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Effect of *Aronia melanocarpa* fruit juice on amiodarone-induced pneumotoxicity in rats

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ABSTRACT

Background: The fruits of *Aronia melanocarpa* (Michx.) Elliot is extremely rich in biologically active polyphenols. **Objective:** We studied the protective effect of *A. melanocarpa* fruit juice (AMFJ) in a model of amiodarone (AD)-induced pneumotoxicity in rats. **Materials and Methods:** AD was instilled intratracheally on days 0 and 2 (6.25 mg/kg). AMFJ (5 mL/kg and 10 mL/kg) was given orally from day 1 to days 2, 4, 9, and 10 to rats, which were sacrificed respectively on days 3, 5, 10, and 28 when biochemical, cytological, and immunological assays were performed. **Results:** AMFJ antagonized AD-induced increase of the lung weight coefficient. In bronchoalveolar lavage fluid, AD increased significantly the protein content, total cell count, polymorphonuclear cells, lymphocytes and the activity of lactate dehydrogenase, acid phosphatase and alkaline phosphatase on days 3 and 5. In AMFJ-treated rats these indices of direct toxic damage did not differ significantly from the control values. In lung tissue, AD induced oxidative stress measured by malondialdehyde content and fibrosis assessed by the hydroxyproline level. AMFJ prevented these effects of AD. In rat serum, AD caused a significant elevation of interleukin IL-6 on days 3 and 5, and a decrease of IL-10 on day 3. In AMFJ-treated rats, these indices of inflammation had values that did not differ significantly from the control ones. **Conclusion:** AMFJ could have a protective effect against AD-induced pulmonary toxicity as evidenced by the reduced signs of AD-induced direct toxic damage, oxidative stress, inflammation, and fibrosis.

Key words: *Aronia melanocarpa*, amiodarone, pneumotoxicity, rats

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INTRODUCTION

Amiodarone (AD), an iodine-containing highly lipophilic benzofuran derivative, is a very effective class III, long-acting antiarrhythmic drug. It causes acute pneumonitis resulting in fatal pulmonary fibrosis.^[1] *In vivo* and *in vitro* studies have shown that AD is directly toxic to lung cells^[2] such as alveolar macrophages,^[3] alveolar epithelial cells,^[4] and pulmonary artery endothelial cells.^[5] AD and its primary metabolite N-desethylamiodarone have been demonstrated to cause apoptosis and necrosis in cultured alveolar type II cells.^[4] AD-induced pulmonary injury could include disruption of mitochondrial function and cellular adenosine triphosphate ATP levels,^[6] enhanced oxidative stress and increased

production of reactive oxygen species,^[7,8] activation of alveolar macrophages and cytokine release.^[9-11]

Aronia melanocarpa (Michx.) Elliot (black chokeberry) originates from the eastern parts of North America and East Canada. Its migration to Europe and the former Soviet Union occurred around 1900. *Aronia* is commonly used to produce fruit syrup, juice, jellies, tea, and wine. Chokeberry fruits are extremely rich in phenolic compounds: Procyanidins, flavonoids (mainly from the subclass of anthocyanins) and phenolic acids.^[12] A series of studies has investigated the antioxidant properties of *Aronia* juice, *Aronia* extract or its phenolic constituents using different well-established assays.^[12-18] Fresh *Aronia* berries possess the highest antioxidant capacity among berries and other fruits investigated so far as measured with oxygen radical absorbance capacity.^[13,15] Studies have demonstrated that flavonoids including anthocyanins possess anti-inflammatory activity due to the suppression

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