

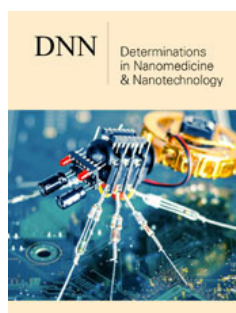
Echinacea-Based Preparation Fight Against the Cold

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ISSN : 2832-4439



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Submission:  June 06, 2022

Published:  September 26, 2022

Volume 3 - Issue 1

How to cite this article: Mahbuba Valiyeva*, Sevil Mehraliyeva, Mahira Amirova. *Echinacea*-Based Preparation Fight Against the Cold. *Determ in Nanomed & Nanotech*. 3(1). DNN. 000551. 2022. DOI: [10.31031/DNN.2022.03.000551](https://doi.org/10.31031/DNN.2022.03.000551)

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Abstract

With the years, *Echinacea* is used more in medical practice with the purpose of strengthening immunity, as innate, as well as adaptive, the fight against viruses and as a rich source of nutrients in the fight against anemia. Many medicinal drugs have been developed based on *Echinacea*, each of which contributes to the medical practice of the physicians. The main feature of *Echinacea* is its ability to improve the cytokine background in colds, stimulate the tumor necrosis factor production, as well as to stimulate the proliferation and differentiation clones of leukocytes, mainly of natural killer and helper lineage. In this work, we offer a brief review of the drugs developed on the basis of *Echinacea* outfitted with scientific research dedicated to their properties, both positive and negative. Although, as it turns out from the presented data, the side effects of *Echinacea* drugs are insignificant or practically absent, so we have not allocated them to a wide area. Due to good tolerability and high therapeutic effects *Echinacea* is an indispensable tool in the fight against diseases on the background of weakened immunity, mainly colds.

Keywords: *Echinacea*; Infection; Technology

Introduction

Despite the wide range of therapeutic effects, *Echinacea* does not cause side effects; those are usually minor, including upset stomach, nausea, and dizziness [1]. *Echinacea* plant comprises the water-soluble immunostimulatory polysaccharides, such as 4-O-methylglucuronyl arabinoxylanes, acid arabinogalactans; the essential oils including borneol, bornyl-acetate pentadeca-8-en-2-on, germacrene D, caryophyllene epoxide; flavonoids, namely ferulic acid and its derivatives, methyl ester of chicory acid, 2-O-caffeoyl-3-O-feruloyl-tartaric acid, 2,3-O-diferuloyl tartaric acid, 2-O-caffeoyl tartaric acid); alkaloids and exhibits an immunomodulatory and anti-inflammatory effect. Due to the presence of a large number of medicinal substances contained in *Echinacea*, it is used as a remedy with a wide range of effects. We represent the number of *Echinacea*-based drugs with their effects. *Echinacea* lozenges are used as immunostimulators in variety of infectious diseases. Polysaccharides in this drug regulate interleukin-1 expression and increase the phagocytic activity of neutrophils and macrophages. The complex effect of *Echinacea* lozenges active substances improves the transfer of B-lymphocytes to the plasma cells and improves the function of T-helpers [2]. Inulin, levulase and betaine in this drug metabolism improves the metabolism, as well shows good impact on the liver and kidney condition. "*Echinacea* +" is an 80% *Echinacea* mixture extract of 40% *Echinacea* Purpurea plus 40% Pale *Echinacea* as well as 10% of garden thyme and 10% cinnamon. This extract also contains alkaloids, polysaccharides, flavonoids, glycosides, terpenes and some organic acids. Standardization is carried out according to caffeic acid and echinacoside glycoside content (Figure 1). The *Echinacea* chemical composition is complex and multicomponent.

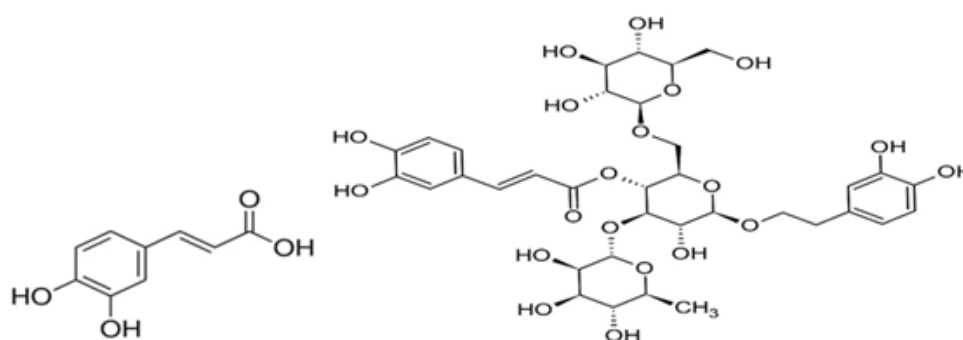


Figure 1: Caffeic acid and its glycoside echinacoside.

