

Critique on Multi-Dimensional Health Benefits of Tulsi

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ABSTRACT

Tulsi is an aromatic shrub in the basil family Lamiaceae, that is thought to have originated in north central India and now grows native throughout the eastern world tropics. Daily consumption of *Tulsi* is said to prevent disease, promote general health, wellbeing and longevity and assist in dealing with the stresses of daily life. *Tulsi* is also credited with giving luster to the complexion, sweetness to the voice and fostering beauty, intelligence, stamina and a calm emotional disposition. *Tulsi* also helps to prevent cancers caused by toxic compounds by reducing DNA damage and inducing apoptosis in precancerous and cancerous cells, thereby reducing the growth of experimental tumors and enhancing survival. In addition to protecting against toxic chemicals, *Tulsi* has also been shown to protect against the toxic effects of heavy metals such as lead, arsenic, cadmium, chromium and mercury and the toxic effects of radiation. The psychotherapeutic properties of *Tulsi* have been explored in various animal experiments that reveal that *Tulsi* has anti-anxiety and anti-depressant properties, with effects comparable to diazepam and antidepressants drugs.

KEYWORDS: *Tulsi*, Detoxification, Stress Control, Health, Benefits

INTRODUCTION

Tulasi (*Ocimum sanctum* Linn.) of Lamiaceae known as Holy Basil. It is commonly available and cultivated across the India and it is having many therapeutic usages and *Arka* is an important dosage form because it has good patient compliance, long shelf life and increased potency. *Tulasi Arka* is one such *Arka* used for *Shwasa* (Asthma), *Kasa* (Cough) and *Hikka* (Hicough).

Tulsi is an aromatic shrub in the basil family Lamiaceae (tribe ocimeae) that is thought to have originated in north central India and now grows native throughout the eastern world tropics. Within *Ayurveda*, *Tulsi* is known as “The Incomparable One,” “Mother Medicine of Nature” and “The Queen of Herbs,” and is revered as an “elixir of life” that is without equal for both its medicinal and spiritual properties. Within India, *Tulsi* has been adopted into spiritual rituals and lifestyle practices that provide a vast array of health benefits that are just beginning to be confirmed by modern science. This emerging science on *Tulsi*, which reinforces ancient *Ayurvedic* wisdom, suggests that *Tulsi* is a tonic for the body, mind and spirit that offers solutions to many modern day health problems.

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Tulsi is perhaps one of the best examples of *Ayurveda*'s holistic lifestyle approach to health. *Tulsi* tastes hot and bitter and is said to penetrate the deep tissues, dry tissue secretions and normalize *Kapha* and *Vata*. Daily consumption of *Tulsi* is said to prevent disease, promote general health, wellbeing and longevity and assist in dealing with the stresses of daily life. *Tulsi* is also credited with giving luster to the complexion, sweetness to the voice and fostering beauty, intelligence, stamina and a calm emotional disposition. In addition to these health-promoting properties, *Tulsi* is recommended as a treatment for a range of conditions including anxiety, cough, asthma, diarrhea, fever, dysentery, arthritis, eye diseases, otalgia, indigestion, hiccups, vomiting, gastric, cardiac and genitourinary disorders, back pain, skin diseases, ringworm, insect, snake and scorpion bites and malaria.

Considered as a potent adaptogen, *Tulsi* has a unique combination of pharmacological actions that promote wellbeing and resilience. While the concept of an “adaptogen,” or herb that helps with the adaptation to stress and the promotion of homeostasis, is not widely used in Western medicine, Western science has

revealed that *Tulsi* does indeed possess many pharmacological actions that fulfill this purpose.

The medicinal properties of *Tulsi* have been studied in hundreds of scientific studies including *in vitro*, animal and human experiments. These studies reveal that *Tulsi* has a unique combination of actions that include: Antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmintic), mosquito repellent, anti-diarrheal, anti-oxidant, anti-cataract, anti-inflammatory, chemopreventive, radioprotective, hepato-protective, neuro-protective, cardio-protective, anti-diabetic, anti-hypercholesterolemia, anti-hypertensive, anti-carcinogenic, analgesic, anti-pyretic, anti-allergic, immunomodulatory, central nervous system depressant, memory enhancement, anti-asthmatic, anti-tussive, diaphoretic, anti-thyroid, anti-fertility, anti-ulcer, anti-emetic, anti-spasmodic, anti-arthritis, adaptogenic, anti-stress, anti-cataract, anti-leukodermal and anti-coagulant activities. These pharmacological actions help the body and mind cope with a wide range of chemical, physical, infectious and emotional stresses and restore physiological and psychological function.

