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## Dietary Supplements and Herbs to Support and Promote Detoxification By Dr. Eman Sadeek Fadlalla

### Abstract:

Detoxification was defined by Centers for Disease Control and Prevention's Agency for Toxic Substances & Disease Registry as "the process of removing a poison or toxin or the effect of either from an area or individual ". Clinical toxicology books define detoxification as conversion of "toxic parent compounds to nontoxic metabolites," or "all reactions, enzyme- catalyzed or not, that consume toxic metabolites without producing injury.

Detoxification for the body may refer to the cleansing of the bowels, kidneys, lungs, the liver or the blood, since these are the organs involved in detoxification of chemicals and toxins from the body. The liver acts as an "in-line" filter for the removal of foreign substances and wastes from the blood. The kidneys filter wastes from the blood into the urine, while the lungs remove volatile gases as we breathe.

Our body is designed to utilize natural substances, which includes foods, herbs and phytochemicals. Any foreign substance will serve as a stimulus to our immune system, which has the function of removing these substances. Although the toxicity of a chemical may vary, it is the job of the liver to reduce toxins into compounds that the body can safely handle and eliminate through the kidneys (as urine), skin (as sweat), lungs (as expelled air) and bowels (as feces). Maintaining these eliminative organs in good working order is essential for one's good health to continue. This review focuses on dietary supplements and herbs to support & promote detoxification.

**Keywords:** Supplements, Herbs, Detoxification.

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## Detoxification

The term “detoxification” has become common in today’s society, generally referring to weight loss, addiction recovery, or a panacea for numerous nonspecific ailments. Approaches to detoxification are highly variable, nonstandardized, and often controversial. The clinical definition of detoxification is less vague. The Centers for Disease Control and Prevention’s Agency for Toxic Substances & Disease Registry defines de- toxification as “the process of removing a poison or toxin or the effect of either from an area or individual.” [1] Clinical toxicology books define detoxification as conversion of “toxic parent compounds to nontoxic metabolites,” or “all reactions, enzyme- catalyzed or not, that consume toxic metabolites without producing injury.” [2], [3] There are virtually no standardized clinical practice guidelines or textbooks in the field of detoxification. Within complementary and alternative medicine (CAM), there may be a large variation between CAM practitioners’ use of detoxification therapies, depending on schooling, subsequent training, or individually developed protocols. It is unclear what methods are used by CAM practitioners on a regular basis for the purpose of detoxification (for diagnosis or treatment).

## Detoxification diets

Detoxification diets, or detox diets for short, are a group of short-term diets intended to release accumulated toxins and waste products from the body. They are based on a theory of digestion and elimination usually associated with naturopathy, an alternative medical system that emphasizes the role of nutrition in restoring or improving the body’s own self-healing properties. In general, detox diets emphasize the following:

- Minimal intake of chemicals on or in food by choosing organic or non-processed foods
- Increased intake of fruits, vegetables, and other foods thought to aid the process of detoxification
- Increased intake of foods and fluids that speed up the processes of urination and defecation [4]

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Diets are very important and are usually the basis for any detox program, whether it is herbs, cleansing or other detox programs.[1] Detox diets will generally eliminate trigger foods, which may cause many problems with digestion and elimination [5].

### **Herbal Detoxification**

Generic diets for detoxification are good, but may not stimulate the liver, lungs or the kidneys as much as one would like. Therefore, herbal cleanses are indicated when we want to hone our cleanse to a "sharp edge" and be organ specific. Of course, herbs are foods too and provide one with vitamins, minerals and enzymes for excellent nutrition. Herbs are powerful, because they may be combined together to fortify those herbs that aid specific organs. For example, herbal combinations that aid the liver may be found in many organic food stores.

While herbs may be taken at any time, they are best for detoxification purposes when they are used with a good diet also. It does not make any sense to take herbs to cleanse the liver if the bowels are clogged with junk or refined foods, since the liver dumps its toxins into the bowels. And while detoxification diets are effective by themselves, they may be reinforced and speeded up with herbs, which stimulate the eliminative organs.

