

# Expert Herbal Reality Resource

## Echinacea

### Names

**Botanical Name** *Echinacea purpurea* (L) Moench, *Echinacea angustifolia* DC

**Family:** Asteraceae

**Common names:** Echinacea, rudbeckia, snakeroot, broad-leaved purple cone flower, narrow-leaved purple cone flower

**Alternate botanical names:** *Echinacea pallida* (Nutt) Britt is a separate species that has sometimes been confused with *E. angustifolia* (and has been seen as the parent species in some classifications). It is likely to have less efficacy than the other two species.



### Description

*Echinacea purpurea* is a perennial growing up to 2 metres high with simple rough stems, hollow near the base and thickening slightly close to the flowerhead. The leaves are broad, ovate to ovate-lanceolate and often toothed, covered in coarse hairs and protruberances, stalked at ground level and almost sessile up the stem. The flower is in the form of a high purple cone surrounded by roughly hairy bracts and then short spreading purple, crimson, pink or white ray florets. *E. angustifolia* is smaller and the leaves are more more elongated, slightly elliptical with entire margins; it has relatively straight ray florets.

Both species are native to eastern and central North America where they commonly grow in moist to dry woodlands or prairies. This plant is now cultivated across the globe for both medicinal and horticultural purposes. *Echinacea angustifolia* is threatened in the wild and harder to grow than *E. purpurea*.

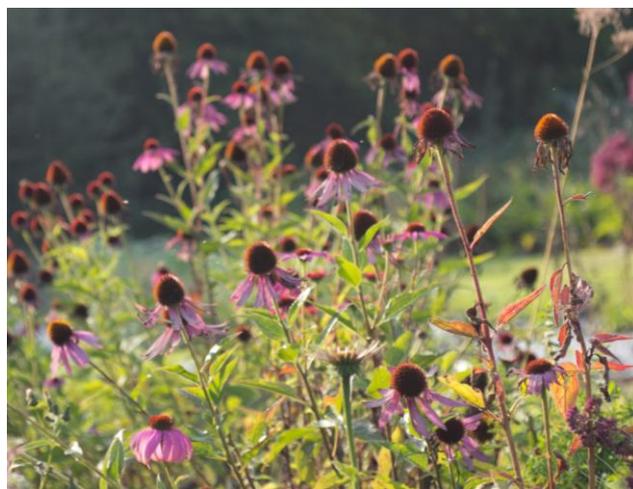
### Constituents

- **Alkylamides (alkamides)** incl. isobutylamides
- **Caffeic acid derivatives:** echinacoside and cynarin (*E. angustifolia*); chicoric acid (*E. purpurea*)
- **Polysaccharide:** 'echinacin' (although identification and consistency of various polysaccharides not clear)
- **Polyacetylenes:** incl. echinalone in (*E. purpurea*)
- **Essential oil** (trace)

Of these constituents there is evidence for immunological activity of the polysaccharides though as these are quickly broken down on digestion such activity will be confined to surface defences in the mouth and throat. Most interest recently has been in the activity of the alkylamides, in modulating the activity of cannabinoid receptors (CB<sub>2</sub>) which have immune-modulating activity.<sup>1</sup> The alkylamides, especially the isobutylamides have a characteristic tingling effect in the mouth and have long been considered a mark of quality of echinacea and are particularly prominent in *E. angustifolia*. Caffeic acid derivatives from the latter have also shown antihyaluronidase activity: hyaluronidase is an enzyme that some infective bacteria use to penetrate mucosal surfaces.

## Traditional use

The roots of echinacea comes with a formidable reputation from the annals of the settler tradition in North America, with one writer M.R Gilmore observing the native population using it as a "remedy for more ailments than any other plant" and others reporting in often rapturous tones their own experiences with the remedy. In particular it was recommended for the bites of snakes and other venomous creatures (to the extent that one researcher publicly volunteered to allow himself to be bitten by rattlesnakes to prove the point to his colleagues!), and for infected and poisonous conditions generally, to treat burns and wounds, and for toothache and sore throats. Septic problems were widely treated with nothing more than echinacea, and most herbalists of the day would go far to ensure a good supply.



