

Serum selenium concentrations of gestational diabetic and control pregnant women in the second trimester of pregnancy

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High serum selenium concentrations are positively associated with the prevalence of type 2 diabetes according to recently published data, whereas in an intervention study, patients who received 200 µg selenium per day as oral supplementation for seven years, had a significantly higher risk of developing type 2 diabetes mellitus compared to the control group. In a previous study, serum selenium levels in gestational diabetic pregnant women were slightly, but significantly higher than in control pregnant women. This finding needed to be confirmed by a larger number of study participants.

To determine serum selenium concentrations and plasma total glutathione peroxidase activity of 31 gestational diabetic and 20 control pregnant women between the 24th and 28th week of pregnancy.

Serum selenium concentrations were measured by hydride generation atomic absorption spectrometry. Plasma glutathione peroxidase activity was determined by an end-point direct assay in the presence of reduced glutathione and cumenehydroperoxide as co-substrates. Statistical analysis was performed using the Microsoft Excel 7.0 and Statistica™ 4.0 software packages.

Serum selenium concentrations were significantly higher in gestational diabetic (50.4±14.4µg/l) compared to control pregnant women (41.1±7.7µg/l, p=0.004). Plasma total glutathione peroxidase activity did not differ between the two groups of pregnant women (3.30±0.95 E/g protein in case of gestational diabetic and 2.84±0.60 E/g protein in case of control pregnant women). Serum selenium concentrations correlated significantly with plasma glutathione peroxidase activity in control pregnant women. In gestational diabetic study participants serum selenium concentrations correlated inversely with fasting plasma glucose values (p=-0.80).

This study confirmed our previous finding of significantly higher serum selenium concentrations in gestational diabetic compared to control pregnant women. The reasons for this observation are unclear; however, the correlation value shows that serum selenium levels seem to either influence or be influenced by fasting plasma glucose concentrations. Despite higher serum selenium levels in gestational diabetics, selenium-dependent glutathione peroxidase activities are similar in both groups of pregnant women.

Examination of microvascular reactivity in juvenile essential hypertension and haemodialysis

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The relationship of juvenile essential hypertension and impaired microvascular function has not yet been demonstrated. In contrast with hypertension in adulthood, a simultaneous assessment of the markers of oxidative stress and the microvascular reactivity has yet not been performed in adolescent patients with essential hypertension.

To compare the microvascular reactivity and markers of oxidative stress in overweight and lean hypertensive adolescents (OHT, LHT), and young haemodialyzed (HD) patients as positive controls.

Twenty-three OHT adolescents, 10 LHT adolescents, 12 young HD patients and 19 controls were enrolled. Microvascular reactivity of the forearm was assessed by means of laser Doppler flowmetry, measuring alterations of the blood perfusion of the microvasculature. Endothelium-dependent and -independent vasodilation, informative of the endothelium and smooth muscle layers of the vessels, were assessed by means of acetylcholine and sodium nitroprusside iontophoresis, respectively.

Maximal vasodilation was achieved by local heating of the skin to 44°C. The obtained perfusion values were expressed as relative to the basal values. We also determined the ratio of the whole blood oxidized/reduced glutathione (GSSG/GSH), the erythrocyte malondialdehyde levels and the activities of erythrocyte antioxidant enzymes.

Microvascular reactivities in both tests were moderately decreased in the two hypertensive groups, and significantly impaired in the HD group, as compared with healthy controls. Ratios GSSG/GSH were increased in all patient groups, being highest in the HD patients. The erythrocyte malondialdehyde levels and the activities of superoxide dismutase and glutathione peroxidase were significantly elevated in the HD group.

Our results suggest that the impairment of the microvascular reactivity does not precede the development of juvenile essential hypertension: an impaired microvascular reactivity is more likely a consequence and not a cause, being related to the degree of oxidative stress.

Improvement of beer's flavour stability by adding antioxidant vitamins

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Thanks to the growing tendency of the consumer's demands, it is important to find possibilities to improve the shelf life of different foods. The flavour stability of a food is an important part of its quality. The flavour changes in beer could be caused by the formation of radicals resulting from the ingress of oxygen.

Vitamin E and C are widely regarded as important dietary antioxidants. These vitamins were added to beer samples at different technological stages using a concentration range between 0 and 40 mg/L for Vitamin C and from 0 to 4 mg/L for Vitamin E. The aim of this study was to determine the flavour stability of these vitamin enriched samples.

The flavour stability of beers can be determined by Electron Spin Resonance (ESR). One of the examined parameter is the lag time. This parameter was determined at packaged sample technological stage in each case. It is in direct connection with the quantity of natural antioxidants found in beer. The formation of hydroxyl radicals will start only after this period of time. The ESR method can be used to analyse the effect of antioxidant vitamins such as vitamin E and C on the flavour stability of beer.

Comparing the different technological stages for vitamin addition, it can be established that the best lag time values were measured when the vitamins were added to the wort after cooling. If vitamin E concentration was higher than 4 mg/L at original pH or vitamin C concentration was higher than 30 mg/L at lower pH, the lag time was higher than 100 minutes. Vitamin addition at the end of fermentation increases the lag time in some cases, but adding vitamin is not recommended in the case of packaged beer.

In the case of original pH ascorbic acid always had a smaller effect on the value of lag time than vitamin E. If these vitamins were added together, their effects were combined so the presence of ascorbic acid reduces the effect of vitamin E.

Conclusions: On the grounds of these facts it can be stated that if the growth of the lag time is the target, individual vitamin addition is the right way to do it. The best results were received when only vitamin E was added to the wort at original pH, or when vitamin C was added to the wort samples separately at a lower pH value.