

The Longwood Herbal Task Force
(<http://www.mcp.edu/herbal/default.htm>) and
The Center for Holistic Pediatric Education and Research
(<http://www.childrenshospital.org/holistic/>)

Clinician Information Summary

EPHEDRA

(*Ephedra sinica*)

SUMMARY

The major modern and historical uses for ephedra (also known as *Ma Huang*) are as a decongestant, bronchodilator, nervous and cardiovascular system stimulant and weight loss remedy. Although there is long historical tradition to support the use of ephedra as a mild bronchodilator, more specific pharmacologic therapies have replaced it in mainstream medicine. It is effective as a decongestant. It causes CNS and cardiovascular stimulation, accounting for many of its side effects. Data are mixed concerning its effectiveness as a weight loss agent, and there are substantial concerns about toxicity with both acute and chronic use. Ephedra can cause severe systemic reactions including tachyarrhythmias, hypertension, psychosis, collapse and even death when taken in high doses. Typical doses used to treat allergic symptoms and asthma may lead to mild tachycardia, hypertension, insomnia, jitteriness and decreased appetite. The FDA has recommended a maximum of 24 mg of ephedrine daily for up to 7 days. Ephedra is not recommended for use during pregnancy, lactation or childhood.

POPULAR USES: decongestant, bronchodilator, CNS and cardiac stimulant, weight loss agent

CHEMICAL CONSTITUENTS: Ephedrine, pseudoephedrine (isoephedrine), norpseudoephedrine (cathine), noephedrine, methylephedrine, methylpseudoephedrine

SCIENTIFIC DATA

In vitro: Ephedrine stimulates thermogenesis in adipocytes

In animals: In mice, rats and monkeys, ephedrine leads to significant weight loss, primarily by enhancing thermogenesis; this effect can be enhanced by combining ephedrine with aspirin

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and/or methylxanthines, even in animals genetically predisposed to extreme obesity. Ephedra has anti-inflammatory activity in the mouse paw model of carageenan-induced inflammation.

In humans: Ephedra causes significant tachycardia and modest hypertension. Although it is an effective short-acting bronchodilator and decongestant, it has been replaced by more specific medications with fewer side effects. Case reports and several randomized trials suggest that ephedra (alone or in combination with caffeine) may be a useful addition to a comprehensive weight loss program. However, most studies have had small sample sizes, significant side effects in the first month of treatment, high drop out rates, and only marginal improvements in weight loss; typical doses in studies showing effectiveness (50-100 mg of ephedrine three times daily) are substantially higher than the total daily dose of ephedra recommended by the FDA (24 mg daily).

TOXICITY AND SIDE EFFECTS

Side effects: Ephedrine can lead to anxiety, dizziness, jitteriness, insomnia, chest tightness, decreased appetite, hypertension, tachycardia, arrhythmias, stroke, urinary retention, vomiting, psychosis, and even death; it has been used to commit suicide. Case reports have cited other side effects including myalgia, cardiomyopathies, rhabdomyolysis, nephrolithiasis, acute hepatitis, eosinophilia-myalgia syndrome, Parkinsonism, and acute myocarditis. Chronic use can lead to weight loss, cardiac hypertrophy and focal myocardial necrosis, and insomnia and other amphetamine-like side effects, including hypertension, dry mouth, arrhythmias, palpitations, anxiety and nervousness.

Interactions with other medications: Ephedra should be used with great caution by patients taking MAO-inhibiting antidepressants, CNS stimulants, cardiovascular stimulants or decongestants because of the risk of severe hypertension. Combining ephedra with methylxanthines such as caffeine may increase the risk of adverse effects. Ephedrine may increase steroid clearance, reducing the effectiveness of dexamethasone; it could also interfere with anti-diabetic drugs by increasing blood sugar levels. Ephedra could theoretically increase the risk of cardiac arrhythmias in patients taking digoxin or other

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cardiac glycosides or halothane; it could enhance the hypertensive effects of ergotamine.

Contraindications: Patients with hypertension, angina and other heart problems, cerebral insufficiency, diabetes, depression, glaucoma, thyroid disease, anxiety disorders, insomnia, anorexia/bulimia, tremor, kidney stones, urinary retention, or benign prostatic hypertrophy should use extreme caution when considering the use of ephedra.

Pregnancy: Ephedrine can cross the placenta and cause adverse effects in the fetus.

Lactation: Ephedrine can cross into breast milk and cause adverse effects in infants.

Pediatric use: Contraindicated in children.

ADDITIONAL RESOURCES

- HOME: <http://www.mcp.edu/herbal/default.htm>
- Ephedra Complete Monograph: <http://www.mcp.edu/herbal/ephedra/ephedra.pdf>
- Ephedra Patient Fact Sheet: <http://www.mcp.edu/herbal/ephedra/ephedra.ph.pdf>