

This thesis is focused on protective and antioxidant properties of bile pigment bilirubin. Bilirubin is a potent scavenger of free radicals and reactive oxygen species generated by increased oxidative stress. Mildly elevated systemic levels of bilirubin are actually associated with lower incidence of oxidative stress-mediated diseases, such as cardiovascular disease, atherosclerosis, diabetes and certain types of cancer. The main aim of this thesis was to prepare bilirubin oxidation products *in vitro*, characterize their physical-chemical properties and then determine biological impact.