

Abstract

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Pharmaceutical Chemistry and Pharmaceutical Analysis

Author: Natália Cisariková

Supervisor: Prof. PharmDr. Petr Zimčík, PhD.

Name of the thesis: **Synthesis and evaluation of BODIPY fluorophores**

Derivatives of 3a,4a-diaza-4-bora-4,4-difluoro-s-indacene, commonly referred to as BODIPY, are a specific group of fluorescent dyes with outstanding optical properties. They are characterized by a high fluorescence quantum yield, narrow absorption and emission bands, and stability against changes in pH and polarity of the solvent. However, their application in photodynamic therapy is limited by their low solubility in polar solvents. This study focuses on the aggregation of BODIPY derivatives in solution and their interaction with lipid nanoparticles, with particular emphasis on the formation of J-dimers. The effect of substituents in *meso* position on these processes and their potential contribution to improving the physicochemical properties of BODIPY dyes is examined. In the experimental part, six derivatives with different substituents in *meso* position were synthesized, and their photophysical properties were further tested. The obtained findings contribute to a deeper understanding of their behavior and may facilitate the optimization of structures for more effective use in photodynamic therapy or other applications in the future.