



ECHINAGREEN™

Echinacea purpurea herb + *Echinacea purpurea* root
+ *Echinacea angustifolia* root

The enhanced benefits of the three ingredients

Effective use of the health properties of different *Echinacea* species

Standardization on active ingredients:

- Cichoric acid
- Echinacoside
- Polysaccharides

WHAT IS ECHINAGREEN™

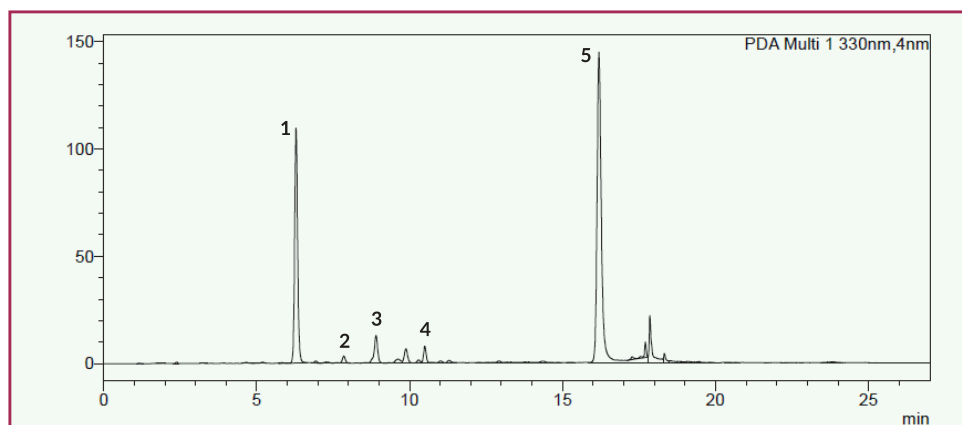
Echinagreen™ is a standardized complex of three diverse ingredients derived from two species of coneflower and different parts of these plants (herb, root).

SPECIFICATION

Both purple coneflower and narrow-leaved coneflower have been described in extensive European Medicines Agency (EMA) monographs. According to European Pharmacopoeia (reference 01/2008:1823) *Echinaceae angustifoliae* root contains not less than 0.5 % echinacoside ($C_{35}H_{46}O_{20}$; Mr 786.5), *Echinacea purpurea* (L.) Moench. herb contains a total of at least 0.1 % caftaric acid ($C_{13}H_{12}O_9$; molecular weight Mr 312.2) and cichoric acid ($C_{22}H_{18}O_{12}$; molecular weight Mr 474.3). Polysaccharide content of *Echinacea purpurea* herb is between 2 and 7 % [1,2].

The sum of all components of the **Echinagreen™** complex includes the following groups of compounds:

- Echinacea purpurea herb standardization - 2% cichoric acid
- Echinacea purpurea root standardization - 1% cichoric acid
- Echinacea angustifolia root standardization - 4% echinacoside



Caftaric acid [1], chlorogenic acid [2], caffeic acid [3], echinacoside [4], cichoric acid [5] – the major compounds present in ECHINAGREEN composition.

Echinacea purpurea which we use as a raw material is cultivated in Poland in accordance with the Code of Good Practice (GACP) which means the product full traceability and consistent quality. In combination with harvesting period, it gives us the highest content of polyphenols including cichoric acid. *Echinacea angustifolia* which we use in complex is confirmed European origin. We use a technology based on aqueous extraction, vacuum evaporation and drying – thanks to which we obtain very pure, concentrated extract with high levels of active substances.

WHAT MAKES THE ECHINAGREEN™ COMPLEX UNIQUE?

- Synergism of action of different groups of compounds present in the coneflower species and plant parts used, which separately show potentially weaker effects.
- Controlled, European origin of raw materials.
- Standardization on different groups of health beneficial compounds.

STATE OF KNOWLEDGE

In the course of evolution, due to the lack of direct health threats from plants (in contrast to infectious agents such as bacteria, viruses), humans have not developed defence mechanisms against them. Therefore, plants are a source of a large number of beneficial, biologically active compounds. By non-specific interaction with the surface of the immune system cells, they are able to activate its cells, as it were, accidentally [3]. In this way, they become modifiers of the biological response - immunostimulators. One of the largest groups of plants with immunostimulating effects belongs to the *Asteraceae* family. Among these, various species of **coneflowers** (*Echinacea*) have a long and documented history of use for infectious conditions.

The species of most interest for health uses are:

purple coneflower (*E. purpurea* (L.) Moench.)

