

Echinacea: Immunity and Upper Respiratory Tract Infections

EMILY MCMILLEN

California State University, Chico, NFSC 345-02, May 2012

ABSTRACT

Extracts from the herb Echinacea have been used to treat symptoms of the common cold and flu for hundreds of years. This herb is also believed to improve immunity against these upper respiratory tract infections. It is believed that echinacea may not only prevent the common cold but may also relieve symptoms when taken at the onset of a cold. Echinacea can be taken in the form of tablets, capsules, tea, and mixed with other herbs, vitamins, and minerals that are believed to boost immunity. Many studies suggest that echinacea may relieve some cold symptoms and reduce the duration of the cold in humans. Another study shows a positive correlation between echinacea and its ability to combat pathogenic microorganisms. Along with beneficial effects this herb also has anti-health qualities for people with certain conditions and those who have suppressed immune systems. This herb may also have adverse side effects when taken with some medications. Echinacea is not a miracle cure for upper respiratory tract infections but may be helpful in relieving the overall severity of symptoms and decrease the time spent being sick.

INTRODUCTION

For over 400 years the plant, Echinacea, has been used to treat a wide variety of illnesses, infections, and diseases. First used by the Native Americans, Echinacea has been used to treat: the common cold, the flu, diphtheria, syphilis, malaria, blood poisoning, and scarlet fever (Ehrlich, 2001). Presently this herb is most commonly used for its popularized immune boosting properties and to relieve cold and flu symptoms. Humans have unfortunately suffered from upper respiratory tract infections such as the common cold and flu which are highly communicable illnesses. Symptoms of these illnesses include sore throat, congestion, runny nose, headache, body aches, cough and overall discomfort. Along the search for a cure, or even a treatment, echinacea was chosen to be one of the herbs used to combat upper respiratory tract infections.

Although echinacea is used to treat many different ailments this paper will focus on the effects of the herbal supplement used to enhance immunity and relieve symptoms of the common cold and flu. The history of Echinacea, side effects, and contraindications will also be discussed. Current scientific studies have shown mixed findings on whether or not echinacea is effective against URTIs. These issues will be presented and discussed in order to formulate a stance on this herb's benefits.

BACKGROUND

Echinacea is a perennial herb that has long stems with one pink or purple flower at the end. The center of the flower is a large seed head with sharp spines that resembles a hedgehog. The Greek word for hedgehog is *echinos* which is where this plant gets its name. This herb originated from North America and was used largely by Native Americans until a physician named John King introduced it as western medicine in 1852. From then on the use of Echinacea expanded to Europe as well. Germany seemed to be the most impressed with the benefits of this herb and to this day most of the scientific studies that have been conducted occurred there. This herb is available in many different forms including: tea, juice, extracts, and tablets (Islam & Carter, 2005).

DISCUSSION

Upper Respiratory Tract Infections

Upper respiratory tract infections (URTIs) include rhinitis, sinus infections, the common cold, laryngitis, and the flu. The study “Use of echinacea in upper respiratory tract infection” is a peer-reviewed article that sought out to examine how echinacea is related to these infections and whether it can be beneficial or not. As previously stated most of the scientific research has been conducted in Germany which is where this particular review is from. It was concluded that echinacea’s mechanism of action showed that certain phytochemicals are actually capable of benefiting the immune system to protect against the cold and flu. Constituents such as caffeic acid derivatives have also been found to be active in echinacea and beneficial to the immune system (Islam & Carter, 2005).

Another article titled “*Echinacea purpurea* L. in children: safety, tolerability, compliance, and clinical effectiveness in upper respiratory tract infections” is a primary research article that focused on the safety of this herb in young children. Their method of research was giving eleven children (ages 2-12 years old) dosages of echinacea extract based on age everyday for ten days. They then measured tolerance to the treatment using a rating scale. It was concluded that echinacea poses no safety issue and most importantly relieved some symptoms of upper respiratory tract infection (Saunders, et al, 2007). The strength of this study is its ability to prove the short terms effects of the herb improving cold and flu symptoms. The children who were studied had a history of URTIs and echinacea did improve the severity of their symptoms during this trial.

A more direct study featured in a primary source article, “Echinacea for Treating the Common Cold,” used randomized controlled trials to test the possible benefits of echinacea for treating the common cold. The hypothesis was that this herb would help to treat the common

cold. Their sample size was quite large and involved 719 patients (713 who completed) ages 12-80 years old who were assessed for five days. The patients, who all had the onset of the common cold, were put into one of four groups. These groups were: no pills, placebo pills (blinded), echinacea pills (blinded), or echinacea pills (unblinded). They not only measured symptoms as per the Wisconsin Upper Respiratory Symptom Survey but they also measured interleukin-8 levels and neutrophil counts. This study, unlike others, concluded that echinacea pills did not provide statistically significant results to prove that it helps those with the common cold (Baret, et al. 2010).

Effects on Human Pathogenic Bacteria

When echinacea's effects are tested on human participants there is a degree of error that must be taken into consideration. People may interpret their cold and flu symptoms differently and therefore report them based on how their perspective. Even though pain is relative to an individual this may lead to a lack in standard reporting in regards to the severity of an illness. This bias can be eliminated through removing the human test subject and testing echinacea directly on the microorganisms of concern.

