

Tarragon



A. dracunculus
USDA

About Tarragon

Artemisia dracunculus L. or Tarragon is a genus of aromatic and bitter plants of a large sunflower family Asteraceae. This family has more than 20,000 species including the common sunflower, marigold, sagebrush and wormwood.

The plant genus *Artemisia*, has been a source of herbal remedies and conventional drugs for centuries. The large family of plants are known for their volatile oils. The

oils are used for medicinal purposes and for repelling insects. The herbs themselves are used in the culinary trades for flavor.

Two varieties of *Artemisia dracunculus* L. are French and Russian tarragons. The Russian tarragon does not have the same flavor profile as the French Tarragon, so it cannot be substituted in recipes for French Tarragon. However, it has an impact on human health in many ways.

The therapeutic properties were discovered in the Middle Ages when it was used to treat fever and upper respiratory infections, ulcers and plaque epidemics, to stimulate appetite and digestive processes.

Recent research on the health effects of Russian tarragon has focused on its influence on glucose and insulin levels in diabetes.

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Tarragon as a culinary herb

As a culinary herb, Tarragon has a distinguishable flavor that cannot be replaced by another herb. It has a distinctly strong flavor, sweet and anise-like.

The French call tarragon a King of Herbs. Tarragon is an essential ingredient in the French Béarnaise sauce, one of the important sauces in French cuisine. Tarragon is also one of the herbs included in the *finest herbes* that is used in Mediterra-

nean and French cooking. The aromatic herb mixture is used to enhance many dishes such as omelets, cooked vegetables, roasted meats, chicken, fish and flavored vinegars. Tarragon is also used in the recipe for Dijon mustard.

There are many recipes that use tarragon alone as a flavoring such as tarragon chicken. It is also used to flavor butter, cheese dish-

es, soups and even fresh fruit.

Most chefs prefer to use fresh tarragon. It has an intense flavor and is used sparingly in dishes. It can be frozen to retain the flavor. Infusing vinegar with fresh tarragon preserves the flavor in the vinegar, which can then be used in salad dressings, sauces and other recipes. Dried tarragon loses its flavor very quickly and is not favored by chefs.

Tarragon and the metabolic syndrome



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Metabolic syndrome is the name for a group of risk factors that occur together and increase the risk for coronary artery disease, stroke, and type 2 diabetes. The risk factors are :

- central obesity: waist circumference ≥ 102 cm or 40 inches (male), ≥ 88 cm or 36 inches (female)
- dyslipidemia: TG ≥ 1.7 mmol/L (150 mg/dl)
- dyslipidemia: HDL-C < 40 mg/dL (male), < 50 mg/dL (female)

- blood pressure $\geq 130/85$ mmHg
- fasting plasma glucose ≥ 6.1 mmol/L (110 mg/dl).

Obesity and insulin resistance are usually present in metabolic syndrome, both of which contribute to the development of diabetes.

Consuming a high fat diet and lack of physical activity can lead to insulin resistance and the metabolic syndrome. The treatment for metabolic syndrome includes lifestyle changes such as diet modification and increased physical activity. However,

most eventually will convert to full type 2 diabetes.

Alternative therapies are evaluated using botanicals such as *A. dracunculoides* to impact glucose and insulin levels. *A. dracunculoides* can impact lipid metabolism in the muscle, such as the use of fat for energy vs storage in the cell, and influencing the synthesis of new fat cells. Preliminary research in laboratory animals shows improvement in insulin resistance with *A. dracunculoides* and its use as a potential treatment for the metabolic syndrome.

Tarragon and diabetes

Majority of the human studies with tarragon in relation to diabetes have been done in the Middle East. Cell culture, animal and human studies have all shown promising results.

Many of the disturbances in the metabolic syndrome, diabetes, and prediabetes relate to the way cells either take up glucose or dispose of it, and whether or not insulin is effective in increasing glucose uptake by cells. Drugs are usually used to enhance the uptake of glucose in diabetes and prediabetic states. Lifestyle changes such as exercise and dietary changes can influence glucose metabolism and uptake by cells. Research also indicates that certain herbal compounds can increase glucose disposal from the bloodstream.

In a cell culture study, *A. dracunculoides* L. extract increased glucose uptake by cells significantly after seven days of treatment. There was also a reduction in insulin levels indicating improved insulin sensitivity by the cells.

An extract of *Artemisia princeps*, another closely related plant to *A. dracunculoides* was also found to increase uptake of glucose in cell culture.