Regular consumption of *Tulsi* tea may be compared with the regular practice of yoga, which can be considered “adaptogenic” through nurturing and nourishing the body -- mind -- spirit while fostering a sense of relaxation and wellbeing. In contrast, regular consumption of caffeinated beverages such as black and green tea (*Camellia sinensis* L.) and coffee (*Coffea arabica* L.) may be compared with more aerobic exercise, which confers health benefits through stimulation and activation. Like yoga, *Tulsi* has a calming effect that leads to clarity of thought, along with a more relaxed and calm disposition. The cognitive and memory-enhancing properties of *Tulsi* therefore differ from those of caffeine-containing beverages such as coffee and tea, which heightens arousal and may cause physical and mental agitation. Furthermore, *Tulsi* does not produce the same physical dependence as caffeine and can be safely consumed on a regular basis without the fear of withdrawal effects. The drinking of tea and coffee has become an integral part of modern life and has been ritualized in many cultures to guide social interactions, set social agendas and invoke spiritual awareness. For example, sophisticated Asian tea ceremonies involve a whole set of rituals, tools and gestures that serve to transcend normal consciousness, while in the west the ritual of “afternoon tea” or “high tea” emphasizes the surroundings, equipment, manners and social circle. In less-formal situations, many people ritualize their

morning cup of coffee and use the “meet-up for coffee” to arrange their social agendas, while the “tea break” is often built into the modern-day work routine. Yet, while tea and coffee have infiltrated their way into modern living, they have not yet attained the status that *Tulsi* has within traditional Indian life.^[1]

In Hinduism, *Tulsi* is worshipped as a goddess and every part of the *Tulsi* plant is revered and considered sacred, including the leaves, stem, flower, root, seeds and oil. Even the surrounding soil, which has recently been found to harbor beneficial endophytic fungi, is considered an aspect of the divine. As such, Hindi households are considered incomplete without a *Tulsi* plant, typically in an ornate earthen pot situated in a courtyard where *Tulsi* serves both practical and ceremonial purposes. For example, *Tulsi*'s distinct clove-like aroma arising from its high eugenol content serves to link the householder to the divine while also repelling mosquitoes, flies and other harmful insects. *Tulsi* is further integrated into daily life through evening and morning rituals and other spiritual and purification practices that can involve ingesting its leaves or consuming *Tulsi* tea. In addition to sanctifying the home, *Tulsi* is used ceremonially in Hinduism and some Greek Orthodox Churches to create “holy water.” *Tulsi* wood or seeds are also used to make *Tulsi* malas, which are strings of beads used to help the mind focus during meditation, chanting and devotional practices and therefore ceremonially connect mind, body and spirit. *Tulsi* has also been used in cities to combat air pollution and hundreds of thousands of *Tulsi* plants have been planted around the Taj Mahal in Agra to help protect the iconic marble building from environmental pollution damage.^[2]

The cultivation and reverence for the *Tulsi* plant in the home not only serves specific religious purposes it also directly connects the devotee with the creative power of nature. Connection with nature is profoundly healing and life-affirming; yet, the potential health, emotional, social and cognitive benefits of connection with nature are only just being realized in the west where disconnection from nature and “nature deficit” are common. A review of the scientific literature on the health benefits of connection to nature suggest that “access to nature plays a vital role in human health, wellbeing and development that has not been fully recognized,” and there is now a global movement to reconnect people with nature that has arisen out of concerns over nature deficit, sedentary lifestyles, obesity, mental health issues, excessive use of electronic media, environmental degradation, wildlife conservation,

sustainability and climate change. The placing of a living *Tulsi* plant at the center of the household, therefore, has applicability beyond the realms of Hinduism and may play a useful role in addressing modern day issues through embodying the healing power of the natural world and serving as a constant connection to living nature.^[3]

DISCUSSION

Protection and detoxification

Many of the physiological benefits of *Tulsi* can be attributed to its ability to assist with the body's internal housekeeping and protection of the body from toxin-induced damage. These functions are often attributed to *Tulsi's* high content of phenolic compounds and anti-oxidant properties, with Krishna *Tulsi* (black/purple variety) having a higher phenolic content and anti-oxidant capacity than white *Vana* (wild) *Tulsi*. Laboratory studies have shown that *Tulsi* protects against toxic chemical-induced injury by increasing the body's levels of anti-oxidant molecules such as glutathione and enhancing the activity of anti-oxidant enzymes such as superoxide dismutase and catalase, which protect cellular organelles and membranes by mopping up damaging free radicals caused by lack of oxygen and other toxic agents.^[4]

Tulsi also helps to prevent cancers caused by toxic compounds by reducing DNA damage and inducing apoptosis in precancerous and cancerous cells, thereby reducing the growth of experimental tumors and enhancing survival. Furthermore, *Tulsi* not only protects against the damage caused by toxic compounds, but also enables the body to more effectively transform and eliminate them by enhancing the activity of liver detoxification enzymes such as the cytochrome P450 enzymes, which deactivates toxic chemicals and enables them to be safely excreted.^[5]

