

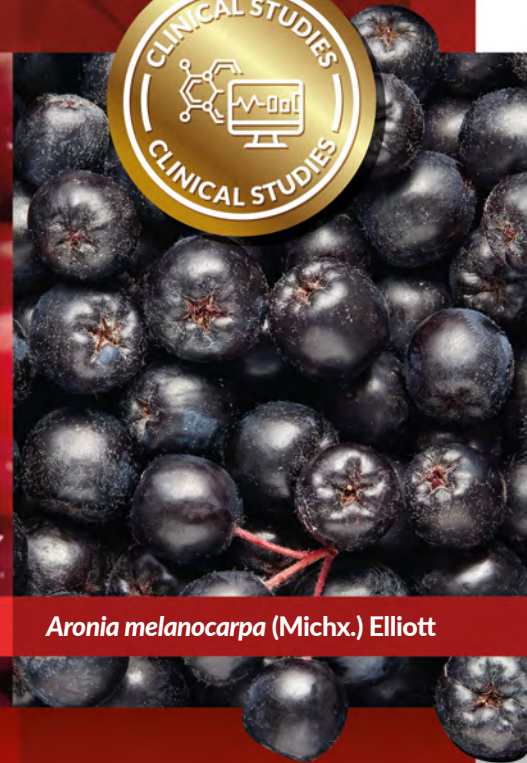


CHERRYGO[®]
by Greenvit[®]

Muscle recovery



Prunus cerasus L. (Vistula)



Aronia melanocarpa (Michx.) Elliott

REGENERATION AFTER SPORT ACTIVITY
REDUCTION OF MUSCLE SORENESS
STIMULATION OF THE IMMUNE SYSTEM



cherrygo.pl



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What is CHERRYGO®

CHERRYGO® is a standardized complex of fruit extracts rich in polyphenols, designed to support the body's recovery and reduce muscle soreness after strong physical exertion. It is composed of tart cherry fruit *Prunus cerasus* L. (Vistula) and aronia berry *Aronia melanocarpa* (Michx.) Elliott, each offering a different but complementary set of polyphenols, including anthocyanins. Such a combination has been widely proven to support human health. As a result of our own laboratory research on the formulation, we have obtained an innovative specific complex with an extended, synergistic spectrum of biologically active ingredients.

Table 1. The main anthocyanins fractions present in tart cherry and aronia.

Plant (fruit) / dominant anthocyanin fraction	
<i>Prunus cerasus</i> L. (Vistula) / Tart cherry	<i>Aronia melanocarpa</i> (Michx.) Elliott
Cy-3-sop	Cy-3-gal
Cy-3-rut-glu	Cy-3-ara
Cy-3-o-glu	Cy-3-glu
Pe-3-rut	Cy-3-xyl

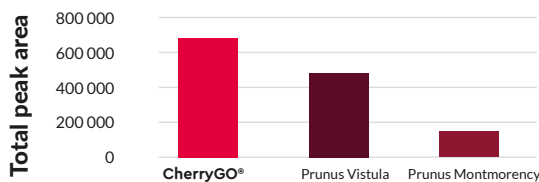


Figure 1. The comparison of anthocyanins **CHERRYGO®** composition and two varieties of tart cherries (*Prunus Vistula* and *Prunus Montmorency*). Total content of anthocyanins was measured by UPLC. The maximum absorption was found at 535 nm. The concentration of each extract solution was 1 mg/ml.

The production of **CHERRYGO®** complex *Prunus cerasus* L. (Vistula) + *Aronia melanocarpa* (Michx.) Elliott is based on a double standardization of each ingredient simultaneously with anthocyanin (HPLC) and polyphenol (UV) content. The complex is composed of:

- **TART CHERRY** Vistula type extract – double standardized for polyphenols (min. 15%) and anthocyanins (min. 3%) content, DER 40:1.
- **ARONIA BERRY** extract – double standardized for polyphenols (min. 50%) and anthocyanins (min. 25%) content, DER 70:1.

Recommended use and dosage

CHERRYGO® is available as a maroon to dark purple powder. It is convenient to include in formulations, suitable for **capsules, tablets, liquid forms**. **Recommended dosage:** 400 mg of **CHERRYGO®** per day.

What makes CHERRYGO® unique?

Innovative, standardized **CHERRYGO®** complex supports the body's natural defense system and regeneration by utilizing health beneficial properties of the two traditionally used fruits that provide high polyphenol content - tart cherry and aronia berry. **CHERRYGO®** complex enables, among others:

- effective regeneration after sport activity, especially endurance and resistance trainings,
- reduction of muscle soreness,
- reduction of inflammation,
- stimulation of the immune system response,
- effective prevention and/or support for the treatment of respiratory infections of viral and/or bacterial etiology.

CHERRYGO® complex has antioxidative and anti-inflammatory properties, and therefore can improve performance in physical activity as well as muscles recovery.¹

Target Group

CHERRYGO® complex is recommended for people who do sports as well as for those with physically demanding jobs.

