The American Journal of Natural Medicines, Facts | *Open Access*
(2024) Volume 1, Issue 2

Systematic Review

Echinacea, The Immune-Boosting Potential of Nature's Herbal Remedy: A Systematic Review

William Justus and Mohammad Faisal Hossain*

Appalachian College of Pharmacy, Oakwood, VA 24631, USA

**Correspondence should be addressed to M. F. Hossain, Ph.D., Assistant Professor, Department of Pharmaceutical Sciences, Appalachian College of Pharmacy, Oakwood, Virginia, USA. E-mail: mhossain@acp.edu*

Article History:
Received: April 10, 2024
Accepted: April 17, 2024
Published: April 18, 2024
Editor: Edgar F. Talbott III, PharmD

Citation: Justus W, Hossain MF. Echinacea, The Immune-Boosting Potential of Nature's Herbal Remedy: A Systematic Review. *Am J Nat Med Facts*. 2024;1(2):1-4

ABSTRACT

Echinacea is a flowering plant commonly found in central and eastern North America. It is used in herbal medicine for its potential health benefits. It is believed to have the potential to boost the immune system and help relieve symptoms of the common cold. Echinacea has shown promise in its ability to help with certain conditions which has led to its popularity in today's natural medicine conversation. This Systematic Review (SR) aims to evaluate clinical trials on echinacea to provide an unbiased review of its efficacy in two categories: Reducing Symptoms of The Common Cold and Prevention of Illness. Ten articles were reviewed in this Systematic Review (SR). Six trials evaluated the efficacy of echinacea in reducing symptoms of the common cold after symptom onset, while four studies investigated its ability to help prevent illness. The results concluded that echinacea is effective in reducing symptoms of the common cold. As for the prevention of illness, echinacea showed no strong evidence of its ability to do so.

Keywords: Echinacea (purple coneflower), Immune, Common cold, Dietary Supplement, Systematic Review

Introduction

In the United States, common colds account for more visits to the doctor than any other condition. According to statistics from the American Lung Association, adults get an average of two to four colds per year, while children suffer from an average of six to eight colds per year, mostly between September and May [1]. A common cold is defined by the National Institute for Health and Care Excellence (NICE) as "a mild, self-limiting, upper respiratory tract infection characterized by nasal stuffiness and discharge, sneezing, sore throat, and cough" [2]. The term "common cold" is widely used in the medical literature, but it has been argued that the common cold is more of a cultural concept rather than a clinical entity as the disease is usually self-diagnosed and treated by the patient [2].

Echinacea is used in herbal medicine around the world. It is particularly for its potential immune-boosting properties. Many people may know echinacea by its native name, coneflower. It is a genus of herbaceous flowering plants in the daisy family, Asteraceae [3]. It is native to North America, particularly the central and eastern regions of the United States and parts of Canada. The most commonly used species for medicinal purposes are Echinacea purpurea, Echinacea angustifolia, and Echinacea pallida. Traditionally, Native Americans used echinacea for various medicinal purposes, such as infections, wounds, burns, and insect bites [3]. The

chemicals contained in the root of the plant differ from those in the upper part of the plant. The roots have a high concentration of volatile oils. At the same time, the above-ground parts contain larger amounts of alkamides and polysaccharides, which are the substances thought to trigger the activity of the immune system [4]. Research suggests that the above-ground portion of the plant is more effective in reducing symptoms of illness. Alkamides are one of the important components of echinacea and are responsible for their potential benefit. Alkamides are thought to possess immune-stimulating properties, helping enhance the body's natural defense mechanisms. In earlier investigations, alkamides have been shown to possess stimulatory effects on phagocytosis [5].

In recent research, alkamides demonstrated that they are detectable in human blood in relevant concentrations after oral administration of Echinacea preparations. Alkamides are structurally similar to endogenous ligands of cannabinoid receptors. Consequently, it was found that alkamides bind significantly to CB (2) receptors. This mechanism is now considered a possible mechanism of action of alkamides as immunomodulatory agents in echinacea preparations. One clinical study compared the oral bioavailability of liquid and tablet formulations of a specific echinacea extract (Echinaforce, A. Vogel Bioforce AG) at a dose of 0.07 mg of the major alkamides. The tincture produced a maximum concentration of 0.40 ng/mL after 30 minutes; the tablets produced a maximum concentration of 0.12 ng/mL after 45 minutes [6]. Polysaccharides are another important biomarker contained in echinacea. Polysaccharides are reported to increase the production of interleukin-1, interleukin-6, and TNF-α by macrophages, along with the enhancement of phagocytosis [5]. Research suggests that polysaccharides derived from echinacea may have anti-inflammatory effects by reducing the production of pro-inflammatory molecules and promoting the activity of anti-inflammatory agents [5]. This Systematic Review (SR) sets out to evaluate clinical trials investigating echinacea's efficacy across two areas: Reducing Symptoms of the Common Cold and Preventing Illness, offering an impartial evaluation.