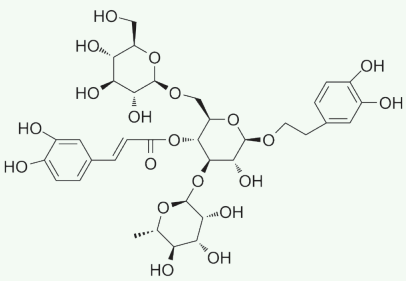
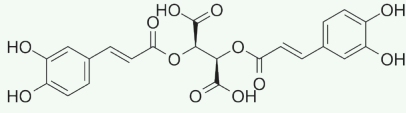
narrow-leaved coneflower (*E. angustifolia* DC.).

The chemical composition of these different species of coneflowers shows similarities, but the pharmacological activities may be significantly different. With the beginning of the 20th century, the main focus was on the cultivation of purple coneflower (*Echinacea purpurea*) and it found wide application in the pharmaceutical industry (4), while *Echinacea angustifolia* is a commonly used resource in homoeopathy.

The main indication for Echinacea from traditional use is the prevention and/or treatment of upper respiratory tract infections. Numerous literature reports indicate antiviral, antibacterial, antifungal, immunomodulatory, anti-inflammatory or antioxidant effects of the plant, exerted by **caffeic acid derivatives (cichoric acid, echinacoside), polysaccharides, glycoproteins, alkamides** present in its composition [7,8].

The ability of Echinacea preparations to activate the feeder cells, **inhibit hyaluronidase**, participate in the generation of **properdin** and increase the CD4/CD8 lymphocyte ratio have been confirmed in numerous studies [9,10,11,12]. In the study by Kim et al. 2002, patients treated with *Echinacea purpurea*/*Echinacea angustifolia* also showed beneficial stimulation of production and consequently increased levels of properdin [13].

The immune system is capable of recognizing and inactivating agents (antigens) that are harmful and foreign to the body. Thanks to antigens, viruses and other pathogens are "seen" by our immune system. Traditionally used Echinacea preparations increase general and local immunity.

<p>Echinacoside - phenolic glycoside, a potent substance with bacteriostatic activity. For example, staphylococci and streptococci are sensitive to echinacoside.</p> 	<p>Cichoric acid - stimulates immune cells (granulocytes, macrophages) and also - inhibits hyaluronidase</p> 	
<p>Polysaccharides - promote increased production of T lymphocytes, key in preventing and fighting infection, and activation of macrophages, capable of neutralizing pathogenic intruders.</p>	<p>Hyaluronidases are enzymes that break down hyaluronic acid, a natural intercellular binder. They are called "spreading factors" because they facilitate the entry of microorganisms and toxins from the gates of infection into the tissues</p>	<p>Properdin a protein substance found in blood serum that is involved in the destruction of gram-negative bacteria and certain viruses.</p>

Traditional medicine makes extensive use of **the herb** and/or **root** of *Echinacea purpurea*. Aqueous extracts of coneflower usually contain more polar metabolites such as polysaccharides and glycoproteins [14,15] and are almost completely devoid of alkamides [8], i.e., the major group of lipophilic components [5].

Aqueous extracts of aerial parts, stems, leaves and flowers [7] and aqueous extracts of *E. purpurea* root [8] have been shown to have significant activity against **influenza virus and herpes simplex virus (HSV-1)**. According to the authors, the lack of activity against rhinoviruses indicates the ability of the tested extracts to inhibit only viruses having in their structure an envelope, which may be the target of action of biologically active substances present in *E. purpurea* [7, 8].

A thorough review and meta-analysis was performed by Shah et al. (2007) [16] evaluating the effect of coneflower on the incidence and duration of the common cold. Fourteen unique studies were included in the meta-analysis. Echinacea reduced the risk of developing a cold by 58% and the duration of a cold by 1.25 days. The authors concluded that published evidence supports the benefits of Echinacea in reducing the incidence and duration of the common cold.

Given the inconclusive results of various studies, Melchart et al. [17] suggested that coneflower may be beneficial for people already suffering from immune disorders, and therefore may have little or no effect on a healthy immune system.

WARNINGS AND PRECAUTIONS FOR USE

Hypersensitivity to the active substance(s) and to other plants of the Asteraceae (Compositae) family. The use is not recommended in cases of progressive systemic disorders, autoimmune diseases, immunodeficiencies, immunosuppression and diseases of the white blood cell system. If the symptoms worsen or high fever occurs during the use of the medicinal product, a doctor or a qualified health care practitioner should be consulted. There is a possible risk of allergic reactions in sensitive individuals. Those patients should consult their doctor before using Echinacea. There is a possible risk of anaphylactic reactions in atopic patients. Atopic patients should consult their doctor before using Echinacea. The use in children under 12 years of age has not been established due to lack of adequate data. The therapy should start at first signs of common cold. If the symptoms persist longer than 10 days during the use of the medicinal product, a doctor or a qualified health care practitioner should be consulted. The anti-inflammatory activity of coneflower can be seriously inhibited by phenobarbital and certain other sedatives and hypnotics, such as chloral hydrate and meprobamate. This is also true of beta-adrenergic blocking agents, such as propranolol [18, 19].

