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Antioxidant property of *Grindelia robusta* infusum in the function of steeping time

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Gumplant (*Grindelia robusta* Nutt.) is a perennial plant growing wild in California, cultivated in Europe. *Grindelia robusta* has been found to be especially efficient in spasmodic asthma, giving prompt relief, and cures effectively in cases previously rebellious to medication. Its expectorant effect is also remarkable. Since in the indication fields in which the gumplant used the role of free radicals is proven, the aim of the work was to study the antioxidant properties of plant.

Gumplant was collected from Transylvania, from Botanical Garden of University of Medicine in 2007, Tirgu Mures, Romania. Aquous extracts were made from different parts of the plant (flower, stem and herba) by infusing for different time (5, 10, 30, 60, 120 min). Total scavenger capacity in extracts was determined by a chemiluminescence method. Hydrogen donor ability and reducing power were measured by spectrometric methods.

Hydrogen donor ability and reducing power vary considerably in the function of the steeping time and the concentration applied. The best results were obtained for concentrated extracts in all cases. Hydrogen donor ability and reducing power of teas generally increased with the increasing steeping time. Total scavenger capacity of flower extract also changed similarly, while significant total scavenger capacity of stem and herba was measured in extracts obtained by 5 min steeping time. In summarizing, the highest antioxidant values were obtained after 120 min steeping time in the case of flower extracts, while the optimal(best) steeping time in case of stem and herba extracts vary in large scale of time depending on the kind of antioxidant measurement.

The antioxidant properties of Grindelia robusta extracts depend on several factors, as plant parts, extraction procedure and concentration. In general 30-120 min steeping time proved to gave the highest antioxidant values except for that 5 min steeping time is enough for relevant total scavenger capacity of steam and herba extracts.

Prooxidant effect of trichothecene mycotoxins in poultry

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Fusarium moulds present is most of the temperate climate areas of the world and those are produce trichothecene mycotoxins, such as T-2 toxin, HT-2 toxin, scirpentriol, nivalenol, diacetoxyscirpenol and deoxynivalenol. There are numerous data that trichothecene myco-toxins affect the antioxidant status of animals, primarily due to their pro-oxidant effect. However, not clear whether the pro-oxidant characteristic of these mycotoxins is a direct or indirect effect. Chemical structure of trichothecenes, presence of epoxy group in the trichothe-cene ring, supports the direct effect through their metabolism by the xenobiotic transforming enzyme system.

The objective of our series of studies was to evaluate dose- and time-related effects of the most important trichothecene mycotoxin, T-2 toxin, on glutathione redox and lipid peroxide status of chickens. The birds were fed with diets experimentally contaminated with different doses of T-2 toxin (0.12, 0.4, 1.5, 2.05 or 2.35 mg kg^{-1}) without or with antioxidant supplementation (vitamin E: 10.5 mg + selenium 0.045 mg $animal^{-1}$ day^{-1}) in short-term (14 days) or long-term (39 days) studies. In each experiment five animals were exterminated from each group at days 3, 7 and 14 in short-term and at days 21 and 39 in long-term trials. Blood and liver samples were taken, in which reduced glutathione (GSH), malondialdehyde (MDA) concentration and glutathione-peroxidase (GSHPx) activity were measured.

The results showed that there were not dose-related changes in the parameters investigated, however long-term effect of T-2 toxin was found, mainly in liver. According to the changes of the different parameters in different tissues it can be stated that liver showed the most marked changes which followed by blood plasma and red blood haemolysates. Antioxidant

supplementation of the experimentally T-2 contaminated diet resulted improvement of the antioxidant and moderately in lipid peroxide status.

The possible causes of the lack of dose-relation would be the environmental factors, e.g. temperature and light regimen, also partially different genetic background of the experimental animals, even all of them was the same hybrid. The other possible cause would be the presence or lack of natural metabolites of T-2 toxin or some other not-identified trichothecene mycotoxins, because the experimental contamination was carried out using crude extract from the mainly T-2 toxin producing moulds, *Fusarium sporotrichioides* or *Fusarium tricintum.*

In conclusion it can be stated that T-2 toxin exposure has some pro-oxidant effect also activated or impaired the amount/activity of the glutathione redox system but its effect depends on the duration of the study also some other factors. Additionally, the question, that T-2 toxin has direct or indirect pro-oxidant effect remains open.

Effects of postconditioning on kidney ischemia/reperfusion injury in hypercholesterolemic rats

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Ischemia/reperfusion injury frequently threats the integrity of the organs during surgery. The protective effect of postconditioning (PK), the short repetitive ischemia/reperfusion cycles, applied in the beginning of reperfusion, has been improved the outcome in vital organs. Signaling cascades are induced by PK interfere in several points to preconditioning, which is blocked by metabolic diseases, such as insulin resistance and type 2 diabetes.

The aim of our study was to compare the efficacy of PK after reperfusion injury of both kidneys in metabolically healthy and hypercholesterolemic rats.

Male Wistar rats (N=30) were divided into two groups. Control group of the animals were fed by normal rat chow, the treated group (n=18) was fed with 1.5% cholesterol containing diet for 8 weeks. Both groups of rats were divided to further two subgroups, and were anaesthetized by ketamin: diazepam. One subgroup of rats was subjected to 45 min ischemia and 2 hours reperfusion, in the other subgroups 4x5 min ischemia/reperfusion cycles were applied in the early phase of reperfusion. After 2 hours of reperfusion blood and tissue (kidney, heart, liver, lung) samples were taken. Serum cholesterol, glucose and triglyceride levels were determined by photometric methods. Kidney function was characterized by serum urea, and creatinin levels. Inflammation and oxidative stress were characterized by the measurement of TNF-α and oxLDL concentrations (ELISA) and PMA induced free radical production capacity of whole blood by chemiluminometric method. Tissue injury in kidney was determined by formaline-fixed, paraffin embedded tissue sections (5 μm), stained with PAS and HE. TNF-α levels were also determined by immunohystochemistry.

Serum cholesterol and triglyceride levels were significantly higher in cholesterol fed rats than in control ones. Serum urea and creatinine levels were same in control and hypercholesterolemic groups. A significant elevation was observed in TNF-α level ($p<0.01$), PMA-induced free radical production ($p<0.05$), and in lipid peroxydation (oxLDL; $p<0.05$) after I/R injury in healthy rats, which reduced almost to the normal levels in PK ones. In hypercholesterolemic rats neither the elevation, nor the postconditioning induced reduction were not as significant as in the healthy rats. Surgical intervention caused a great elevation in serum glucose and insulin levels ($p<0.01$). PK caused a further elevation in insulin levels, while the TNF-α concentration and free radical levels were reduced. Tissue TNF-α level, measured in hypoxia sensitive papilla, was significantly higher in cholesterol fed animals, than in control rats, and this high level was not able to change in response to PK. In healthy animals PK caused a significant reduction in tissue TNF-α level, as well.

PK proved to be a very effective defense against I/R in healthy animals, but it was ineffective in hypercholesterolemic ones.