



GI Detox™+ – Scientific Validation of Botanical Ingredients

Zeolite

Medicinal Actions:

Adsorbent, anti-inflammatory, antioxidant, immunomodulatory.^{1,2}

Traditional Use:

Zeolite is a collective name for minerals and chemical compounds within the group of silicates.¹ Due to the unique arrangement of the atoms and the water-binding capacities of the microporous structure, zeolite minerals act like a “rock-sponge”.¹ Traditional applications of natural clay include skin conditions as well as gastrointestinal disorders such as diarrhoea, irritable bowel syndrome, mercury poisoning, and nausea.^{3,4} Medical applications of zeolites have been used in filtration systems for anesthesia and dialysis and as contrast materials in nuclear magnetic resonance imaging. Zeolite powders for external use include application as deodorants, antimycotic agents and wound dressings.⁵

Scientific Evidence:

Zeolites are hydrated crystalline aluminosilicates of volcanic or synthetic origin with unique adsorption and dehydrating-rehydrating properties.^{2,5,6} Zeolites can act as an inorganic cation-exchanger, adsorbent, detergent builder, and active reservoir for metal-catalyzed reactions.¹ Zeolites are minerals and chemical compounds within the group of silicates with a microporous and distinctive three-dimensional structure which have a negative charge.^{1,2} The three dimensional channel surfaces enables zeolites to trap molecules, with high exchange capacity for certain cations and capacity to adsorb contaminants.⁷

In a clinical trial, zeolite supplementation has been shown to beneficially affect intestinal barrier integrity, accompanied by mild anti-inflammatory effects in individuals undergoing regular aerobic exercise training.¹

Safety Summary:

Consumption of 1,845 mg/day of zeolite has been shown to be safe for 12 weeks in otherwise healthy endurance trained athletes.¹ When ingested, powdered zeolites (like almost all silicates), are inert and therefore do not react chemically with food or body fluids or their metabolites.² The risk of any associated adverse effects is therefore insignificant.² Avoid during pregnancy and breastfeeding as safety has not been scientifically established during these times.

Activated Charcoal

Medicinal Actions:

Absorptive agent, adsorptive agent.⁸

Traditional Use:

Charcoal has been used for thousands of years in Egyptian, Greek, Roman and Hindu cultures for medicinal purposes.⁹ The activated form of charcoal has been used for the past century for gastric decontamination following the ingestion of toxic substances.⁹ Activated charcoal is considered to be an effective remedy for the treatment of toxic ingestions with the exception of those caused by corrosive agents, cyanide, iron, mineral acids, organic solvents, and heavy metals.⁸

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Scientific Evidence:

Activated charcoal is considered to be the most effective absorptive and adsorptive agent.⁸ It helps prevent the absorption of substances within the gastrointestinal tract, thereby decreasing systemic absorption of potentially toxic chemicals.⁹ Activated charcoal also enhances elimination by interrupting the reabsorption of chemicals excreted directly into the gastrointestinal tract from systemic circulation (enteroenteric recycling), or chemicals secreted in bile (enterohepatic recycling).¹⁰ It is made from pulverized carbonaceous substances that produce charcoal.⁸ Charcoal is activated by a process called pyrolysis, which expands its surface area, causing the charcoal to develop millions of tiny pores between the carbon atoms.⁸ The pore structure of activated carbon makes the adsorbent suitable for adsorption, a process by which molecules are captured and trapped within the internal pores via electrostatic attractions.⁸ The average surface area of activated charcoal ranges between 200-800 m²/gram. The vast surface area provides activated charcoal with numerous bonding sites, which allows it to adsorb poisons and other substances, thereby preventing them from being absorbed or reabsorbed into the blood circulation.⁸

To date, there have been numerous animal and volunteer studies, as well as clinical studies (case series and reports) performed to assess the efficacy of activated charcoal in the treatment of acute poisoning.^{11,12} Research has demonstrated enhanced elimination and clinical benefits for the uses of both, single and multiple doses of activated charcoal.^{11,12} In a clinical trial, administration of activated charcoal significantly reduced exposure to rivaroxaban (an anticoagulant agent), suggesting that it could be used in overdose and accidental ingestion to antagonise absorption.¹³

Safety Summary:

Considered safe when used orally short term.¹⁴ In therapeutic doses (25-100 grams for adolescents and adults, and 25-50 grams or 0.5-1 gram/kg for children aged 1 to 12 years).¹⁵ Administration of 50 grams of activated charcoal has been safely used without serious adverse events in otherwise healthy volunteers.¹³ Activated charcoal is contraindicated in patients with unprotected airways and decreased levels of consciousness who are not intubated.⁹ It is also contraindicated in therapeutic doses if its use increases the risk or severity of aspiration, particularly in cases of ingestion of hydrocarbons (such as kerosene, lighter fluid and lamp oil).⁹ Adverse reactions following the ingestion of corrosives (acids or alkalis) may lead to vomiting, obscure endoscopic visualization,⁹ constipation, black stools, gastrointestinal obstruction, and pulmonary aspiration.¹⁴ Administration following the ingestion of corrosives may also cause charcoal leaking into the peritoneum in cases of perforation.⁹ Caution should be exercised when administering charcoal in therapeutic doses in patients who are at risk of gastric haemorrhage or perforation. Caution is also advised in patients who have ingested a substance that puts them at risk for sudden onset of seizures, or sudden decrease of mental status (e.g. clonidine or tricyclic antidepressants).⁹ Considered safe during pregnancy and breastfeeding when used orally short term.¹⁴

Aloe Vera (*Aloe barbadensis*)

Medicinal Actions:

Antifungal,¹⁶ antiinflammatory,¹⁷ antimicrobial, antiviral, demulcent, emollient, immune enhancing, vulnerary.¹⁸

Traditional Use:

Aloe vera has traditionally been used internally as a general tonic, antiinflammatory, carminative, laxative, and anthelmintic agent.¹⁶ In Ayurvedic medicine, aloe gel has been used as a tonic for the liver, spleen and the blood due to its bitter, astringent, pungent, sweet and cooling properties.¹⁹

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Scientific Evidence:

The key phytochemical compounds of aloe gel include anthraquinones, polysaccharides and glycoproteins.¹⁸ Aloe resin, the solid residue obtained from the latex¹⁸ consists of mainly hydroxyanthracene derivatives.²⁰ Aloe vera has been reported to improve parameters of gastrointestinal function including colonic bacterial activity, gastrointestinal pH, stool specific gravity and gastrointestinal motility.¹⁶ It is also indicated for inflammatory conditions of the gastrointestinal tract.²¹

Several clinical trials have reported the beneficial effects of aloe vera administration. Aloe gel has been shown to reduce histological disease activity in patients with ulcerative colitis.^{22,23} Aloe latex has also demonstrated improvements in a range of constipation indicators including bowel movement frequency, stool consistency, and laxative dependence.²³ Supplementation with *Aloe barbadensis* extract (AVH200®) has demonstrated improvement in pain severity, pain frequency and bloating in adult patients with irritable bowel syndrome.²⁴ Oral administration of aloe vera gel has also been found to reduce the growth of *Candida albicans* in the spleen and kidney (animal research).²⁵

Based on *in vitro* experiments, aloe possesses antimicrobial activity against a number of pathogens including *Pseudomonas aeruginosa*, *Streptococcus pyogenes*, *Staphylococcus aureus* (methicillin-resistant strains), *Escherichia coli*, *Shigella flexneri*, *Enterobacter cloacae* and *Enterococcus bovis*.¹⁶

Safety Summary:

Contraindicated in persons with a known hypersensitivity to aloe vera.¹⁸ Considered safe and well tolerated at the dose recommended, with no known interactions.¹⁷ No adverse effects expected during pregnancy and breastfeeding.¹⁷

MMST Silica

Medicinal Actions:

Adsorptive agent²⁶ plays a role in optimal connective tissue health.²⁷

Traditional Use:

Silicon is the third most abundant trace element within the human body, it can be found in higher concentrations in the skin, as well as mucous membranes and connective tissues.²⁸ Silicon rarely occurs as a pure free element, rather it forms strong bonds with oxygen and mainly exists as silica or silicate compounds.²⁹ Silicon is an essential mineral for bone formation, it improves bone matrix quality, facilitates bone mineralization and plays a role in optimal connective tissue health.²⁷ Silicon, in the form of monomethyl silanetriol (MMST) has been used for decades as an oral silica supplement for bone and connective tissue health.³⁰

Scientific Evidence:

MMST is a monomeric, organosilicon molecule that is stable in aqueous solution at high concentrations when compared to its naturally occurring inorganic analogue.³⁰ Supplementation with silica in the form of Silicea Gastrointestinal Gel, has been shown to significantly improve gastrointestinal symptoms associated with functional gastrointestinal disorders.²⁶ Due to its extremely hydroscopic nature, silicic acid readily binds with water, resulting in very large surface areas (i.e. a surface area of 300 m²/g has been measured from a particle size of approximately 4 µm). When mixed with water, silicon dioxide forms a gel, allowing various molecules (bacteria, acids, ions, organic poisons and gas) to be adsorbed into its structure, thereby aiding in their elimination from the body.²⁶ Silica in the form of silicic acid may also provide protection to the gastrointestinal mucous membrane. Clinical evidence suggests silica gel can help reduce abdominal pain, distension and nausea as well as decrease stool frequency and the duration in subjects with diarrhea.²⁶