The Native Americans, and the 19<sup>th</sup> century 'Eclectic' physicians who adopted their use of echinacea, preferred *E. angustifolia* root, which is high in alkylamides that impart a persistent tingling sensation in the mouth and stimulate the flow of saliva, long used as a sign of good quality (and likely to be a key part of the echinacea reputation).

The world-wide reputation of echinacea was cemented when the German homoeopathic physician Dr Madaus visited the USA in the 1930's and observed that it was the most popular home remedy for infections across the country. Probably because of the difficulty of mass cultivation of *Echinacea angustifolia*, he created a new prescription medicine from using the aerial parts of *E. purpurea*.

## Traditional actions

Traditional Ayurvedic characteristics are

**Rasa (taste):** Bitter, pungent.

**Virya (energy):** Cooling.

**Vipaka (post-digestive):** Pungent.

**Guna (quality):** Light, dry, sharp.

**Dosha:** strengthens *vata* and reduces excessive *pitta* and *kapha*

**Dhatu (tissue):** Rasa/plasma, rakta/blood.

**Srota (channel):** Rakta/circulatory, rasa/lymphatic, prana/respiratory, anna/ digestive, shukra/reproductive.

**Ayurvedic Indications:** Famous for its ability to clear *ama* from the tissues, excellent for enhancing immunity and for relieving acute and chronic infections as well as toxic blood conditions. It clears excess *ama*, *pitta* and *kapha* from the *rasa* and *rakta dhatus*, relieving fevers, infections, lymphatic congestion, tonsillitis, swollen glands, catarrh, colds and flu. Clears *ama*, heat and congestion from *shukravahasrotas*, useful in a range of gynaecological problems.

**Ama pachana** – clears toxins from the gut.

**Amavataghna** – relieves gout and arthritis.

**Gulmaghana** – reduces swollen glands and lumps.

**Jwaraghna** – reduces fevers.

**Kasasvasahara** – relieves coughs and breathing problems.  
**Krimipranut** – combats infections.  
**Kusthaghna** – alleviates skin problems.  
**Raktadhara** – enhances circulation.  
**Raktashodhana** – purifies the blood.  
**Striroga** – helpful in gynaecological problems.  
**Udaraprasamana** – relieves allergies.  
**Visahara** – clears toxicity.

## What practitioners say

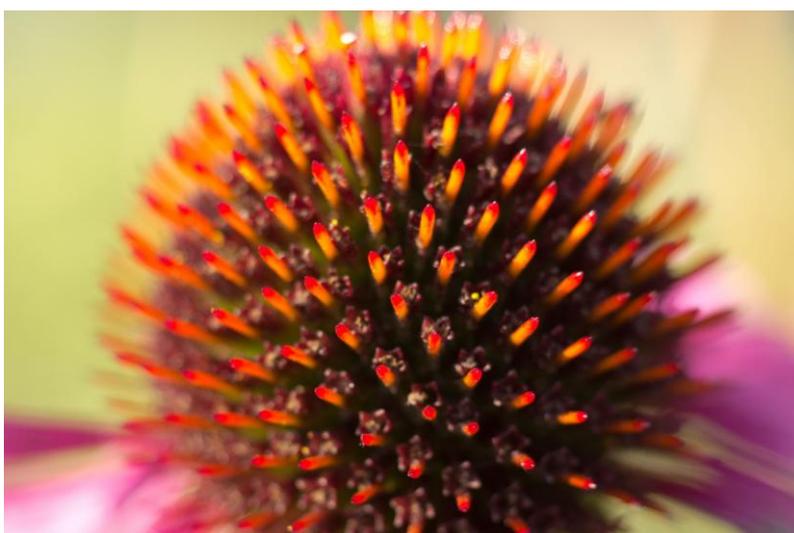
**Upper respiratory:** use to fend off tendencies to cold, flu, tonsillitis, pharyngitis, laryngitis, general mucous and sinus congestion. The immune stimulating properties of echinacea are focussed on throat surfaces and immediately underlying lymphatic tissues, which is where most upper respiratory battles are waged.

