

Curriculum Vitae

Dr Carmelo Drago, *researcher*

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Dr Carmelo Drago commenced his studies in Chemistry at the University of Catania in 1995. In September 2000, as an undergraduate, he started working on his final year project entitled "*Stereoselective Oxidation of cyclic conjugated dienes catalysed by Chloroperoxidase from *Caldaryomices fumago**" under the supervision of Prof. Corrado Tringali. This work was carried out as a collaborative project between the CNR (National Research Council) and the University of Catania. He graduated on December 21st 2001 (Mark: 110/110). In April 2002, he moved to the University of Sheffield (U.K.) to begin a PhD working on a project entitled "*Combinatorial Approaches to Catalysis for Asymmetric Sulfide Oxidation*" under the supervision of Prof. R.F.W. Jackson. Mainly, he focused his work on two aspects, the parallel synthesis of libraries of catalysts by the approach on solid supports (SPS) and the development of more efficient and rapid testing processes to allow a faster screening of catalysts libraries made on solid phase (HTS). This project was funded by the European Union as part of an European network project COMBICAT: "*The Discovery of New Molecular Catalysts through Combinatorial Chemistry*". In this context, he carried out part of his research work at the University of Cologne (Germany) working on a project titled "*Approaches to Infrared Thermography Screening of Heterogeneous Catalysts Libraries*" under the supervision of both Prof. A. Berkessel and Prof. R. F. W. Jackson. Moreover, the promising applications of his findings was the base for a professional collaboration with a research groups of GlaxoSmithKline located in Stevenage and Harlow (U.K.). He successfully gained his doctorate in September 2005.

In December 2005, he moved to Milan where he undertook his research experience at CISI (Centre for Bio-molecular Interdisciplinary Studies and Industrial applications), originally a *spin-off* supported by the University of Milan on guidance of Prof. Carlo Scolastico. In CISI, he was involved on the "*design, synthesis and biological screening of libraries of molecules obtained using high throughput techniques starting from original structural unities, for both diagnostic and therapeutic applications*". During that time he was involved in the synthesis of peptidomimetic compounds as a potential pro-apoptotics.

In March 2011, he moved to the Nanotechnologies Laboratory of the ISTM (CNR) in Milan, where he worked on a project concerning the *Synthesis, design and characterization of SPIO nanoparticles conjugated to biomolecules for therapeutic and diagnostic applications* under the supervision of Dr. Alessandro Ponti, with whom he currently continues to collaborate.

Since November 2011, he is working as a permanent researcher (reg.-n° 14514) at the Institute of Biomolecular Chemistry (CNR) of Catania, where he is involved in research projects in the area of sustainable chemistry (development of catalytic, sustainable, for the transformation of used vegetable oils into biofuels), medicinal chemistry (synthesis of molecules for therapeutic and diagnostic applications) and in the field of functionalized materials both for the development of biosensors (amperometric, optical, etc.) and drug delivery (functionalization of SPIO nanoparticles).

SCIENTIFIC INTEREST

- Sustainable synthesis and optimization of novel biofuels and biofuel additives from renewable feedstock
- Development of sustainable catalytic processes and synthesis of bioactive molecules
- Synthesis, design and characterization of SPIO nanoparticles conjugated to biomolecules developed from original structural units for therapeutic and diagnostic applications
- Design, synthesis and biological screening methods through high yield synthesis of combinatorial libraries of molecules developed from original structural units, for therapeutic and diagnostic applications

PATENTS

1. Medical compounds; Giovanni M. Pitari; Claudia G. Leotta; Carmelo Drago; Giovanni Nicolosi, WO2019008537A1 (PCT/IB2018/054981)
2. One-pot process for the production of biodiesel and glycerol ether mixtures useful as biofuels; C. Drago, L. F. Liotta, V. La Parola, M. L. Testa and G. Nicolosi; WO/2014/122579 (PCT/IB2014/058783)
3. New Homo- and Heterodimeric SMAC Mimetic Compounds as Apoptosis Inducers; Pierfausto Seneci; Laura Belvisi; Federica COSSU; Domenico Delia; Carmelo Drago; Daniele LECIS; Stefano Maiorana; Leonardo Pierpaolo Manzoni; Eloise Mastrangelo; Mario Milani De Mayo De Mari; Paola Maria Chiara PEREGO; Francesca Vasile; US20160317605A1; EP2817322B1 (PCT/IB2012/000297 del 20-02-2012)
4. SMAC mimetic compounds as apoptosis inducers; Carlo Scolastico, Leonardo Pierpaolo Manzoni, Pierfausto Seneci, Laura Belvisi, Domenico Delia, Martino Bolognesi, Eloise Mastrangelo, Mario De Mayo De Mari Milani, Ilaria Motto, Carmelo Drago; US8609685B2 (EP07021843 del 2007-11-09)

