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Webinars

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The Chemistry of Flavylium Derivatives: From the Molecular Level to Advanced Functional Materials

Luís Cruz

LAQV REQUIMTE, Department of Chemistry and Biochemistry, Faculty of Sciences of the University of Porto
luis.cruz@fc.up.pt
https://www.foodphenolab.com/luis-cruz

Polyphenolic pigments comprise a large family of synthetic and natural flavylium-based dyes, including anthocyanins, 3-deoxyanthocyanidins, and pyranoanthocyanin derivatives, widespread in the plant kingdom. These compounds display a pH-dependent equilibria network giving rise to a wide portfolio of beautiful colors from orange-red at low pH values (flavylium cation) to blue-violet at from neutral to basic pH values (quinoidal bases). Because of their interesting chromatic features, photochemical and biological properties, anthocyanins and related flavylium dyes have been gaining increased attention by the scientific community, finding several technological applications as colorants, antioxidants, photosensitizers, pH-sensors, and photochromic systems with interest for food, textile, cosmetics, energy, pharmaceutical, and biomedical fields. Over the last few years, our research has focused on chromatic stabilization and tuning the physicochemical properties of anthocyanins through pioneering, advanced, and chemically programmable strategies. Additionally, the rational design of flavylium-based materials and sensing systems for food applications has involved developing stimuli-responsive host-guest chemosensors and fabricating smart pH-responsive flavylium-biopolymer films and membranes.

Short Bio

Luís Cruz is a Principal Investigator at the Associated Laboratory for Green Chemistry (LAQV) of the Network of Chemistry and Technology (REQUIMTE) under an individual CEEC contract (2023.07923.CEECIND) and an Invited Adjunct Professor at the Polytechnic Institute of Porto. His research expertise includes the chemical and enzymatic synthesis of plant polyphenols, particularly anthocyanins and flavylium derivatives, and their photophysical and physicochemical characterization, as well as the fabrication of advanced stimuli-responsive polyphenol-based biomaterials for applications in sensing, biomedicine, and food packaging.

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