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## **Investigation of Potential Effects of Aronia Melonocarpa Supplementation on Sportive Performance**

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**Abstract:** Nowadays, people's interest in more natural resources and aromatic plants has started to increase in terms of natural and healthy nutrition. Recently, the demand for medicinal plants rich in polyphenols with antimicrobial and antioxidant properties has increased. Aronia (*Aronia melanocarpa*) has recently become one of the most preferred fruits due to its high antioxidant activity and rich polyphenol content. The aim of this study was to investigate the potential effects of Aronia supplementation on athletes and its mechanisms of action from a specific point of view. For this purpose, a literature review was conducted and information was compiled with current studies by searching through aronia supplementation and sportive performance. It is seen that *Aronia melanocarpa* is used in many aspects. It has been evaluated in the treatment of many diseases, including colds and stomach diseases, as well as intestines, gall bladder and liver. Since it increases the level of good cholesterol, it has also been used to combat heart disease and cardiovascular problems. As a result of the literature researches, it can be said that *aronia melanocarpan* is used for therapeutic purposes in many diseases, but the studies in terms of sportive performance are limited. More studies are needed to reveal the effects of this supplement on sportive performance.

**Keywords:** Supplement, Sport, performance, Antioxidant

### **Introduction**

*Aronia melanocarpa* spread to Russia under the leadership of Germany in the early 1900s and started production. This remarkable plant is a shrubby species belonging to the Rosaceae family and can reach a height of 2 to 3 metres. Flowering in May-June, *Aronia* bears fruits that are shiny black in colour when ripe, measuring 6 to 13 mm in size and weighing 0.5 to 2 grams (Chrubasik et al., 2010). In different parts of Europe, *Aronia melanocarpa* fruit is found in various uses in the form of fruit syrup, jam, marmalade, tea, juice and extracts. This fruit is commonly known as "Chokeberry" and is divided into two recognised species, *Aronia melanocarpa* (black chokeberry) and *Aronia arbutifolia* (red chokeberry) (Oszmiański & Lachowicz, 2016). *Aronia* fruit stands out as a functional food due to its rich chemical content and high antioxidant activity. It is attracting more and more attention worldwide and its health benefits are being investigated.

In particular, its significant antioxidant activity plays an effective role in the treatment of chronic and degenerative diseases (Konić-Ristić et al., 2011). The positive effects of anthocyanins on health have also focused research on the content of *Aronia melanocarpa* fruit. This fruit offers a wide range of protective and beneficial effects based on its antioxidant and biological activities (Tolic et al., 2017). In this context, the potential of *Aronia melanocarpa* in the field of health and nutrition is attracting more and more interest worldwide. This research focussed on the use of the natural food supplement in the context of exercise.

### **Method**

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- Selection and peer-review under responsibility of the Organizing Committee of the Conference

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This study is a study obtained by summarizing many studies using the compilation method. A compilation is expressed as articles created by bringing together published studies on a particular subject. The purpose of the reviews is to present the information about that subject to the reader as a whole (Karaçam, 2013). For this purpose, literature review SCI, SSCI, SCI-Expanded and sports basic field articles accessed from SportDiscus, Google Scholar, PubMed and EMBASE databases were examined and the information was compiled and presented with a holistic perspective.

## **Results and Discussion**

### **Antioxidant Content and Application Areas**

Aronia melanocarpa stands out as a food source enriched with various valuable compounds such as anthocyanin, proanthocyanidin, flavonol, flavanol and phenolic acids (Kokotkiewicz et al. 2010). This special fruit has a number of positive effects on health due to its notorious antioxidant profile. Aronia fruits are also used as herbal medicine in Russia and Eastern European countries, not only for their nutritional properties, but also for their antihypertensive and anti-atherosclerotic properties (Jurikova et al., 2017).

The various properties of this fruit, which is important for health, have been elucidated by many studies. Thanks to its antioxidant properties, many studies have focused on the anti-inflammatory, antibacterial, anticancer, antimutagenic and antidiabetic activities of Aronia melanocarpa (Naruszewicz et al., 2007). In addition, research on obesity has shed light on the therapeutic potential of Aronia. This special fruit also stands out as a potential aid in the prevention and treatment of autoimmune and cardiovascular diseases. The health benefits of Aronia melanocarpa are evaluated in a wide spectrum and the powerful biological effects of this fruit have aroused a growing interest in the medical world.