The article "*Echinacea* Extracts Contain Significant and Selective Activities against Human Pathogenic Bacteria" is primary source article that set out to test six different echinacea extracts that are commercially available on fifteen different human pathogenic bacteria and two pathogenic fungi. Their methods included analyzing the composition of the extracts and diluting them in order to compare them equally. The extracts were categorized based on biologically active ingredients: alkyamides, polysaccharides, and caffeic acids. A major strength of this study includes the creation of a standardized method of preparation, extraction, and analysis of the components present in echinacea (Sharma, et al, 2008). Having a way to equally measure and analyze the extracts is beneficial because it decreases the chances of having large variables in measurements.

The key findings from this article include evidence that several colonies of bacterium were sensitive to exposure from various echinacea extracts. The pathogenic bacteria that were impacted the most were those suspect to causing URTIs. It was concluded from this study that echinacea, mainly the ethanol formulation, may provide protection and relieve symptoms caused by sinusitis, pharyngitis, bronchitis, pneumonia, and pharyngitis (Sharma, et al, 2008).

Reactions with Medication

One major contraindication of echinacea is that it may be harmful to those individuals taking immune suppressing drugs. Echinacea contains substances that can enhance the immune system and those who take immunosuppressant drugs are advised not to consume it as it may counteract them. It is especially advised that individuals who have received immunosuppressive medications for an organ transplant avoid using echinacea (Ehrlich, 2001).

Individuals with depressed immune systems are likely to be taking immunosuppressant drugs. As stated previously, these drugs are counteracted by the effects of this herb. Oddly, this herb's immune boosting properties may possibly cause the opposite effect. Echinacea can

theoretically worsen the symptoms, specially the immune mediated inflammatory mechanisms, of those with autoimmune diseases (Islam & Carter, 2005).

In contrast, a possible benefit of consuming echinacea with other medications is the possibly of reducing the recurrence of yeast infections. The antifungal medication called econazole may be taken with echinacea to improve its effectiveness (Ehrlich, 2001).

Adverse Reactions with Other Illnesses

Again, it is important to note that although echinacea can be beneficial to the immune system it can also be harmful to certain individuals. People who suffer from rheumatoid arthritis, collagen vascular disease, multiple sclerosis, asthma, tuberculosis, skin allergies, allergic rhinitis, or have acquired immune deficiency syndrome are urged to avoid it (Islam & Carter, 2005). Many of these conditions are those that affect the immune system and in those cases echinacea poses anti-health properties. It is likely that individuals who suffer from allergies to plants may also have an allergic reaction to the chemical properties found in echinacea.

Study Limitations

Even though it was found that echinacea generally has a positive effect the many different forms of echinacea along with varied concentrations is an issue because it is difficult to provide clear recommendations for humans (Islam & Carter, 2005). Also, the types of echinacea consumed along with the dosage may affect individuals differently and results are not constant. Furthermore, the populations being studied may vary in different regions so the factors that influence colds also differ (Baret, et al. 2010). Testing the actual bacteria involved in URTI's appears to hold the strongest evidence supporting echinaceas positive immune supporting properties. However, this study may be limited due to the bacteria being outside the human body rather than being present in the lungs, throat, etc. The bacteria grown in a petri dish versus the bacteria in an individual's physiological environment may differ enough provide varying results.

CONCLUSION

After examining the studies and their results presented in this paper it can be concluded that echinacea does in fact have beneficial effects on upper respiratory tract infections. Both increased immunity against cold causing bacteria and reduction in cold symptom severity have been supported by numerous studies with humans and bacteria. The articles that were reviewed were mixed in their findings on whether or not echinacea supports a healthy immune system and alleviates URTI symptoms. However, the literature review is overall in favor of the positive effects of echinacea.

Recommendations for Further Research

Many of the trials aimed for testing echinacea on humans seemed to lack in length of time as well as number of subjects. It is suggested that for further research longer trials for testing echinacea are done on a larger, more varied population. Since the lack of a standardized product is an apparent issue it is also recommended that new research is conducted to set a standard in concentrations, dosages, and ways of processing echinacea. Also, it would be beneficial to implement a universal assessment of the severity of cold and flu symptoms due to the wide range of variability that can occur during reporting. If possible it would be more beneficial if actual bacterial cultures can be taken from a person via biopsy while they are experiencing a URTI. This may be even more viable for studying the effects of echinacea on the bacteria involved URTIs rather than relying on self-reporting.

REFERENCES

- Islam, J., & Carter, R. (2005). Use of echinacea in upper respiratory tract infection. *Southern Medical Journal*, 98(3), 311-318.
- Saunders, P. R., Smith, F., & Schusky, R. W. (2007). Echinacea purpurea l. in children: safety, tolerability, compliance, and clinical effectiveness in upper respiratory tract infections. *Canadian Journal of Physiology & Pharmacology*, 85(11), 1195-1199.
- Barret, B., Brown, R., Rakel, D., & et al, (2010). Echinacea for treating the common cold. *Annals of Internal Medicine*, 153(12), 769-W246.
- Sharma, M., Vohra, S., & Hudson, J. B. (2008). Echinacea extracts contain significant and selective activities against human pathogenic bacteria*. *Pharmaceutical Biology*, 46(1/2), 111-116.
- Ehrlich, NMD, S. D. (2001). *Echinacea*. University of Maryland Medical Center, Maryland. Retrieved from <http://www.umm.edu/altmed/articles/echinacea-000239.htm>