

# Echinacea

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**Echinacea** is the name of a genus of native North American plants, commonly known as the purple coneflower. The most widely used herbal product in the United States is a liquid extract made from the root of *Echinacea purpurea*. Because the active component of the plant has not been identified, commercial echinacea products are not typically standardized to any particular component. The research literature on echinacea is difficult to evaluate because of the heterogeneity of the products used in various studies. The herb has been recommended as a prophylactic treatment for upper respiratory infection and is widely used for this indication. However, based on the current literature, it appears that prophylactic echinacea does not have a significant impact on the frequency, severity, or duration of upper respiratory infection. The data regarding treatment of upper respiratory infection appear to support a modest positive effect. No significant herb-drug interactions with echinacea have been reported; adverse effects reported generally have been uncommon and minor, including abdominal upset, nausea, and dizziness. (Am Fam Physician 2003;67:77-80,83. Copyright© 2003 American Academy of Family Physicians.)

See page 7 for definitions of strength-of-evidence levels.

**E**chinacea is the name of a genus of plants native to midwestern North America, commonly known as the purple coneflower. Echinacea preparations are derived from three of the nine species: *Echinacea purpurea*, *Echinacea angustifolia*, and *Echinacea pallida*. The most commonly used preparation in this country is a liquid extract made from the root of *E. purpurea*. Echinacea is sold under a wide variety of trade names.

Medicinal use of this herb began with Native Americans, who used *E. angustifolia* to treat health problems ranging from respiratory infections to snakebites. During the 19th century, echinacea was used as a blood purifier and a treatment for dizziness. In the early 20th century, it was used as a cold and flu remedy, and as an anti-infective until the advent of modern antibiotics. Its recent resurgence as a treatment for upper respiratory infections (URIs) has placed echinacea among the three top-selling herbs in the United States.<sup>1</sup>

## Pharmacology

Echinacea is widely promoted for its ability to "boost" the immune system; however, data to support this claim are inconclusive. A num-

ber of in vitro and animal studies have shown that echinacea appears to increase immunologic activity by increasing levels of interferon and may increase phagocytosis, cellular respiratory activity, and lymphocyte activation through release of tumor necrosis factor, interleukin-1, and interferon beta-2.<sup>2</sup> The active components believed to be responsible for this immune-stimulating effect are the high-molecular-weight polysaccharides such as heteroxylan and arabinogalactan. However, because the active component has not been identified, commercial echinacea products are not typically standardized to any particular component.

## Uses and Efficacy

The research literature on echinacea is difficult to evaluate because of the heterogeneity of the products used in the studies. Because some studies have examined combinations of echinacea species using differing parts of the various plants, and others have looked at echinacea combined with other herbs, it is difficult to attribute efficacy to any one of the constituents.

## UPPER RESPIRATORY INFECTION: PREVENTION

Echinacea is widely used as a prophylactic treatment for URIs. Results of two double-

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blind placebo-controlled randomized trials showed that none of the echinacea preparations taken as prophylaxis had a significant impact on the frequency, severity, or duration of URIs.<sup>3,4</sup> [References 3 and 4—Evidence level B, lower quality randomized controlled trials (RCTs)] A systematic review of four studies confirmed the lack of effect of echinacea in preventing URIs.<sup>5</sup> [Evidence level B, systematic review of lower quality RCTs] However, methodologic questions remain, including the possibility that sample sizes have been too small to detect a modest positive prophylactic effect of one or more of the echinacea preparations.

#### UPPER RESPIRATORY INFECTION: TREATMENT

Current data supporting the use of echinacea as treatment for URI are limited because of the heterogeneity of preparations studied and the poor methodologic quality of many of the studies. Thus, the data precluded a quantitative meta-analysis of 16 trials in a Cochrane review of echinacea.<sup>6</sup> However, the majority of the studies from the Cochrane review reported a positive effect.<sup>6</sup>

Three studies show that echinacea reduced severity of symptoms on URI symptom scoring instruments and reduced the duration of illness by one to two days.<sup>7-9</sup> [Reference 9—Evidence level B, lower quality RCT] One of these studies<sup>7</sup> examined a preparation made from the root of *E. pallida*, which is not widely sold in the United States; the other studies<sup>8,9</sup>

examined proprietary preparations based on liquid preparations of *E. purpurea* (trade names, Echinaforce and EchinaGuard), which more closely resemble the typical echinacea preparations that are available in the United States. Small sample sizes (54 to 80 subjects in the active treatment groups) limit the applicability of many of the study results.

