**FOREWORD**

**Dr Chris Etheridge and Dr Carrie Ruxton, TAP**

**IT’S ALWAYS TIME FOR TEA**

Around 40% of the nation’s hydration comes in a cup of tea and this great British beverage is an important source of health-enhancing minerals, polyphenols and flavanols.

It’s even rich in tooth-strengthening fluoride and a recent review estimated that tea provides around 70% of the UK’s dietary fluoride.

X-Factor judge and comic David Walliams says: “In Britain, a cup of tea is the answer to every problem.” While Doctor Who screenwriter Russell T. Davis reckons: “Tea! That's all I needed! Good cup of tea! Super-heated infusion of free-radicals and tannin, just the thing for healing the synapses.”

Indeed, tea and herbal infusions deliver a host of healing and health-enhancing properties.

Black tea, the one we drink the most often, is brimful of flavonoids and provides around 80% of our overall intake.[[1]](#footnote-2) One study concluded that three cups of tea a day has approximately the same antioxidant flavonoid power as eating six apples.[[2]](#footnote-3)

Another study found that one or two cups of tea has the same “radical scavenging capacity” as five portions of fruit and vegetables and many of the flavonoids found in tea are several times more potent than Vitamin C or E.[[3]](#footnote-4),[[4]](#footnote-5)

Dr Chris Etheridge, a leading medical herbalist, researcher says: “Tea is such an integral part of British life it is easy to overlook the extraordinary health benefits it brings to the table. Tea is brimful of antioxidant flavonoids and is a powerful weapon against oxidative stress, which is a factor, many serious health problems.”

William Gladstone, Britain’s longest serving prime minister, was convinced that tea was a cure for all ills, and wrote: “If you are cold, tea will warm you; if you are too heated, it will cool you; If you are depressed, it will cheer you; If you are excited, it will calm you.”

And there is now convincing evidence that tea and herbal infusions are tea-rrific as an all-round tonic or a solution to sip for a specific ailment such as nausea, stress or aches and discomfort.

Chris says: “The plant compounds in tea and other herbal infusions have a wide range of proven properties. Many are potent anti-oxidants, some including rosehip, lemon balm, red bush and yerba mate have cholesterol-lowering or vasodilation activity which help protect against heart disease while others, such as ginger and mint are great for nausea and tummy upsets.”

The Tea Advisory Panel has produced a summary dossier of data and studies of some of the nation’s most popular herbal infusions. Read on to find out more

**Red bush tea**

***Latin name****: Aspalathus linearis*(N.L.Burm.) R.Dahlgr.

**Family:** Fabaceae (pea family).

**Common names:** Rooibos, rooibosch, red bush, bush tea, red tea.

**Part used:** Leaf.

**Key constituents**: polyphenols; dihydrochalcones; flavonoids (including Aspalathin, quercetin, dihydro-orientin and dihydro-iso-orientin); the processed leaves and stems contain benzoic and cinnamic acids, and nothofagin.

**Background:**

Rooibos is a shrub with needle-like leaves that is a member of the legume, or pea, family and native to the mountain slopes of western Cape Province, South Africa.[[5]](#footnote-6) The leaves are oxidized, a process often referred to as [fermentation](http://en.wikipedia.org/wiki/Fermentation_%28tea%29), and used to make a [tisane](http://en.wikipedia.org/wiki/Tisane) called Rooibos or red bush tea.

Red bush tea is caffeine free, low in tannin, high in vitamin C and bursting with antioxidants and other helpful plant compounds. It has been popular in southern Africa for generations and is now enjoyed around the world. Rooibos is brewed in the same manner as [black tea](http://en.wikipedia.org/wiki/Black_tea) and can be drunk with milk and sugar to taste, or with a slice of lemon and sweetened with honey.

**Health properties:**

Traditionally it has been used to relieve infant [colic](http://en.wikipedia.org/wiki/Colic), allergies, [asthma](http://en.wikipedia.org/wiki/Asthma) and dermatological problems[[6]](#footnote-7) and laboratory studies have shown it has potent [antioxidant](http://en.wikipedia.org/wiki/Antioxidant), immune-modulating and anti-cancer effects.[[7]](#footnote-8),[[8]](#footnote-9),[[9]](#footnote-10)

In 2011, researchers who measured the impact of rooibos on a number of biological makers associated with cardiovascular and other degenerative diseases concluded it lowered risk. The study confirmed that a high intake of rooibos tea resulted in significant reductions in lipid peroxidation, LDL cholesterol, triglycerides, and an increase in heart-healthy HDL cholesterol levels compared with the control group.[[10]](#footnote-11)

Emerging data suggests it may help nervous tension, allergies and digestive problems.[[11]](#footnote-12) Rooibos tea has also been shown to inhibit [in vitro](http://en.wikipedia.org/wiki/In_vitro) activity of [xanthine oxidase](http://en.wikipedia.org/wiki/Xanthine_oxidase), an enzyme which could limit uric acid production and aid in treatment of [gout](http://en.wikipedia.org/wiki/Gout).[[12]](#footnote-13)

**Contraindications:** None known.

***Use in pregnancy*: Category A:** compatible with pregnancy.

***Use in lactation*: Category C:** compatible with breast-feeding.

**Warnings and precautions:** None required.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Rooibos tea is possibly linked with one isolated case of hepatotoxicity (low relevance).1 Women diagnosed with low-grade B-cell malignancy six years prior to the event on rituximab and prednisone noted highly elevated liver enzymes with no apparent clinical toxicity symptoms, and this was associated with consumption of Rooibos tea at around one litre per day (teaspoon of leaves per serving, assumed 150mL). While cessation of tea normalised liver enzymes, the product was not named, contamination was not ruled out, and a reintroduction challenge was not carried out.

**Interactions:** Rooibos tea contains antioxidants and could theoretically interfere with the action of certain chemotherapeutic agents, if consumed in large amounts (low relevance). Isolates may have a weak oestrogenic activity, so caution should be used with hormone-sensitive cancers (low relevance).[[13]](#footnote-14)

**Safety in children:** No information available, but no adverse effects expected.

**Overdose:** No incidents found in published literature.

**Toxicology:** Extract negative for mutagenic activity.[[14]](#footnote-15)

**Fennel seed tea**

***Latin name****: Foeniculum vulgare* Mill.

**Family:** Apiaceae (celery family).

**Common names:** Fennel fruit (seed), bitter fennel, sweet fennel.

**Part used:** Fruit (seed).

**Key constituents**: Essential oil containing mainly anethole and fenchole (<7.5% combined), estragole (<5%) α-pinene, limonene, camphene, *p*-cymene, β-pinene, β -myrcene, α-phellandrene, sabinene, γ-terpinene and terpinolene.

**Background:**

Fennel is a sweet-smelling perennial herb with yellow flowers which is native to the Mediterranean but is now found all around the world.

**Health properties**

Traditionally, fennel has been used to ease digestive problems including heartburn, gas, bloating, loss of appetite and colic in infants.[[15]](#footnote-16) A 2003 study 0f 125 children aged 2 to 12 weeks found that fennel seed reduced colic in 65% of the babies, compared to 23.7% who were given a placebo.[[16]](#footnote-17)

Its major constituent anethole, has been shown to inhibit spasms in smooth muscle.[[17]](#footnote-18) Fennel is also thought to increase production of bile, which is important for digestion, and urine production.[[18]](#footnote-19)

Laboratory studies have shown that fennel seed oil reduces the frequency and severity of uterine contractions[[19]](#footnote-20) and a 2012 trial reported, “Fennel is an effective herbal drug for menstrual pain.”[[20]](#footnote-21)

Fennel seeds are also used a breath-freshener and contain high levels of nitrates, which a 2012 study found supported the growth of new blood vessels and reduced tension in the vessel walls, which reduces the risk of cardiovascular disease.[[21]](#footnote-22)

**Contraindications:** Known sensitivity to Apiaceae family. It is advisable not to use during pregnancy without professional advice.

***Use in pregnancy*:** Category B3: No increase in frequency of malformation or other harmful effects on foetus from limited use in women. There is some evidence of increased foetal damage in some animal studies, but the relevance to humans is unknown. Oestrogenic effects have been shown to reduce fertility in female and male mouse models – no comparable human studies have been published.

***Use in lactation*:** Category C: compatible with breastfeeding – the seed has traditionally been used to enhance lactation.

**Warnings and precautions:** None required.

**Effect on ability to drive or operate machinery:** No adverse reactions expected.

**Adverse reactions:** Rare, immediate hypersensitivity reactions to ingested fennel have been reported.[[22]](#footnote-23) Cross-sensitivity to fennel and other members of the Apiaceae family have been found.[[23]](#footnote-24) One study showed that fennel sensitivity was present in one case out of 200 children with food allergies, who were tested for multiple allergies.[[24]](#footnote-25) Hypersensitivity to fennel appears to also be related to peach allergies. One study noted that out of 148 persons with peach allergies, fennel allergy was present in 39% of persons, which appears to be related to a 9kDa lipid-transfer protein present in fennel having high cross-reactivity with known peach allergins.[[25]](#footnote-26)

**Interactions:** Oral dosing of an aqueous fennel extract reduced the bioavailability for ciprofloxacin in rat studies. This was shown not to be due to the phytochemical components of the fennel, but rather due to a large number of mineral cations in the extract (probably from the water used to make up the samples).[[26]](#footnote-27)

**Safety in children:** Except from rare allergic responses, no adverse effects are expected.

**Overdose:** No incidents found in the published literature.

**Toxicology:** LD50 value is 1326 mg/kg for fennel essential oil. No toxic effects in mouse models with oral doses of 0.5, 1.0 and 3.0 g/kg of ethanolic fennel extract. In a chronic toxicity study 100 mg/kg of orally administered fennel extract per day for 90 days caused no reported changes, apart from slight snout alopecia in some male animals.[[27]](#footnote-28)

**Liquorice tea**

***Latin name****: Glycyrrhiza glabra* L.

**Family:** Fabaceae (pea family).

**Common names:** Liquorice, licorice (USA, Australia).

**Part used:** Root and stolon.

**Key constituents**: triterpenoid saponins (2-6% w/w) including glycyrrhizin (also known as glycyrrhizic acid) as potassium and calcium salts; glycyrrhetinic acid (the aglycone of glycyrrhizin) (0.5-0.9% w/w); flavonoids (1-1.5% w/w) including liquirtin, chalcones and isoflavonoids. Glycyrrhizin (but not glycyrrhetinic acid) has an intensely sweet taste, 50-170 times greater than cane sugar (sucrose).

**Background:**

Liquorice is a member of the legume family which is native to southern Europe, India and parts of Asia. Although its distinctive flavour is similar to that of anise or fennel the plants are not related botanically, but some products described as liquorice have been found to contain anise, instead.[[28]](#footnote-29) [[29]](#footnote-30)

**Health properties:**

Clinical and experimental studies suggest liquorice works in a number of ways. It is anti-inflammatory, antiviral, antimicrobial, antioxidative and immunodulatory. It also has anti-cancer properties and protects the liver and heart.[[30]](#footnote-31)

Liquorice is a demulcent and creates a soothing film over mucous membrane, which explains its popularity for digestive system complaints including stomach ulcers, heartburn, colic, and chronic gastritis.

Laboratory studies demonstrate that liqourice may help protect against peptic ulcers and one trial of 100 patients, most of whom had not responded to conventional medicine, found that 90% reported improvement after taking a liquorice extract for six weeks.[[31]](#footnote-32)

Another small study found that people with canker sores reported effective pain relief after gargling with deglycyrrhizinated licorice dissolved in warm water four times a day.[[32]](#footnote-33)

In Japan, glycyrrhizin one of the active ingredients in liquorice, is given intravenously to treat chronic viral hepatitis and cirrhosis, and has been shown to improve liver function.[[33]](#footnote-34) One study reported that glycyrrhizin “can be useful for patients with difficult-to-diagnose acute liver disease as an 'initial' treatment tool to improve liver inflammation before starting disease-specific treatments”.[[34]](#footnote-35) Another found it can help reverse fatty acid metabolism and protect against liver damage caused by paracetamol.[[35]](#footnote-36)

Liquorice is used to treat sore throats, bronchitis, cough, and infections caused by bacteria or viruses. In part, this might be explained by a 2007 study which found glycyrrhizin inhibits a protein associated with both acute and chronic inflammation — which also supports its traditional use for osteoarthritis and lupus.[[36]](#footnote-37)

The research is limited, and as a study reported in 1958 “much remains to be discovered about the mode of action of glycyrrhetic acid, but it offers a new approach to the treatment of inflammatory conditions free from the disadvantages of corticoids which have claimed so much attention”.[[37]](#footnote-38)

Curiously, steroids are known to suppress adrenal function but liquorice has been shown to improve adrenal function in people who have taken steroid drugs long-term. [[38]](#footnote-39)

**Contraindications:** The Commission E monographs list**:** cholestatic liver disorders, liver cirrhosis, hypertension, hypokalaemia, severe kidney insufficiency and pregnancy. The hypokalaemic effects may be more severe in patients with anorexia nervosa. Liquorice is also contraindicated in those with oedema or congestive heart failure.

***Use in pregnancy*:** Category A: no proven increase in frequency of malformation or other harmful effects on the foetus. However, high consumption of liquorice-based confectionary was associated with preterm delivery (A Finish study shows an average 2.5 day reduction in gestation duration). European agencies advise that liquorice is contraindicated in pregnancy, however lower doses up to 3/g per day are thought to be safe. Liquorice should be avoided in women with gestational hypertension (preeclampsia).

***Use in lactation*:** Category C: compatible with breast feeding, but high doses should be avoided.

**Warnings and precautions:** If taking liquorice for long time periods at a high dose, a high potassium and low sodium diet should be advocated. Blood pressure and weight gain should be carefully monitored (hypokalaemia is the earliest threat and can occur at relatively low intakes of liquorice). However, this should not be necessary with usual liquorice tea intake. The side-effects of liquorice are greater in the elderly, patients with hypertension, cardiac and renal disease. Liquorice should not be used alongside digoxin, diuretics, laxatives, and other potassium-depleting drugs. High doses should be avoided in pregnancy and when breast feeding.

**Effect on ability to drive or operate machinery:** None expected.

**Adverse reactions:** Chronic liquorice intake can lead to an acquired form of “apparent mineralocorticoid excess” syndrome, with potassium depletion, sodium retention and down-regulation of the renin-angiotensin-aldosterone system. There have been reports of severe hypertension, heart enlargement and congestive heart failure in people consuming more than 100g/day of liquorice confectionary for long time periods.[[39]](#footnote-40) Symptoms resolved when liquorice intake was stopped.

