian. IUPAC project no. TGC 2005-015-1-300. Chairmen: P. Tundo and F. Zecchini. INCA & IUPAC, July 2007.



Latest events

- Presentation of Master's Degree in "Diffusion of the scientific culture: "Science to serve mankind and the environment", Cà Foscari- Venice, July 17th, 2007.
- Conference: "European High Resolution GC/MS Users Meeting Applications in Environmental, Food and Feed Analysis", Auditorium Santa Margherita, Università Ca' Foscari, Venice, March 23-24, 2007.
- Results of the 6th CIND-Circuito di Intercalibrazione Diossine (Dioxins Intercalibration Circuit) and presen-



The INCA Laboratories

Since 1993 the INCA Consortium has been active in the field of research, training, and education in chemistry for the environment.

For a research/educational organization having its own laboratories is a strategic choice. Soon after its establishment INCA opened its first laboratory in Marghera (Venezia, 1994). Nowadays the Consortium owns five self-managed laboratories: Marghera (Venezia), Cagliari, Lecce, Napoli and Palermo (see map).

The laboratories in Napoli and Palermo were created thanks to the funds of the P0 project financed by the Italian Law 488/92 (funding program devoted to expansion and upgrade of scientific and technological networks). Thanks to the same project the labs of Venezia were expanded and upgraded.

In some other cases specific analytical instruments - dedicated to the Consortium's own research plans - are provided by INCA for its research units and hosted at the departmental labs of the member universities.

As can be seen in the lab sheets, the laboratories are involved in all the activities of the Consortium – research, training, and education. All the labs share three general goals:

- to become centres of excellence in their own field of expertise;
- to transfer know-how related to chemistry for environment protection to university and secondary school students, to technicians of the public and private environmental agencies and research institutes, and to industry personnel;
- to become a local hub connecting university, school, and industry.

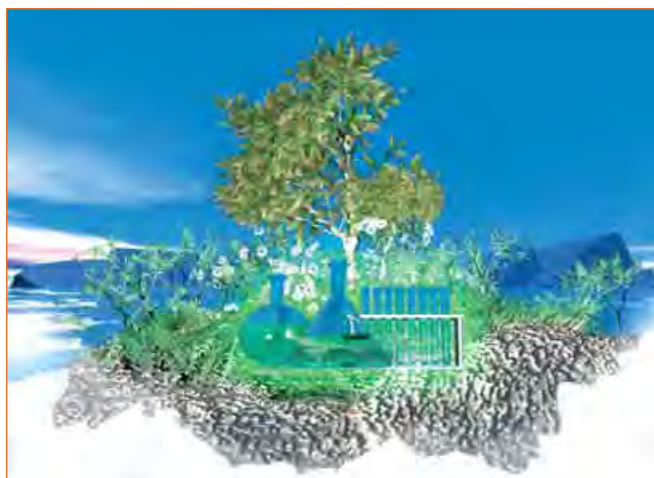
Even if INCA is striving for their self-subsistence from a financial point of view, its laboratories do not want to be competitive on the market. Differently, the aim is to build well-integrated entities which may become centres of excellence dedicated to know-how transfer and higher-education or to specific environmental monitoring and scale-up activities with connections at a local, regional, national or international level. INCA fosters local collaborations of its labs with industry, services, and secondary school, through a bridging activity based on higher scientific education. Many of the INCA's recently completed projects involved one or more laboratories. Some examples of such projects are described in the projects sheets. Most of them dealt with higher-education and/or applied research.

In order to achieve the aforementioned general goals, high-quality staff and equipment are necessary. The directors of the laboratories are selected among the most active and renown academics of the corresponding member universities. The selection of the staff is fundamental as well. Some labs have their own personnel, while as a rule researchers are chosen among the most distinguished young graduates, doctoral- and post-graduate students, or post-docs (grants or temporary work contracts). For what concerns the equipment, top-quality instruments are a mandatory choice for the Consortium's labs, using both funds from projects and/or INCA's institutional ones. The most representative analytical instruments are reported in the lab sheets.



Basic and applied research, education and training, and proper environmental monitoring are the cornerstones of the chemistry of the future, a mandatory issue for the protection of environment and the sustainable development. To meet these needs, INCA keeps on expanding and upgrading its most powerful tool: the national network of labs.