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Safety Summary:

MMST silica is considered safe as it does not contain nano-silica particles unlike some silicon supplements, over which safety concerns have been expressed. Supplementation with 10.5 mg of MMST per day for 4 weeks has been shown to be safe with no adverse effects or serum biochemical changes in otherwise healthy pre-menopausal women.³⁰ Considered safe during pregnancy and breastfeeding when used in amounts commonly found in food.³¹ The estimated dietary intake of silicon ranges between 21-46 mg/day.³²

Apple Pectin

Medicinal Actions:

Antiinflammatory, antioxidant,³³ prebiotic,³⁴ prophylactic.^{35,36}

Traditional Use:

Pectin is a type of soluble fiber found in cell walls of all higher plants.³³ Traditionally apple pectin is primarily used in the treatment of digestive disorders due to its high fiber content and the ability to regulate bowel movements. Pectin also acts as an antioxidant.³³

Scientific Evidence:

Apple pectin is a complex polysaccharide, it exhibits a high degree of esterification and a particularly high content of branched side chains.³⁴ Consumption of pectin is associated with maintenance of normal blood cholesterol concentrations and a reduction of post-prandial glycaemic responses.³⁴ It also exerts prebiotic effects and is fermented by the microflora in the large intestine resulting in the formation of short chain fatty acids. Pectin also acts as a natural prophylactic agent against poisoning with toxic cations.³⁵ It has been shown to be effective in removing lead and mercury from the gastrointestinal tract.³⁷ Consumption of pectin is also reported to have an antiinflammatory effect by modulating the composition and metabolism of the complex gut microbiota and promoting the production of interleukin-10.

Safety Summary:

Pectin is considered safe and well tolerated in dietary amounts.³⁸ Pectin has Generally Recognized as Safe (GRAS) status. Consumption of 10 grams of apple pectin powder twice daily for 6 months has been safe and well tolerated without serious adverse reactions or significant hematological or biochemical changes in individuals with duodenal ulcers.³⁹ Considered safe during pregnancy and breastfeeding.³⁸

Humic Acid / Fulvic Acid

Medicinal Actions:

Antiinflammatory, antioxidant, chelating agent, complement activator,⁴⁰ detoxifying agent.^{41,42}

Traditional Use:

Humic substances occur naturally as biogenic, heterogeneous organic substances. They can be subdivided into humic acid, fulvic acid, and humin. Humic substances can be found in soils, waters, sewage, compost heaps, marine and lake sediments, peat bogs, carbonaceous shales, lignites, and brown coals.⁴³

Scientific Evidence:

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The humic substances, such as fulvic acid and humic acid, are the results of degradation of organic matter, mainly vegetal substances.⁴⁰ Components of humic substances are divided to humins, humic acid, and fulvic acids according to their solubility in water at different pH levels. Humic acid is soluble in water under alkaline conditions and has a molecular weight of 5–10 kDa. Humic acid is not absorbable from the intestinal tract. It plays an important role in buffering the pH, cleansing the colon, and detoxifying the body by blocking the absorption of toxins. Fulvic acid is soluble in water under diverse pH conditions and because of its low molecular weight (around 2 kDa), it is well absorbed in the intestinal tract and eliminated within hours from the body.⁴⁰ Fulvic acid is thought to be a strong antioxidant, antiinflammatory agent, and memory enhancer and likely has systemic effects as a complement activator.⁴⁰ Novel investigations indicate that fulvic acid acts as an antiaggregation factor of tau protein *in vitro*, therefore fulvic acid may also be of interest for prevention of Alzheimer's disease.⁴⁰ Fulvic acid constituents are believed to chelate minerals and deliver them to their cellular targets.^{41,42}

Safety Summary:

Despite its long standing safe use in Ayurvedic medicine,⁴⁰ presently there is limited scientific information regarding the safety of humic acid.⁴⁴ Supplementation with fulvic acid (3.8% 5-40 mL twice daily) for 3-7 days has been safely used without any serious adverse effects in individuals with predetermined atopy.⁴³ Avoid the use of humic/fulvic acid during pregnancy and breastfeeding as safety has not been scientifically established during these times.^{44,45}

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