#### URINARY TRACT INFECTION

Echinacea is often used for treatment and prevention of urinary tract infection (UTI), based on an assumption of its immunostimulating properties. Only anecdotal evidence supports the use of echinacea for these indications.

#### FUNGAL INFECTIONS

In Germany, the combination of oral, freshly expressed echinacea juice and a topical antifungal cream has been used in the treatment of recurrent vaginal yeast infections.<sup>10</sup> Further research into this application is necessary to validate its efficacy.

#### Interactions, Adverse Effects, and Contraindications

No significant herb-drug interactions with echinacea have been reported. Based on in vitro studies, echinacea may be a mild inhibitor of the cytochrome P450 3A4 enzyme complex system; this inhibition tends to increase levels of drugs metabolized by this system, such as itraconazole (Sporanox), fexofenadine (Allegra), and lovastatin (Mevacor).<sup>11</sup> Although no such interaction has been reported in humans, it is probably advisable to use echinacea with caution in patients who are taking these medications. Theoretically, the immune-stimulating properties of echinacea might interfere with the use of immunosuppressive medications in patients with autoimmune disease; however, while such an effect is theoretically possible, it has not been documented in animals or humans.

The reported adverse effects have generally been uncommon and minor; they include

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abdominal upset, nausea, and dizziness. Anaphylaxis, asthma exacerbation, and angioedema have been reported in isolated cases. Persons with a history of allergy to any plant in the daisy family (including ragweed, marigold, and chrysanthemum) may be at greater risk for significant allergic reaction to echinacea.

Contraindications to the use of echinacea are controversial. The German Commission E monograph,<sup>10</sup> a consensus statement of expert opinions, recommends that echinacea not be used in patients with autoimmune conditions or human immunodeficiency virus (HIV) infection, because of the risk that its immunostimulating effect could lead to exacerbation of autoimmune illness or increase in HIV viral load; however, this risk is theoretic and has not been adequately studied.

### Dosage

Recommended dosages of echinacea differ widely depending on the product. The most commonly used preparation in the United States is a liquid extract of *E. purpurea* root; typical dosing of such a preparation would be 3 mL every three to four hours for the first one to two days of upper respiratory illness, then three times daily for the subsequent week. Patients who are using an echinacea tea (made from *E. angustifolia* or *E. purpurea* root) will need to take higher dosages, typically 6 to 8 oz four times daily for the first two days, titrating down to once or twice daily on days 3 to 7.

### Final Comment

Many family physicians in the United States have already encountered patients who use echinacea preparations for treatment or prophylaxis of URI and a variety of other infections. Patients will usually not inform their physicians unless specifically asked about the use of herbal medicines. Although data are inconclusive, there may be a mild positive effect of reducing the severity and duration of URIs when treatment is initiated soon after the onset

TABLE 1  
Key Points About Echinacea

Efficacy	URI prophylaxis: ineffective URI treatment: modest positive effect on duration and severity of URI
Adverse effects	Infrequent: abdominal upset, nausea, dizziness Rare: anaphylaxis, asthma exacerbation, angioedema
Interactions	No significant herb-drug interactions with echinacea have been reported.
Dose	Varies depending on brand. Available in liquid form, capsules and tablets, and tea
Cost	\$8 to \$17, depending on brand, for 3- to 4-week supply
Bottom line	Safe herbal medicine; may be effective in treatment of URI

URI = upper respiratory infection.

of symptoms. Unfortunately, it is unclear which of the many echinacea preparations should be recommended because of a lack of standardization of echinacea products and a lack of consistency in the study of these products.

Serious adverse effects from the use of echinacea appear to be extremely rare, and the potential for important herb-drug interactions appears to be limited. Although many physicians do not actively recommend echinacea because of the lack of evidence confirming its efficacy, they can feel comfortable with their patients' choice to use this extremely safe herbal medicine. *Table 1* discusses the efficacy, safety, tolerability, and cost of echinacea.

### AS WE WENT TO PRESS:

A recently published randomized, double-blind, placebo-controlled study investigated

the efficacy of echinacea on the early treatment of the common cold in 148 college students. No detectable harm or benefit was found. The results contradict current evidence and remind us that more research is necessary to provide definitive evidence for the role of echinacea in the treatment of the common cold. (Barrett BP, Brown RL, Locken K, Maberry R, Bobula JA, DAlessio D. *Treatment of the common cold with unrefined echinacea*. *Ann Intern Med* 2002;137:939-46.)

*The author indicates that he does not have any conflicts of interest. Source of funding: none reported.*

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