In an animal study, diabetic rats and rabbits were supplemented with an extract of the aerial parts of *A. herba-alba* (herb related to Tarragon) for 2-4 weeks. The *A. herba-alba* supplementation was very effective in significantly reducing blood glucose levels, and preventing the elevation of glycosylated hemoglobin levels (HbA1C),

In herbal remedies, all the components of the plant such as leaves or roots may not be equally effective as treatments depending on their chemical composition. The aerial parts of the plant *A. dracunculoides* L. have the active components, not the roots.

A study in human subjects found that *A. herba-alba* (AHA) reduced blood sugar (BS) significantly in diabetics that had elevated BS levels. In fact, five of the 15 subjects who were not responding to oral anti-diabetic drugs and diet restriction, all responded well to AHA. Also of interest is that after withdrawal of the extract, in seven patients the effects on BS still continued. No side effects were recorded during or after treatment with AHA.

A substance from *Artemisia annua*, a closely related plant to the French Tarragon yields a substance called Artemisinin. It and its derivatives are used to treat malaria worldwide.

Tarragon and insulin activity

In healthy individuals increased blood glucose levels after a meal stimulate insulin secretion from the pancreas. The increased insulin then stimulates glucose uptake by cells, removing it from the blood, and bringing blood glucose levels down. When an individual is insulin resistant, this does not occur. Insulin may be released in adequate amounts, but the body does not react to increased insulin levels normally.

There is a build-up of insulin and glucose in the bloodstream. They will need medication to bring glucose levels down.

The major tissues that use glucose in the body are the muscles. The muscle tissue has transporters for glucose on the cell surface, some of which need insulin for them to become active.

Components in *A. drancunculus* L. extract increased glucose

transport into cells from the bloodstream. It also reduced glucose synthesis in the liver in diabetic laboratory animals. Two main components in the extract were identified. The components were more effective in reducing blood glucose levels than currently used medications. The *A. drancunculus* L. extract was effective in reducing blood glucose levels by enhancing it the same way as insulin.

Tarragon is also known as:

- false tarragon
- green sagewort
- silky wormwood
- dragon sagewort
- dragon wormwood
- estragon

Tarragon and diabetic neuropathy

One of the side effects of diabetes is the development of neuropathy which can in serious cases lead to amputations. There are very few pharmacological treatments for neuropathy. However, there are botanicals that show promising results that could be used to delay and perhaps pre-

vent neuropathy.

Feeding a high fat diet to laboratory animals induces obesity and diabetes and decreases nerve conduction that is clearly measurable. This is thought to be due to high oxidative stress caused by the high fat diet. *A. drancunculus*

L. extract given to mice fed a high fat diet prevented neuropathy and sensory loss. *A. drancunculus* L. extract is safe and nontoxic and should be used in the earliest stages of diabetes to prevent neuropathy.



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Tarragon and traditional uses

A. drancunculus L. is a perennial that grows in Europe, Russia, Mongolia, China and western and central North America with origin being in Eastern Siberia and Mongolia. The most important active compounds in the plants are essential oils, coumarins, flavonoids, and phenolcarboxylic acids. The most important essential oils are estragol, sabinene, and methyleugenol. The important flavonoids are quercetin,

luteolin, camphorol, isorhamnetin, and their glycosides. The accumulation of all of these compounds depends on the habitat.

Tarragon has had many uses: as an ingredient in drinks, as a meat and vegetable preservative, and as a spice in many confectionaries, cheeses and mustards. It has been used to treat scurvy, night blindness, and as an anticonvulsant in epilepsy

and neuroses. It has also been used as a treatment for edema, kidney stones and for chronic cholecystitis. Estragol has been used in Chinese medicine as a liver protective agent, diuretic, and for amelioration of skin inflammation. The water soluble components have been used to treat ulcerations, gingivitis, burns and joint diseases and as antibacterial agents.

References:

- Cefalu, WT, et al. *Am J Clin Nutr* 2008;87(suppl):481S-7S.
- Yamamoto N. et al. *Bioscience, Biotechnology, and Biochemistry* (2010) 74(10): 2036-2042.
- Zhao, W-Q et al. *European Journal of Pharmacology* (2004) 490: 71- 81.
- Chow, L et al. *Metabolism Clinical and Experimental* (2010) 59: 70-85.
- Govorko, D. et al. *J. Biol. Chem.*, December 17, 2010; 285 (51): 39691-39701.
- Wang, ZQ, et al. *J. Nutritional Biochemistry* (2011) 22: 71-78.
- Tin AS, et al. *Anticancer Drugs*. 2011 Dec 17.
- Watcho P, et al. *Mediators of Inflammation*. Volume 2010, Article ID 268547.



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