LABORATORY	DIRECTOR	ADDRESS	CONTACTS
INCA Laboratory of Marghera (Venezia)	Prof. P. Tundo	Via delle Industrie 21/8 30175 Marghera - Venezia	Tel.: 041-234-6601 Fax: 041-234-6602 e-mail: tundop@unive.it
INCA Laboratory of Lecce - Organic Micropollutants	to be appointed	c/o Dip. Ingegneria dell'Innovazione, Università di Lecce, Via Monteroni; 73100 Lecce	
INCA Laboratory of Cagliari	Prof. G. Cao	c/o CRS4, Sesta Strada Ovest, z.i. Macchiareddu AREA CASIC; 09010 UTA (CA)	Tel. 070-6755058 Fax: 070-6755057 e-mail: cao@visnu.dicm.unica.it
INCA Laboratory of Napoli	Prof. L. Previtera	c/o Dip. di Chimica Organica e Biochimica, Università "Federico II" - Complesso Universitario Monte S. Angelo, Via Cynthia 4; 80126 Napoli	Tel.: 081- 674122 Fax: 081 674393 e-mail: lucio.previtera@unina.it
INCA Laboratory of Palermo	Prof. F. La Mantia	c/o Dip. di Ingegneria Chimica dei Processi e dei Materiali, Università di Palermo, Viale delle Scienze;	Tel.: 091-6567203 Fax: 091-6567208 e-mail: lamantia@dicpm.unipa.it



INCA Laboratory of Marghera (Venezia)

Director: Prof. Pietro TUNDO
 Location: Via delle Industrie, 21/8
 30175 Venezia-Marghera



The laboratory is located at the new directional facilities c/o VEGA Science Park, Marghera, Venezia. The building, owned by INCA Consortium, hosts the president's and administrative offices and the three divisions– green chemistry, micropollutant analysis, and environmental microbiology – which make up the INCA Laboratory of Marghera.

Actually each division is to be considered as an independent laboratory working in collaboration with the others. The new facilities, which cover an area of approx. 2,500 m², are operative since March 2005.

The INCA laboratory of Marghera was established with the final goal of realizing a centre of excellence for scientific research, environmental monitoring, and high-level training.

Training

The lab hosts national and foreign researchers in close contact with internationally renown experts, in the framework of scientific collaborations, research projects, and doctoral programs.

Laboratory activities

The three research labs are active in their respective areas of expertise:

- Fundamental research on Green Chemistry;
- Analysis of micropollutants (dioxins, PCBs, PAHs, etc.) ;
- Bioremediation and advanced biological monitoring.



Running projects

Current national and international projects:

- European Integrated Project SOLVSAFE;
- Research with industrial partners: ICI, Dow Chemical, etc. (research & training);
- Calibration Network for Dioxins (CIND) (research & training);
- Research mobility bilateral programs (memoranda of understanding; research & training);
- Tempus JEP-30031-2002, training of Egyptian post-graduate students.

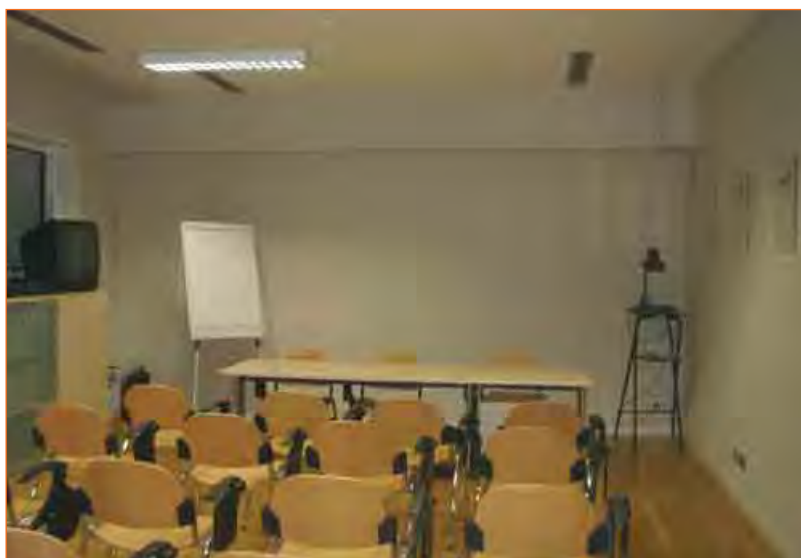
Main analytical instrumentation

- NMR Bruker 300 MHz
- High Resolution Mass Spectrometer (HRMS)
- ICP-MS
- LC-MS
- GC-MS
- WTW Oxytop100
- MJ PTC-100
- Epifluorescence microscope Olympus BX51



Mission

- Strengthen scientific networks on green/sustainable chemistry, by fostering wide collaborations between universities and industry.
- Create a model research structure, linked internationally.
- Train young scientists through research projects and mobility.
- Get developing nations involved in training and research.
- Disseminate research results through editorial activities, particularly in collaboration with WILEY-VCH.



The "A. Bomben" teaching room.



