



## ECHINACEA

(*E. purpurea*, *E. pallida*, *E. angustifolia*)

**Family:** Compositae, Asteraceae

**Synonyms:** Purple coneflower, Pale purple coneflower, Narrow-leaf purple coneflower, Kansas niggerhead, Sampson root (1), American coneflower, Black Sampson, Black Susans, *Brauneria angustifolia* or *pallida*, Comb flower, Hedgehog, Igelkopfwurzel, Indian Head, Kansas snakeroot, Purpursonnenhutkraut, Purpursonnenhutwurzel, Racine déchinacea, Red sunflower, Rock-up-hat, Roter sonnenhut, Schmallblaettrige, Kegelblumenwurzel, Schmalltrigger sonnenhut, Scurvy root, Snakeroot, Sonnenhutwurzel (2).

### Plant characteristics

The Echinaceas include nine species, three of which have been studied for their medicinal properties: *E. Purpurea* (Purple coneflower), *E. angustifolia* (Narrow-leafed coneflower), and *E. pallida* (Pale coneflower). All are herbaceous perennials native to the North American prairies and open woodlands (3). *E. angustifolia* grows to about 20 inches in height. It has a bristly disk surrounded by pale pink drooping rays and a soft tap root. *E. pallida* grows a little taller, though is very similar in appearance to *E. angustifolia* and the two species are often confused with one another. In both plants, the leaves are lance-shaped and narrow. *E. purpurea* has broader, toothed leaves, deeper pink petals, and characteristic orange-tipped spines in the flower disk (3). Its root is fibrous (4).

*E. purpurea* grows vigorously in North Carolina and is a common garden perennial. Gardeners have not cultivated *E. pallida* and *E. angustifolia* as widely. Hence, their seed characteristics resemble those of wild plant species (e.g. the seeds require scarification and soaking) (4). Growers can propagate Echinacea from seed or division and plant the seedlings in spring or early summer (5). Echinaceas flower from June to October. Growers harvest the flower heads and leaves at the bud stage and the roots during the fall of the second or third year (5). The seeds of 2 or 3 year old plants are valuable as well.

### Herb chemical constituents and properties

**Biologically-active chemicals:** water-soluble polysaccharides, caffeic and ferulic acid derivatives, glycoproteins, and fat-soluble alkylamides along with volatile oils, flavanoids, and trace amounts of 1,2 saturated pyrrolizidine alkaloids (not the unsaturated alkaloids implicated in hepatotoxicity) (6-9). The constituents vary between species, by part of the plant examined (i.e., above ground plant vs. root), and by growing conditions, time of harvest, etc (10).

**Herbal properties:** Alterative, analgesic, antiedemic, antiexudative, anti-inflammatory, antispasmodic, antiseptic, antiviral, fungicidal, immunostimulant, protistocidal, sialogogue, trichomonocidal, vasodilator, vulnerary (11).