Herbs may be used as teas, powders or extracts. Powders are usually encapsulated for easier swallowing, but are best when taken with meals and digestive enzymes. Extracts may be used when specific herbs are needed, but may be extracted with alcohol, which we need to avoid. Herbal teas are easily made and easily taken all throughout the day [5].

### **Detox supplements for Liver support:**

Water-soluble toxins can pass through our bodies unchanged and be eliminated in the stool, sweat or urine. Fat-soluble toxins, however, cannot be excreted without undergoing metabolic transformation (detoxification) in the liver so that they can become water-soluble. Liver cells have sophisticated mechanisms to break down toxic substances. These include both endogenous (produced by the body) and exogenous (obtained from the environment; i.e., xenobiotics) substances [6], [7].

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Metabolism of harmful substances in the body involves phase I and phase II reactions (by the action of enzymes)

phase I: carried out mostly by cytochrome P450 enzymes and may involve the generation of free radicals

phase II: process the by-products of phase I reactions and metabolites then excreted from the body.

phase I reactions can result in the production of more toxic substances (bioactivation, which can lead to hepatotoxicity and other tissue damage), so efficient phase II processing is desirable, a balance between phase I and phase II reactions is required i.e. stimulate both phase I and phase II simultaneously. Antioxidant activity may be associated with phase I reactions; antioxidant and phase II activity may also contribute to chemoprevention [8].

### **Use of dietary supplements to support and promote liver detoxification.**

#### **Schisandra**

Schisandra chinensis (Schizandra chinensis) fruit is indicated in traditional Chinese medicine (TCM) for chronic cough, nocturnal emission, spermatorrhoea, frequent urination, protracted diarrhoea, night sweats, wasting disorder, palpitations and insomnia [9], [10]. An ancient TCM text records that Schisandra is also often prescribed to “resolve wine toxins”. [11] Schisandra has been used in the Far East as a tonic, particularly in fatigue [12].

Schisandra lignans have enhanced phase I/II hepatic metabolism in vivo when administered orally in experimental models. [13], [14] In addition, oral doses of Schisandra water extract or lignans: increased the metabolism of oestradiol;7 promoted metabolism of alcohol; [15] decreased ethanol-induced oxidative stress [16], [17].

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### **Rosemary Leaf**

Leaf of *Rosmarinus officinalis* has been traditionally used for a range of conditions including sluggish digestion, flatulence, headache and to facilitate eliminatory functions. In France, it is regarded as a choleric and cholagogue, [18] thus improving hepatic and biliary function. [19] Culpeper recommended it for 'cold' diseases of the liver. [20] Rosemary leaf contains an essential oil, phenolic diterpenes (including carnosol and carnosic acid), rosmarinic acid, flavonoids and triterpenoids. [21] Oral doses of Rosemary extracts have induced phase I and phase II enzymes in vivo. [22] Extract had greater activity than isolated constituents administered by the same route. [22], [23] High oral doses of Rosemary extract enhanced the metabolism of endogenous oestrogens. [24]

### **St Mary's Thistle**

For centuries *Silybum marianum* (previously *Carduus marianus*) has been recommended in Europe for the treatment of liver disorders, [25] and more recently for jaundice, gallstones, gallbladder colic, hepatitis and haemorrhoids. [26] St Mary's Thistle fruit contains an active, lipophilic, flavanolignan mixture known as silymarin, which consists mainly of three isomers: silybin, silychristin and silydianin. Most standardised extracts contain 70–80% of flavanolignans calculated as silybin. [27] St Mary's Thistle has well-documented hepatoprotective activity in vivo, including reducing liver damage caused by paracetamol and alcohol. Some of the mechanisms of this activity include: scavenging of free radicals and inhibiting lipid peroxide formation (antioxidant activity), stabilising of cell membranes, including blocking the binding of toxins [28].

