

novel porphyrin macrocycles and polyhydroxylated 2,3-diaryl-9H-xanthen-9-ones: synthesis, biological evaluation, applications and patents

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A) New synthetic methodologies leading to porphyrin derivatives have been studied. Such methodologies involve the macrocycle derivatization by cycloaddition transformations, and also other structural modifications from beta-substituted macrocycles. The new compounds have been structurally elucidated and biologically evaluated. Significant applications have been found on the use of the new compounds as antimicroorganism agents.

Such applications include processes of waste water purification by using porphyrins as photosensitizers in heterogeneous media (in a collaborative action with CICECO colleagues, a patent has been registered). Other porphyrin applications were found for the use of such compounds in photodynamic therapy of cancer cells; their anti-microorganism actions have also been well established. Certain Mn(III) and Fe(III) complexes have also demonstrated very good catalytic action in the oxidative transformation of organic substrates into higher value-added products.

B) Xanthenes constitute one of the major classes of naturally occurring oxygen-containing heterocyclic compounds containing dibenzo-pyrone rings. Natural derivatives can be hydroxylated, methoxylated or prenylated, among other possibilities; the parent compound xanthone itself is not known as a natural product. The presence of aryl groups on the xanthone core has only been reported for a few synthetic derivatives, and as far as we know the literature had

never presented the synthesis of xanthenes featuring 2,3-diaryl moieties before our work. A large number of hydroxylated 2,3-diaryl-9H-xanthen-9-ones have been synthesised by two different approaches, involving modern organic transformations. The biological evaluation of the prepared 2,3-diarylxanthenes showed they present potent potential as new drugs and cosmetics and the excellent results led us to register them in a patent.