INCA Laboratory of Lecce

Location: c/o Dip. Ingegneria dell'Innovazione, Università di Lecce,
Via Montironi; 73100 Lecce



Having been inaugurated in May 2005, the Laboratory of LECCE is the latest achievement in the national INCA's own laboratory network. It is located in the Engineering Department of the University of Lecce thus ensuring a multidisciplinary approach to its environmental protection and monitoring activities. The laboratory originates from a joint effort of the INCA Consortium and the National Program (European Union funds through PON 2000-2006) and currently employs three full-time chemists (of which two have PhD). It covers a surface of about 150 m². A request for accreditation by the National Laboratory Accreditation body SINAL has been submitted (ISO 17025:2005).

Training

The laboratory and its highly qualified staff provide training at different levels and are involved in several training

projects both at national and international level such as:

- Analysis, Training and Establishing Laboratory Facilities for Persistent Organic Pollutant (POPs) Determination at Suez Canal University, Ismailia, Egypt;
- Training of technicians for environmental monitoring and management (IFTS, CIPE n. 83/2003).

Activities

Current laboratory activities include:

- Analysis of Persistent Organic Micropollutants (POPs) such as PCDD/Fs, PCBs, PBDEs, PAHs at the ultra-trace level in environmental matrices;
- Development of novel protocols for the analysis of POPs;
- Support to public agencies in deployment of environmental monitoring programmes;
- Support to various research groups at the University of Lecce in the field of advanced analytical techniques;
- Advanced research for the design of innovative analytical methods.



Running projects

Ongoing and starting-up projects are currently including:

- Bilateral cooperation between Italy and Egypt (MAE);
- Summer School on Green Chemistry (NATO ASI) “New Organic Chemistry Reactions and Methodologies for Green Production”.
- Agreement between ARPA Puglia and INCA Consortium to carry out analyses of PCDD, PCB, PCT and IPA on solid and liquid matrices, on emissions and training of technicians for the sampling.

Main analytical instrumentation

- automatic solid sample extractor (Dionex ASE300);
- automatic sample purification systems (FMS PowerPrep);
- HRGC-LMRS (Agilent 5973 MSD);
- HRGC-HRMS (Thermo MAT95 XP).



Mission

- The laboratory aims at becoming a leading reference at the regional level in the field of environmental monitoring, particularly since it is located in a “hot-spot” where current and past industrial activities have had a significant impact on local ecosystems.
- The laboratory wants to support relevant authorities to enforce control and monitoring of the food-processing industry as well as helping local industries to achieve compliance through assessment of POPs contamination of foodstuff products at the regional scale (southern Italy).
- The strategic geographical location of the INCA Laboratory of Lecce renders it suitable at standing among main actors for future and running scientific collaborations between INCA and the Mediterranean basin area (MEGREC Network).



- The laboratory of LECCE promotes INCA educational activities in close collaboration with authorities of “Objective 1” regions with particular attention to local areas in close vicinity.



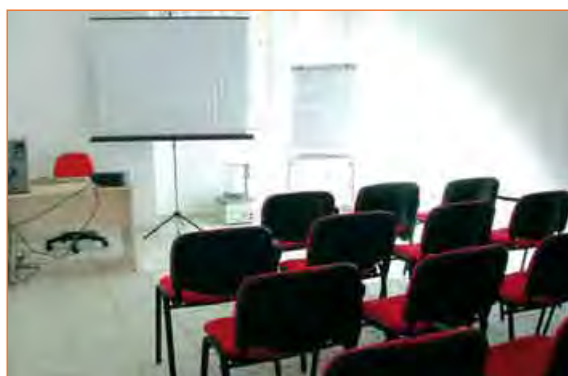
INCA Laboratory of Cagliari

Director: Prof. Giacomo CAO
Location: c/o CRS4, Sesta Strada Ovest,
z.i. Macchiareddu AREA CASIC; 09010 UTA (CA)

In 2001 INCA established the Laboratory of Environmental Chemical Engineering of Cagliari, which is presently hosted at the facilities of the Interdepartmental Center of Environmental Science and Engineering (CINSA; University of Cagliari). Nowadays the lab covers a 120 m² area.

Training

The lab is actively working in collaboration with CINSA in the framework of the International PhD in Environmental Science and Technology which will be jointly awarded by the University of Cagliari, the University of Aveiro (Portugal), the University of Pushchino Russia and ENIM (Marocco).



Laboratory activities

The lab is active in two main research areas:

- Engineering of novel synthetic technologies, along with the identification of new operating conditions.
- Soil remediation by mechanochemistry.



Running projects

- CHISS project (training)
- Monitoring and remediation of polluted sites (research & training).

Main analytical instrumentation

- Electron microscopy with EDX KEVEX microanalysis
- X-Ray Diffractometer Philips model ADP
- CP-OES Varian model VISTA MPX
- Batch reactor PARR model 4520



Mission

- To provide scientific support to chemical, metallurgical and petrochemical industries located in the Sardinia region in order to design alternative processes and operating conditions.
- To become a reference lab for the experimentation of remediation techniques, aiming at the identification of the most appropriate ones in relation to the actual type and level of pollution of the contaminated sites both at a local and a regional level.



