# Summary of study named: Effects of selected natural substances on the antioxidant system of an organism

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The aim of this study was to compare the effects of selected natural substances on the antioxidant defense system under comparable conditions, focusing on influencing the activity of selenoenzymes thioredoxin reductase (TrxR-1) and glutathione peroxidase (GPx-1).

Experiments were performed in rats (Wistar, male). Livers, and in some cases kidneys were collected in all experiments. Homogenates were created from the collected organs and subsequently the activity of TrxR-1 and GPx-1, glutathione reductase (GR), catalase (CAT) and superoxide dismutase (SOD), and reduced glutathione (GSH) and lipid peroxidation (LP) levels were determined.

We demonstrated significant effects of selected natural substances on the redox system, including influences of selenoenzymes thioredoxin reductase and glutathione peroxidase.

The biggest influence on the activity of selenoenzymes thioredoxin reductase and glutathione peroxidase had hydroxytyrosol (HT) and oleuropein (OLEU). In rat liver tissue there was a significant decrease of the activity of both above mentioned enzymes after administration of these agents, however in kidney tissue only the glutathione peroxidase activity was reduced.

The thioredoxin reductase activity was reduced by resveratrol in rat liver tissue and by myricetin in rat liver and kidney tissue. Glutathione peroxidase was reduced in the liver tissue of rats by all of the above mentioned red wine polyphenols (resveratrol, myricetin, quercetin and epicatechin) and in kidney tissue only by myricetin, quercetin and epicatechin.

The substances naringin, naringenin, hesperidin and hesperetin did not affect the thioredoxin reductase activity in rat liver tissue. The GPx-1 activity was increased by naringenin and naringin in rat liver tissue. An interesting finding was the positive influence of

these substances on the GSH level in rat liver tissue. The GSH level was increased through hesperetin, naringin and naringenin.

Melatonin (ME) had a significant effect on the activity of enzymes thioredoxin reductase and glutathione peroxidase, and increased the activity of both enzymes.

We investigated the effect of iron on oxidative stress and its effect on selected pretreatment agents (deferiprone, naringin, naringenin, myricetin and quercetin). The glutathione peroxidase activity was induced by ferric (III+) ions. This increase was reduced by pretreatment of deferiprone, quercetin and naringin to the control level. On the contrary, the application of myricetin supported this increase. The thioredoxin reductase activity was also increased by application of ferric (III+) ions. This increase was reduced by the pretreatment of deferiprone and quercetin to the control level. In case of application of the above mentioned substances only, i.e. without subsequent application of ferric (III+) ions, the glutathione peroxidase activity was significantly reduced and the thioredoxin reductase activity increased by all of these substances.

Some of our findings are the first in the field (OLEU, HT, ME) and are therefore suitable for future studies.

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