REFERENCE PUBLICATIONS

1. EMA/HMPC/557979/2013 Committee on Herbal Medicinal Products (HMPC) Assessment report on Echinacea purpurea (L.) Moench., herba recens
2. EMA/HMPC/688212/2008 Committee on Herbal Medicinal Products (HMPC) Assessment report on Echinacea angustifolia DC., radix
3. Łukasz Zapata, Witold Lasek Naturalne immunostymulatory egzogenne Natural exogenous immunostimulators Zakład Immunologii, Centrum Biostruktury Akademii Medycznej w Warszawie POSTĘPY BIOLOGII KOMÓRKI TOM 34 2007 NR 3 (581-594)
4. Schultz V. et al. Rational phytotherapy. A physicians' guide to herbal medicine, 4th edn. Springer-Verlag 2000, Berlin
5. Barnes J. et al. Echinacea species (Echinacea angustifolia (DC.), Hell Echinacea pallida (Nutt.) Nutt Echinacea purpurea (L.) Moench): A review of their chemistry, pharmacology and clinical properties. J Pharm Pharmacol. 2005;57:929-54
6. Manayi A et al. Echinacea purpurea: Pharmacology, phytochemistry and analysis methods. Pharmacogn Rev. 2015;9(17):63-72. doi:10.4103/0973-7847.156353
7. Vimalanathan S. et al. Echinacea purpurea. Aerial Parts Contain Multiple Antiviral Compounds, Pharmaceutical Biology 2005, 43:9, 740-745, DOI: 10.1080/13880200500406354
8. Hudson J. et al. Characterization of Antiviral Activities in Echinacea. Root Preparations, Pharmaceutical Biology 2005, 43:9, 790-796, DOI: 10.1080/13880200500408491
9. Goel V, Chang C, Slama Jv, Barton R, Bauer R, Gahler R, Basu Tk. Echinacea stimulates macrophage function in the lung and spleen of normal rats. J Nutritional Biochem 2002; 13: 487.492.
10. Goto S, Sakai S, Kera J, Suma Y, Soma G-I, Takeuchi S. Intradermal administration of lipopolysaccharide in treatment of human cancer. Cancer Immunol Immunother 1996; 42: 255.261.
11. Grim W, Muller HH. A randomized controlled trial of the effect of fluid extract of Echinacea purpurea on the incidence and severity of colds and respiratory infections. Am J Med 1999; 106: 138. 143.
12. Skopińska-Różewska E, Sokolnicka I, Radomska-Leśniewska D, Radomska-Leśniewska D, KapaEka B, Sommer E, BiaEAs-Chromiec B, Filewska M, Demkow U. The in vivo effect of Echinacea purpurea succus on various functions of human blood leukocytes. Centr Eur J Immunol 2003; 28: 126.130.
13. Immunological activity of larch arabinogalactan and Echinacea: a preliminary, randomized, double-blind, placebo-controlled trial Linda S Kim, Robert F Waters, Peter M Burkholder PMID: 11991793 Altern Med Rev 2002 Apr;7(2):138-49
14. Stimpel M. et al. Macrophage activation and induction of macrophage cytotoxicity by purified polysaccharide fractions from the plant Echinacea purpurea. Infect Immun. 1984;46(3):845-849. doi:10.1128/IAI.46.3.845-849.1984
15. Luettig B. et al. Macrophage activation by the polysaccharide arabinogalactan isolated from plant cell cultures of Echinacea purpurea. J Natl Cancer Inst. 1989;81(9):669-675. doi:10.1093/jnci/81.9.669
16. Shah SA, Sander S, White CM, Rinaldi M, Coleman CI. Evaluation of Echinacea for the prevention and treatment of the common cold: a meta-analysis. Lancet Infect Dis 2007, 7(7):473-480
17. Melchart D, Linde K, Worku F, Sarkady L, Holzmann M, Jurcic K and Wagner H, Results of five randomized studies on the immunomodulatory activity of preparations of Echinacea. J Alt Comp Med 1: 145-160, 1995.
18. EMA/HMPC/424583/2016. European Union herbal monograph on Echinacea purpurea (L.) Moench, radix. Accessed on 21-08-2020
19. EMA/HMPC/688216/2008 Community herbal monograph on Echinacea angustifolia DC., radix

Note: this document is used in business relations. It was designed for professional users. Any unauthorized use of this document, in whole or part, especially in communication with consumers, is prohibited.

Greenvit Ltd
Aleja Wojska Polskiego 27A,
PL 18-300 Zambrow, Poland
T: +48 85 733 60 54
info@greenvit.pl; www.greenvit.pl