SELECTED PUBLICATIONS

1. Towards Bio-compatible Magnetic Nanoparticles: Immune-related Effects, In-vitro Internalization, and In-vivo Bio-distribution of Zwitterionic Ferrite Nanoparticles with Unexpected Renal Clearance; Anna M. Ferretti, Sandro Usseglio, Sara Mondini, Carmelo Drago, Rosa La Mattina, Bice Chini, Claudia Verderio, Marianna Leonzino, Cinzia Cagnoli, Pooja Joshi, Diana Boraschi, Paola Italiani, Yang Li, Benjamin J. Swartzwelter, Luigi Sironi, Paolo Gelosa, Laura Castiglioni, Uliano Guerrini, Alessandro Ponti, *Journal of Colloid and Interface Science*, **2021**, 582, 678-700.
2. Zwitterion-Coated Iron Oxide Nanoparticles: Surface Chemistry and Intracellular Uptake by Hepatocarcinoma (HepG2) Cells; Sara Mondini, Marianna Leonzino, Carmelo Drago, Anna M. Ferretti, Sandro Usseglio, Daniela Maggioni, Paolo Tornese, Bice Chini, Alessandro Ponti, *Langmuir*, **2015**, 31, 7381
3. Smac mimetics induce inflammation and necrotic tumour cell death by modulating macrophage activity; D Lecis, M De Cesare, P Perego, A Conti, E Corna, C Drago, P Seneci, H Walczak, MP Colombo, D Delia, S Sangaletti, *Cell Death and Disease*, **2013**, 4, e920;
4. Magnetic nanoparticles conjugated to chiral imidazolidinone as recoverable catalys; Sara Mondini, Alessandra Puglisi, Maurizio Benaglia, Daniela Ramella, Carmelo Drago, Anna M. Ferretti, and Alessandro Ponti, *J. Nanopart. Res.* (2013) 15:2025
5. One-pot microwave assisted catalytic transformation of vegetable oil into glycerol-free Biodiesel; C. Drago, L. F. Liotta, V. La Parola, M. L. Testa and G. Nicolosi; *Fuel*, **2013**, 113, 707
6. Homo- and heterodimeric Smac mimetics/IAP inhibitors as in vivo-active pro-apoptotic agents. Part I: Synthesis; Pierfausto Seneci, Laura Belvisi, Aldo Bianchi, Martino Bolognesi, Carmelo Drago, Domenico Delia, Marilena de Matteo, Luca Ferrante, Leonardo Manzoni, Paola Perego, Donatella Potenza, Vincenzo Rizzo, Federica Servida, Gabriele Timpano, Francesca Vasile and Carlo Scolastico; *Bioorganic & Medicinal Chemistry*, **2012**, 20, 6687
7. Targeting the X-linked Inhibitor of Apoptosis Protein (XIAP) through 4-substituted azabicyclo[5.3.0]alkane Smac-mimetics. Structure, activity and recognition principles, Eloise Mastrangelo, Federica Cossu, Mario Milani, Graziella Sorrentino, Daniele Lecis, Domenico Delia, Leonardo Manzoni, Carmelo Drago, Pierfausto Seneci, Carlo Scolastico, Vincenzo Rizzo and Martino Bolognesi, *Journal of Biological Chemistry*, **2008**, 384, 673.
8. A Vanadium-catalysed Sulfur Oxidation/Kinetic Resolution Process for the Synthesis of Enantiomerically Pure Alkyl Aryl Sulfoxides, Carmelo Drago, Lorenzo Caggiano, and Richard F.W. Jackson, *Angewandte-Chemie International Edition*, accepted as VIP, **2005**, 44, 7221