CARDANOL AND GLYCEROL AS BUILDING BLOCKS FOR THE SYNTHESIS OF NEW PORPHYRINS

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INTRODUCTION

Porphyrins are a group of tetrapyrrolic compounds which have significant attractive chemical and physical properties, due to their wide application in many areas of new materials such as chemical technology, ecology, medicine, and eletronics[1]. The use of these macrocycles is heavily dependent on their structures. Thus, it is important to develop or improve strategies to reach new synthetic porphyrin derivatives with features to increase their photochemical ability.[2]

Our purpose is to synthesize new molecular hybrid porphyrin-cardanol-glycerol structures (Fig. 1) aiming at applications in photodynamic therapy and also as fluorescent marker for biodiesel.[3]

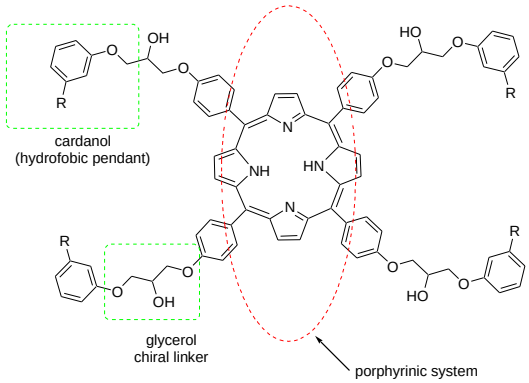


Figure 1

RESULTS AND DISCUSSION

Porphyrin **4** was prepared using the aldehyde **1**, pyrrole **3** and propionic acid, by heating the mixture at 130 ^{0}C for 30 min. The compound **4** was isolated after purifications in silica gel (10% yield). For the synthesis of the porphyrin **5**, first the aldehyde **2** was prepared by treatment of **1** with epichlorohydrin (a derivative of glycerol) in the presence of an alcoholic solution of $FeCl_3$, followed by vigorously stirring with 18% HCl. The reaction of pyrrole (**3**) with aldehyde **2** was first carried out in dichloromethane using BF_3 etherate as catalyst, at 0 °C to produce the porphyrinogen intermediate. After that, DDQ was added to afford **5** in 10% yield after purifications (Scheme 1). Currently, we are optimizing the preparation of porphyrin **5**, starting from both **2** and **4**, as well as evaluating the use of other methods of preparation of porphyrin systems. The next step is the coupling of saturated cardanol (Fig. 2) with porphyrin **5**, which can be made by nucleophilic attack of the cardanol oxygen atom with subsequent displacement of the chlorine atom, forming the desired molecular hybrid porphyrin-glycerol-cardanol system.

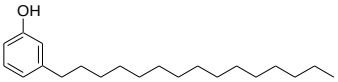
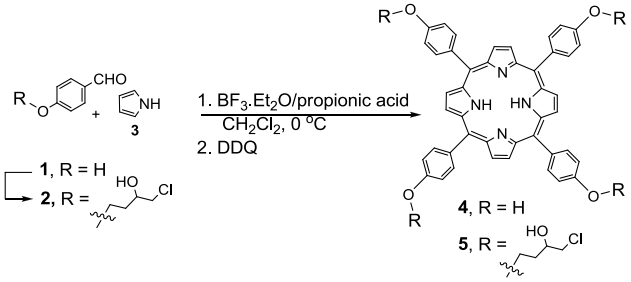


Figure 2. Structure of the saturated cardanol.



Scheme 1: Synthesis of porphyrin systems **4** and **5**

CONCLUSION

We have performed the synthesis of a novel porphyrin **5**, which is an intermediate for an advanced hybrid molecular system designed for photodynamic therapy studies as well as fluorescent marker for biodiesel.

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