Specification

We guarantee the full control of the origin and quality of these locally sourced raw ingredients. Aronia berries are obtained from selected Polish plantations. The tart cherry Vistula fruits are from unique, local plantations, traditionally cultivated along the Vistula river on limestone soil for over 100 years now. The Vistula tart cheery juice has a very intense colour and more beneficial ingredients compared to most widely grown *Prunus Montmorency* type. The Vistula cherries used in production are certified by EU with Protected Designation of Origin – PDO. The distance between the plantation and **GREENVIT®**'s production facility is no greater than 300 km.

CHERRYGO® trademark and formulation

The registered trademark belongs to GREENVIT®. Its use is exclusively related to the purchased complex of extracts. The use of the CHERRYGO® trademark in the final products containing this complex mixed with other ingredients belonging to the same botanical family is not permitted.

Prunus cerasus L. (Vistula) and Aronia melanocarpa (Michx.) Elliott studies

It is assumed that regular and adequate physical exertion, including sports, have a beneficial effect on the immune system. This is very important in the **prevention of mild forms of immunodeficiency (accompanied by recurrent infections)**.

Unlike moderate physical activity, intense, prolonged physical exertion can cause immunosuppression and lower immunity. It seems that short-term, transient immunosuppression (the so-called immunosuppressive window 'opened window') appears after acute physical stress and lasts about 3 - 12 hours. Insufficient regeneration and repeated transient immunosuppression can cause the so-called overlapping episodes of immunosuppression lead to a long-term decrease in immunity.²

During the immunosuppression window, the risk of infections increases. These changes can cause an increase in susceptibility to frequent respiratory infections, in particular during the 1 to 2 week rest phase after long and intense physical exertion (marathon runners, long-distance runners, etc.) and to the occurrence of chronic fatigue syndrome and hidden viral infections (CMV, EBV, herpes viruses, etc.). Additional factors that increase the risk of infection in people performing high-intensity efforts are: greater exposure to pathogens due to more intense breathing, especially cold and dry air and in the case of athletes, additionally more frequent stay in large human communities and travel.

Chronic fatigue syndrome after viral infection is also very dangerous. It lasts for several months and is manifested by fatigue, muscle pain, and decreased athletic performance.

There is a rather unfortunate concept of 'soreness', which is described as pain and stiffness occurring after 'excessive' physical exertion. The phenomenon of 'soreness' is precisely exceeding the tolerance of physical load, which can lead to damage to ligament structures, sarcomeric (muscular) proteins and the cytoskeleton. As a result of exceeding the load tolerance, an unfavorable condition-inflammatory reaction occurs, which manifests itself as the so-called delayed muscle pain syndrome for up to a few days. The pain associated with acute muscle injury is most likely caused by oxidative tissue damage resulted from excessive free radicals production, which in consequence leads to an inflammatory response and increased secondary muscle soreness. On the other hand, chronic inflammation also increases the body's immune response, affecting muscle regeneration.

Proper muscle regeneration and repair is complex and requires time. However, it can be accelerated through healthy **eating coupled with supplementation**.^{3,4,5,6,7}

Tart cherries belonging to the Prunus species are a rich source of polyphenols, which have antioxidant and anti-inflammatory properties. The chemical composition of tart cherries is influenced by many factors such as variety, ripening stage, agricultural practices and environmental conditions.⁷

The bioactive properties of tart cherries result from the interaction of different polyphenols present in this fruit, which can act synergistically in modulating different molecular pathways.⁸

Reactive oxygen species (ROS), i.e. oxygen free radicals and compounds capable of generating them, are involved in many key physiological processes. Both excessive production of free radicals and their deficiency can be harmful to the body, which is why the balance between pro- and antioxidant mechanisms is so important. Understanding the role of oxidative stress caused by ROS in the formation and development of many chronic diseases resulted in the conscious use of anthocyanins as antioxidant compounds showing **health beneficial and anti-inflammatory properties**.¹⁰

The anti-inflammatory properties of anthocyanins can be attributed primarily to their antioxidant properties, which result in downregulation of the redox-sensitive nuclear factor - κ B signaling pathway (NF- κ B). Moreover, anthocyanins effectively inhibit the production of inflammatory mediators such as prostaglandin E2 (PGE2) as well as pro-inflammatory cytokines and enzymes such as COX-2, PLA2, LOX and iNOS.^{11,12}

Supplementation with antioxidants can **counteract fatigue and increase performance** through increased perfusion of the exercising muscle.¹³

Among the mechanisms responsible for the antiviral effects of aronia, the most frequently mentioned are: blocking hemagglutinin (HA), which prevents adhesion and penetration of the virus into the host cells, inhibition of viral reproduction, preventing further transmission of the virus from cell to cell by inhibition of neuraminidase.^{14,15,16}

An equally important, indirect, mechanism for fighting viral infection – both in case of tart cherries and aronia berries, may be to stimulate the immune system response.