Chronic intake and associated hypokalaemia has been associated with an increased risk of thromboembolism.[[40]](#footnote-41) Liquorice-induced pseudoaldosteronism has been associated with a hypokalaemic myopathy and dilated cardiomyopathy.[[41]](#footnote-42)

100 mg/day of glycyrrhizin is the lowest observed adverse effect level and using a safety factor of 10, 10 mg/day of glycyrrhizin/day would represent a safe dose for the majority of adults. As good quality liquorice contains 5% glycyrrhizin, 10 mg equates to 0.2 g g/day liquorice.[[42]](#footnote-43) There have been reports of rhabdomyolysis and liquorice consumption, resulting in acute renal failure and calcium deposition in damaged skeletal and heart muscle.[[43]](#footnote-44) A study reported that serum testosterone was reduced by up to 35% after liquorice consumption (7g/day of a liquorice preparation containing 500 mg glycyrrhizin) in men.[[44]](#footnote-45) Other studies have not been able to confirm this effect.

**Interactions:**

* Anticoagulants: Liquorice may increase the metabolism and clearance of warfarin.
* Cardiac glycosides: Liquorice may potentiate the toxicity.
* Contraceptive pill: there is a theoretical risk that chronic, high intake of liquorice may counteract the contraceptive pill, so care must be taken.
Cortisol acetate: Liquorice increased cortisol availability in tissues in the hours following oral cortisone acetate administration.
* Cyclosporine: Liquorice greatly reduced the oral bioavailability of cyclosporine by activating P-gp and CYP3A4.
* Cytochrome P450 substrates: Glycyrrhizin, a major ingredient of liquorice, induces CYP3A and CYP2D6, and can affect the intracellular concentration of drugs metabolized by this enzyme.
* Diuretics: concurrent liquorice intake should be stopped due to potassium-depleting effects of both.
* Insulin: Liquorice may have a synergistic effect possibly causing hypokalaemia and sodium retention with concomitant use.
* Laxatives: reduce potassium levels so the intake of liquorice concurrently should be avoided.
* MAO-inhibitors (MAO-I): Liquorice may potentiate activity of MAO-I drugs.
P-Glycoprotein (P-gp) substrates: Liquorice inhibited P-gp, resulting in increased intracellular concentration of the chemotherapy agent daunorubicin, a substrate of P-gp.

**Safety in children:**High intake of liquorice should be discouraged.

**Overdose:** Intake of 7g/day of liquorice for 7 days caused reversible pseudoaldosteronism in humans.[[45]](#footnote-46)

**Toxicology:** Doses of 100, 250 and 500 mg/kg in rats showed dose-dependent suppression of adrenal-pituitary axis with significant decreases in cortisol, ACTH, aldosterone and potassium, together with increases in rennin production.[[46]](#footnote-47) Oral consumption of glycyrrhetinic acid by mice (0.1-1.0 mg/ml) resulted in increased right atrial pressure and thickening of the pulmonary blood vessels, suggesting pulmonary hypertension.[[47]](#footnote-48)

**Hibiscus tea**

***Latin name****: Hibiscus sabdariffa* L.

**Family:** Malvaceae (mallow family).

**Common names:** Roselle, Rosella, agua de Jamaica, flor de Jamaica, sorrel, red sorrel, Jamaica, hibiscus tea, agua de Jamaica, karkade, sour-sour.

**Part used:** Calyx.

**Key constituents:** ascorbic acid (vitamin C) (variable amounts); 15-30% w/w organic acids (citric, malic and tartaric acids); acidic polysaccharides; flavonoid glycosides (anthocyanins) e.g. cyanidin, gossypetin, hibiscin, hibiscitrin, hibiscetin, sabdaretin (major); delphinidin, chrysanthenin, myrtillin (minor);polyphenols, such as protocatechuic acid; and alkaloids such as daphniphylline.

**Background:**

There are several hundred species of hibiscus, a bushy annual plant in the mallow family, but the tea is made from the crimson or deep magenta-coloured calyces ([sepals](http://en.wikipedia.org/wiki/Sepal)) of the [Hibiscus sabdariffa](http://en.wikipedia.org/wiki/Roselle_%28plant%29) flower.

**Health properties:**

Hibiscus tea contains vitamin C and minerals as well as a number of health-boosting plant compounds including [anthocyanins](http://en.wikipedia.org/wiki/anthocyanins), which appear to have [antihypertensive](http://en.wikipedia.org/wiki/Antihypertensive_drug) activity.

These anthocynanins are believed to have the same action as the [angiotensin-converting enzyme](http://en.wikipedia.org/wiki/Angiotensin-converting_enzyme) (ACE) inhibitors prescribed to control high blood pressure.

A 2004 study found that hibiscus was as effective as the ACE-inhibiting drug [captopril](http://en.wikipedia.org/wiki/Captopril) at lowering blood pressure.[[48]](#footnote-49)

While a study published in 2007, which compared *Hibiscus sabdariffa* L. to the anti-hypertensive drug [lisinopril](http://en.wikipedia.org/wiki/lisinopril), also reported a significant reduction in blood pressure — down from 146.48/97.77 to 129.89/85.96 mmHg.[[49]](#footnote-50)

Preliminary research has also shown that drinking hibiscus tea may lower [blood pressure](http://en.wikipedia.org/wiki/Blood_pressure) in people with [type 2 diabetes](http://en.wikipedia.org/wiki/Type_2_diabetes),[[50]](#footnote-51) or mild [hypertension](http://en.wikipedia.org/wiki/Hypertension).[[51]](#footnote-52)

In one study, people with diabetes drinking hibiscus tea had a fall in blood pressure from 134.8 mmHg to 112.7 mmHg one month later.[[52]](#footnote-53) Drinking three cups of hibiscus tea daily for six weeks reduced systolic blood pressure by 7 mm Hg in mildly hypertensive participants.[[53]](#footnote-54) In those with mean systolic blood pressure over 129 mm Hg, the reduction was nearly 14 mm Hg.

Traditionally, people have used hibiscus tea for helping to relieve the common cold, as well as treating depression. It is also used by some cancer patients. It has a tart, [cranberry](http://en.wikipedia.org/wiki/Cranberry)-like flavour and is often drunk with added [sugar](http://en.wikipedia.org/wiki/Sugar).

**Contraindications:** Can trigger mild allergic reactions such as hay fever. It is advisable not to use during pregnancy without professional advice.

***Use in pregnancy*:** *H. sabdariffa* **seed** has possible emmenagogue activity (stimulates menstrual flow). However, there is no evidence that the calyx has the same effect, so this is probably of little significance at normal intake levels.

***Use in lactation*: Category C:** compatible with breast-feeding.

**Warnings and precautions:** None required.

**Effect on ability to drive or operate machinery:** Possible care: a small number of people have reported an hallucinogenic effect or a sensation of intoxication from drinking the tea.

**Adverse reactions:** Reported hallucinogenic effect, or a sensation of intoxication, from drinking the tea. The tea can trigger mild allergic reactions such as hay fever.

**Interactions:** May reduce chloroquine and acetaminophen plasma levels, decreasing effectiveness of treatments.

**Safety in children:** Possible mild allergic reactions such as hay fever are possible.

**Overdose:** None reported.

**Toxicology:** No significant safety concerns.[[54]](#footnote-55)The LD50 of *H. sabdariffa* calyx extract in rats was found to be above 5000 mg/kg. Very high doses (2000 mg/kg) in animals (90-day oral administration of water and alcohol extracts in albino rats) led to severe diarrhoea and weight loss followed by death. Reduced erythrocyte count and increased AST, ALT and creatinine.[[55]](#footnote-56) Single dose study (5000 mg/kg) did not cause acute toxicity, and doses of 50, 100 and 200 mg/kg body weight for 270 days did not cause chronic toxicity in rat.[[56]](#footnote-57) One study investigating rat testes noted that four weeks of 200mg/kg Hibiscus extract in male mice was able to adversely affect sperm morphology. The percentage of abnormal sperm morphology (nonspecific morphology abnormalities) increased from 18.5% at baseline to 43.5-52.5%; sertoli cells also appeared to be altered.[[57]](#footnote-58)

**Yerba mate**

***Latin name****: Ilex paraguariensis* A. St. Hil.

**Family:** Aquafoliaceae (holly family).

**Common names:** Yerba mate, yerva mate, maté, Paraguay tea, St Bartholomew’s tea, Jesuit’s tea, ilex, hervea, guyaki, chimarrão, cimmaron.

**Part used:** Leaf and twigs.

**Key constituents**:flavonoids (quercetin, kaempferol and rutin); polyphenols (particularly caffeoyl derivatives); xanthine alkaloids (caffeine (0.7-1.7% w/w), theobromine (0.3-0.9%) and theophylline (absent or trace); saponins; minerals such as potassium, manganese and magnesium.

**Background:**

Yerba mate is made from the leaves of the Argentina holy bush and according to the Pasteur Institute in Paris it contains almost all the vitamins necessary to sustain life.[[58]](#footnote-59) Fans say it has the strength of coffee, benefits of tea and the feeling of chocolate,[[59]](#footnote-60) so it’s no surprise that mate, as it is sometimes known, is added to some energy drinks.

**Health properties:**

A review published in 2010 admitted “research on biomedical properties of this herb has had a late start,” but the authors went on to identify a wide range of health-enhancing properties of yerba mate.[[60]](#footnote-61)

Laboratory tests confirm it is antioxidant and antimutagenic, which suggests it can protect against the cell damage association with cancer. Yerba mate also aids vasodilation, reduces lipids and supports weight loss — which could help protect against cardiovascular disease.[[61]](#footnote-62)

Trials have confirmed it lowers the dangerous LDL cholesterol associated with heart disease and that yerba mate works synergistically to increase the effectiveness of prescription statins.[[62]](#footnote-63)

Laboratory studies have “provided strong evidence of anti-inflammatory effects” and has been shown to protect against lung inflammation caused by cigarette smoking.[[63]](#footnote-64)

The authors conclude: “The evidence seems to provide support for beneficial effects of mate drinking on chronic diseases with inflammatory component and lipid metabolism disorders.”

**Contraindications:** Patients with hypertension, cardiac disorders or anxiety should not consume mate, due to the high caffeine levels.

***Use in pregnancy*:** Should be avoided – there has been a report of neonatal withdrawal syndrome after chronic maternal drinking of mate.[[64]](#footnote-65)

***Use in lactation*:** Should be avoided.[[65]](#footnote-66)

**Warnings and precautions:** Epidemiologic data indicate that chronic mate drinkers are at an increased risk of prostate[[66]](#footnote-67), bladder[[67]](#footnote-68), esophageal[[68]](#footnote-69), lung[[69]](#footnote-70), and head and neck cancers.[[70]](#footnote-71) Mate contains polycyclic aromatic hydrocarbons (PAHs), which are known carcinogens. The cancer risk appears to be additive with chronic alcohol or tobacco use (the latter of which also contain PAHs).[[71]](#footnote-72)

**Effect on ability to drive or operate machinery:** No adverse reactions expected at normal levels – higher intake may cause anxiety and loss of concentration.

**Adverse reactions:** Sleep disruption, arrhythmias, increased heart rate, stomach upset, and anxiety in vulnerable subjects.

**Interactions:** Chemotherapy: due to its antioxidant activity, mate may interfere with some chemotherapy drugs (low relevance).

Stimulant, cardiac, hypertension and antidepressant drugs: due to its caffeine content, mate may interact with these drugs, although studies have not been carried out.

**Safety in children:** Consumption of mate is best avoided in children due to the stimulatory effect of the xanthine alkaloids.

**Overdose:** None reported in the published literature.

**Toxicology:** In acute and chronic studies yerba mate at a dose of 2g/kg bodyweight in both species was not associated with any toxicological or biochemical changes of toxicity.[[72]](#footnote-73) Hepatic veno-occlusive disease/liver failure has been reported in adult woman, linked to the chronic long-term use of mate that contained small amounts of pyrrolizidine alkaloids.[[73]](#footnote-74)

**Chamomile tea**

***Latin name****: Matricaria chamomilla* (L).(*syn.* *Matricaria recutita* (L.)

*Chamomilla recutita* (L.))

**Family:** Asteraceae (daisy family).

**Common names:** German chamomile, wild chamomile, chamomile, camomile USA). Not to be confused with Roman chamomile (*Chamaemelum nobile*), which can also be drunk as a tea.

**Part used:** Flower heads.

**Key constituents**: Essential oil (0.5-1.5%) including (-)-α-bisabolol, bisabolol oxides A, B and C, *trans*-en-yn-dicycloethers and matricine (only the distilled essential oil contains the blue compound chamazulene, which is a breakdown product of matricine during steam distillation); flavonoids (including apigenin) and bitter principals.

**Background:**

Chamomile is a daisy like plant which is often used in herb infusions to help induce sleep. It has traditionally been used for medicinal purposes and is one of the most popular single ingredients in herbal teas or tisanes.[[74]](#footnote-75)

**Health properties:**

Laboratory studies have shown that chamomile can kill bacteria, fungus, and viruses. It also helps relax muscle contractions, particularly in the smooth muscles that make up the intestines.[[75]](#footnote-76)

These properties were confirmed by a study published by the American Chemical Society’s Journal of Agricultural and Food Chemistry which found that drinking five cups of chamomile tea every day for two weeks increased markers for antibacterial activity as well as levels of glycine, an amino acid which relieves muscle spasms.[[76]](#footnote-77)

Glycine is also known as a nerve relaxant, which probably explains why the tea acts as a mild sedative and sleep aid.[[77]](#footnote-78)

Chamomile is also used for treating inflammation in the body, including respiratory infections, inflammation of the eyes or skin, intestinal inflammation, mouth ulcers, or inflammation of the gums.[[78]](#footnote-79) It is used to relieve the discomfort of irritable bowel syndrome.[[79]](#footnote-80) It helps relieve menstrual cramps as it works as an anti spasmodic and muscle relaxant.[[80]](#footnote-81) Chamomile has a cooling effect and can be applied to help a number of skin conditions including chicken pox, acne, rashes and fungal infection.[[81]](#footnote-82)

**Contraindications:** There have been reports of skin reactions and dermatitis from the topical use of chamomile products, though there is a low chance of this being due to pollen. However, people with known sensitivity to chamomile should avoid topical use of chamomile products.

Ingestion of chamomile preparations has been linked to some cases of anaphylaxis, so its use should be avoided in cases of known sensitivity.

***Use in pregnancy*:** Category A: No proven increase in the frequency of malformation or other harmful effects on the foetus. This is despite widespread consumption of the tea in many countries during pregnancy.

