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**Effect of *Aronia melanocarpa* juice on cold restraint stress-induced gastric mucosal lesions and liver lipid peroxidation**

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It has been suggested that many of negative effects of oxidative stress are diminished upon supplementation with certain dietary antioxidants. The anthocyanins are water-soluble plant pigments, important dietary antioxidants used to prevent oxidative damage from active oxygen species in living systems. Chokeberry (*Aronia melanocarpa*) is a rich source of phenolic substances, mainly flavonoids from the anthocyanin subclass. Recently, protective effect of natural fruit juice from *A. melanocarpa* (AMFJ) on indomethacin-induced gastric mucosal lesions is studied and proven. Additionally, the red pigment fraction of the chokeberry had the beneficial effect in suppressing the area of gastric mucosal damage caused by absolute ethanol. It is known that immobilization stress accelerated by cold (CRS), a combination of two potent stressors, can disrupt balance in an oxidant/antioxidant system and cause oxidative damage to several tissues by altering the enzymatic and non-enzymatic antioxidant status, protein oxidation and lipid peroxidation. In this study, gastroprotective effect of AMFJ on CRS (3.5 h at  $4 \pm 1^\circ\text{C}$ ) in rats and its influence on lipid peroxidation at the level of liver were investigated.

Male Wistar rats ( $220 \pm 20$  g) were divided in five experimental groups, each group contained six rats. The first group was control, non pretreated group. The second and the third group were pretreated with a single dose of AMFJ (5 ml/kg and 10 ml/kg *i.g.*). The fourth group of animals received AMFJ (5ml/kg) for 7 days. Quercetin (100 mg/kg), a known gastroprotective plant flavonoid, was administered to the last group as positive control. At the end of experiment, number and severity of gastric mucosal lesions were evaluated morphologically and histopathologically and level of intragastric pH was measured. In addition, ELISA test was used for biochemical evaluation in liver.

The average ulcer score in non-pretreated (control) group was  $3.66 \pm 0.52$ . AMFJ administered as a single dose of 5 and 10 ml/kg did not prevent the gastric mucosal lesions induced by CRS. However, long pretreatment with 5 ml/kg of AMFJ significantly ( $p < 0.05$ ) reduced ulcer index ( $3.00 \pm 0.89$ ). This effect was similar to those obtained with quercetin. It was also found that AMFJ did not inhibit gastric acid secretion, because no significant difference was found between the intragastric pH of pretreated and control rats.

Cold restraint stress significantly increased level of lipid peroxidation in liver, evaluated as thiobarbituric acid-reactive substances (TBARS) *per* mg of proteins. Liver tissue TBARS was reduced significantly by single and long pretreatment with 5 ml/kg of AMFJ ( $1.62 \pm 0.11$  and  $1.63 \pm 0.06$   $\mu\text{mol/mg}$  protein, respectively) vs.  $1.90 \pm 0.05$   $\mu\text{mol/mg}$  protein in control group ( $p < 0.05$ ).

Our study demonstrated that multiple low doses of AMFJ reduced CRS-induced gastric damage. The gastroprotective activity was accompanied by significant decrease in lipid peroxidation level in liver tissue. These effects most probably result from the ability of its constituents (anthocyanins and other phenolics) to scavenge reactive oxygen species produced in CRS.