Photodegradation of chloramphenicol using base-free and zinc porphyrins.

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Chloramphenicol (CFN) is an antibiotic used against various diseases around the globe. Recently, CFN has been considered an emerging antibiotic pollutant because it can cause impacts on the environment and human health. The exposure to chloramphenicol can be the cause of serious effects on the environment, such as inhibiting the growth of algae, and on human health, being a contributing factor in aplastic anemia and cancer development. The removal of this pollutant from the water sources is important. For this purpose, this study used porphyrins associated with light to degrade CFN.[1]
The photodegradation of CFN was carried out using the porphyrins 5,10,15,20-tetrakis-(4-carboxyphenyl)porphyrin (H_2T4CPP), 5,10,15,20-tetrakis-(4-sulfonatophenyl)porphyrin (H_2T4SPP), and their zinc complex [Zn(T4CPP)] and [Zn(T4SPP)], respectively. The porphyrin aqueous solution was added to a CFN solution (acetonitrile:deionized water 1:9), and the reaction was carried out under magnetic stirring for 15 hours in the dark or for the same time under illumination with visible light. It was possible to verify the effect of the light on the CFN degradation.[2]

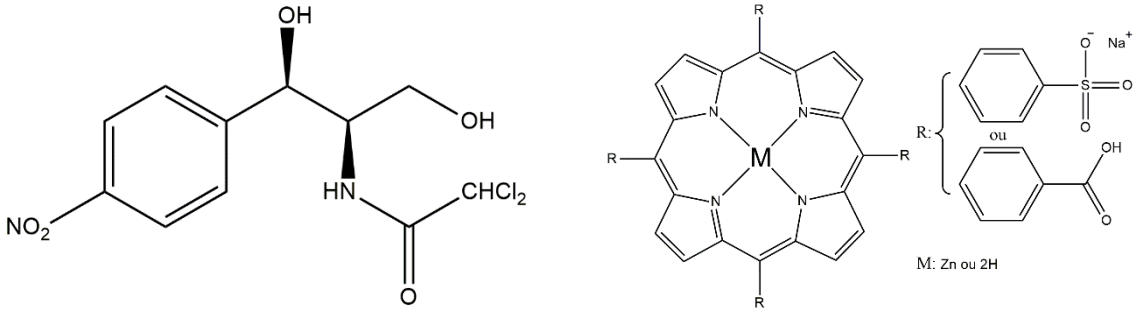

Figure 1 Structures of (a) Chloramphenicol and (b) porphyrinic catalysts.

Preliminary high-performance liquid chromatography analyses have shown that CFN is lightly unstable under visible light. Unfortunately, all tested porphyrins lead to a low CFN degradation degree. It was possible to verify the formation of more than one degradation product for each tested condition. The next step of this study will involve the identification of the products. Furthermore, the experimental variables will be more studied to improve CFN degradation.

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References

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