

## **Abstract**

Hemoproteins represent very important components of many living organisms. Participation in the processes of oxygen transport and storage, electron transport or enzymatic catalysis of reactions involving oxygen or hydrogen peroxide are commonly known functions of hemoproteins. Recently, there has been discovered a new group of hemoproteins. The main feature of this new group of proteins is their ability to detect changes in heme concentration (heme-responsive proteins) or changes in diatomic gas concentration (gas-responsive heme-containing sensor proteins) in their vicinity. Detection of these concentration changes generates signals that induce structural changes of the respective sensor proteins. Finally, the structural changes of the respective sensor proteins affect their functions or activities.

The subject of this diploma thesis is the preparation and characterization of the eukaryotic heme sensor Bach1. We especially focused on the ability of Bach1 to bind heme molecules and on the comparison of various Bach1 properties in its apoform and holoform. Determination of the exact amount of heme molecules that specifically interact with heme sensor Bach1 represents very important part of this thesis. We also studied the effect of different redox states of heme iron and the presence of interaction partners of Bach1 on its heme binding ability. The effect of heme binding on the oligomeric state and the structural properties of Bach1 is also described in this thesis.