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ECHINACEA

Family: *Compositae*

Genus: *Echinacea*

Species: *purpurea*



Source: www.hebes.mdx.ac.uk



www.hflp.sdstate.edu/ho311/outdoor_2002.html

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General Background

Other common names are; Purple Coneflower, Kansas Snakeroot and Black Samson. This plant is native to central parts of the United States and is now commercially cultivated in Europe and the US. The name Echinacea is derived from the Greek word for hedgehog and was inspired by the appearance of the flower's central cone. The plant is a perennial growing to 50cm with daisy-like purple flowers, leaves are largely ovate and coarsely-toothed, covered in coarse hair. It has a faint aromatic smell, with a sweetish taste, leaving a tingling sensation in the mouth. The plant is grown from seed in spring or by root division in winter. It thrives best in rich, sandy soil. The flowers are gathered in full bloom and the roots of 4-year old plants are lifted in autumn. The flower stems and most of the leaves die off during the winter, but produce numerous short, lateral rhizomes from the base of the stem, each developing into more flowering stems in the second and subsequent years of growth.

The Comanche Indians in North America used Echinacea as a remedy for toothache and sore throats, and the Sioux Indians took it for rabies, snake bite and septic conditions.

Details of Quality Characteristics

Echinacea is considered one of the world's most useful medicinal herbs. It contains alkamides (mostly isobutylamides with olefinic and acetylenic bonds), caffeic acid esters (mainly echinacoside and cynarin), polysaccharides, volatile oil (humulene), echinolone and betaine. *In vitro* and *in-vivo* investigations have shown non-specific immunostimulating activity, but the active compounds remain unidentified. The alkamides and caffeic acid derivatives are considered the main contributors to the therapeutic effect. Alkamides are antibacterial and antifungal. The polysaccharides have an anti-hyaluronidase action inhibiting the ability of viruses to enter and take over cells.

Echinacea contains oil and resin in both the wood and bark along with masses of inulin, inuloid, sucrose, vulose, betaine, two phytosterols and fatty acids, oleic, cerotic, linolic and palmatic.

Current Production and Yields

The plant is cultivated in eastern USA, Switzerland and southern Germany. Trials have also been carried out in Denmark with successful results. US yields are the only statistics currently available, they are as follows:

<i>E. purpurea</i>	1.12 t/ha
<i>E. angustifolia</i>	1.26 t/ha
<i>E. pallida</i>	2.02 t/ha

Constraints upon Production

Due to the slow establishment rate of the crop early weed control is essential. This may be a problem as there are currently few herbicides available for safe use on the crop and it is not feasible to use non-chemical control methods such as mechanical weeding on a large scale.

Markets and Market Potential

Echinacea is the best known and researched herb for stimulating the immune system. Research shows that Echinacea has a general stimulating effect on the body's immune defences and has the ability to raise the body's resistance to bacterial and viral infections by stimulating the immune system. Preparations of the above ground parts of purple coneflower are sold as treatment for common colds and similar symptoms, it is used as a dietary supplement. Thousands of doctors currently use Echinacea for treating infectious diseases. It is also currently being investigated as a treatment for HIV and AIDS.

It is used for infections of all kinds and is particularly useful for chronic infections such as post-viral fatigue syndrome (ME). It is also good for chilblains, colds, flu, skin disorders or infections and respiratory problems, and is also very effective as a gargle for throat infections or enlarged lymph glands. It is also helpful for treating allergies such as asthma.

Echinacea increases the 'non-specific' activity of the immune system. Unlike a vaccine which is active only against a specific disease, Echinacea stimulates the overall activity of the cells responsible for fighting all kinds of infection. Unlike antibiotics, which are directly lethal to bacteria, Echinacea makes our own immune cells more efficient in attacking bacteria, viruses and abnormal cells, including cancer cells.

Other Information

The crop thrives in full sun or light shade in hotter climates, it can grow in fairly poor and dry soil. The plants are drought and frost tolerant. Echinacea is a lime-loving plant growing best on fertile, free-draining loams. It can grow in soils with pH 5.5-8.0. The soil texture is important and a soil that can be easily washed from the roots is desirable. Good weed control is essential to achieve acceptable yields. A direct-seeded crop is slow to establish so competition with weeds is poor.

Cultivations of different cultivars of *E. purpurea* show variations with respect to yield and composition of the compounds. Early investigations have shown a diurnal variation in the content of cichoric acid. Seasonal and ontogenetic variation of both alkalamides and caffeic acid derivatives is also presumed but needs to be verified to provide a basis for cultivation guidelines. Initial treatment of harvested material is also very important due to the liability of cichoric acid.

Bringing Echinacea into production has resulted in identification of diseases that had not been observed in the wild. Wilt or blight (*Fusarium oxysporum*) causes the formation of dark tissues along the leaf edges that eventually die. Wilting of the shoots is also evident. If the stems or roots are cut near the base the tissues appear to contain dark blotches in and around the vascular system. This has only been evident in wetter soils or during wetter years.

Aster Yellows is a phytoplasma that causes the stem to become yellow to red in colour. As the disease progresses the flowers stop producing seeds and become feathery. This disease is spread by leaf hoppers and appears to develop in a year or

two. Infected plants should be removed as soon as they are identified to prevent spread of the disease.

Plants are harvested in the autumn, tops are cut to about 5cm above ground level before plants are lifted using a digger that can work to a depth of 30cm. Shoot residue must be removed before roots are cut into 5-10 cm long pieces and thoroughly washed. After washing, the roots, which are about 30-35% dry matter, are dried at 40-45°C until brittle.

Research

Research is currently inconclusive relating to properties echinacea may have to boost immunity for battling upper respiratory infections, fighting infections, and relief of swelling or pain, thus curing colds. So far research has not identified an individual compound responsible for these effects. It may require a number of properties to get the desired effect.

Echinacea has been shown in animal and human studies to improve the migration of white blood cells to attack foreign micro organisms and toxins in the bloodstream. Research suggests that echinacea's activity in the blood may have value in the defence of tumour cells.

Future work should target cultivar selection, the effects of pH, fertiliser and planting density on yield, and the effect of drying and storage conditions on chemical composition of the root. There is now a need to get commercial volumes onto the world market to assess the crops full potential.

Useful Websites

<http://attra.ncat.org/attra-pub/echinacea.html> - Echinacea as an Alternative Crop: Horticulture Technical Note

<http://www.crop.cri.nz/psp/broadshe/ECHINACE.HTM> - Crop and food research: Echinacea – the purple coneflowers

BioMat Net

[Publications: Nachwachsende Rohstoffe - Vielfalt aus 1001 Projektidee \(in German\)](#)

Contacts

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Cooperative project between Royal Danish School of Pharmacy (Department of Medicinal Chemistry), Danish Technical University (Department of Organic Chemistry) and Danish Institute of Agricultural Sciences. Contact via ub@strukdir.dk

References

Chevalier, A., (1996) *Encyclopaedia of Medicinal Plants*. Dorling Kindersley Ltd.

