

Supercritical Antioxidants

Supercritical Antioxidants® is an herbal formulation designed to reduce toxicity and protect against environmental mutagens in the population. Its primary ingredient is a dual extract of turmeric (*Curcuma longa*), a safe and popular culinary herb with proven anticarcinogenic and antimutagenic properties (Wood 1982, Nagabhusana 1987, Soni 1987, Huang 1988, Ruby 1996). Conventional turmeric extracts are typically prepared by isolating through solvent extraction one or more "standardized" constituents, specifically one or more curcuminoids. Alternatively, the turmeric extract used in Supercritical Antioxidants is a full spectrum extract of the herb in which turmeric is first extracted using compressed CO₂ gas under supercritical conditions. After extraction of the fat-soluble constituents, turmeric residue is subjected to a second state "post-supercritical" hydroethanolic extraction to extract the water-soluble fractions. This dual extraction process yields a broad spectrum extract that is highly concentrated, chemical-solvent free, undamaged by heat or chemical stress, and rich with all the healing and protective turmeric oils, resins, and curcuminoids. The turmeric extract in Supercritical Antioxidants is then joined together with other antioxidant herbs that have demonstrated profound synergy with turmeric, multiplying the power and activity of this important herb several fold. Most prominent among these synergistic herbs is green tea (*Camellia sinensis*), extracts of which have previously demonstrated the ability to inhibit mutagenicity (Wang, 1989), carcinogenicity (Komari, 1993) and metastasis (Yang, 1998).

Supercritical Antioxidants in Scientific Research

Kuttan et al (2004) conducted a human clinical trial in which Supercritical Antioxidants was administered to 45 male smokers and 10 male non-smokers for a period of one month. Age of the subjects was between 30-40 years old and all of them had been smoking for a minimum period of 10 years. Urinary mutagenicity was monitored as a way of measuring the antimutagenic potential of the herbal formula. Of the 5 subjects with increased urinary mutagenicity at the threshold of the study, it was found that mutagenicity in these subjects was significantly lowered after consumption of Supercritical Antioxidants. After one month, increased mutagenicity in cigarette smokers was reduced to normal by Supercritical Antioxidants. Sreekanth et al (2003) found that administration of Supercritical Antioxidants to smokers increased the antioxidants superoxide dismutase and glutathione in blood and decreased glutathione peroxidase. These results indicate that Supercritical Antioxidants has potent antioxidant activity and could increase detoxifying enzymes, which makes it an effective chemoprotective herbal formulation.

In animal studies, Kuttan et al. found that Supercritical Antioxidants significantly inhibited the urinary mutagenicity induced in rats by benzo[*a*]pyrene as well as by tobacco extract. Sreekanth et al (2003) found that administration of Supercritical Antioxidants to mice resulted in elevation of antioxidant enzymes such as catalase and superoxide dismutase in blood as well as in liver and kidney. Glutathione-S-transferase activity was found to be significantly elevated in liver and kidney of animals treated with Supercritical Antioxidants. Glutathione levels were also significantly elevated in blood. Glutathione reductase was significantly elevated in kidney. Administration of Supercritical Antioxidants decreased the lipid peroxidation in serum, liver and kidney, as well as reduced the levels of conjugated dienes and hydroperoxides. Swarnam et al (2005) found that Supercritical Antioxidants administration decreased the increased lipid peroxidation and conjugated dienes in the lung tissue and serum of cigarette smoke exposed rats. Moreover, administration of Supercritical Antioxidants was found to increase the activity of catalase in erythrocytes and lung tissue of rats, which was decreased upon smoke exposure.

Glutathione peroxidase, which was increased by smoke exposure, was decreased by Supercritical Antioxidants and concomitantly there were increased levels of glutathione in the cells.

In vitro studies(Swarnam, 2005) further indicated that addition of Supercritical Antioxidants could reduce the mutagenicity produced by tobacco smoke condensate, mosquito coil smoke condensate as well as by aqueous tobacco extract. Kuttan et al(2004) found that Supercritical Antioxidants significantly inhibited, in a dose-dependent manner, the mutagenicity induced by numerous direct-acting mutagens, including tobacco extract, sodium azide and 4 nitro-o-phenylenediamine(NPD).

ORAC

Oxygen Radical Absorbance Capacity(ORAC) analysis provides a measure of scavenging capacity of antioxidants against the peroxy radical, one of the most common reactive oxygen species in the body. The ORAC analysis for Supercritical Antioxidants revealed a total value of 2,423 ORAC units per serving, with a 1,440 ORAC *hydro* value(reflecting water soluble antioxidant capacity) and a 983 ORAC *lipo* value (reflecting fat soluble antioxidant capacity).

Dosage

Indication	Dosage
For Dramatic Antioxidant Protection	Take 2 capsules of Supercritical Antioxidants daily with meals.

Interactions & Safety Information

There are no known side effects or drug interactions associated with Supercritical Antioxidants. However, it is important to ask one's doctor or another qualified professional about possible interactions with specific medications or medical conditions before taking any supplements. If a woman is breastfeeding, pregnant or considering pregnancy, they should consult their healthcare practitioner prior to using Supercritical Antioxidants.

Haematological, hepatic and renal function tests were done in the blood of human volunteers before and after Supercritical Antioxidants administration for one month. It was determined that administration of Supercritical Antioxidants did not produce any significant change in haematological parameters such as white blood cell, granulocyte, red blood cell, platelet and haemoglobin levels. Supercritical Antioxidants administration for one month also did not produce any significant change in liver function and renal function as compared with placebo, nor did it produce any weight change . As a whole, Supercritical Antioxidants administration did not produce any apparent toxicity or adverse reactions to human volunteers or animal subjects.

Quality Assurance

Test	Test Method	Specification
Total Plate Count (Aerobic)	CFSAN/BAM	<10,000 CFU
Yeast and Mold	CFSAN/BAM	<100 CFU
Choliforms	CFSAN/BAM	<10 CFU
E. Coli	CFSAN/BAM	Negative/10g
Salmonella	CFSAN/BAM	Negative/10g
Lead	ICP-MS	<10 ppm
Arsenic	ICP-MS	<10 ppm
Mercury	ICP-MS	<.025 ppm
Cadmium	ICP-MS	<10 ppm

References

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naturally occurring plant phenols; exceptional activity of ellagic acid. Proceedings of the National Academy of Sciences of the United States of America. 79:5513-5517, 1982.

Yang G.Y., Liao J., Kim K., Yurkow E.J., and Yang C.S.: Inhibition of growth and induction of apoptosis in human cancer cell lines by tea polyphenols. Carcinogenesis 19:611-616, 1998.

Links to the PubMed studies

(note: the studies refer to "Smokeshield" which is the old name for SC Antioxidants)

<http://www.ncbi.nlm.nih.gov/pubmed/15149152>

<http://www.ncbi.nlm.nih.gov/pubmed/12841947>