How herb was used traditionally	How it is used today (based on scientific evidence)
<p>The Lakota people called <i>E. angustifolia</i> Icahpe hu and used it for snake bites, sepsis, and rabies (9,12). The Blackfoot saw the plant as a remedy for toothache and other tribes used it for cough medicine (Choctaw), venereal disease (Delaware), sore throats (Comanche), rheumatism and colds (Cheyenne), and eye infections (Dakota) (13). Among the early European settlers, <i>Echinacea purpurea</i> first appeared in John Clayton's 1762 <i>Flora Virginica</i> as a remedy for saddle sores on horses (13). Echinacea became a favorite of the Eclectic physicians in the U.S. when H.C.F. Meyer produced a commercial medicine from <i>E. angustifolia</i> (14,15). After investigating Dr. Meyer's claims about the plant, Dr. John King and John Uri Lloyd determined that it had significant value and created an Echinacea "Specific Medicine" for sepsis, cancerous growths, typhoid, puerperal fever, throat infections, wound healing, and inflammatory skin conditions (8,13,16). In Ellingwood's <i>American Materia Medica</i>, Echinacea is listed as a treatment for syphilis, typhus, diphtheria, chronic mastitis, and tuberculosis as well (17).</p> <p>Echinacea preparations fell out of favor in the U.S. with advances in antibiotics and the decline of the Eclectics (18), though both <i>E. angustifolia</i> and <i>E. pallida</i> remained in the National Formulary though its 1947 edition (13). Gerhard Madaus, a German pharmaceutical manufacturer imported <i>E. purpurea</i> seeds to Germany in the 1930s. Since then, German scientists have conducted research into the biochemistry, pharmacology, and clinical usefulness of the herb (19).</p> <p>Echinacea is the most commonly used herbal product in the U.S.: 40.3% of adults surveyed in 2002 reported that they had taken the herb over the past 12 months (20). The herb continues to enjoy popularity in Europe, especially in Germany where over 200 Echinacea products are available (21). Retailers sold \$58 million worth of Echinacea products in 2000 (8). Manufacturers market Echinacea as an immune stimulant and the public uses it most often to treat cold symptoms (22-26). Modern herbalists continue to value Echinacea for treatment of a variety of infectious conditions, such as upper respiratory infections, urinary tract infections, otitis media, vaginal candidiasis, and skin infections (9,15,17,27). Echinacea is often combined with herbs with antimicrobial activity, such as Goldenseal or other berberine containing herbs (9). Because of its anti-inflammatory properties, Echinacea is also helpful as part of a formula to treat acute arthritic conditions (9,15).</p>	<p>European and American researchers have conducted hundreds of studies on Echinacea and its constituents. Studies include a large number of clinical trials. Unfortunately, conclusions are not easy to draw from the available information due to:</p> <ol style="list-style-type: none"> <li>(1) methodological flaws in the trials</li> <li>(2) varying plant species and plant parts, making preparations lack equivalency (21)</li> <li>(3) varying dosing schedules (28)</li> <li>(4) addition of other herbal components</li> <li>(5) failure of the study investigators to assay product for constituents</li> <li>(6) lack of comparability of measured outcomes (29)</li> </ol> <p>Up until the past 10 years, most of the research on Echinacea was conducted in Germany, primarily using <i>E. purpurea</i> (29).</p> <p>Echinacea is possibly effective for</p> <ul style="list-style-type: none"> <li>• Treating the common cold. Patients who take Echinacea for a cold seem to feel better, though they do not necessarily have fewer symptoms. See comments above regarding difficulties in interpretation of the clinical trials- several have revealed a 10-40% reduction in symptoms, though a few trials have negative results (29).</li> </ul> <p>It is unclear if Echinacea is effective for</p> <ul style="list-style-type: none"> <li>• Preventing the common cold. Some studies have been positive and others have been negative (21,30-32)</li> <li>• Treating wound infections. A small study was positive, but the verdict is still out (33).</li> <li>• Prevention of vaginal yeast infection- one positive study using Echinacin has been conducted (8).</li> <li>• Prevention of secondary outbreaks of genital herpes- the only known study was negative study (using Echinaforce) (34).</li> </ul>

**Preparation and Dosage:** Many preparations of Echinacea are available commercially in a variety of forms, including tea bags, capsules, alcoholic tinctures and fluid extracts, and non-alcoholic liquid formulations that are stabilized in glycerin or concentrating in a liquid filled capsule. The products contain various species and plant parts and cannot be considered as equivalent. Clinical trials have employed different formulations as well. At his time, the gaps in scientific knowledge regarding the optimal concentrations of the constituents and their bioavailability in different forms make a definitive recommendation of a specific product impossible. Some scientists recommend the use of a liquid form or buccal tablet of Echinacea, because of its possible capacity to stimulate tonsillar lymphoid tissue (14).