Long-term oral administration of chamomile extracts to rats caused no teratogenicity or changes in prenatal development.[[82]](#footnote-83) One piece of research on animal models showed that chamomile infusion had a stimulating effect on the uterus, but it is not known if this is relevant to humans.[[83]](#footnote-84)

***Use in lactation*:** Category C: compatible with breast feeding.

**Warnings and precautions:** Chamomile tea should be avoided in those with known sensitivity to chamomile or the Asteraceae family.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Hypersensitivity reactions to chamomile have been linked to dermatitis.[[84]](#footnote-85) Chamomile tea allergy[[85]](#footnote-86) and contact dermatitis[[86]](#footnote-87) (including urticaria)[[87]](#footnote-88) from cosmetics[[88]](#footnote-89) containing chamomile are known. Hypersensitivity to chamomile tea dust has been noted among tea packers.[[89]](#footnote-90)Allergic conjunctivitis was seen in seven hay fever patients who had used chamomile tea as an eyewash – they all had positive skin tests to chamomile but there was no reaction after oral ingestion, so chamomile pollen was thought to be the sensitising factor.[[90]](#footnote-91) A case of severe anaphylaxis in an atopic child consuming chamomile tea has been reported, though mugwort (*Artemisia vulgaris* – another member of the Asteraceae family) was identified as one of the predisposing allergens.[[91]](#footnote-92) Chamomile hypersensitivity is more likely to occur following sensitising to mugwort.

**Interactions:** Past theoretical interactions with NSAIDS, analgesics, antiepileptics and warfarin have been based upon incorrect assumptions. There is a study suggesting reduced iron intake after chamomile ingestion.[[92]](#footnote-93) In cases of iron-deficiency anaemia, chamomile tea should not be taken concurrently with iron supplements.

Cytochrome P450 substrates: Chamomile extract inhibits CYP1A2, CYP2C9, CYP2D6 and CYP3A4 and can affect the intracellular concentration of drugs metabolized by these enzymes (low relevance to tea).

Cyclosporine: Concurrent use of extract resulted in increased levels of cyclosporine (low relevance to tea).

**Safety in children:** Chamomile is safe for use in children, unless there is a pre-existing chamomile or Asteraceae hypersensitivity reaction.

**Overdose:** No incidents found.

**Toxicology:** No toxicological effects were found in a mouse study for consumption up to 1440 mg/kg of a dried chamomile infusion given by intraperitoneal injection (reversible depressive effects on the central nervous system were seen in doses >90 mg/kg).[[93]](#footnote-94)

**Lemon balm tea**

***Latin name****: Melissa officinalis* L.

**Family:** Lamiaceae (deadnettle family).

**Common names:** Lemon balm, balm, bee balm.

**Part used:** Aerial parts.

**Key constituents**: Essential oil (0.02-0.3% w/w) including monoterpenes (citronellal, geranial and neral) and sesquiterpenes; phenolic acids (including rosmarinic acid) and flavonoids.

**Background:**

Traditionally, infusions of lemon balm have been drunk to relieve mental stress and anxiety, aid sleep and to provide symptomatic relief of mild gastrointestinal complaints including bloating and flatulence.[[94]](#footnote-95) And a European Medicines Authority report confirmed these uses are “well documented in recognised handbooks”.[[95]](#footnote-96)

**Health properties:**

A 2003 study of 20 volunteers given extracts of lemon balm up at varying doses found that self-rated calmness increased “significantly” an hour and 2.5 hours after taking 300mg of the extract.

A 2004 trial of 18 volunteers who were subjected to stress found lemon balm increased calmness and reduced alertness. Curiously, the study found lemon balm also increased the speed of mathematical processing with no reduction in accuracy.[[96]](#footnote-97)

And a trial with Alzheimer’s patients noted a reduction in agitation in the lemon balm group compared to those who received a placebo.

Lemon balm also appears to protect against DNA damage. A 2011 trial involving 55 radiology staff members found significant improvement in plasma levels of catalase, superoxide dismutase and glutathione peroxidise, which are all markers for cell damage, and a pronounced reduction in plasma DNA damage.[[97]](#footnote-98)

**Contraindications:** High doses should not be consumed by people with hypothyroidism, as it may reduce thyroid function (low relevance from tea).

***Use in pregnancy*:** Category B2: no increase in frequency of malformation or other harmful effects in the foetus from human consumption. Animal studies are lacking.

***Use in lactation*:** Category C: Compatible with breast feeding. The essential oils in lemon balm can pass into breast milk, but the amounts are small so adverse reactions are not expected.

**Warnings and precautions:** Use with care in cases of hypothyroidism (low relevance from tea).

**Effect on ability to drive or operate machinery:** Despite the relaxing effects of the tea, no adverse effects are expected. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf>

**Adverse reactions:** There has been one case of contact urticaria from a cosmetic product containing lemon balm.[[98]](#footnote-99)

**Interactions:** None expected.

**Safety in children:** No information available, but adverse reactions are unlikely.

**Overdose:** None reported in the published literature.

**Toxicology:** Acute administration of lemon balm extract to normal rats (25 mg/kg by intravenous injection) caused a reduction in thyroid stimulating hormone in serum and the pituitary gland. Lemon balm did not reduce TSH in hypothyroid rats.[[99]](#footnote-100) Ames test was negative for mutagenicity.[[100]](#footnote-101)

**Peppermint tea**

***Latin name****: Mentha x piperita* L.

**Common names:** Peppermint.

**Family:** Lamiaceae (deadnettle family).

**Part used:** Leaf.

**Key constituents**: Essential oil (0.5-4% w/w) consisting of mostly menthol (35-45%), (-)-menthone (10-30%), (+/-)-menthyl acetate, 1,8-cineole, limonene, β-pinene, β-caryophyllene, menthofuran, piperitone, jasmine (trace) and pulgenone; flavonoid tannins (6-12% w/w); triterpenes; and bitter principals.

**Background:**

One of the mint family of perennial herbs which grow throughout Europe, the peppermint is a hybrid cross between watermint and spearmint which spreads by rooting. Mint is rich in carotenes and vitamin C. It is also a good source of minerals including magnesium, copper, iron, potassium and calcium[[101]](#footnote-102).

**Health properties:**

Mint was originally used as a medicinal herb to treat stomach ache and chest pains[[102]](#footnote-103) and several studies support the use of peppermint for indigestion and irritable bowel syndrome.[[103]](#footnote-104) In 2011 Australian researchers showed, for the first time, how it helps to relieve IBS symptoms.[[104]](#footnote-105)

Dr Stuart Brierley of Adelaide University explains: “Our research shows that peppermint acts through a specific anti-pain channel called TRPM8 to reduce pain sensing fibres, particularly those activated by mustard and chilli. This is potentially the first step in determining a new type of mainstream clinical treatment for Irritable Bowel Syndrome (IBS).”

Mint calms the muscles of the stomach and improves the flow of bile, which the body uses to digest fats. As a result, food passes through the stomach more quickly.[[105]](#footnote-106)

Animal studies demonstrate a relaxation effect on gastrointestinal (GI) tissue, analgesic and anesthetic effects in the central and peripheral nervous system, immunomodulating actions and chemo-preventive potential.[[106]](#footnote-107)

While laboratory tests have confirmed strong antioxidant and anti-tumor actions, and some antiallergenic potential.[[107]](#footnote-108)

**Contraindications:** Those with a history of gallstones, gallbladder problems, severe liver disease, hiatus hernia or gastro-oesophageal reflux disease should take care when using peppermint. Peppermint tea contains tannins so should not be taken long-term by those with constipation, iron deficiency anaemia or malnutrition.

***Use in pregnancy*:** Category B2: no increase in frequency of malformation or other harmful effects on foetus seen from use in women. Animal studies are lacking. Teratogenic effects were not seen in animal models using 190, 220,400 and 430 mg/kg daily doses.[[108]](#footnote-109) The extracted peppermint oil should not be used during pregnancy.

***Use in lactation*:** Category CC: compatible with breastfeeding but use with caution, as high intake may reduce milk secretion. The extracted peppermint oil should not be used during breastfeeding.

**Warnings and precautions:** The Commission E advises the use of peppermint only under professional supervision for people with gallstones. Long-term use should be restricted due to the tannin comment. Use with caution with highly ulcerated or inflamed conditions of the gastrointestinal tract.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Contact dermatitis has been reported with peppermint oil and the leaves of peppermint.[[109]](#footnote-110) The extracted oil can cause mucosal sensitivity, heartburn, skin rashes, bradycardia, muscle tremor, ataxia, neonatal jaundice (in babies with glucose-6-phosphate dehydrogenase deficiency).

**Interactions:** Peppermint tea has been shown to reduce iron absorption.[[110]](#footnote-111) In cases of iron-deficiency anaemia, peppermint tea should not be taken concurrently with iron supplements.

Peppermint tea has been shown to inhibit the conversion of nicotine into continine, due to the inhibition of the liver enzyme CYP2D6. While minor in potency, it does appear to be relevant to peppermint tea ingestion.

**Safety in children:** No adverse effects are expected from use of peppermint leaf.

**Overdose:** No cases of overdose have been documented for peppermint leaf (though there have been cases for the peppermint essential oil and peppermint confectionary).

**Toxicology:** Laboratory studies showed that when consumed orally for seven days with 4g/kg of peppermint concentrate did not show signs of toxicity.[[111]](#footnote-112) Peppermint tea was shown not to produce nephrotoxicity.[[112]](#footnote-113) No evidence of mutagenicity in the Ames test.

**Spearmint tea**

***Latin name****: Mentha spicata* L.

**Common names:** Spearmint, common mint, garden mint.

**Family:** Lamiaceae (deadnettle family).

**Part used:** Leaf.

**Key constituents**: Essential oil (1-4% w/w) including R-(–)-carvone, limonene, dihydrocarvone, and 1,8-cineol. Unlike peppermint essential oil, spearmint essential oil only contains minimal amounts of menthol and menthone; flavonoid tannins (6-12% w/w); triterpenes; and bitter principals.

**Background:**

Although it has a very similar aroma to peppermint, and shares many of the same digestive properties, spearmint contains a slightly difference balance of plant chemicals. Spearmint has less menthol than peppermint, but is rich in limonene, dihydrocarvone and cineol.[[113]](#footnote-114)

**Health properties:**

Laboratory tests confirm mint kills some types of bacteria, fungus, and viruses, suggesting it may have antibacterial, antifungal, and antiviral properties[[114]](#footnote-115)[[115]](#footnote-116) and the *Journal of Chemistry*, reports that spearmint extract has "good total phenolic and flavonoid contents” and exhibits “excellent antioxidant activity”.[[116]](#footnote-117)

A 2007 study published in Phytotherapy Research found it also offers hope to women with hirsutism as drinking two cups of spearmint tea a day for fie days lowers levels of androgens associated with excessive hair in women.

The Turkish researchers conclude that spearmint tea “could be a good natural alternative for women who have mild symptoms”.

**Contraindications:** As for peppermint, those with a history of gallstones, gallbladder problems, severe liver disease, hiatus hernia or gastro-oesophageal reflux disease should take care when using spearmint. Spearmint tea does contain some tannins so should not be taken long-term by those with constipation, iron deficiency anaemia or malnutrition.

***Use in pregnancy*:** Category B2: no increase in frequency of malformation or other harmful effects on foetus seen from use in women. Animal studies are lacking. The extracted spearmint oil should not be used during pregnancy.

***Use in lactation*:** Category CC: compatible with breastfeeding but use with caution, as high intake may reduce milk secretion. The extracted spearmint oil should not be used during breastfeeding.

**Warnings and precautions:** As for peppermint, spearmint should only be used under professional supervision for people with gallstones. Long-term use should be restricted due to the tannin comment. Use with caution with highly ulcerated or inflamed conditions of the gastrointestinal tract.

Kidney disorders: Spearmint tea could increase the risk of kidney damage. Higher amounts of spearmint tea seem to have greater effects. In theory, using large amounts of spearmint tea might make kidney disorders worse.[[117]](#footnote-118)

Liver disease: Spearmint tea might increase the risk of liver damage. Higher amounts of spearmint tea seem to have greater effects. In theory, using large amounts of spearmint tea might worsen liver disease.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Contact dermatitis has been reported with peppermint oil and the leaves of peppermint,[[118]](#footnote-119) so a similar issue could theoretically occur with spearmint leaf. The extracted oil could possibly cause mucosal sensitivity, heartburn, skin rashes, bradycardia, muscle tremor, ataxia, neonatal jaundice (in babies with glucose-6-phosphate dehydrogenase deficiency).

**Interactions:** Due to the tannin content, spearmint tea might reduce iron absorption, as seen with peppermint tea.[[119]](#footnote-120) In cases of iron-deficiency anaemia, chamomile tea should not be taken concurrently with iron supplements.

Spearmint tea, like peppermint tea, might inhibit the conversion of nicotine into continine, due to the inhibition of the liver enzyme CYP2D6.

**Safety in children:** No adverse effects are expected from use of spearmint leaf.

**Overdose:** No cases of overdose have been documented for spearmint leaf.

**Toxicology:** Spearmint tea was shown to be nephrotoxic in laboratory studies,[[120]](#footnote-121) but it is not known if this is relevant to humans. No evidence of mutagenicity in the Ames test.

**Rosehip tea**

***Latin name****: Rosa canina* L.*, Rosa rubiginosa* L. and *Rosa rugosa* Thunb.

**Family:** Rosaceae (rose family).

**Common names:** Rosehip

**Part used:** Fruit (hip).

**Key constituents**: Ascorbic acid (vitamin C), carotenoids (including β-carotene, lutein, zeaxanthin and lycopene), polyphenols (such as proanthocyanidins), flavonoids (such as quercetin and catechin), unsaturated fatty acids and galactolipids such as GLGPG.

**Background:**

Rosehips which are the round part of the flower, just below the rose, have always been prized for their vitamin C content, although much of the vitamin is actually lost during drying.

**Health properties:**

The polyphenols and anthocyanin in Rosehip explains the tradition of using this herbal infusion to treat minor stomach complaints such as spasms, stomach acid deficiency, preventing stomach irritation, and as a "stomach tonic" for the intestines.

Traditionally, Rosehips are also used for diarrhoea, constipation, gallstones, gallbladder ailments, lower urinary tract and kidney disorders, fluid retention (dropsy or oedema), gout, back and leg pain (sciatica), diabetes, high cholesterol, weight loss, high blood pressure, chest ailments, fever, increasing immune function during exhaustion, increasing blood flow in the limbs, increasing urine flow and quenching thirst.[[121]](#footnote-122)

More recently Rosehip is emerging as a useful counter to arthritic pain. A meta-analysis of three randomised controlled trials involving 287 patients with an average treatment period of three months reported that treatment with standardised Rosehip powder consistently reduced pain scores and that patients allocated to Rosehip powder were twice as likely to respond to Rosehip compared to placebo.[[122]](#footnote-123) A further meta-analysis of three controlled trials in patients with osteoarthritis found that Rosehip powder reduced pain compared to placebo. It seemed twice as likely that a person randomised to Rosehip would respond with pain reduction compared to placebo.[[123]](#footnote-124)

There appear to be heart benefits, too. A study from Lund University in Sweden recruited 31 obese men and women to see if a daily drink made with rosehip powder would reduce their risks of developing type two diabetes and heart disease.[[124]](#footnote-125) Each subject spent six weeks drinking the rosehip solution, made with 40 grams of Rosehip powder, followed by six weeks on a drink make from apples and grapes.

At the end of each phase, researchers measured patients’ body weight, blood pressure, blood fat levels and glucose tolerance — to look for the early stages of diabetes.

