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**Protection of model cells against oxidative stress by polyphenols  
and synthetic compounds**

**ABSTRACT**

My doctoral dissertation consists of three papers published in the *Journal of Applied Microbiology* and *Molecules* devoted to (I) assessment of the protective properties of selected catechins against oxidative stress, (II) determination of the antioxidant properties of selected catechins against erythrocytes subjected to oxidative stress, (III) comparison of the protective properties of selected polyphenols against peroxidation of lipids in egg yolk and erythrocyte membranes and oxidation of chosen erythrocyte components (hemoglobin and glutathione).

We showed that studied flavanols [(+) - catechin and (-) - epigallocatechin gallate] increased the survival of yeasts subjected to thermal stress. Oxidative stress markers such as production of reactive oxygen species, total antioxidant capacity and protein carbonylation had lower values in yeast treated with these flavanols. It can be concluded that these compounds protect yeast against the effects of oxidative stress.

Next, we checked whether selected catechins [(+) - catechin, epigallocatechin (EGC) and epigallocatechin gallate (EGCG)] affect human erythrocytes and if they protect against damage caused by oxidative stress. All tested catechins protected erythrocytes against hemolysis caused by permanganate, oxidation of thiol groups of erythrocyte proteins and peroxidation of membrane lipids, which show us beneficial effect of catechins present in plant food and drink on the human body.

We also compared the protective effect of a number of synthetic and natural antioxidants on the peroxidation of lipids in egg yolk and erythrocyte membranes. Most of the tested compounds showed this activity in both systems, but some revealed their pro-oxidative activity in interaction with erythrocytes, which tells us that antioxidant activity may differ in different systems.