INCA Laboratory of Napoli

Director: Prof. Lucio PREVITERA
 Location: c/o Dip. di Chimica Organica e Biochimica, Università "Federico II"
 – Complesso Universitario Monte S. Angelo,
 Via Cinthia 4; 80126 Napoli

The lab is located at the facilities of the Department of Organic Chemistry and Biochemistry of the "Federico II" University of Naples. The lab is intended as a centre of excellence in the field of NMR analysis for different applications in environmental and food chemistry.

Training

The lab is active in the field of training. Besides hosting pre- and postgraduate students, due to its particular expertise, the lab organized NMR courses for young researchers coming from different research units of INCA.

Laboratory activities

- Synthetic strategy for stereoselective preparation of nucleosides analogs (purinic and pyrimidinic).
 - Synthesis of new environmentally-friendly algicides, mimicking natural products.
- Isolation and characterization of metabolites by aquatic plants behaving as algal growth inhibitors.
- Chemical and toxicological investigation of phenolic compounds in wastewaters from olive oil production for eco-compatible disposal.
 - Structural studies for polysaccharides produced by extremophile bacteria and phytopathogenic fungi.
 - Characterization of components from food industry wastes as preliminary tests for their reuse.



Running projects

Batch extraction of lycopene and vitamin E from tomato wastes with dense carbon dioxide – A workpackage of the project "Treatment for recovery and reuse of the byproducts of tomato industrial processing" (PON 2000-2006; Meas. 3.1/3).



Main analytical instrumentation

- Spectrometer NMR Varian 500 MHz;
- NMR spectrometers;
- Mass spectrometers;
- X-Ray Diffractometers;
- UV spectrophotometers;
- Computerized modeling for molecular dynamics.

Mission

- To become a centre of excellence for training and use of NMR technology at a local and regional level.
- To foster the application of NMR analytical methods in research projects concerning environment monitoring and recovery and reuse of molecules from the food industry.



INCA Laboratory of Palermo

Director: Prof. Franco LA MANTIA
Location: c/o Dip. di Ingegneria Chimica dei Processi e dei Materiali,
Università di Palermo, Viale delle Scienze; 90128 Palermo

The INCA Laboratory of Palermo is hosted at the facilities of the Department of Chemical Engineering Processes and Materials, University of Palermo. The lab owns singular expertise in chemical reactions applied to engineering processes and studies on relationship between material characteristics and environment (materials' life cycle).

Training

The lab collaborates with the regional agency for environment protection on the training of environmental technicians in its field of expertise.

Laboratory activities

The lab is active in four main research areas:

- Water purification treatments;
- Treatment of wastes from food industry;
- Recycling and recovery of plastic materials;
- Biodegradability of plastic material.



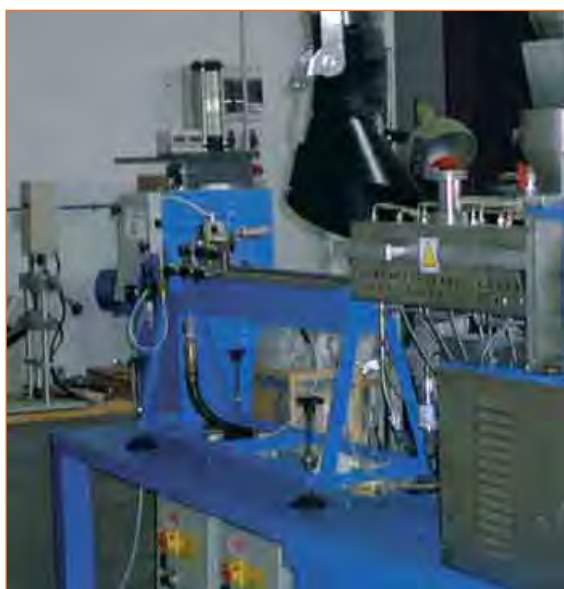
Running projects

- Research with industrial partners on photocatalytic materials (research).
- Research with industrial partners on post-consumer recycling of plastic materials (research).
- Research in collaboration with public agencies in the field of water purification and plastic recycling (research & training).



Main analytical instrumentation

- Scanning Electron Microscopy (E-SEM);
- Atomic Force Microscopy (AFM);
- NMR Spectrometer;
- X Ray Spectrometer;
- Thermal analysis Apparatuses;
- Dynamic-mechanical and dielectric Spectrometers;
- Capillary and rotational Rheometers;
- Liquid and gas phase Chromatographs;
- Pilot Systems for control processes;
- Total Organic Carbon Analyzer (TOC);
- P.I.V. (Particle Image Velocimetry).



Mission

- To become a centre of excellence at a national level in its field of expertise.
- Fostering collaborations between INCA, universities and industry.
- To collaborate with local agencies for environment protection.