In the context of the total benefits of health-promoting compounds present in tart cherry and aronia berries, recent research on the bioavailability of anthocyanins and flavanones is of significant importance. The published results indicate that they are much more bioavailable than previously predicted, which further indirectly **confirms the protective, regenerating effects** of these substances in the diet and supplementation.¹⁷

Detailed results of *in vitro* studies related to anti-inflammatory, antiviral activity are included in relevant **GREENVIT**[®] materials related to aronia extracts and are available upon request.





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Studies on the Effectiveness of B-PAC[®] Cherry Recovery based on CHERRYGO[®]



The latest observational study has confirmed the effectiveness of **B-PAC[®] Cherry Recovery** based on **CHERRYGO[®]** in accelerating muscle regeneration after physical exertion. Thanks to its unique formula based on **CHERRYGO[®]** – a standardized extract from *Prunus cerasus* L. (Vistula) and *Aronia melanocarpa* (Michx.) Elliott – **B-PAC[®] Cherry Recovery** supports post-exercise recovery, reduces muscle soreness, and promotes muscle regeneration after physical exertion. Thanks to its scientifically proven composition, it is an essential supplement for active individuals seeking enhanced muscle performance and overall well-being.

Study participants

- ✓ Athletes who daily play football in semi-professional football team.
- ✓ Before initiating the study, the participants completed preliminary questionnaire in which they determined parameters such as age, height, weight, as well as assessed their current physical condition.

The course of the study

- ✓ Randomised, double blind, placebo controlled studies. Daily supplementation for 10 days with **B-PAC[®] Cherry** mg.
- ✓ **Recovery** (400 mg, n=10 subjects) or **Placebo** (400 mg, n=10 subjects).
- ✓ On the 7th day of the study, the participants took part in an intensive training session.
- ✓ On the 8th, 9th and 10th day of the study, the participants completed a survey assessing the level of perceived muscle pain and muscle soreness.

The scheme of the course of the study

Figure 2.

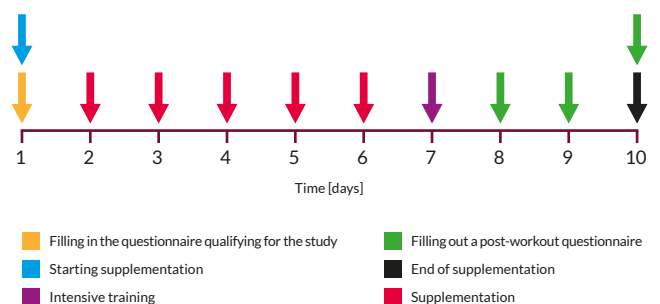
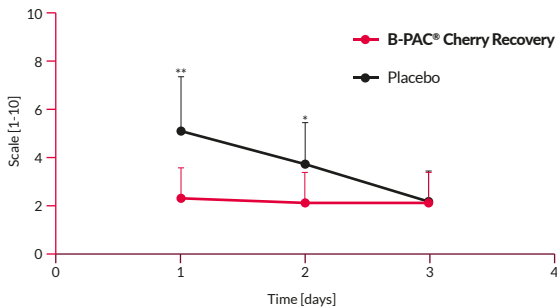
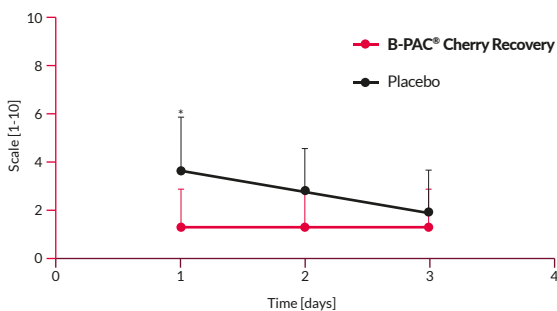


Figure 3. Assessment of pain associated with sore muscles in rest



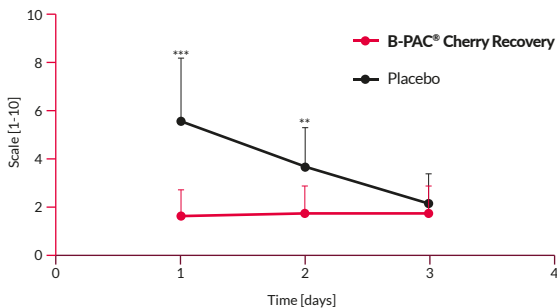
Values represent an average result from participants survey, where 1 symbolizes no pain and 10 symbolizes high pain.

Figure 4. Assessment of the perception of muscle pain during daily activities



Values represent an average result from participants survey, where 1 symbolizes no pain and 10 symbolizes high pain.

Figure 5. Assessment of the level of muscle pain after waking up



Values represent an average results from participants survey, where 1 symbolizes no pain and 10 symbolizes high pain.

Conclusions

B-PAC® Cherry Recovery accelerates muscle regeneration after physical exertion.

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