While these actions are vitally important for protecting against natural toxins produced within the body or by animals or plants, they are perhaps even more important in the modern age to protect against the vast range of pollutants, pesticides, pharmaceuticals, heavy metals, radiation and other industrial toxicants created from human activity.^[6]

Toxicant stress: Chemicals, heavy metals and radiation

The ability of *Tulsi* to protect against the damaging effects of various toxicants has been documented in numerous experimental studies. These studies attest to the ability of *Tulsi* to prevent liver, kidney and brain injury by protecting against the genetic, immune and cellular damage caused by pesticides, pharmaceuticals and industrial chemicals. Thus, *Tulsi* has been shown to protect against the toxic effects of

industrial chemicals such as butylparaben, carbon tetrachloride, copper sulfate and ethanol, and common pesticides such as rogor, chlorpyrifos, endosulfan and lindane. *Tulsi* has also been shown to protect against the toxic effects of many pharmaceuticals drugs including acetaminophen, meloxicam, paracetamol, haloperidol.^[7]

In addition to protecting against toxic chemicals, *Tulsi* has also been shown to protect against the toxic effects of heavy metals such as lead, arsenic, cadmium, chromium and mercury and the toxic effects of radiation. *Tulsi* exerts its radio-protective effects by scavenging free radicals and reducing the oxidative cellular and chromosomal damage induced by radiation, thereby reducing organ damage and enhancing post-radiation survival in experimental animals.^[8]

Physical stress

The actions that protect against the toxic effects of chemicals and radiation also help to address the toxic effects of many physical stressors. Prolonged physical exertion, physical restraint, exposure to cold and excessive noise disturb homeostasis by inducing physiological and metabolic stress. When the capacity to adapt to these stressors is exceeded, maladaptation occurs resulting in damage to biochemical pathways, organ function and health. Through enhancing various cellular and physiological adaptive functions, adaptogenic herbs such as *Tulsi* are able to protect against this damage.^[9]

Studies using forced-swimming, restraint and cold-exposure stress in laboratory animals have shown that *Tulsi* enhances aerobic metabolism, improves swimming time, reduces oxidative tissue damage and normalizes many physiological and biochemical parameters caused by physical stressors. Similarly, experimental studies have shown that *Tulsi* helps reduce the effects of acute and chronic noise-induced stress in experimental animals, with enhancement of neurotransmitter and oxidative stress levels in discrete brain regions along with improved immune, ECG and corticosteroid responses.^[10]

Metabolic stress

Metabolic stress due to poor diet, low physical activity and psychological stress is a prominent feature of modern lifestyles and “metabolic syndrome” is estimated to affect as much as one-third of modern populations. Metabolic syndrome, also known as “prediabetes” or “Syndrome X,” includes the “deadly quartet” of centripetal obesity, hypertension, high cholesterol and poor glucose regulation and is associated with chronic inflammation and a greater risk of diabetes, heart disease and stroke. While the exact causes of

metabolic syndrome are still being debated, there is evidence to suggest that *Tulsi* can assist in dealing with many features of metabolic syndrome and their consequences.^[11]

Numerous test tube and animal experiments as well as human clinical trials have shown that *Tulsi* has anti-diabetic activity. Studies using diabetic laboratory animals have shown that *Tulsi* can reduce blood glucose, correct abnormal lipid profiles and protect the liver and kidneys from the metabolic damage caused by high glucose levels. *Tulsi* has also been shown to improve lipid profiles, prevent weight gain, hyperglycemia, hyperinsulinemia, hypertriglyceridemia and insulin resistance, and protect the organs and blood vessels from atherosclerosis in laboratory animals fed high-fat diets. Similarly, in human clinical trials, *Tulsi* has shown to decrease glucose levels, improve blood pressure and lipid profiles and reduce many diabetic symptoms in patients with type 2 diabetes.^[12]

The beneficial metabolic effects of *Tulsi* are multiple and include protecting the liver, kidneys and pancreatic islet cells from free radical damage; enhancing liver bile acid synthesis and reducing liver lipid synthesis; enhancing insulin secretion and action; lowering cortisol levels; and reducing inflammation. The anti-inflammatory action of *Tulsi*, which has been observed in both acute and chronic inflammatory models in animals, is attributed to *Tulsi*'s eugenol and linoleic acid content and the inhibition of both the cyclooxygenase and the lipoxygenase pathways of arachidonic acid metabolism. This enables *Tulsi* to exert anti-inflammatory effects comparable to nonsteroidal anti-inflammatory drugs such as phenylbutazone, ibuprofen, naproxen, aspirin and indomethacin.^[13]

