

Echinacea May Reduce Respiratory Tract Infections, Complications, and Antibiotic Use, Meta-analysis Shows

Reviewed: Gancitano G, Mucci N, Stange R, et al. Echinacea reduces antibiotics by preventing respiratory infections: A meta-analysis (ERA-PRIMA). *Antibiotics*. April 2024;13(4):364. doi: 10.3390/antibiotics13040364.

By Samaara Robbins

Respiratory tract infections (RTIs), including upper RTIs that affect the nasopharynx and sinuses and lower RTIs that involve the trachea, bronchi, and lungs, are among the most common illnesses worldwide. Although most RTIs are viral, antibiotics remain widely used to treat associated secondary bacterial infections, often unnecessarily. Echinacea (*Echinacea* spp., Asteraceae) root and aerial parts have demonstrated antiviral and immunomodulatory effects, and alcoholic extracts of fresh plant material have shown broad activity against respiratory viruses. This meta-analysis evaluated the safety and efficacy of echinacea in reducing recurrent RTIs, as well as related complications and antibiotic use.

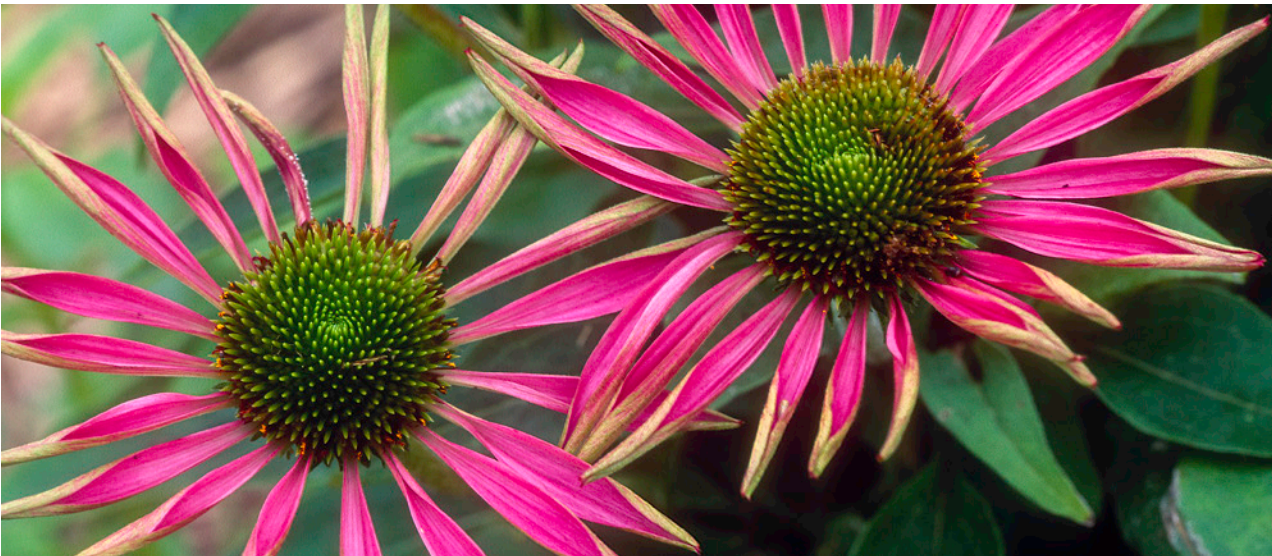
Study Design and Methods

A keyword search of Embase, PubMed, Google Scholar, and Cochrane Database of Abstracts of Reviews of Effectiveness (DARE) through June 2023 identified 2,434 articles. After removing duplicates and other articles that did not meet inclusion requirements (e.g., studies without control groups, animal studies, non-randomized studies, etc.), 30 randomized controlled trials (RCTs) were included. Because several studies included multiple echinacea treatment arms, or both prevention and treatment phases, the meta-analysis evaluated 39 total comparisons. Of these, 22 studies (27 comparisons) examined echinacea for prevention of RTIs, and eight studies (12 comparisons) assessed its use for acute treatment.

Trial durations ranged from less than one month to five months. Six prevention studies lasted less than one month, including three with artificial inoculation periods. One study used interval preventive therapy (six 10-day cycles) over six months.

Study Details: At a Glance	
Study Design	Meta-analysis
Included Trials	30 randomized controlled trials
Participants	Children and adults diagnosed with the common cold, rhinitis, nonspecific respiratory infections, the flu, or flu-like infections
Interventions	Various <i>Echinacea</i> preparations, including lipophilic extracts, pressed juice formulas, and dried, powdered, or unspecified <i>Echinacea</i> material
Controls	Various
Disclosures	Three of the 15 authors (RS, WCA, and SLJ) received honoraria from A. Vogel AG (Roggwil, Switzerland), and one author (GH) received honoraria for statistical evaluation of the meta-analysis. The remaining authors declared no conflicts of interest.

Echinacea *Echinacea purpurea*
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Twenty-one studies evaluated echinacea as a single product, and nine studies used multi-ingredient echinacea formulas that contained other botanicals, vitamins, or homeopathic additives. Across the 39 comparisons, most tested lipophilic (alcoholic, glycerol, or supercritical CO₂) extracts of *Echinacea purpurea*. Seven studies assessed hydrophilic (pressed-juice) preparations of *E. purpurea*, and four examined dried, powdered, or unspecified *Echinacea* species.

RTIs were primarily patient-reported and confirmed by physicians or nurses, with diagnoses including the common cold, rhinitis, nonspecific respiratory infections, the flu, and flu-like infections. Three trials artificially induced respiratory infections through inoculation with rhinovirus (the primary cause of the common cold). Seven studies included children under the age of 12, and three included children under the age of 2.

Results

In 22 studies involving 4,916 total participants, echinacea preparations significantly reduced the incidence of RTIs compared with controls ($P < 0.01$). Results were consistent across studies and remained stable after excluding those with a high risk of bias.

Additionally, pooled results from eight studies ($N = 3,203$) showed that echinacea significantly reduced the risk of RTI recurrence and relapse by approximately 40% ($P < 0.01$).

Eleven studies ($N = 2,388$) reported the number of participants who developed complications from RTIs, and 13 studies ($N = 2,695$) reported the total number of complications observed, which could include multiple complications per participant. In both analyses, echinacea use was associated with an approximately 56% reduced risk of complications compared with controls ($P < 0.01$).

Ten studies evaluated antibiotic use, seven of which were of high methodological quality. Echinacea significantly reduced overall antibiotic use ($P = 0.03$), with even greater reductions seen in prevention trials ($P = 0.01$). Two studies involving children showed particularly strong effects, with antibiotic use reduced by about half in one study and by up to 80% in the other ($P < 0.01$ for both).

The authors performed a sub-analysis of high-quality trials only, and the pooled results remained robust and consistent. Lipophilic echinacea extracts were significantly more effective than hydrophilic extracts in reducing the monthly risk of RTIs, as well as recurrence and complications ($P < 0.01$ for all).

Adverse events were equally frequent in the echinacea and control groups and included mild gastrointestinal complaints that did not require medical intervention.

Conclusion

The authors concluded that echinacea may be an effective and well-tolerated option for preventing RTIs and related complications. The meta-analysis also found that echinacea significantly reduced antibiotic use. HG

Echinacea *Echinacea purpurea*

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