After six weeks on the Rosehip drink, blood pressure fell by an average of 3.4%, a small but significant decline, and their total cholesterol levels dropped by almost 5%. There was an even bigger drop —6%— in LDL cholesterol, the ‘bad’ type of blood fat linked to increased risk of heart disease. The researchers estimated that the drop in cholesterol and blood pressure combined would reduce the risk of heart disease in obese patients by 17%.

**Contraindications:** Rugosin E, a chemical found in rose hip, might slow blood clotting (low relevance to tea use). Drinking large amounts of rose hip tea might increase the risk of bleeding in people with bleeding disorders.

***Use in pregnancy*:** Category A: No proven increase in the frequency of malformation or other harmful effects on the foetus. This is despite widespread consumption of the tea in many countries during pregnancy. No studies have been carried out.

***Use in lactation*:** Category C: compatible with breast feeding. No studies have been carried out.

**Warnings and precautions:** Rugosin E, a chemical found in rose hip, might slow blood clotting (very small amounts present in tea). Taking rose hip might increase the risk of bleeding in people with bleeding disorders.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Supplementation with up to 5 g/day of Rosehip powder for three months failed to have any significant side-effects relative to placebo in people with osteoarthritis.[[125]](#footnote-126) Gastrointestinal side-effects such as diarrhoea, loose stools, and persistent constipation have occurred with ingestion of 40g/day of rose hip tea taken for six weeks.[[126]](#footnote-127) Exposure to rose hips dust in tea packers has caused rare severe respiratory allergies.[[127]](#footnote-128)

**Interactions:** Slight theoretical risk of interaction with anticoagulant drugs, increasing their effect (low relevance to tea use).

**Safety in children:** No problems expected.

**Overdose:** None reported in the published literature.

**Toxicology:** Rose hips contain vitamin C, so high intake could theoretically cause vitamin C toxicity (e.g. oxalate kidney stone formation, gastrointestinal effects), though this is highly unlikely from rose hip tea consumption and has not been observed.[[128]](#footnote-129)

**Ginger tea**

***Latin name****: Zingiber officinale* Rosc.

**Common names:** Ginger

**Family:** Zingiberaceae (ginger family).

**Part used:** Rhizome.

**Key constituents**: Essential oil (1-3% w/w) including monoterpenes (mostly geraniol and neral), sesquiterpenes (making up 30-70% of the essential oil – including β–sesquiphellandrene, *ar*-curcumene, α-zingerberene and β-bisabolene); pungent principals (4-7.5% w/w, including gingerols, shogaols and related phenolic ketone derivatives).

β–sesquiphellandrene and α-zingerberene are highest in fresh ginger and decompose on drying and storage. The gingerols gradually convert to shogaols on storage.

**Background:**

Ginger is a member of the Zingiberaceae family, alongside cardamom and turmeric and it has a long history of use to relieve digestive problems, such as nausea, loss of appetite, motion sickness and morning sickness.

**Health properties:**

The phenolic compounds in ginger work in a number of ways and are known to help relieve gastrointestinal irritation, stimulate saliva and bile production and suppress gastric contractions.

A University of Georgia study of 73 volunteers found that ginger reduced exercised-induced pain by 25%.[[129]](#footnote-130)

And a 2013 study of 70 students who suffered painful periods reported significant pain reduction and 83% of the volunteers reported improvement in nausea symptoms, compared to 47% who were given a placebo. The researchers concluded: “Ginger is effective in minimising the pain severity in primary dysmenorrhoea.”[[130]](#footnote-131)

A review published in the British Journal of Anaesthesia confirmed evidence that ginger helps relieve sea-sickness, morning sickness and nausea caused by chemotherapy.[[131]](#footnote-132) The American College of Obstetricians and Gynecologists confirms that, “Treatment of nausea and vomiting of pregnancy with ginger has shown beneficial effects and can be considered as a non-pharmacologic option.”[[132]](#footnote-133)[[133]](#footnote-134)

**Contraindications:** The Commission E monographs contraindicates ginger in patients with gallstones, except under medical supervision, and for use for morning sickness during pregnancy (but see below).

***Use in pregnancy*:** Category A: No proven increase in the frequency of malformation or other harmful effects on the foetus. This is despite widespread consumption of the tea in many countries during pregnancy. However, there is no consensus in the literature about the safety of ginger during pregnancy (despite clinical trials showing no adverse effects on subsequent births.[[134]](#footnote-135) In accordance with good practice, ginger should not be used during pregnancy without medical supervision, and doses restricted to less than 2g/day of dried ginger.

***Use in lactation*:** Category C: compatible with breast feeding.

**Warnings and precautions:** Theoretical interaction with anticoagulants such as warfarin or aspirin, or for those at risk of haemorrhage for doses exceeding 4g/day.[[135]](#footnote-136) Ginger tea should be used with caution with peptic ulcers, gastro-oesophageal reflux disease and gastritis.

**Effect on ability to drive or operate machinery:** No adverse reactions expected.

**Adverse reactions:** Occupational allergic dermatitis and allergic respiratory symptoms are possible for ginger.[[136]](#footnote-137) gastrointestinal symptoms, especially heartburn, can be common at higher doses.[[137]](#footnote-138)

**Interactions:** Ginger has a theoretical antiplatelet effect and potential interactions with anticoagulant medication. However, such concerns have been overturned in clinical trials.[[138]](#footnote-139)

**Safety in children:** Generally considered safe.

**Overdose:** No incidents reported in the published literature.

**Toxicology:** Dried ginger has an LD50 of 250 g/kg. Ginger extract caused no mortality in laboratory studies at doses up to 2.5 g/kg (equivalent to 75 g/kg fresh ginger rhizome).[[139]](#footnote-140) Another study showed that 100 mg/kg/day of extract for three months caused no signs of chronic toxicity.[[140]](#footnote-141)

Some cytotoxicity has been reported in vitro for ginger,[[141]](#footnote-142) but another study showed no signs of mutagenicity.[[142]](#footnote-143)

**Black tea**

***Latin name****: Camellia sinensis* (L.) Kuntze fermentatum.

**Family:** Theaceae (tea family).

**Common names:** Black tea.

**Part used:** Leaves.

**Key constituents**:  [polyphenols](https://en.wikipedia.org/wiki/Polyphenols), including: [flavonoids](https://en.wikipedia.org/wiki/Flavonoid), [epigallocatechin gallate](https://en.wikipedia.org/wiki/Epigallocatechin_gallate) (EGCG) and other [catechins](https://en.wikipedia.org/wiki/Catechins).

**Background:**

Traditionally, black tea has been used for the relief of fatigue and weakness.[[143]](#footnote-144)

**Health properties:**

Black tea is associated with reduced cardiovascular risk. A 2001 Dutch study of 806 elderly men found that black tea intake was associated with a reduced risk of ischaemic heart disease mortality.[[144]](#footnote-145) A 2001 meta-analysis of tea intake (black and green) found that the incidence rate of myocardial infarction is estimated to decrease by 11% with an increase in tea consumption of 3 cups/day.[[145]](#footnote-146) Also, people who have been drinking black tea for at least a year before having a heart attack seem to be less likely to die after having a heart attack.

A 2013 trial in 111 men and women found that 3 cups of tea each day reduced blood pressure variation.[[146]](#footnote-147) A meta-analysis of 10 studies found that black tea significantly reduced LDL (bad) cholesterol.[[147]](#footnote-148)

Black tea has also been linked with reduced risk of cancer. A 2015 meta-analysis found that black tea consumption is associated with reduced cancer risk and reduced cancer mortality. [[148]](#footnote-149)

A 2014 study in 111 tea drinking men and women found that ingestion of black tea over 3 months can improve body weight and body fat distribution.[[149]](#footnote-150)

Hardening of the arteries (atherosclerosis): Early research shows that people who drink black tea seem to have a reduced risk of having their arteries become hardened. This link is stronger in women than men.

Low blood pressure after eating (postprandial hypotension): Drinking beverages containing caffeine, such as black tea, helps increase blood pressure in older people who have low blood pressure after eating.

Kidney stones: Women who drink black tea seem to have an 8% lower risk of developing kidney stones.

Brittle bones (osteoporosis: some early research shows that older women who drink more black tea seem to have stronger bones. Drinking more black tea also seems to be linked with a lower risk of hip fracture in older men and women.

Ovarian cancer: Women who regularly drink tea, including black tea or green tea, appear to have a lower risk of developing ovarian cancer compared to women who never or rarely drink tea.

Parkinson's disease: Some research shows that people who drink caffeinated beverages such as coffee, tea, and coca cola have a lower risk of Parkinson's disease. The lower risk seems to be directly related to the dose of caffeine in men but not women. Drinking black tea also appears to be linked with a reduced risk of Parkinson's disease among people who smoke cigarettes.

Colon and rectal cancer: Some early research suggests that drinking black or green tea might be linked with a lower risk of colon and rectal cancer. However, most research shows that drinking tea is not linked with a lower risk of colon and rectal cancer. In fact, some early research suggests that drinking higher amounts of black tea might be linked with an increased risk of colon and rectal cancer.

Diabetes: Early research suggests that taking an extract of black and green tea does not improve HbA1C levels in people with diabetes. HbA1C is a measure of blood sugar control. Other early research suggests that drinking at least one cup of black tea per day is not linked with a lower risk of developing type 2 diabetes in Japanese adults.

Stomach cancer: Some early research suggests that drinking black or green tea might be linked with a lower risk of stomach cancer. However, most research shows that people who drink black or green tea do not have a lower risk. In fact, some early research suggests that drinking higher amounts of black tea might be linked with an increased risk of stomach cancer.

Bladder cancer: Some early research suggests that people who drink black or green tea might have a lower risk of urinary tract cancers. However, other research shows that drinking black tea is not linked with a reduced risk of bladder cancer.

Cavities: Early research suggests that rinsing with a black tea extract might prevent cavities.

Kidney cancer: Early research suggests that people who drink more black or green tea may have a higher risk of developing kidney cancer.

Mouth cancer: Early research shows that black tea might help prevent mouth cancer in patients with lesions in the mouth that may turn into cancer.

Pancreatic cancer: Some early research suggests that drinking black tea is linked with a reduced risk of pancreatic cancer risk. However, other research shows conflicting results.

Prostate cancer: Early evidence suggests that drinking black tea is linked with a reduced risk of prostate cancer.

Stress: Early research suggests that drinking black tea for 6 weeks does not improve blood pressure, heart rate, or feelings of stress ratings while performing stressful tasks.

Stroke: Black tea contains chemicals called flavonoids. Early research suggests that eating a diet that contains flavonoids is linked with a lower risk of stroke.

**Contraindications:** High doses (more than 6 cups per day) should be avoided due to the caffeine content. Black tea contains 2-4% caffeine w/w.

***Use in pregnancy*:** The UK FSA recommends that pregnant women should limit caffeine intake to no more than 200 mg daily (4 cups of tea).

***Use in lactation*:** An intake of 6 cups of tea (300mg caffeine) each day should not be exceeded.

**Warnings and precautions:**

Anaemia: Drinking black tea may make anaemia worse in people with iron deficiency.

Anxiety disorders: The caffeine in black tea might make these conditions worse.

Bleeding disorders: There is some reason to believe that the caffeine in black tea might slow blood clotting, though this hasn’t been shown in people. Use caffeine cautiously if you have a bleeding disorder.

Heart problems: Caffeine in black tea can cause irregular heartbeat in certain people. If you have a heart condition, use caffeine with caution.

Diabetes: The caffeine in black tea might affect blood sugar. Use black tea with caution if you have diabetes.

Diarrhoea: Black tea contains caffeine. The caffeine in black tea, especially when taken in large amounts, can theoretically worsen diarrhoea, though this is probably balanced by the binding tannins in tea.

Seizures: Black tea contains caffeine. There is a concern that high doses of caffeine might cause seizures or decrease the effects of drugs used to prevent seizures. If you have ever had a seizure, do not use high doses of caffeine or caffeine-containing supplements such as black tea.

Glaucoma: Drinking caffeinated black tea increases the pressure inside the eye. The increase occurs within 30 minutes and lasts for at least 90 minutes.

Hormone-sensitive condition such as breast cancer, uterine cancer, ovarian cancer, endometriosis, or uterine fibroids: Black tea contains phytoestrogens. If you have any condition that might be made worse by exposure to oestrogenic chemicals, do not use black tea.

High blood pressure: The caffeine in black tea might increase blood pressure in people with high blood pressure. However, this does not seem to occur in people who drink black tea or other caffeinated products regularly.

Irritable bowel syndrome (IBS): Black tea contains caffeine. The caffeine in black tea, especially when taken in large amounts, can worsen diarrhoea and may worsen IBS symptoms.

Brittle bones (osteoporosis): Drinking caffeinated black tea can increase the amount of calcium that is flushed out in the urine. This might weaken bones. Do not drink more than 300 mg of caffeine per day (approximately 2-3 cups of black tea). Taking extra calcium may help to make up for calcium losses. Older women who have a genetic condition that affects the way they use vitamin D, should use caffeine with caution. The fluoride in black tea will also help prevent osteoporosis.

Overactive bladder: The caffeine in black tea might increase the risk of developing an overactive bladder. Also, black tea might increase symptoms in people who already have an overactive bladder.

**Effect on ability to drive or operate machinery:** No effects expected.

**Adverse reactions:** None likely with amounts up to 6 cups of tea each day.

**Interactions:**

Moderate risk:

Adenosine (Adenocard): The caffeine in black tea might block the affects of adenosine (Adenocard). Adenosine (Adenocard) is often used by doctors to do a test on the heart. This test is called a cardiac stress test. Stop drinking black tea or other caffeine-containing products at least 24 hours before a cardiac stress test.

Antibiotics (Quinolone antibiotics): The body breaks down caffeine to get rid of it. Some antibiotics might decrease how quickly the body breaks down caffeine. Taking these antibiotics along with black tea can increase the risk of side-effects including jitteriness, headache, increased heart rate and other side-effects. Some antibiotics that decrease how quickly the body breaks down caffeine include ciprofloxacin (Cipro), enoxacin (Penetrex), norfloxacin (Chibroxin, Noroxin), sparfloxacin (Zagam), trovafloxacin (Trovan), and grepafloxacin (Raxar).

Cimetidine (Tagamet) can decrease how quickly the liver breaks down caffeine. Taking cimetidine (Tagamet) along with black tea might increase the chance of caffeine side-effects including jitteriness, headache, fast heartbeat, and others.

Clozapine (Clozaril): The caffeine in black tea seems to decrease how quickly the body breaks down clozapine (Clozaril). Taking black tea along with clozapine (Clozaril) can increase the effects and side-effects of clozapine (Clozaril).

Dipyridamole (Persantine): The caffeine in black tea might block the affects of dipyridamole (Persantine). Dipyridamole (Persantine) is often used by doctors to do a test on the heart. This test is called a cardiac stress test. Stop drinking black tea or other caffeine containing products at least 24 hours before a cardiac stress test.