The main biologically active substances in this plant are alkaloids of various structures, polysaccharides, flavonoids, glycosides, terpenes and organic acids as well. It is known that the listed components exhibit unique prophylactic properties of this plant. The mechanism of the *Echinacea* immunostimulatory effect is explained by the fact that its components help to regulate phagocytic activity, promote the formation of macrophages, slow down the release of inflammatory factors, as well as regulate the B-cells activity, increase the secretion of interleukins and show the antifungal effect [3]. *Echinacea* is used in such respiratory system infections as tracheitis, bronchitis, pneumonia, as well as urinary tract infections along with fungal infections, and helps in prevention of postoperative infections [4]. The garden thyme *Satureia Montana* provides this drug with an essential oil rich in carvacrol, or cymophenol, $C_6H_3(CH_3)(OH)C_3H_7$, a phenol derivative monoterpene, aromatic ring of which enriches this plant with antiseptic properties, for instance it destroys staphylococci, bacteria and some pathogenic fungi. The antiviral effect is due to the polyphenols it contains. Cinnamon (*Cinnamomum Zeylanicum*) contains the essential oil eugenol, terpenes, alcohols, and tannins [5]. Pharmacological effects of "*Echinacea* +" preparation is based on its induction of the interferon biosynthesis; enhances body antiviral, antibacterial, antiviral, antifungal and anti-inflammatory capacity; it is an antiseptic with a broad-spectrum antimicrobial capacity; exhibiting an antispasmodic property it improves the respiratory function of organism. *Echinacea* tincture is prepared in a 1:10 ratio [6]. For this, 200g of plant freshly harvested leaves, flowers, stems or 50g of dry raw material is pured with 1 liter of 40% ethyl alcohol. Used 30-40 drops 3 times a day this remedy increases the number of leukocytes (T-lymphocytes, granulocytes), activates phagocytes and increases the regenerative abilities of tissues. Immunomodulatory properties of *Echinacea* tinctures are based on stimulation of the production and proliferation of interleukin-10 (IL-10), IL-12, and tumor necrosis factor- α (TNF- α) [7].

Echinacea tincture increases the production of interferon in the body. *Echinacea* tincture is effective in inflammatory processes of the female genital organs, prostate adenoma, gastric ulcer, arthritis, hepatitis, nephritis, eczema and psoriasis. *Echinacea*

root tincture also is used in pneumonia, bronchial asthma and cough. "*Echinacea* composition S" is a homeopathic remedy with the extract of *Echinacea angustifolia* (Narrow-leaf Coneflower), in purulent infections and processes of the skin, soft tissues, mucous membranes (abscesses, boils, phlegmon, carbuncles, gingivitis, stomatitis, sinusitis, gastroenteritis, enterocolitis, osteomyelitis, mastitis, mastitis, collomitis), sepsis, secondary bacterial and viral infections, etc.) This herb induces immune response increasing cell populations and their biological functions, including CD49+ and CD19+ lymphocytes in spleen and natural killer cell cytotoxicity. The *Echinacea* treatment alters the cytokine production by mitogen-stimulated splenic cells. This herb increases interferon- γ production but inhibits the release of interleukin (IL)-1 β . Only *E. angustifolia*- and *E. pallida*-treated mice demonstrated significantly higher production of IL-4 and increased IL-10 production. So, the findings demonstrate that *Echinacea* is a wide spectrum immunomodulator that modulates both innate and adaptive immune responses [8]. "*Echinacea* composition S" is a homeopathic remedy that contains an extract of Narrow-leaf Coneflower used in purulent infectious and inflammatory processes of the skin, soft tissues, mucous membranes (abscesses, boils, phlegmon, carbuncles, gingivitis, stomatitis, sinusitis, gastritis, cystitis, gastroenteritis, enterocolitis s.), as well as toxic syndromes (osteomyelitis, sepsis, secondary bacterial and viral infections, etc.) [9]. *Echinacea* extract is the drug used in influenza, fatigue, anemia, avitaminosis, headaches, infectious diseases, respiratory and urinary tract diseases [10]. The preparation of *Echinacea* extract is as follows: crushed & mashed fresh roots of *Echinacea* are infused with 95% alcohol for 2 weeks. The resulting mixture is filtered. 25-30 drops 3 times a day 30 minutes before meals are effective in gastric ulcer, arthritis, hepatitis, nephritis, eczema, psoriasis; *Echinacea* extract also exhibits effect in pneumonia, bronchial asthma, cough. It may be used externally in inflammatory processes of the female genital organs, prostate adenoma.

Conclusion

In view of the practical absence of side effects (100% natural product) and high immunostimulating ability, *Echinacea* preparations should be included in the list of preferred drugs in the fight against catarrhal diseases.

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