### **Amino acids and trimethylglycine**

Certain amino acids are used in phase 2 as the water soluble substance that is conjugated (attached) to the toxic molecule. These amino acids include glycine, taurine, and glutamine. [29]

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### **Green Tea**

Green tea (*Camellia sinensis*) compounds increase both phase 1 and phase 2 enzyme activities. [30] Research shows that green tea may have liver protective properties. [31], [32] In addition, green tea has been shown to block chromosomal (DNA) damage from chemicals in cigarette smoke. [33]

### **Turmeric**

Turmeric and its curcuminoids also exhibit strong antioxidant activity [34], enhance cellular resistance to oxidative damage [35], and enhance the body's natural antioxidant glutathione levels; which in turn aids the liver in detoxification [36]

### **Garlic**

Garlic appears to induce both phase 1 and phase 2 enzymes. [37] In addition, aged garlic extract may increase the glutathione level and glutathione related enzymes, which aid in detoxifying the body. [38] Research has also suggested that garlic extract may help to protect the body from heavy metal poisoning. [39]

### **Detox supplements for Inflammation support:**

#### **Turmeric:**

This is the bright yellow herb that gives traditional curry its color. It is one of the most powerful anti-inflammatory agents we know. It's really shocking what turmeric is capable of healing.

Turmeric can be hard to absorb so it's usually best taken in food where it lends its deep pigment to any food it comes into contact with, or in liquid extract form. As a powder, you can take turmeric in capsules or put a pinch of turmeric in boiling water; either drink straight or make a hot beverage with the turmeric water [40].

#### **Bromelain, quercetin and papain:**

These are three potent enzymes that have been long associated with reducing inflammation. You can get them in isolated form as a supplement and take them away

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from meals. Taking them before bed tends to work well. Bromelain is found in pineapples, quercetin is found most abundantly in capers, and papain is the enzyme found in papayas. You can find them as a supplement at most health-food stores. They are also very good digestive aids if you take them with meals [40].

#### **Aloe vera gel:**

In addition to being a wonderful tonic for your digestive tract, aloe is one of the most healing plants. They are meant to trigger healing wherever they go and as such, they reduce inflammation. Aloe can be used both topically and internally. Do pay attention to your bowel movements though, because it can sometimes have a laxative effect [40].

### **DETOXIFY COLON: COLON CLEANSING EXPLAINED**

A variety of health problems exist today which can all be traced back to the colon; abdominal pain, discomfort, constipation, diarrhea and lack of energy. Bowel movements are the basis of our health. If we don't have at least one bowel movement per day, we are already walking our way toward disease. These diseases even may lead to colon cancer. Therefore we require a regular cleanses of our colon, kidney, liver & gall bladder to keep our bodies healthy. A colon cleanse is the most important cleanse of all others [41].

#### **Different Types of Colon Cleansing**

The different methods of colon cleansing are 1) Colon Hydrotherapy, 2) Enemas, 3) Herbal supplements, 4) Laxatives and 5) Oxygen-based Cleansers. Here is a brief description about each of these cleansing methods.

1) Colon Hydrotherapy: In this process of colon cleansing warm and filtered water is used to fuse into the colon via a plastic tube. With this method, only the large intestine can be cleansed. Colon hydrotherapy process is also termed as 'colonic irrigation' and 'using colonemas.'

2) Enemas: The problem of constipation is being treated by this process of colon cleansing from many earlier centuries. The effectiveness of this treatment

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mainly depends on the type of enema used. Enemas are used to remove the waste material only from the lower part of the colon. Enemas are also useful in emptying the rectum. The different types of enemas are water enemas, coffee enemas, clay enemas, etc. Most people do not like inserting enemas through their rectal cavity.

3) Herbal Supplements: Nowadays, different herbal supplements are available on the market in the form of pills or capsules. These herbal supplements are very inexpensive and are not always fully effective in cleansing the bowel.

4) Laxatives: Like enemas these are also used as the temporary treatments of constipation. This treatment can be considered as the most dangerous treatment among all other colon cleansing methods as there may be serious dehydration and even loss of muscle round the colon lining.

5) Oxygen-based Cleansers: The best method among the entire colon cleansing methods is the Oxygen-based Cleansers. In this process of colon cleansing the compacted matter can be melt away by oxidation-reduction reaction. A good oxygen-based colon cleanser works in the whole system and can completely cleanse the entire intestinal tract and it also fully detoxifies the whole tract [41].

