Session VI: Functional Colorants - II

Porphyrinoids: Synthesis and their role in medical and environmental remediation applications

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Prof.Graca Neves has completed Licenciatura in Chemistry, University of Lourenço Marques, with flying colors in July 1973. In July 1976, she obtained Master of Science" by the University of Manchester, U.M.I.S.T., Great Britain and PhD in PhD in Chemistry, specialization in Organic Chemistry, University of Aveiro in December 1986 with distinction. She obtained Habilitation ("Agregação") in chemistry approved with unanimity in September 2006.

Prof. Neves was Research Auxiliar Department of Chemistry, University of Lourenço Marques, Mozambique in 1972 and Monitor "Monitor", Department of Chemistry, University of Lourenço Marques, Mozambique in 1973. In October 1977, she was Trainee Assistant ("Assistente Estagiário"), Department of Chemistry, University of Aveiro and in October 1979 Assistant, Department of Chemistry, University of Aveiro. She was Assistant Professor, Department of Chemistry, University of Aveiro since December 1986 and Associate Professor, Department of Chemistry, University of Aveiro since June 1991. She is Associate Professor with Habilitation, Department of Chemistry, University of Aveiro since September 2006

After her PhD, she continued her research activity in the area of tetrapyrrolic macrocycles in closely collaboration with her colleagues Professor J. A. S. Cavaleiro, Augusto C. Tomé, Artur Silva, Mário Simões and Amparo Faustino. Her research interests are focused on the development of new synthetic methodologies to prepare and functionalize porphyrins and related compounds (corroles, phthalocyanines, inverted porphyrins, heteroporphyrins) using conventional chemistry, cyclo-addition reactions or transition metals. Through interdisciplinary connections she is also interested in studying the potential of the synthesized compounds in various areas like photodynamic therapy of tumors and other pathological conditions (eg microbial), development of supramolecular systems, sensors, dyes for solar etc.

Another line of action is related with the synthesis and characterization of porphyrins and metal complexes with potential use as catalysts in oxidative transformations under homogeneous and heterogeneous conditions Some of these studies aim through oxidative transformations using hydrogen peroxide as oxidant and tetrapyrrolic macrocycles and polyoxometalates as catalysts to obtain from simple and inexpensive natural compounds or others, new compounds with higher added value. More recently some studies have been focused on the oxidation of drugs and pollutants.

Prof.Neve's research interests also include Supervision or Co-supervision of PostDoc supervision: 10 finished, 4 on-going, PhD thesis 19 finished, 2 on-going and MSc thesis 19 finished, 2 on-going

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Abstract

Porphyrins and analogues are well-known by their role in important biological functions like respiration, photosynthesis, drug detoxification among others. The iron(II) complex of protoporphyrin IX, also known as haem is present in hemoproteins (e.g., hemoglobin, myoglobin, cytochrome enzymes) responsible by the transport and storage of dioxygen and in electron transfer reactions. On the other hand, chlorophylls are of pivotal importance for the photosynthetic processes. The impressive work concerning the structure elucidation of these pigments known as "colors of life", in the early-mid 20th century, accompanied by the development of efficient synthetic approaches, knowledge concerning their mode of action, biosynthesis and catabolism conducted to new information responsible by the success of natural but also of synthetic porphyrins and analogues (e.g. corroles, phthalocyanines) in different applications. Today, natural and synthetic porphyrin type derivatives are recognized to have, depending on their structures, adequate photophysical/photochemical features to be explored in the development of novel catalysts, electronic devices, sensors, dyes for photovoltaic solar cells and as therapeutic agents [1,2].

In these communication a special attention would be given to synthetic approaches developed in our group to functionalize/immobilize porphyrin derivatives in order to allow their applications in environmental remediation (e.g. detection and removal of metal ions) and to explore their photodynamic action into clinical and non-clinical contexts [3-6].

References

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