Disulfiram (Antabuse) can decrease how quickly the body gets rid of caffeine. Taking black tea (which contains caffeine) along with disulfiram (Antabuse) might increase the effects and side-effects of caffeine including jitteriness, hyperactivity, irritability, and others.

Ephedrine: stimulant drugs speed up the nervous system. Black tea contains caffeine. Caffeine and ephedrine are both stimulant drugs. Taking black tea along with ephedrine might cause too much stimulation and sometimes serious side-effects and heart problems. Do not take caffeine containing products and ephedrine at the same time.

Fluvoxamine (Luvox) can decrease how quickly the body breaks down caffeine. Taking caffeine along with fluvoxamine (Luvox) might cause too much caffeine in the body, and increase the effects and side-effects of caffeine.

Lithium: the caffeine in black tea can increase how quickly your body gets rid of lithium. If you take products that contain caffeine and you take lithium, stop taking caffeine products slowly. Stopping caffeine too quickly can increase the side-effects of lithium.

Medications for depression (MAOIs): the caffeine in black tea can stimulate the body. Some medications used for depression can also stimulate the body. Drinking black tea and taking some medications for depression might cause too much stimulation of the body and serious side-effects including fast heartbeat, high blood pressure, nervousness, and others. Some of these medications used for depression include phenelzine (Nardil), tranylcypromine (Parnate), and others.

Medications that slow blood clotting (Anticoagulant / Antiplatelet drugs): black tea might slow blood clotting. Taking black tea along with medications that also slow clotting might increase the chances of bruising and bleeding. Some medications that slow blood clotting include aspirin, clopidogrel (Plavix), diclofenac (Voltaren, Cataflam, others), ibuprofen (Advil, Motrin, others), naproxen (Anaprox, Naprosyn, others), dalteparin (Fragmin), enoxaparin (Lovenox), heparin, warfarin (Coumadin), and others.

Oestrogens can decrease how quickly the body breaks down caffeine. Taking oestrogen pills and drinking black tea can cause jitteriness, headache, fast heartbeat, and other side-effects. Some oestrogen pills include conjugated equine estrogens (Premarin), ethinyl oestradiol, oestradiol, and others.

Pentobarbital (Nembutal): the stimulant effects of the caffeine in black tea can block the sleep-producing effects of pentobarbital.

Phenylpropanolamine: caffeine in black tea can stimulate the body. Phenylpropanolamine can also stimulate the body. Taking caffeine and phenylpropanolamine together might cause too much stimulation and increase heartbeat, blood pressure, and cause nervousness.

Riluzole (Rilutek): drinking black tea can decrease how quickly the body breaks down riluzole (Rilutek) and increase the effects and side-effects of riluzole.

Stimulant drugs interacts with black tea. Stimulant drugs speed up the nervous system. By speeding up the nervous system, stimulant medications can make you feel jittery and speed up your heartbeat. The caffeine in black tea can also speed up the nervous system. Drinking black tea along with stimulant drugs might cause serious problems including increased heart rate and high blood pressure. Avoid taking stimulant drugs along with black tea.Some stimulant drugs include diethylpropion (Tenuate), epinephrine, phentermine (Ionamin), pseudoephedrine (Sudafed), and many others.

Theophylline: caffeine works similarly to theophylline. Caffeine can also decrease how quickly the body gets rid of theophylline. This might cause increased effects and side-effects of theophylline.

Verapamil (Calan, Covera, Isoptin, Verelan) can decrease how quickly the body gets rid of caffeine. Drinking black tea and taking verapamil (Calan, Covera, Isoptin, Verelan) can increase the risk of side-effects for caffeine including jitteriness, headache, and an increased heartbeat.

Warfarin (Coumadin) is used to slow blood clotting. Large amounts of black tea might decrease how well warfarin (Coumadin) slows blood clotting. Decreasing the how well warfarin (Coumadin) slows blood clotting might increase the risk of clotting. It is unclear why this interaction might occur. Be sure to have your blood checked regularly. The dose of your warfarin (Coumadin) might need to be changed.

Minor Interactions

Alcohol can decrease how quickly the body breaks down caffeine. Taking black tea along with alcohol might cause too much caffeine in the bloodstream and caffeine side-effects including jitteriness, headache, and fast heartbeat.

Birth control pills can decrease how quickly the body breaks down caffeine. Taking black tea along with birth control pills can cause jitteriness, headache, fast heartbeat, and other side-effects. Some birth control pills include ethinyl estradiol and levonorgestrel (Triphasil), ethinyl estradiol and norethindrone (Ortho-Novum 1/35, Ortho-Novum 7/7/7), and others.

Fluconazole (Diflucan) might decrease how quickly the body gets rid of caffeine. This could cause caffeine to stay in to body too long and increase the risk of side-effects such as nervousness, anxiety, and insomnia.

Medications for depression (Tricyclic Antidepressants): tannins can bind to many medications and decrease how much medicine the body absorbs. To avoid this interaction avoid tea one hour before and 2 hours after taking medications for depression called tricyclic antidepressants. Some medications for depression include amitriptyline (Elavil) or imipramine (Tofranil, Janimine).

Medications for diabetes: black tea might increase blood sugar. Diabetes medications are used to lower blood sugar. By increasing blood sugar, black tea might decrease the effectiveness of diabetes medications. Monitor your blood sugar closely. The dose of your diabetes medication might need to be changed. Some medications used for diabetes include glimepiride (Amaryl), glyburide (DiaBeta, Glynase PresTab, Micronase), insulin, pioglitazone (Actos), rosiglitazone (Avandia), chlorpropamide (Diabinese), glipizide (Glucotrol), tolbutamide (Orinase), and others.

Mexiletine (Mexitil) can decrease how quickly the body breaks down caffeine. Taking Mexiletine (Mexitil) along with black tea might increase the caffeine effects and side-effects of black tea.

Phenothiazines: Tannins can bind to many medications and decrease how much medicine the body absorbs. To avoid this interaction avoid tea one hour before and 2 hours after taking phenothiazine medications. Some phenothiazine medications include fluphenazine (Permitil, Prolixin), chlorpromazine (Thorazine), haloperidol (Haldol), prochlorperazine (Compazine), thioridazine (Mellaril), and trifluoperazine (Stelazine).

Terbinafine (Lamisil) can decrease how quickly the body gets rid of caffeine and increase the risk of side-effects including jitteriness, headache, increased heartbeat, and other effects.

**Safety in children:** A 2014 meta-analysis concluded that children and adolescents should limit daily caffeine consumption to 2.5 mg kg(-1) body weight day(-1), equating to one or two cups of tea .[[150]](#footnote-151)

**Overdose:** Exceeding 6 cups of tea daily could increase tremor and anxiety in susceptible individuals.

**Green tea**

**Latin name***: Camellia sinensis* (L.) Kuntze non-fermentatum.

**Family:** Theaceae (tea family).

**Common names:** Green tea.

**Part used:** whole or cut young, unfermented, rapidly hot dried leaf of Camellia sinensis and its cultivated varieties.

**Key constituents**:  Flavonoids: flavonols: quercetin, kaempferol, myricetin mainly as 3-O-glycosides Flavones: apigenin, luteolin as C-glucuronides Flavanols: (flavan-3-ols 10-25%): (-)-epicatechin (EC), (-)-epicatechin-3-O-gallate (ECG), (-)- epigallocatechin (EGC) and (-)-epigallocatechin-3-O-gallate (EGCG) Phenolic acids: including among others, chlorogenic acid, gallic acid, theogallin, amino acids: 19 amino acids, amongst which theanine [5-N-ethyl glutamine (3% w/w)], terpene saponins (theafolia saponins): aglycones including among others, barringtogenol C, R1- barringenol, polysaccharides (13 %) and proanthocyanidins (tannins).

**Background:**

Green tea is commonly consumed in Asia but was introduced into Europe in the 17th century. Traditionally, green tea has been used for the relief of fatigue and weakness, as a diuretic and for stomach disorders.[[151]](#footnote-152)

**Health properties:**

Green tea and its constituent catechins have been shown to reduce body fat. A 2005 12-week controlled study in Japanese men found that green tea extract reduced body fat, BMI, body weight and waist circumference.[[152]](#footnote-153) A 2009 study in 107 Caucasian subjects also found that green tea extract reduced abdominal fat.[[153]](#footnote-154) A 2009 meta-analysis of 11 trials concluded that green tea catechins reduced body weight and body fat.[[154]](#footnote-155)

Green tea has also been shown to reduce cardiovascular risk. A 2001 meta-analysis of tea intake (black and green) found that the incidence rate of myocardial infarction is estimated to decrease by 11% with an increase in tea consumption of 3 cups/day.[[155]](#footnote-156) A 2006 study in Japanese men found that green tea consumption was associated with reduced cardiovascular risk in particular reduced risk of stroke.[[156]](#footnote-157) Green tea drinking (120-599 ml daily) has ben associated with a 46% reduced risk of hypertension.[[157]](#footnote-158) A 2015 meta-analysis found that green tea is associated with reduced CVD mortality and reduced mortality overall. [[158]](#footnote-159)There is further evidence to suggest that green tea reduces the risk of diabetes (6 cups daily) and some cancers.[[159]](#footnote-160)

**Contraindications:** High doses (more than 6 cups daily) should be avoided due to the caffeine content

***Use in pregnancy*:** The UK FSA recommends that pregnant women should limit caffeine intake to no more than 200 mg daily (4 cups of tea).

***Use in lactation*:** An intake of 6 cups of tea (300mg caffeine) each day should not be exceeded.

**Warnings and precautions:** As for black tea.

**Effect on ability to drive or operate machinery:** No effects expected.

**Adverse reactions:** Rare reports of mild gastrointestinal disturbance, headache and dizziness.

**Interactions:** As for black tea.

**Safety in children:** No information available, but see black tea.

**Overdose:** Exceeding 6 cups of tea daily could increase tremor and anxiety in susceptible individuals.

**Nettle tea**

***Latin name****: Urtica dioica* L., *Urtica urens* L.

**Family:** Urticaceae (nettle family)

**Common names:** Common nettle, stinging nettle

**Part used:** Leaf and root.

**Key constituents**: Minerals: copper and magnesium; flavonoids: kaempferol, isorhamnetin, quercetin; amines: histamine, choline; acids: carbonic acid, oxalic acid, citric acid.[[160]](#footnote-161)

**Background:**

Traditionally, nettle has been used as a diuretic, for minor urinary complaints, painful joints and seborrhoeic skin conditions. The European Medicines Authority has confirmed these indications in its well documented monographs. [[161]](#footnote-162)

**Health properties:**

Studies on the health properties of nettle have been conducted in animals and the laboratory setting. A 2000 study in rats showed that nettle has a diuretic effect while a 2004 study in mice produce a dose-dependent effect in reducing pain. The EMA states that this analgesic activity supports both the use of nettle in joint pain and in seborrhoeic (inflammatory) skin conditions.[[162]](#footnote-163)

**Contraindications:** Contraindicated in patients with hypersensitivity to nettle herb and in condition where a reduced fluid intake is recommended (e.g. severe cardiac or renal disease).

***Use in pregnancy*:** Category B2: No increase in malformations or other harmful effects on the foetus from limited use in pregnant women. Animal studies are lacking.

Some unreferenced reports suggest that nettle is an abortifacient and may affect the menstrual cycle, and its use should be avoided during pregnancy.

***Use in lactation*:** Category C: Both leaf and root are compatible with breast feeding.

**Warnings and precautions:** In irrigation therapy, care must be taken to ensure abundant fluid intake.

**Effect on ability to drive or operate machinery:** No studies reported.

**Adverse reactions:** Mild gastrointestinal complaints, e.g. nausea, diarrhoea, vomiting and allergic reactions (e.g. itching, exanthema, hives) may occur. LD50 value for oral nettle tea infusion in rats is 1.31 g/kg (dried herb equivalent).

**Interactions:** None reported

**Safety in children:** No information available, but problems are not expected.

**Overdose:** None reported in the published literature.

**Echinacea tea**

***Latin name****:* *Echinacea angustifolia DC., radix.*

**Family:** Asteraceae (daisy family).

**Common names:** Echinacea, narrow-leaved coneflower.

**Part used:** Whole or cut dried underground parts.

**Key constituents**: Alkamides (0.5%): mainly isobutylamides or 2-methylbutylamides (eg, caffeic acid derivatives (1.0-1.4%): principally echinacoside (0.5-1.3%) with modest amounts of cynarin (0.12-0.14%), chlorogenic and cichoric acids; Polysaccharides and glycoproteins; volatile oil.

**Background:**

Traditionally, Echinacea has been used to treat upper respiratory tract infections including the common cold, catarrh and tonsillitis. The European Medicines Authority has confirmed these indications in its well documented monographs [[163]](#footnote-164)

**Health properties:**

A number of clinical studies in humans have shown that Echinacea has benefits in upper respiratory tract infections. A 1989 study among 289 volunteers from four military establishments found that Echinacea produced a 20% relative risk reduction in respiratory infection compared with placebo.[[164]](#footnote-165) A 2014 Cochrane review of 24 double-blind trials showed that Echinacea is associated with positive trends for the treatment of colds.[[165]](#footnote-166)

**Contraindications:** *Echinacea angustifolia* should not be used in progressive systemic diseases such as tuberculosis, diseases of the white blood cells system, collagenoses, multiple sclerosis, AIDS, HIV infections and other immune diseases.[[166]](#footnote-167) Echinacea should not be used by transplant patients taking immunosuppressant drugs such as cyclosporine.

***Use in pregnancy*:** Category A: No proven increase in the frequency of malformation or other harmful effects on the foetus despite consumption by a large number of pregnant women. A prospective, controlled study 2000 concluded that gestational use of Echinacea during organogenesis (organ development in pregnancy) was not associated with an increased risk of major malformations.

***Use in lactation*:** Category C: Compatible with breast feeding.

**Warnings and precautions:** Allergic reactions: may cause contact dermatitis, particularly if known allergy to member of the Asteraceae (daisy) family.

**Effect on ability to drive or operate machinery:** No adverse effects expected.

**Adverse reactions:** Adverse reactions to Echinacea are infrequent and typically consist of digestive upset. The unpleasant taste and increased salivation caused by liquid Echinacea preparations may cause distress to some people.

Hypersensitivity reactions may rarely occur, particularly if the aerial parts of Echinacea are used.A systematic review, based on clinical studies, case reports and surveillance programmes of national medicines regulatory authorities and WHO, concluded that Echinacea products have a good safety profile when taken in the short term, while data on long term use is not available. If adverse events occur they tend to be transient and reversible, the most common being gastrointestinal or skin related.[[167]](#footnote-168)

Leucopoenia (reduced white blood cell count) and erythema nodosum (a severe skin reaction) linked to Echinacea has been documented in case reports.

Misinformation exists that Echinacea is potentially hepatotoxic due to the presence of pyrrolizidine alkaloids (PAs). However, the PAs found in Echinacea species do not contain the 1,2-unsaturated necrine ring system that is the cause of liver damage, so are completely safe.