Infection protection

Modern research has revealed that *Tulsi* has anti-bacterial, anti-viral and anti-fungal activity that includes activity against many pathogens responsible for human infections. *Tulsi* has also been shown to boost defenses against infective threats by enhancing immune responses in nonstressed and stressed animals and healthy humans. While no human trials have been published, there is experimental evidence that *Tulsi* may help in the treatment of various human bacterial infections including urinary tract infections, skin and wound infections, typhoid fever, cholera, tuberculosis, gonorrhoea, acne, herpes simplex, leishmaniasis, various pneumonias and fungal infections, as well as mosquito-borne diseases such as dengue, malaria and filariasis.^[14]

Tulsi has also been shown to be active against many animal pathogens, and this has led to *Tulsi* being used

in animal rearing to reduce infections in cows, poultry, goats, fish and silkworms. *Tulsi*'s activity against water-borne and food-borne pathogens further suggests that it can be used in the preservation of food stuffs and herbal raw materials as well as for water purification and as a hand sanitizer. *Tulsi*'s broad-spectrum activity, which includes activity against *Streptococcus mutans*, the organism responsible for tooth decay, further suggests that it can be used as a herbal mouth wash for treating bad breath, gum disease and mouth ulcers. This has been confirmed in clinical trials that have demonstrated that rinsing with *Tulsi* is as effective as 0.2% Chlorhexidine and Listerine in reducing the levels of *Streptococcus mutans* and that a herbal mouthwash that includes *Tulsi* is preferred for its taste and convenience.

Tulsi's unique combination of antibacterial, antioxidant, anti-inflammatory and analgesic activities also makes it useful in wound healing. This is supported by experimental evidence that has shown that *Tulsi* can increase wound-breaking strength and accelerate wound healing in laboratory animals. *Tulsi* has also been shown to have anti-ulcer and ulcer-healing activity that has been observed in many different animal models including aspirin-, indomethacin-, alcohol-, histamine-, reserpine-, serotonin-, acetic acid-, meloxicam-, cold restraint-, pyloric ligation- and stress-induced ulceration models. This anti-ulcer activity is attributed to multiple actions including the reduction of offensive factors such as acid-pepsin secretion and lipid peroxidation and the enhancement of gastric defensive factors such as mucin secretion, cellular mucus and longevity of mucosal cells.^[15]

Mental stress

In addition to physical, toxic and infective stress, modern living is associated with heightened levels of psychological stress caused by the many demands and fast pace of modern life. This stress compounds the toxic effects of chemical pollutants and the constant fear of pervasive toxic chemicals can itself lead to even further stress and anxiety that may be just as toxic as the chemicals causing it. While the reality of daily chemical exposure cannot be denied, regular consumption of *Tulsi* not only helps protect and detoxify the body's cells and organs, it can also help reduce toxic stress by relaxing and calming the mind and offering many psychological benefits including anti-depressant activity and positive effects on memory and cognitive function.^[16]

The psychotherapeutic properties of *Tulsi* have been explored in various animal experiments that reveal that *Tulsi* has anti-anxiety and anti-depressant properties, with effects comparable to diazepam and

antidepressants drugs. Animal studies further reveal that *Tulsi* enhances memory and cognitive function and protects against aging-induced memory deficits. Similarly, in human studies, *Tulsi* has been observed to reduce stress, anxiety and depression, with a 6-week, randomized, double-blind, placebo-controlled study reporting that *Tulsi* significantly improves general stress scores, sexual and sleep problems and symptoms such as forgetfulness and exhaustion.

While modern scientific studies suggest that *Tulsi* is effective in treating a range of stressful conditions, within Ayurveda, *Tulsi* is more commonly recommended as a preventive measure to enhance the ability to adapt to both psychological and physical stress and therefore prevent the development of stress-related diseases. To this end, many Ayurvedic practitioners recommend the regular consumption of *Tulsi* tea as an essential lifestyle practice.^[17]

CONCLUSION

Tulasi (Ocimum sanctum Linn.) of Lamiaceae known as Holy Basil. It is commonly available and cultivated across the India and it is having many therapeutic usages. The medicinal properties of *Tulsi* have been studied in hundreds of scientific studies including *in vitro*, animal and human experiments. These studies reveal that *Tulsi* has a unique combination of actions that include: Antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmintic), mosquito repellent, anti-diarrheal, anti-oxidant, anti-cataract, anti-inflammatory, chemopreventive, radioprotective, hepato-protective, neuro-protective, cardio-protective, anti-diabetic, anti-hypercholesterolemia, anti-hypertensive, anti-carcinogenic, analgesic, anti-pyretic, anti-allergic, immunomodulatory. The psychotherapeutic properties of *Tulsi* have been explored in various animal experiments that reveal that *Tulsi* has anti-anxiety and anti-depressant properties, with effects comparable to diazepam and antidepressants drugs. Animal studies further reveal that *Tulsi* enhances memory and cognitive function and protects against aging-induced memory deficits.

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