Furthermore, these beneficial properties of Aronia can be integrated with traditional medical practices and become part of a holistic understanding of health supported by natural and herbal solutions as well as modern medicine. In conclusion, the nutritional value of Aronia melanocarpa and its positive effects on health emphasise the versatile use of this fruit and its importance in the world of health. Further research and discoveries in the future will allow us to better understand the potential of Aronia and more effectively understand the role of this valuable fruit in the field of health.

Aronia melanocarpa is a fruit that attracts attention with its rich components such as anthocyanin, proanthocyanidin, flavonol, flavanol and phenolic acid. In particular, research shows that this fruit has a number of positive effects on health. Aronia fruit juice has hepatoprotective (liver protective), hypolipidemic (lowering lipid levels) and hypoglycaemic (lowering blood sugar) effects. Antiaggregant, anti-inflammatory, vasoactive, vasoprotective and hypotensive activities of aronia extracts are also indicated. Various studies indicate that the rich content of this fruit in polyphenols, especially anthocyanins, is the main reason for these favourable effects, being associated with its antiradical activity *in vitro* and *in vivo*. However, the wide range of constituents contained in aronia fruit may not only be limited to antioxidant effects, but may also act on different mechanisms on the organism (Bell et al., 2006; Valcheva et al., 2007; Valcheva-Kuzmanova et al., 2004; Maas et al., 2016).

These positive health effects of this fruit suggest that it may play an important role in the prevention of type 2 diabetes, cardiovascular diseases and their potential complications. Common risk factors for type 2 diabetes and cardiovascular diseases include impaired glucose tolerance (prediabetic state) and dyslipidaemia. These conditions, taken together, can lead to metabolic syndrome. Research on the potential of the bioactive components contained in aronia fruit to reduce the possible effects of this metabolic syndrome suggests that this fruit may have an important role in health. Therefore, aronia fruit and its derivatives are recommended by nutritionists and researchers as part of a healthy lifestyle, and studies on it have contributed to a better understanding of its contributions to health (Bell et al., 2006; Valcheva et al., 2007; Valcheva-Kuzmanova et al., 2004; Maas et al., 2016).

In a study examining the effects of aronia fruit juice, multiple pathways were tested on insulin signalling to focus on reactions related to insulin resistance and proved to reduce the risk factor. In a separate study, aronia extract was observed to reduce fasting blood glucose levels in individuals with type 2 diabetes (Valcheva et al., 2007). In another study, the effects of aronia fruit juice were examined in diabetic and healthy rats. This study revealed a significant decrease in abnormalities in the diabetic group. Cardioprotective studies have shown a

significant decrease in total cholesterol and low-density cholesterol levels in patients with metabolic syndrome (Bell et al., 2006).

When the effects of aronia extract on lipid parameters were investigated, it was observed that total cholesterol level decreased, triglyceride levels decreased and HDL2 cholesterol increased. In another study, it was reported that aronia fruit juice caused a concentration-dependent decrease in superoxide production only in individuals with cardiovascular risk, while no effect was observed in the control group (Bell et al., 2006). The levels of antioxidants increased with the administration of aronia supplementation in athletes and effectively strengthened the glutathione defence system by increasing GSH availability and GPx activity after exercise and 30 minutes after exercise (Chung et al., 2023). Currently, studies on the use of this supplement in sportive fields are increasing in the literature.

## **Conclusion**

Research has clearly demonstrated that aronia fruit juice and extract exhibit positive effects on health. These positive effects on a wide range of health parameters, from insulin resistance to cardiovascular risk factors, emphasise the nutritional and therapeutic potential of aronia. There is increasing scientific evidence supporting the positive effects of the bioactive components contained in this fruit, especially anthocyanins, on metabolism. These positive contributions of aronia to health lead it to be considered as a potential natural supplement in the prevention and treatment of many health problems.

## **Recommendations**

Especially its positive effects on insulin resistance and risk factors of cardiovascular diseases are based on the strong antioxidant and anti-inflammatory properties of this fruit. In conclusion, the positive effects of the rich bioactive components in aronia fruit on health have been supported by scientific research and emphasised that this fruit can play an important role in the world of health. The potential of this natural resource will be further understood by future research and evaluated as an effective support in healthy lifestyle practices.

## **Scientific Ethics Declaration**

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

## **Acknowledgements or Notes**

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