**Interactions:** Echinacea should not be prescribed with long-term immunosuppressant medicine, as it may theoretically decrease the effectiveness of the drug. No case reports have been published.

**Safety in children:** No information available. Due to the slight risk of allergy, the MHRA advises that use is avoided in children under 12 years, unless under the care of a medical herbalist.

**Overdose:** None reported in the published literature.

**Lemon verbena**

***Latin name****: Aloysia citrodora* Palau (was previously known as *Lippia citrodora* Palau).

**Family:** Verbenaceae (verbena family).

**Common names:** Lemon verbena, Cedrón, Herb Louisa, Hierba Luisa, Lemon-Scented Verbena.

**Part used:** Aerial parts.

**Key constituents**: C[itral](https://en.wikipedia.org/wiki/Citral) (30-35%), [nerol](https://en.wikipedia.org/wiki/Nerol) and [geraniol](https://en.wikipedia.org/wiki/Geraniol).[[168]](#footnote-169) Extracts of lemon verbena also contain [verbascoside](https://en.wikipedia.org/wiki/Verbascoside).[[[169]](#footnote-170)](https://en.wikipedia.org/wiki/Aloysia_citrodora#cite_note-14)

**Background:**

Traditionally, lemon verbena has been used for digestive disorders, including indigestion, gas, colic, diarrhoea and constipation. It has also been used for the treatment of mild agitation, joint pain, poor sleep (insomnia), asthma, colds, fever, haemorrhoids, varicose veins, skin conditions and “chills”.

**Health properties:**

Various studies have found that lemon verbena may reduce oxidative stress.[[170]](#footnote-171)-173 A 2005 study suggested that lemon verbena had an anti-*Candida albicans* activity.174

**Contraindications:** None known.

***Use in pregnancy*:** No research available, but generally considered safe.

***Use in lactation*:** No research available, but generally considered safe.

**Warnings and precautions:** Lemon verbena can cause skin irritation (dermatitis) in some people. Large amounts of lemon verbena (greater than 6 cups per day) could theoretically irritate the kidneys and make kidney disease worse. However, no cases have been noted.

Although some *in vitro* genotoxicity of verbascoside has been reported on human lymphocytes with an involvement of PARP-1 and p53 proteins,175 subsequent *in vivo* tests reported no genotoxicity for high dosage oral administration.176

**Effect on ability to drive or operate machinery:** No effects expected.

**Adverse reactions:** Lemon verbena can cause skin irritation (dermatitis) in some people.

**Interactions:** None expected.

**Safety in children:** No information currently available, but probably safe.

**Overdose:** None reported in the published literature.

1. Lakenbrink C et al. (2000) Flavonoids and other polyphenols in consumer brews of tea and other caffeinated beverages. J Agric Food Chem, 48; 2848-2852 [↑](#footnote-ref-2)
2. Papanga G, et al (1999) The polyphenolic content of fruit and vegetables and their antioxidant activities. What does a serving constitute? Free Rad Res 30(2): 153-162 [↑](#footnote-ref-3)
3. Vinson JA, et al (1995) Plant flavonoids, especially tea flavonols, are powerful antioxidants using an in vitro oxidation model for heart disease. J Agric Food Chem 43 (11):2800-2802 [↑](#footnote-ref-4)
4. Rice- Evans CA, et al (1995) The relative antioxidant activities of plant derived polyphenolic flavonoids. Free Rad Res 2214 (4): 375-383 [↑](#footnote-ref-5)
5. [Standley L](http://www.ncbi.nlm.nih.gov/pubmed?term=Standley%25252520L%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=11170567), [Winterton P](http://www.ncbi.nlm.nih.gov/pubmed?term=winterton%25252520p%2525255bauthor%2525255d&cauthor=true&cauthor_uid=11170567), [Marnewick JL](http://www.ncbi.nlm.nih.gov/pubmed?term=marnewick%25252520jl%2525255bauthor%2525255d&cauthor=true&cauthor_uid=11170567) et al. Influence of processing stages on antimutagenic and antioxidant potentials of rooibos tea. [J Agric Food Chem.](http://www.ncbi.nlm.nih.gov/pubmed/11170567) 2001;49(1):114-7. [↑](#footnote-ref-6)
6. [Joubert E](http://www.ncbi.nlm.nih.gov/pubmed?term=Joubert%25252520E%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18621121), [Gelderblom WC](http://www.ncbi.nlm.nih.gov/pubmed?term=gelderblom%25252520wc%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18621121), [Louw A](http://www.ncbi.nlm.nih.gov/pubmed?term=louw%25252520a%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18621121), [de Beer D](http://www.ncbi.nlm.nih.gov/pubmed?term=de%25252520Beer%25252520D%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18621121). South African herbal teas: Aspalathus linearis, Cyclopia spp. and Athrixia phylicoides--a review. [J Ethnopharmacol.](http://www.ncbi.nlm.nih.gov/pubmed/18621121) 2008 Oct 28;119(3):376-412. [↑](#footnote-ref-7)
7. <https://www.redbushtea.com/pdfs/redbush_research_papers/paper_8.pdf> [↑](#footnote-ref-8)
8. <http://www.ncbi.nlm.nih.gov/pubmed/7681534> [↑](#footnote-ref-9)
9. <http://www.sciencedirect.com/science/article/pii/S1383571807001234> [↑](#footnote-ref-10)
10. [Marnewick JL](http://www.ncbi.nlm.nih.gov/pubmed?term=Marnewick%25252520JL%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20833235), [Rautenbach F](http://www.ncbi.nlm.nih.gov/pubmed?term=rautenbach%25252520f%2525255bauthor%2525255d&cauthor=true&cauthor_uid=20833235), [Venter I](http://www.ncbi.nlm.nih.gov/pubmed?term=Venter%25252520I%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20833235) et al. Effects of rooibos (Aspalathus linearis) on oxidative stress and biochemical parameters in adults at risk for cardiovascular disease. [J Ethnopharmacol.](http://www.ncbi.nlm.nih.gov/pubmed/20833235) 2011 Jan 7;133(1):46-52. [↑](#footnote-ref-11)
11. [Bramati L](http://www.ncbi.nlm.nih.gov/pubmed?term=Bramati%25252520L%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=12236672), [Minoggio M](http://www.ncbi.nlm.nih.gov/pubmed?term=minoggio%25252520m%2525255bauthor%2525255d&cauthor=true&cauthor_uid=12236672), [Gardana C](http://www.ncbi.nlm.nih.gov/pubmed?term=gardana%25252520c%2525255bauthor%2525255d&cauthor=true&cauthor_uid=12236672) et al. Quantitative characterization of flavonoid compounds in Rooibos tea (Aspalathus linearis) by LC-UV/DAD. [J Agric Food Chem.](http://www.ncbi.nlm.nih.gov/pubmed/12236672) 2002 Sep 25;50(20):5513-9. [↑](#footnote-ref-12)
12. [Kondo M](http://www.ncbi.nlm.nih.gov/pubmed?term=Kondo%25252520M%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=24261664), [Hirano Y](http://www.ncbi.nlm.nih.gov/pubmed?term=Hirano%25252520Y%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=24261664), [Nishio M](http://www.ncbi.nlm.nih.gov/pubmed?term=nishio%25252520m%2525255bauthor%2525255d&cauthor=true&cauthor_uid=24261664) et al. Xanthine oxidase inhibitory activity and hypouricemic effect of aspalathin from unfermented rooibos. [J Food Sci.](http://www.ncbi.nlm.nih.gov/pubmed/24261664) 2013 Dec;78(12):H1935-9. [↑](#footnote-ref-13)
13. Shimamura N, Miyase T, Umehara K, Warashina T, Fujii S. Phytoestrogens from Aspalathus linearis. *Biol Pharm Bull*. 2006 Jun; 29(6):1271-4. [↑](#footnote-ref-14)
14. Standley L, Winterton P, Marnewick JL, Gelderblom WCA, Joubert, Britz TJ. Influence of processing stages on antimutagenic and antioxidant potentials of rooibos tea. *J. Agric. Food Chem.* 2001; 49(1): 114–117. [↑](#footnote-ref-15)
15. [http://www.webmd.com/vitamins-supplements/ingredientmono-311-fennel.aspx?activeingredientid=311&activeingredientname=fenne](http://www.webmd.com/vitamins-supplements/ingredientmono-311-fennel.aspx?activeingredientid=311&activeingredientname=fennel) [↑](#footnote-ref-16)
16. <http://www.ncbi.nlm.nih.gov/pubmed/12868253> [↑](#footnote-ref-17)
17. <http://www.uofmhealth.org/health-library/hn-2089002> [↑](#footnote-ref-18)
18. <http://www.uofmhealth.org/health-library/hn-2089002>