Method

This SR was conducted using the electronic database PubMed using the keyword "echinacea" as the search criteria. For inclusion in this Systematic Review (SR), studies had to meet two standards: they had to be clinical trials conducted since the year 2000 (within the past 24 years), and their outcomes needed to be relevant to our study objectives. The main study objectives are reducing symptoms of the common cold and preventing illness.

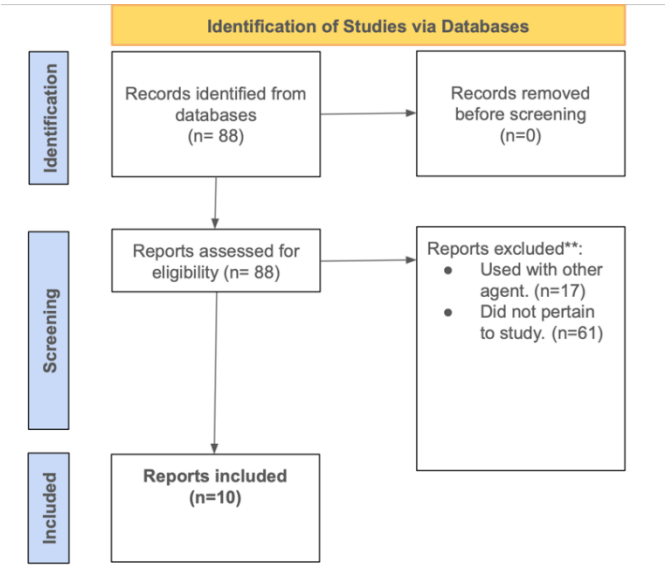

Figure 1: Flow Chart of Study Selection

Results and Discussion

A Systematic Review (SR) is a tool for researchers wanting to assess numerous studies on a specific topic. Although there are differences among each study, the objective remains the same: to group the findings. In this particular Systematic Review (SR), we concentrated on two major outcomes. First, we investigated whether echinacea has any benefit in helping reduce the symptoms associated with the common cold. Second, we searched for its potential benefit in preventing the onset of illness. The results are presented in tables to provide a better understanding, as demonstrated below:

Table 1: Effectiveness in Reducing Symptoms of the Common Cold

Author	Participants	Study Length (Days)	% Weight	Statistics	Outcomes
Yale, Steven H, and Kejian Liu [7]	128	7	17.56	P = 0.73	⛔
Barrett, Bruce P et al [8]	148	10	20.30	95% CI = -1.09-0.22	⛔
Goel, V et al [9]	128	7	17.56	P < 0.01	✅
Schulten, B et a [10]	80	–	10.97	P = 0.0112	✅
Goel, Vinti et al [11]	150	7	20.58	–	✅
Lindenmuth, G F, and E B Lindenmuth [12]	95	5	13.03	P < 0.001	✅

Table 1 indicates that four out of six studies exhibited potential in reducing symptoms. 62.14% of the study populations demonstrated a positive outcome when it came to relieving the symptoms associated with the common cold. The average duration of the studies was ~7 days. The common cold usually lasts ~7 days which explains the study duration average. Each study used echinacea as a sole therapy to provide the most accurate results. The table implies that echinacea could potentially be effective in reducing symptoms of the common cold.

Table 2: Effectiveness in Preventing Illness

Author	Participants	Study Length (Days)	% Weight	Statistics	Outcome
Ogal, Mercedes et al, 2021 [13]	201	60	24.70	P < 0.001	✅
O'Neil, Joelle et al, 2008 [14]	58	56	7.10	P = 0.67	⛔
Turner, Ronald B et al, 2005 [15]	437	7	53.75	P = 0.57,0.46, 0.22	⛔
Turner, R B et al, 2000 [16]	117	14	14.40	0.21	⛔

Table 2 reveals that three out of four studies did not show a positive impact in preventing illness, with only 24.7% of the study population experiencing a positive effect on illness prevention. Study durations varied highly in this analysis. Two studies ranged from 56 to 60 days, and the other two ranged from 7 to 14 days. A point of interest is that the longest study duration was the only one to demonstrate a positive impact, suggesting echinacea's effectiveness when used for long-term prevention. Future studies need to be conducted to make a clear observation on whether echinacea is safe and effective to use long term. As the same with Table 1, echinacea was used alone in these studies to provide the most accurate results. Overall, the findings in this table suggest that echinacea may not be effective in preventing illness.