**Immune:** echinacea works mainly in innate immunity (rather than the acquired immunity of antibody production) and is appropriate for any acute and chronic infections, whether due to bacterial, viral, protozoal or other organisms. It is likely to be particularly effective in infections on or near accessible surfaces, including the upper gut wall, though has also been used to modulate immune responses including in moderating allergies and hypersensitivity reactions.

**External uses:** echinacea is especially effective as a mouth wash for gum disease where the tingle factor from the alkylamides is most valued. It has traditionally been used to bathe infected and open wounds, bites or poisonous attack, especially when healing is impaired. It has also been used for hot and irritated skin conditions such as eczema and psoriasis, and as a douche for vaginal infections.

## Evidence

Because of the European adoption of the aerial parts of *Echinacea purpurea* the evidence base is largely linked to this version. For example a Cochrane review pointed marginally in favour of *Echinacea purpurea* aerial parts: “Our exploratory meta-analyses suggest that at least some *Echinacea* preparations may reduce the relative risk of catching a cold by 10% to 20%. A risk reduction of 15% would mean that if 500 out of 1000 persons receiving a placebo would catch a cold this figure would be 425 of 1000 persons with an echinacea product. This is clearly a small effect of unclear clinical relevance. This review points out a familiar complaint among reviewers of the evidence: that they could not well distinguish between echinacea products.<sup>ii</sup> An earlier (more positive) Cochrane review by the some of the same authors had pointed in favour of *Echinacea purpurea* aerial parts.<sup>iii</sup> However a later meta-analysis by other reviewers also did not differentiate between echinacea preparations.<sup>iv</sup>



## Safety

Echinacea is safe for the vast majority of people, and there are no concerns in pregnancy and breastfeeding. Occasional minor gastrointestinal irritation has been reported and rare allergic reactions have been reported. It is also likely to be safe for long term use.

A trend in modern reviews of echinacea is to warn against its used in auto-immune conditions on the basis of its immune stimulant reputation. This is entirely theoretical as there is no evidence of such a problem. It also overlooks both the likely activities of echinacea and its traditional use. The best explanations for the activity of echinacea all involve surface defences, often against immune-provoking micro-organisms, rather than core immune stimulation. For example any impact of polysaccharides (which do not survive digestion) by definition will have to be on surface antibody signalling, using these defence priming mechanisms,. Echinacea alkylamides, acting on cannabinoid 2 (CB<sub>2</sub>) receptors, appear to modulate white blood cell response to immune stimulants depending on the extent of the assault.<sup>v</sup> So, on the evidence we have to date, echinacea root is more likely to prime the immune response before infection but moderate it during infection. The best frontline evidence for this modulating effect was the use of echinacea by Eclectic physicians in the USA to treat sepsis, the 'cytokine storm' complication of Spanish flu, during the deadly 1918-19 epidemic.

However it will be prudent not to take echinacea when on immunosuppressive medication (eg after transplants or following severe immunological diseases, HIV etc).

## Dosage

1 - 4 g of dried root of *E. purpurea* (0.5 - 3 g of dried root of *E. angustifolia*) three times per day

## References

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- <sup>i</sup> Gertsch J. (2008) Immunomodulatory lipids in plants: plant fatty acid amides and the human endocannabinoid system. *Planta Med.* 74(6): 638-650
  - <sup>ii</sup> Karsch-Völk M, Barrett B, Kiefer D, et al. (2014) Echinacea for preventing and treating the common cold. *Cochrane Database Syst Rev.* 2(2): CD000530.
  - <sup>iii</sup> Linde K, Barrett B, Wölkart K, et al. (2006) Echinacea for preventing and treating the common cold. *Cochrane Database Syst Rev.* 2006;(1):CD000530
  - <sup>iv</sup> David S, Cunningham R. (2019) Echinacea for the prevention and treatment of upper respiratory tract infections: A systematic review and meta-analysis. *Complement Ther Med.* 44: 18–26
  - <sup>v</sup> Gertsch J, Schoop R, Kuenzle U, Suter A. (2004) Echinacea alkylamides modulate TNF-alpha gene expression via cannabinoid receptor CB2 and multiple signal transduction pathways. *FEBS Lett.* 577(3): 563-569