 Tanira MOM, Shah AH, Mohsin A, et al. Pharmacological and toxicological investigations on *Foeniculum vulgare* dried fruit extract in experimental animals. *Phytother Res* 1996;10:33-6. [↑](#footnote-ref-19)
19. Ostad SN, Soodi M, Shariffzadeh M, Khorshidi N, Marzban H. The effect of fennel essential oil on uterine contraction as a model for dysmenorrhea, pharmacology and toxicology study. J Ethnopharmacol. 2001;76:299–344. [[PubMed](http://www.ncbi.nlm.nih.gov/pubmed/11448553)] [↑](#footnote-ref-20)
20. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3611645/> [↑](#footnote-ref-21)
21. <http://www.ncbi.nlm.nih.gov/pubmed/23240972> [↑](#footnote-ref-22)
22. Asero R. Fennel, cucumber, and melon allergy successfully treated with pollen-specific injection immunotherapy. *Annals of Allergy, Asthma & Immunology*. 2000; 84(4):460-462. [↑](#footnote-ref-23)
23. Stager J, Wuthrich B, Johannson SGO. Spice allergy in celery-sensitive patients. Allergy. 1991 August; 46(6): 475–478. [↑](#footnote-ref-24)
24. Rance F, Dutau G. Practical strategy for the diagnosis of food allergies. *Pediatric Pulmonology* - Supplement. 1997;16:228–229. [↑](#footnote-ref-25)
25. Pastorello EA, Farioli L, Stafylaraki C, Scibilia J, Giuffrida MG, Mascheri A, Piantanida M, Baro C, Primavesi L, Nichelatti M, Schroeder JW, Pravettoni V. Fennel Allergy Is a Lipid-Transfer Protein (LTP)-Related Food Hypersensitivity Associated with Peach Allergy. *J Agric Food Chem.* 2013 Jan 23;61(3):740-746. [↑](#footnote-ref-26)
26. Zhu M, Wong PY, Li RC. Effect of oral administration of fennel (Foeniculum vulgare) on ciprofloxacin absorption and disposition in the rat. J Pharm Pharmacol. 1992; 51: 1391-1396. [↑](#footnote-ref-27)
27. Caldwell J, Sutton JD. Influence of dose size on the disposition of trans-[methoxy-14C]anethole in human volunteers. *Food Chem Toxicol*. 1988; 26:87-91. [↑](#footnote-ref-28)
28. Liquorice - Wikipedia, the free encyclopedia [↑](#footnote-ref-29)
29. <http://www.nlm.nih.gov/medlineplus/druginfo/natural/881.html> [↑](#footnote-ref-30)
30. <https://www.ncbi.nlm.nih.gov/pubmed/18446848> [↑](#footnote-ref-31)
31. <http://umm.edu/health/medical/altmed/herb/licorice> [↑](#footnote-ref-32)
32. <http://umm.edu/health/medical/altmed/herb/licorice> [↑](#footnote-ref-33)
33. <https://www.ncbi.nlm.nih.gov/pubmed/8783808> [↑](#footnote-ref-34)
34. <https://www.ncbi.nlm.nih.gov/pubmed/21681505> [↑](#footnote-ref-35)
35. <http://www.ncbi.nlm.nih.gov/pubmed/25032255> [↑](#footnote-ref-36)
36. <http://www.ncbi.nlm.nih.gov/pubmed/17462578> [↑](#footnote-ref-37)
37. [http://www.ijpp.com/IJPP%20archives/1959\_3\_1/39-47.pdf](http://www.ijpp.com/IJPP%252520archives/1959_3_1/39-47.pdf) [↑](#footnote-ref-38)
38. <http://www.nlm.nih.gov/medlineplus/druginfo/natural/881.html> [↑](#footnote-ref-39)
39. Chamberlain TJ. Licorice Poisoning, Pseudoaldosteronism, and Heart Failure. *JAMA*. 1970; 213:1343; Koster M. David GK. Reversible severe hypertension due to licorice ingestion. *N Engl J Med*. 1968; 278: 492-496; Conn JW, Rovner DR, Cohen EL. Licorice-Induced Pseudoaldosteronism Hypertension, Hypokalemia, Aldosteronopenia, and Suppressed Plasma Renin Activity. *JAMA*. 1968; 205: 492-496. [↑](#footnote-ref-40)
40. Lozano P., Flores D., Martínez S., Artigues I., Rimbau E., Gómez F. Upper limb ischemia induced by chronic licorice ingestion. *J Cardiovasc Surg* (Torino).2000; 41: 631–632. [↑](#footnote-ref-41)
41. Hasegawa J, Suyama Y, Kinugawa T, Morisawa T, Kishimoto Y. Echocardiographic findings of the heart resembling dilated cardiomyopathy during hypokalemic myopathy due to licorice-induced pseudoaldosteronism. *Cardiovasc Drugs Ther.* 1998; 12: 599–600. [↑](#footnote-ref-42)
42. Stormer FC, Reistad R, Alexander J. Glycyrrhizic acid in liquorice-evaluation of health hazard. Food Chem Toxicol. 1993 Apr; 31(4): 303-312. [↑](#footnote-ref-43)
43. Firenzuoli F, Gori L. Rhabdomyolysis due to liquorice ingestion. Recenti Prog Med 2002; 93: 482–483; Saito T, Tsuboi Y, Fujisawa G, Sakuma N, Honda K, Okada K, Saito K, Ishikawa. An autopsy case of licorice-induced hypokalemic rhabdomyolysis associated with acute renal failure: special reference to profound calcium deposition in skeletal and cardiac muscle. *Nihon Jinzo Gakkai Shi.* 1994 Nov; 36(11):1308-1314. [↑](#footnote-ref-44)
44. rmanini D, Bonanni G, Palermo M. Reduction of serum testosterone in men by licorice. *N Engl J Med.* 1999. Oct 7;341(15): 1158. [↑](#footnote-ref-45)
45. Armanini D, Bonanni G, Palermo M. Reduction of serum testosterone in men by licorice. *N Engl J Med.* 1999. Oct 7;341(15): 1158. [↑](#footnote-ref-46)
46. Al Qarawi AA, Abdel-Rahman HA, Ali BH, El Mougy SA. Liquorice (*Glycyrrhiza glabra*) and the adrenal-kidney-pituitary axis in rats. *Food and chemical toxicology.* 2002; 40 (10): 1525-1527. [↑](#footnote-ref-47)
47. Ruszymah BH, Nabishah BM, Aminuddin S, Khalid BA. Effects of glycyrrhizic acid on right atrial pressure and pulmonary vasculature in rats. *Clin Exp Hypertens.* 1995 Apr; 17(3): 575-591. [↑](#footnote-ref-48)
48. [Herrera-Arellano A](http://www.ncbi.nlm.nih.gov/pubmed?term=Herrera-Arellano%25252520A%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=15330492), [Flores-Romero S](http://www.ncbi.nlm.nih.gov/pubmed?term=Flores-Romero%25252520S%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=15330492), [Chávez-Soto MA](http://www.ncbi.nlm.nih.gov/pubmed?term=Ch%252525C3%252525A1vez-Soto%25252520MA%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=15330492), [Tortoriello J](http://www.ncbi.nlm.nih.gov/pubmed?term=tortoriello%25252520j%2525255bauthor%2525255d&cauthor=true&cauthor_uid=15330492). Effectiveness and tolerability of a standardized extract from Hibiscus sabdariffa in patients with mild to moderate hypertension: a controlled and randomized clinical trial. [Phytomedicine.](http://www.ncbi.nlm.nih.gov/pubmed/15330492) 2004 Jul; 11(5):375-82. [↑](#footnote-ref-49)
49. [Herrera-Arellano A](http://www.ncbi.nlm.nih.gov/pubmed?term=Herrera-Arellano%25252520A%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=17315307), [Miranda-Sánchez J](http://www.ncbi.nlm.nih.gov/pubmed?term=Miranda-S%252525C3%252525A1nchez%25252520J%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=17315307), [Avila-Castro P](http://www.ncbi.nlm.nih.gov/pubmed?term=Avila-Castro%25252520P%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=17315307) et al. Clinical effects produced by a standardized herbal medicinal product of Hibiscus sabdariffa on patients with hypertension. A randomized, double-blind, lisinopril-controlled clinical trial. [Planta Med.](http://www.ncbi.nlm.nih.gov/pubmed/17315307) 2007 Jan;73(1):6-12. [↑](#footnote-ref-50)
50. [Mozaffari-Khosravi H](http://www.ncbi.nlm.nih.gov/pubmed?term=Mozaffari-Khosravi%25252520H%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18685605), [Jalali-Khanabadi BA](http://www.ncbi.nlm.nih.gov/pubmed?term=jalali-khanabadi%25252520ba%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18685605), [Afkhami-Ardekani M](http://www.ncbi.nlm.nih.gov/pubmed?term=afkhami-ardekani%25252520m%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18685605) et al. The effects of sour tea (Hibiscus sabdariffa) on hypertension in patients with type II diabetes. [J Hum Hypertens.](http://www.ncbi.nlm.nih.gov/pubmed/18685605) 2009 Jan;23(1):48-54 [↑](#footnote-ref-51)
51. .[McKay DL](http://www.ncbi.nlm.nih.gov/pubmed?term=McKay%25252520DL%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Chen CY](http://www.ncbi.nlm.nih.gov/pubmed?term=Chen%25252520CY%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Saltzman E](http://www.ncbi.nlm.nih.gov/pubmed?term=Saltzman%25252520E%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Blumberg JB](http://www.ncbi.nlm.nih.gov/pubmed?term=Blumberg%25252520JB%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807). Hibiscus sabdariffa L. tea (tisane) lowers blood pressure in prehypertensive and mildly hypertensive adults. [J Nutr.](http://www.ncbi.nlm.nih.gov/pubmed/20018807) 2010 Feb;140(2):298-303 [↑](#footnote-ref-52)
52. [Mozaffari-Khosravi H](http://www.ncbi.nlm.nih.gov/pubmed?term=Mozaffari-Khosravi%25252520H%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18685605), [Jalali-Khanabadi BA](http://www.ncbi.nlm.nih.gov/pubmed?term=jalali-khanabadi%25252520ba%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18685605), [Afkhami-Ardekani M](http://www.ncbi.nlm.nih.gov/pubmed?term=afkhami-ardekani%25252520m%2525255bauthor%2525255d&cauthor=true&cauthor_uid=18685605) et al. The effects of sour tea (Hibiscus sabdariffa) on hypertension in patients with type II diabetes. [J Hum Hypertens.](http://www.ncbi.nlm.nih.gov/pubmed/18685605) 2009 Jan;23(1):48-54 [↑](#footnote-ref-53)
53. [McKay DL](http://www.ncbi.nlm.nih.gov/pubmed?term=McKay%25252520DL%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Chen CY](http://www.ncbi.nlm.nih.gov/pubmed?term=Chen%25252520CY%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Saltzman E](http://www.ncbi.nlm.nih.gov/pubmed?term=Saltzman%25252520E%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807), [Blumberg JB](http://www.ncbi.nlm.nih.gov/pubmed?term=Blumberg%25252520JB%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=20018807). Hibiscus sabdariffa L. tea (tisane) lowers blood pressure in prehypertensive and mildly hypertensive adults. [J Nutr.](http://www.ncbi.nlm.nih.gov/pubmed/20018807) 2010 Feb;140(2):298-303 [↑](#footnote-ref-54)
54. Ali B, Al-Wabel NA, Blunden G. Phytochemical, pharmacological and toxicological aspects of *Hibiscus sabdariffa* L.: A review. *Phytother Res*, 2005; 19(5): 369-375. [↑](#footnote-ref-55)
55. Fakeye TO, Pal A, Bawankule DU, Yadav NP, Khanuja SPS. Toxic effects of oral administration of extracts of dried calyx of Hibiscus sabdariffa Linn.(Malvaceae). *Phytother Res*. 2009; 23(3): 412-416. [↑](#footnote-ref-56)
56. Sireeratawong S, Itharat A, Khonsung P, Lertprasertsuke N, Jaijoy K. Toxicity Studies of the Water Extract from the Calyces of *Hibiscus sabdariffa* L. in Rats. *Afr J Tradit Complement Altern Med*. 2013; 10(4): 122-127. [↑](#footnote-ref-57)
57. Mahmoud YI. Effect of extract of Hibiscus on the ultrastructure of the testis in adult mice. *Acta Histochem.* 2012 Jul;114(4): 342-8. [↑](#footnote-ref-58)
58. <http://www.twinings.co.uk/tea-club/yerba-mate> [↑](#footnote-ref-59)
59. <http://www.twinings.co.uk/tea-club/yerba-mate> [↑](#footnote-ref-60)
60. <https://www.ncbi.nlm.nih.gov/pubmed/20599603> [↑](#footnote-ref-61)
61. <https://www.ncbi.nlm.nih.gov/pubmed/20599603> [↑](#footnote-ref-62)
62. <https://www.ncbi.nlm.nih.gov/pubmed/20599603> [↑](#footnote-ref-63)
63. <https://www.ncbi.nlm.nih.gov/pubmed/20599603> [↑](#footnote-ref-64)
64. Martin I, Lopez-Vilchez MA, Mur A. Neonatal withdrawal syndrome after chronic maternal drinking of mate. *Ther Drug Monit*. Feb 2007; 29(1):127-129. [↑](#footnote-ref-65)
65. Martin I, Lopez-Vilchez MA, Mur A. Neonatal withdrawal syndrome after chronic maternal drinking of mate. *Ther Drug Monit*. Feb 2007; 29(1):127-129. [↑](#footnote-ref-66)
66. Deneo-Pellegrini H, Ronco AL, De Stefani E. Food groups and risk of prostate cancer: a case-control study in Uruguay. *Cancer Causes Control*. Jul 2012; 23(7): 1031-1038. [↑](#footnote-ref-67)
67. De Stefani E, Correa P, Fierro L. Black tobacco, mate, and bladder cancer. A case-control study from Uruguay. *Cancer.* Jan 15 1991; 67(2): 536-540; De Stefani E, Boffetta P, Deneo-Pellegrini H, et al. Non-alcoholic beverages and risk of bladder cancer in Uruguay. *BMC Cancer*. 2007; 7: 57; Bates MN, Hopenhayn C, Rey OA. Bladder cancer and mate consumption in Argentina: a case-control study. *Cancer Lett.* Feb 8 2007; 246(1-2): 268-273. [↑](#footnote-ref-68)
68. Szymanska K, Matos E, Hung RJ. Drinking of mate and the risk of cancers of the upper aerodigestive tract in Latin America: a case-control study. *Cancer Causes Control*. Nov 2010; 21(11): 1799-1806; Pintos J, Franco EL, Oliveira BV. Mate, coffee, and tea consumption and risk of cancers of the upper aerodigestive tract in southern Brazil. *Epidemiology*. Nov 1994; 5(6): 583-590. [↑](#footnote-ref-69)
69. De Stefani E, Fierro L, Correa P. Mate drinking and risk of lung cancer in males: a case-control study from Uruguay. *Cancer Epidemiol Biomarkers Prev.* Jul 1996; 5(7): 515-519. [↑](#footnote-ref-70)
70. Goldenberg D, Lee J, Koch WM. Habitual risk factors for head and neck cancer. *Otolaryngol Head Neck Surg*. Dec 2004; 131(6): 986-993. [↑](#footnote-ref-71)
71. Loria D, Barrios E, Zanetti R. Cancer and yerba mate consumption: a review of possible associations. *Rev Panam Salud Publica.* Jun 2009; 25(6): 530-539. [↑](#footnote-ref-72)
72. de Andrade F1, de Albuquerque CA, Maraschin M, da Silva EL. Safety assessment of yerba mate (*Ilex paraguariensis*) dried extract: results of acute and 90 days subchronic toxicity studies in rats and rabbits . *Food Chem Toxicol*. 2012 Feb; 50(2): 328-34. [↑](#footnote-ref-73)
73. McGee J, Patrick RS, Wood CB. A case of veno-occlusive disease of the liver in Britain associated with herbal tea consumption. *J Clin Pathol.* Sep 1976; 29(9): 788-794. [↑](#footnote-ref-74)
74. A review of the Bioactivity and Potential Health Benefits of Chamomile Tea by Diane L. McKay and Jeffrey B. Blumberg [↑](#footnote-ref-75)
75. University of Maryland Medical Centre [↑](#footnote-ref-76)
76. <http://www.sciencedaily.com/releases/2005/01/050104112140.htm> [↑](#footnote-ref-77)
77. Letsgohealthy.blogspot [↑](#footnote-ref-78)
78. Letsgohealthy.blogspot [↑](#footnote-ref-79)
79. Letsgohealthy.blogspot [↑](#footnote-ref-80)
80. Letsgohealthy.blogspot [↑](#footnote-ref-81)
81. Letsgohealthy.blogspot [↑](#footnote-ref-82)
82. .Mann C, Staba EJ. The chemistry, pharmacology and commercial formulations of chamomile, in: “*Herbs, spices and medicinal plants*”. 1986; vol 1, Oryx Press, Phoenex, p 265. [↑](#footnote-ref-83)
83. Shipochliev T. Uterotonic action of extracts from a group of medicinal plants. *Vet Med Nauki.* 1981; 18: 94-98. [↑](#footnote-ref-84)
84. Anliker MD, Borelli S, Wüthrich B. Occupational protein contact dermatitis from spices in a butcher: a new presentation of the mugwort-spice syndrome. *Contact Dermatitis*. 2002 Feb; 46(2): 72-74; Bossuyt L, Dooms-Goossens A. Contact sensitivity to nettles and camomile in 'alternative' remedies. *Contact Dermatitis*. 1994 Aug; 31(2): 131-132. [↑](#footnote-ref-85)
85. Casterline CL; Allergy to Chamomile Tea. *JAMA*. 1980; 244(4): 330-331. [↑](#footnote-ref-86)
86. 23.Giordano-Labadie F, Schwarze HP, Bazex J. Allergic contact dermatitis from camomile used in phytotherapy. Contact Dermatitis 2000; 42(4): 247; Pereira F1, Santos R, Pereira A. Contact dermatitis from chamomile tea. *Contact Dermatitis*. 1997 Jun; 36(6): 307; Rodríguez-Serna M1, Sánchez-Motilla JM, Ramón R, Aliaga A. Allergic and systemic contact dermatitis from *Matricaria chamomilla* tea. *Contact Dermatitis*. 1998 Oct; 39(4): 192-193; Rudzki E, Rebandel P. Positive patch test with Kamillosan in a patient with hypersensitivity to camomile. *Contact Dermatitis*. 1998 Mar; 38(3): 164. [↑](#footnote-ref-87)
87. Foti C, Nettis E, Panebianco R, Cassano N, Diaferio A, Pia DP. Contact urticaria from *Matricaria chamomilla*. *Contact Dermatitis*. 2000 Jun; 42(6): 360-361. [↑](#footnote-ref-88)
88. Schempp CM, Schöpf E, Simon JC. Durch Pflanzen ausgelöste toxische und allergische Dermatitis (Phytodermatitis). *Der Hautarzt.* 2002; 53(2): 93-97. [↑](#footnote-ref-89)
89. Abramson MJ, Sim, MR, Fritschi L, Vincent T, Benke G, Rolland JM. Respiratory disorders and allergies in tea packers. *Occupational Medicine*. 2001; 51(4): 259-265. [↑](#footnote-ref-90)
90. Subiza J, Subiza JL, Alonso M, Hinojosa M, Garcia R, Jerez M, Subiza E. Allergic conjunctivitis to chamomile tea. *Ann Allergy*. 1990 Aug; 65(2): 27-32. [↑](#footnote-ref-91)
91. Subiza J, Subiza JL, Hinojosa M, Garcia R, Jerez M, Valdivieso R, Subiza E. Anaphylactic reaction after the ingestion of chamomile tea: a study of cross-reactivity with other composite pollens. *J Allergy Clin Immunol*. 1989 Sep; 84(3): 353-358. [↑](#footnote-ref-92)
92. Hurrell RF, Reddy M, Cook JD. Inhibition of non-haem iron absorption in man by polyphenolic-containing beverages. *Br J Nutr*. 1999 Apr; 81(4): 289-295. [↑](#footnote-ref-93)
93. Della Loggia R, Traversa U, Scarcia V, Tubaro A. Depressive effects of *Chamomilla recutita* (L.) rausch, tubular flowers, on central nervous system in mice. *Pharmacological Research Communications* 1982; 14(2): 153-162. [↑](#footnote-ref-94)
94. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf> page 16 [↑](#footnote-ref-95)
95. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf> page 19 [↑](#footnote-ref-96)
96. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf> page 16 [↑](#footnote-ref-97)
97. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf> page 17 [↑](#footnote-ref-98)
98. West I, Maibach HI. Contact urticaria syndrome from multiple cosmetic components. *Contact Dermatitis*. 1995 Feb; 32(2): 121. [↑](#footnote-ref-99)
99. Sourgens H, Winterhoff H, Gumbinger HG, Kemper FH. Antihormonal effects of plant extracts. TSH- and Prolactin-suppressing properties of Lithospermum officinale and related plants. *Planta Medica.* 1982; 45, 78-86. [↑](#footnote-ref-100)
100. Schimmer O, Krüger A, Paulini H, Haefele F.An evaluation of 55 commercial plant extracts in the Ames mutagenicity test. *Pharmazie*. 1994 Jun; 49(6): 448-451. [↑](#footnote-ref-101)
101. [www.fitday.com](http://www.fitday.com) [↑](#footnote-ref-102)
102. The Herb Book by John Lust [↑](#footnote-ref-103)
103. University of Maryland Medical Centre [↑](#footnote-ref-104)
104. <http://www.sciencedaily.com/releases/2011/04/110419101234.htm> [↑](#footnote-ref-105)
105. University of Maryland Medical Centre [↑](#footnote-ref-106)
106. <http://www.ncbi.nlm.nih.gov/pubmed/16767798> [↑](#footnote-ref-107)
107. <http://www.ncbi.nlm.nih.gov/pubmed/16767798> [↑](#footnote-ref-108)
108. Evaluation of certain food additives (Fifty-first report of the Joint FAO/WHO Expert Committee on Food Additives). WHO Technical Report Series, No. 891, 2000. [↑](#footnote-ref-109)
109. Herro E, Jacob SE. *Mentha piperita* (peppermint). *Dermatitis*. 2010 Nov-Dec; 21(6): 327-329. [↑](#footnote-ref-110)
110. Hurrell RF, Reddy M, Cook JD. Inhibition of non-haem iron absorption in man by polyphenolic-containing beverages. *Br J Nutr*. 1999 Apr; 81(4): 289-295. [↑](#footnote-ref-111)
111. Della Loggia R, Tubaro A, Lunder TL. Evaluation of some pharmacological activities of a peppermint extract. *Fitoterapia*. 1990; 61: 215-221. [↑](#footnote-ref-112)
112. Akdogan M, Kilinç I, Oncu M, Karaoz E, Delibas N. Investigation of biochemical and histopathological effects of *Mentha piperita* L. and *Mentha spicata* L. on kidney tissue in rats. *Hum Exp Toxicol*. 2003 Apr; 22(4): 213-219 [↑](#footnote-ref-113)
113. <http://www.medicalnewstoday.com/articles/266128.php> [↑](#footnote-ref-114)
114. University of Maryland Medical Centre [↑](#footnote-ref-115)
115. <http://www.ipcbee.com/vol15/10-U00041.pdf> [↑](#footnote-ref-116)
116. <http://www.medicalnewstoday.com/articles/266128.php> [↑](#footnote-ref-117)
117. Akdogan M, Kilinç I, Oncu M, Karaoz E, Delibas N. Investigation of biochemical and histopathological effects of *Mentha piperita* L. and *Mentha spicata* L. on kidney tissue in rats. *Hum Exp Toxicol*. 2003 Apr; 22(4): 213-219. [↑](#footnote-ref-118)
118. Herro E, Jacob SE. *Mentha piperita* (peppermint). *Dermatitis*. 2010 Nov-Dec; 21(6): 327-329. [↑](#footnote-ref-119)
119. Hurrell RF, Reddy M, Cook JD. Inhibition of non-haem iron absorption in man by polyphenolic-containing beverages. *Br J Nutr*. 1999 Apr; 81(4): 289-295. [↑](#footnote-ref-120)
120. Akdogan M, Kilinç I, Oncu M, Karaoz E, Delibas N. Investigation of biochemical and histopathological effects of *Mentha piperita* L. and *Mentha spicata* L. on kidney tissue in rats. *Hum Exp Toxicol*. 2003 Apr; 22(4): 213-219. [↑](#footnote-ref-121)
121. http://naturaldatabaseconsumer.therapeuticresearch.com/ [↑](#footnote-ref-122)
122. .[Cohen M](http://www.ncbi.nlm.nih.gov/pubmed?term=Cohen%25252520M%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=22762068). Rosehip - an evidence based herbal medicine for inflammation and arthritis. [Aust Fam Physician.](http://www.ncbi.nlm.nih.gov/pubmed/22762068) 2012 Jul;41(7):495-8. [↑](#footnote-ref-123)
123. [Christensen R](http://www.ncbi.nlm.nih.gov/pubmed?term=Christensen%25252520R%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18407528), [Bartels EM](http://www.ncbi.nlm.nih.gov/pubmed?term=Bartels%25252520EM%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18407528), [Altman RD](http://www.ncbi.nlm.nih.gov/pubmed?term=Altman%25252520RD%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=18407528) et al. Does the hip powder of Rosa canina (rosehip) reduce pain in osteoarthritis patients?--a meta-analysis of randomized controlled trials. [Osteoarthritis Cartilage.](http://www.ncbi.nlm.nih.gov/pubmed/18407528) 2008 Sep;16(9):965-72. [↑](#footnote-ref-124)
124. [Andersson U](http://www.ncbi.nlm.nih.gov/pubmed?term=Andersson%25252520U%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=22166897), [Berger K](http://www.ncbi.nlm.nih.gov/pubmed?term=Berger%25252520K%2525255BAuthor%2525255D&cauthor=true&cauthor_uid=22166897), [Högberg A](http://www.ncbi.nlm.nih.gov/pubmed?term=h%252525c3%252525b6gberg%25252520a%2525255bauthor%2525255d&cauthor=true&cauthor_uid=22166897) et al. Effects of rose hip intake on risk markers of type 2 diabetes and cardiovascular disease: a randomized, double-blind, cross-over investigation in obese persons. [Eur J Clin Nutr.](http://www.ncbi.nlm.nih.gov/pubmed/22166897) 2012 May;66(5):585-90. [↑](#footnote-ref-125)
125. Winther K, Apel K, Thamsborg G. A powder made from seeds and shells of a rose-hip subspecies (*Rosa canina*) reduces symptoms of knee and hip osteoarthritis: a randomized, double-blind, placebo-controlled clinical trial. *Scand J Rheumatol.* 2005 Jul-Aug; 34(4): 302-308. [↑](#footnote-ref-126)
126. Andersson U, Berger K, Högberg A, Landin-Olsson M, Holm C. Effects of rose hip intake on risk markers of type 2 diabetes and cardiovascular disease: a randomized, double-blind, cross-over investigation in obese persons. *Eur J Clin Nutr*. 2012 May; 66(5): 585-590. [↑](#footnote-ref-127)
127. Kwaselow A, Rowe M, Sears-Ewald D, Ownby D. Rose hips: a new occupational allergen. *J Allergy Clin Immunol.* 1990 Apr; 85(4): 704-708. [↑](#footnote-ref-128)
128. Roth DA, Breitenfield RV. Vitamin C and Oxalate Stones. *JAMA.* 1977; 237(8): 768. [↑](#footnote-ref-129)
129. <http://www.medicalnewstoday.com/articles/189359.php> [↑](#footnote-ref-130)
130. <http://www.ncbi.nlm.nih.gov/pubmed/23865123> [↑](#footnote-ref-131)
131. <http://www.ncbi.nlm.nih.gov/pubmed/23865123> [↑](#footnote-ref-132)
132. <http://www.aafp.org/afp/2011/1115/od1.html#afp20111115p1-b7> [↑](#footnote-ref-133)
133. American College of Obstetricians and Gynecologists. ACOG practice bulletin: nausea and vomiting of pregnancy. *Obstet Gynecol*. 2004;103 (4):803–814. [↑](#footnote-ref-134)
134. Fischer-Rasmussen W1, Kjaer SK, Dahl C, Asping U. Ginger treatment of hyperemesis gravidarum. *Eur J Obstet Gynecol Reprod Biol.* 1991 Jan 4; 38(1): 19-24. [↑](#footnote-ref-135)
135. Bordia A, Verma SK, Srivastava KC. Effect of ginger (*Zingiber officinale* Rosc.) and fenugreek (*Trigonella foenumgraecum* L.) on blood lipids, blood sugar and platelet aggregation in patients with coronary artery disease. Prostaglandins. *Leukot Essent Fatty Acids*. 1997 May; 56(5): 379-84. [↑](#footnote-ref-136)
136. Zuskin E, Kanceljak B, Skuric Z, Pokrajac D, Schachter EN, Witek TJ, Maayani S. Immunological and respiratory findings in spice-factory workers. *Environ Res.*1988 Oct; 47(1): 95-108; Futrell JM, Rietschel RL. Spice allergy evaluated by results of patch tests. *Cutis*. 1993 Nov; 52(5): 288-90; Kanerva L, Estlander T, Jolanki R. Occupational allergic contact dermatitis from spices. *Contact Dermatitis*. 1996 Sep; 35(3): 157-62. [↑](#footnote-ref-137)
137. De Smet PAGM, Keller K, Hansel R. (Eds). “Adverse effects of herbal drugs”, vol 3). 1992; Springer-Verlag, Berlin, p 221. [↑](#footnote-ref-138)
138. Lumb AB. Effect of dried ginger on human platelet function. *Thromb Haemost*. 1994 Jan; 71(1): 110-1. [↑](#footnote-ref-139)
139. Mascolo N, Jainb R, Jain SC, Capasso F. Ethnopharmacologic investigation of ginger (*Zingiber officinale*). *J Ethnopharmacol.* 1989 November; 27(1–2): 129–140. [↑](#footnote-ref-140)
140. Qureshi S, Shah AH, Tariq M, Ageel AM. Studies on Herbal Aphrodisiacs Used in Arab System of Medicine. *Am J Chin Med.* 1989; 17:01n02: 57-63. [↑](#footnote-ref-141)
141. Unnikrishnan MC, Kuttan R. Cytotoxicity of extracts of spices to cultured cells. *Nutr Cancer.* 1988; 11: 251–7 [↑](#footnote-ref-142)
142. Balachandran B, Sivaswamy SN, Sivaramakrishnan VM. Genotoxic effects of some foods & food components in Swiss mice. *Indian J Med Res*. 1991 Oct; 94: 378-83. [↑](#footnote-ref-143)
143. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_Community\_herbal\_monograph/2014/04/WC500165888.pdf [↑](#footnote-ref-144)
144. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-145)
145. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-146)
146. Hodgson et al. AM J Clin Nutr 2013; 97:543-50. http://www.ncbi.nlm.nih.gov/pubmed/23553154 [↑](#footnote-ref-147)
147. Zhao et al 2015. Clinical Nutrition 2015; 34:612-9 http://www.ncbi.nlm.nih.gov/pubmed/24972454 [↑](#footnote-ref-148)
148. Tang et al. Br J Nutr 2015, July 23: 1-11http://www.ncbi.nlm.nih.gov/pubmed/26202661 [↑](#footnote-ref-149)
149. Bohn et al. Functional Food 2014; 5(17):1613-1620. http://www.ncbi.nlm.nih.gov/pubmed/24889137 [↑](#footnote-ref-150)
150. Ruxton C. [J Hum Nutr Diet.](http://www.ncbi.nlm.nih.gov/pubmed/25099503) 2014 Aug;27(4):342-57