The data from both tables suggest that echinacea might be effective in reducing symptoms associated with the common cold. On the other side, regarding its efficacy in preventing illness, echinacea did not present compelling evidence. It's important to note

several limitations within this Systematic Review (SR). First, there was considerable variability in the dosage forms utilized across studies. These dosage forms ranged from tablets, tinctures, and concentrated extracts of the plant. Second, there was significant variation in doses among the studies, leading to their exclusion from our analysis.

Conclusion

While echinacea did show some compelling evidence of reducing symptoms associated with the common cold, it should not serve as a replacement for prescribed medications. Dietary supplements like echinacea do not have FDA approval. Individuals considering self-treatment with dietary supplements should consult with a healthcare professional before doing so. Reflecting on these studies, the main limitation was the inconsistency in dosage forms. Future research should aim to discover the most appropriate dosage form to find out which formulation of echinacea has the best benefits. In conclusion, echinacea may help with symptom reduction for the common cold but does not offer a positive impact on preventing illness.

Conflict of interest

The authors declare no conflict of interest.

References

[1] Association AL. Facts About the Common Cold. Accessed April 04, 2024.

[2] Eccles R. Common cold. Front Allergy. 2023;4:1224988. doi:10.3389/falgy.2023.1224988

[3] [History of a plant: the example of Echinacea] - PubMed. Accessed April 04, 2024.

[4] Echinacea Information | Mount Sinai - New York. Accessed April 04, 2024.

[5] Manayi A, Vazirian M, Saeidnia S. Echinacea purpurea: Pharmacology, phytochemistry and analysis methods. Pharmacogn Rev. 2015;9(17):63-72. doi:10.4103/0973-7847.156353

[6] NatMed Pro - Professional Monograph. Accessed April 05, 2024.

[7] Echinacea purpurea Therapy for the Treatment of the Common Cold: A Randomized, Double-blind, Placebo-Controlled Clinical Trial | Complementary and Alternative Medicine | JAMA Internal Medicine | JAMA Network. Accessed April 05, 2024.

[8] Barrett BP, Brown RL, Locken K, Maberry R, Bobula JA, D'Alessio D. Treatment of the Common Cold with Unrefined Echinacea. Ann Intern Med. 2002;137(12):939-946. doi:10.7326/0003-4819-137-12-200212170-00006

[9] Goel V, Lovlin R, Barton R, et al. Efficacy of a standardized echinacea preparation (Echinilin) for the treatment of the common cold: a randomized, double-blind, placebo-controlled trial. J Clin Pharm Ther. 2004;29(1):75-83. doi:10.1111/j.1365-2710.2003.00542.x

[10] Schulten B, Bulitta M, Ballering-Brühl B, Köster U, Schäfer M. Efficacy of Echinacea purpurea in patients with a common cold. A placebo-controlled, randomised, double-blind clinical trial. Arzneimittelforschung. 2001;51(7):563-568. doi:10.1055/s-0031-1300080

[11] Goel V, Lovlin R, Chang C, et al. A proprietary extract from the echinacea plant (Echinacea purpurea) enhances systemic immune response during a common cold. Phytother Res PTR. 2005;19(8):689-694. doi:10.1002/ptr.1733

[12] Lindenmuth GF, Lindenmuth EB. The efficacy of echinacea compound herbal tea preparation on the severity and duration of upper respiratory and flu symptoms: a randomized, double-blind placebo-controlled study. J Altern Complement Med N Y N. 2000;6(4):327-334. doi:10.1089/10755530050120691

[13] Ogal M, Johnston SL, Klein P, Schoop R. Echinacea reduces antibiotic usage in children through respiratory tract infection prevention: a randomized, blinded, controlled clinical trial. Eur J Med Res. 2021;26(1):33. doi:10.1186/s40001-021-00499-6

[14] O'Neil J, Hughes S, Lourie A, Zweifler J. Effects of echinacea on the frequency of upper respiratory tract symptoms: a randomized, double-blind, placebo-controlled trial. Ann Allergy Asthma Immunol. 2008;100(4):384-388. doi:10.1016/S1081-1206(10)60603-5

[15] Turner Ronald B., Bauer Rudolf, Woelkart Karin, Hulsey Thomas C., Gangemi J. David. An Evaluation of Echinacea angustifolia in Experimental Rhinovirus Infections. N Engl J Med. 2005;353(4):341-348. doi:10.1056/NEJMoa044441

[16] Turner RB, Riker DK, Gangemi JD. Ineffectiveness of Echinacea for Prevention of Experimental Rhinovirus Colds. Antimicrob Agents Chemother. 2000;44(6):1708-1709.