ABSTRACT

Charles University in Prague
Faculty of Pharmacy in Hradec Králové
Department of Biochemical Sciences

Candidate: Mgr. Veronika Staňková
Supervisor: PharmDr. Iva Boušová, Ph.D.
Title of thesis: Catechins: interaction with human serum albumin and affecting its glycation by methylglyoxal.

The catechins (flavan-3-ols) are polyphenolic substances of higher plants exerting a wide spectrum of biological and pharmacological properties. The first part of this thesis was focused on the study of potential interactions of four catechins (namely (-)-catechin, (-)-gallocatechin, (-)-catechin gallate, and (-)-gallocatechin gallate) with human serum albumin (HSA). HSA is the main transport protein in the blood serum, which influences the metabolism, bioavailability and biological activity of drugs *in vivo*. Binding ability of catechins to HSA was evaluated *in vitro* using UV/VIS spectroscopy, fluorescence spectroscopy, and gel electrophoresis (native and SDS-PAGE). Binding ability of catechins to HSA varied depending on their chemical structure and concentration. The presence of galloyl moiety and number of hydroxyl groups were found to be key structural features essential for catechin interaction with the molecule of HSA. In the second part of this work, the ability of catechins to influence methylglyoxal-induced non-enzymatic glycation of human serum albumin is evaluated. Non-enzymatic glycation of proteins plays an important role in the pathogenesis of different lifestyle diseases. The ability of catechins to inhibit methylglyoxal-induced glycation of HSA was evaluated *in vitro* using UV/VIS spectroscopy and fluorescence spectroscopy. The ability of catechins to inhibit production of both non-specific advanced glycation end-products (total AGEs) and specific marker argpyrimidine was evaluated using the fluorescence spectroscopy. The antiglycation activity of catechins varied depending on their structure and concentration. Higher antiglycation ability was found in catechins containing the galloyl moiety in their structure.