http://www.ncbi.nlm.nih.gov/pubmed/25099503 [↑](#footnote-ref-151)
151. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-152)
152. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-153)
153. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-154)
154. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-155)
155. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-156)
156. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-157)
157. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-158)
158. Tang et al. Br J Nutr 2015, July 23: 1-11http://www.ncbi.nlm.nih.gov/pubmed/26202661 [↑](#footnote-ref-159)
159. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2014/04/WC500165886.pdf [↑](#footnote-ref-160)
160. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2009/12/WC500017975.pdf [↑](#footnote-ref-161)
161. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2009/12/WC500017975.pdf [↑](#footnote-ref-162)
162. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2009/12/WC500017975.pdf [↑](#footnote-ref-163)
163. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2012/05/WC500127888.pdf [↑](#footnote-ref-164)
164. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2012/05/WC500127888.pdf [↑](#footnote-ref-165)
165. http://www.ncbi.nlm.nih.gov/pubmed/24554461 [↑](#footnote-ref-166)
166. <http://www.ema.europa.eu/docs/en_GB/document_library/Herbal_-_HMPC_assessment_report/2013/08/WC500147187.pdf> [↑](#footnote-ref-167)
167. http://www.ema.europa.eu/docs/en\_GB/document\_library/Herbal\_-\_HMPC\_assessment\_report/2012/05/WC500127888.pdf [↑](#footnote-ref-168)
168. Lawless, J., *The Illustrated Encyclopaedia of Essential Oils*, [ISBN 1-85230-661-0](https://en.wikipedia.org/wiki/Special%3ABookSources/1852306610) [↑](#footnote-ref-169)
169. Funes L, Fernández-Arroyo S, Laporta O, Pons A, Roche E, Segura-Carretero A, Fernández-Gutiérrez A and Micol V, Food Chemistry, 2009, Volume 117, No. 4, pages. 589-598. [↑](#footnote-ref-170)
170. Malekirad, Ali Akbar; Hosseini, Nasser; Bayrami, Mansour; Hashemi, Touraj; Rahzani, Kobra; Abdollahi, Mohammad “Benefit of Lemon Verbena in Healthy Subjects; Targeting Diseases Associated with Oxidative Stress” Asian Journal of Animal & Veterinary Advances; Sep 2011, Vol. 6 Issue 9, p953.

171 Funes, L; Carrera-Quintanar L; Cerdán-Calero M; Ferrer MD; Drobnic F; Pons A; Roche E; Micol V (Apr 2011). "Effect of lemon verbena supplementation on muscular damage markers, proinflammatory cytokines release and neutrophils' oxidative stress in chronic exercise". Eur J Appl Physiol. 111 (4): 695–705.

172 Carrera-Quintanar, L.; Funes L; Viudes E; Tur J; Micol V; Roche E; Pons A. (18 Nov 2010). "Antioxidant effect of lemon verbena extracts in lymphocytes of university students performing aerobic training program". Scand J Med Sci Sports.

173 Funes L; S. Fernández-Arroyo; O. Laporta; A. Pons; E. Roche; A. Segura-Carretero (2009). "Correlation between plasma antioxidant capacity and verbascoside levels". Food Chemistry 117: 589–598.

174 Teixeira D.; et al. (2005). "Anti-Candida activity of Brazilian medicinal plants". Journal of Ethnopharmacology 97 (2): 305–11.

175 Antonietta Santoro; et al. (2008). "Verminoside- and verbascoside-induced genotoxicity on human lymphocytes: Involvement of PARP-1 and p53 proteins". Toxicology Letters 178 (2): 71–76.

176 Santos-Cruz, L. F. et al. (Mar 2012). "Verbascoside is not genotoxic in the ST and HB crosses of the Drosophila wing spot test, and its constituent, caffeic acid, decreases the spontaneous mutation rate in the ST cross". Food Chem Toxicol. 50 (3–4): 1082–90.

**Bibliography**

Mills S, Bone K. “*The essential guide to herbal safety*”. 2005 Elsevier. [↑](#footnote-ref-171)