**Regardless of the form, most herbalists suggest very frequent dosing of Echinacea at the time the first symptoms appear in the case of acute infections, i.e., every 2-3 hours while awake (9,15), and followed by tapering dosage schedules as the symptoms abate.**

- Take one dropperful (40 drops) of a 1:3-1:5 tincture in 30-45% EtOH containing *E. purpurea* herb and root, with perhaps the addition of *E. angustifolia* root.
- The tea is prepared by steeping one tea bag in a cup of water for 15 minutes or simmering 1 tsp of root for 15 minutes and drinking one cup every 2-3 hours.

The German Commission E recommends the following for chronic conditions:

- *E. purpurea* fresh pressed juice, total of 6-9 ml/ day (3 cc BID-TID corresponding to 300mg BID-TID)
- *E. angustifolia* root, total of 2-6 ml of 1:2 fluid extract or 5-15 ml of the 1:5 tincture
- *E. purpurea* root, 1:2 fluid extract, 3-9 ml/day or 7.5-22.5 ml of the 1:5 tincture

**Dosage may be increased for acute infections.**

Patients may note a tingling, numbing sensation on the tongue when taking the tincture.

Safety issues	Consumer marketing issues
<p><b>Side effects:</b> unpleasant taste (1.7%); nausea/vomiting (0.48%); abdominal pain, diarrhea, sore throat (0.24%) (18). Heartburn, upset stomach, fatigue, sleeplessness, dizziness, headache, aggressive behavior, eczema, nonspecific rash, itchiness, increased hair loss, increased urge to urinate are reported in clinical trials, though Echinacea was well-tolerated in general (28,32,35,36).</p> <p><b>Adverse events:</b> Echinacea has rarely been associated with rash, asthma, and anaphylaxis in sensitive individuals (35,37,38). Other allergic reactions include hives, itchy eyes, runny nose, chest tightness, shortness of breath, and croup (2). In Germany, 3 patients (over a 6 year period) who took Echinacea have died, one of inflammation of the blood vessels and another of low platelet count. It is unclear if Echinacea caused these problems (39).</p> <p><b>Precautions/contraindications:</b></p> <ul style="list-style-type: none"> <li>• Safety of Echinacea in pregnancy is uncertain (29), but studies to date reveal no evidence for frequent adverse outcomes (40)</li> <li>• Avoid with tuberculosis, HIV infection, progressive diseases such as lupus, multiple sclerosis.</li> <li>• <b>Avoid Echinacea with an allergy to ragweed, chamomile, and other members of the daisy family</b></li> </ul>	<p><b><i>E. angustifolia:</i></b> Buyers purchased \$3.8 million of <i>E. angustifolia</i> in 2001. Growers and wildcrafters harvested 241,000 pounds of root and sold it for \$14-20 per pound. Demand is high for wild-harvested root, but low for cultivated root, because the latter is thought to have lower levels of bioactive compounds. <i>E. angustifolia</i> will grow well in all regions of NC, but particularly in the eastern part of the state (41).</p> <p><b><i>E. pallida:</i></b> Buyers purchased about \$150,000 of the root in 2001, corresponding to a harvest of 14,000-15,000 pounds at \$7-14 per pound. Demand is not high and is expected to decrease. <i>E. pallida</i> grows well in eastern NC (41).</p> <p><b><i>E. purpurea:</i></b> Buyers purchased about \$1.3 million of the herb in 2001, or 430,000 pounds. Because <i>E. purpurea</i> grows easily, its demand has not outpaced its supply in the market and it sells for \$3-4 per pound. Growers should have a buyer/grower contract in place before settling on this herb for commercial production. <i>E. purpurea</i> will grow well in all regions of the state (41).</p>

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*These informational monographs are based on our interpretation of current research in the rapidly evolving study of the safety and effectiveness of herbal medicines. This information is intended to serve as a resource and not to be used to diagnose or treat any illness. Patients should consult a licensed health care professional when using any herbal dietary supplements.*