### **The best colon cleansing foods.**

#### **Fiber**

Plant-based diets containing generous amounts of vegetables, fruits, beans, seeds, nuts and whole grains are high in fiber, which is the essential, non-digestible component of food. A high-fiber diet supports a healthy digestive tract by sweeping debris from the colon, much like a broom. Fiber exercises the intestinal tract by stimulating peristalsis, the wave-like muscular contractions of the bowel that decrease bowel transit time. Fiber also holds moisture in the colon, softening the stool. We need both soluble and insoluble fiber for colon cleansing every day. Soluble fiber dissolves in water whereas insoluble does not. Insoluble fiber is especially good for improving elimination and preventing constipation. Soluble fiber increases beneficial bacteria, which produce natural antibiotics that eliminate potentially harmful bacteria such as Salmonella, Campylobacter and E. coli. Researchers believe adequate and consistent levels of healthy

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intestinal flora can also help prevent colon cancer. Soluble fiber is also binding cholesterol and aiding its passage through the body. Flax seed and oats top the list of foods highest in both soluble and insoluble fiber. Other foods high in soluble fiber include beans, peas, rice, barley, citrus, strawberry and apples. Foods high in insoluble fiber include whole wheat, rye, brown rice, barley, cabbage, beets, carrots, brussels sprouts, turnips, cauliflower and apple (with skin) [42].

### **Green Foods**

The high chlorophyll content of green foods (such as alfalfa, wheatgrass, barley grass, spirulina, blue-green algae) makes them ideal for colon cleansing. In addition to cleansing, chlorophyll soothes and heals damaged tissue in the digestive tract. It helps the body to obtain more oxygen and draws out toxins. For this reason, chlorophyll is called "the internal deodorant." [42].

### **Fermented Foods**

A diet high in refined carbohydrates and low in fiber reduces the number of friendly bacteria in the intestines, upsetting the balance of the body's intestinal ecosystem. Yogurt, kefir and other fermented foods such as miso and sauerkraut can replenish friendly bacteria. Bifidobacteria are most numerous in the colon, while Lactobacilli prevail in the small intestine. These beneficial bacteria synthesize vitamins from food remnants, degrade toxins, prevent colonization of disease-causing micro-organisms, crowd out less beneficial bacteria, stimulate the immune system and produce short-chain fatty acids that provide an energy source for cells lining the colon [42].

### **Water**

Water is the universal solvent, and an insufficient amount of it causes constipation and toxicity in the bowel and kidneys. Physical activity, fever, hot or dry climates and consumption of meat and salty foods all increase the need for water. The optimal amount varies widely, usually from six to 10 glasses a day. One useful formula is to drink half your weight in ounces. For example, if you weigh 120 pounds (55 kilograms), drink 60 ounces (eight glasses/two liters) of water per day. This can include pure water, herb tea or

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diluted fruit juices. Caffeinated beverages do not count because they are dehydrating. The best time to drink a glass of water is between meals or 20 minutes or more before eating; sip only small amounts with a meal. An important rule is: When thirsty, drink water—not pop or other beverages. Cleansing and nourishing are two equally important factors in the health equation. [42].

### Heavy Metal Detoxification

Heavy metals are metallic elements, which have a high atomic weight and a density much greater (at least 5 times) than water. There are more than 20 heavy metals, enhance the excretion of metals. [43], [44]. Heavy metals can also but four are of particular concern to human health: lead (Pb), cadmium (Cd), mercury (Hg) and inorganic arsenic (As). [45]. According to the US Agency for Toxic Substances and Disease Registry, these four heavy metals are four of the top six hazards present in toxic waste sites. They are highly toxic and can cause damaging effects even at very low concentrations.

We are exposed to heavy metal intake mainly through the environment, via the air, water and food. Occupational exposure can also be an issue in some instances. Herbs, which are capable of binding to heavy metals, but not making them more soluble as a result, are likely to have a key role in reducing the GIT absorption of these elements. This will help to free up the body's excretion mechanisms (which can be overloaded if there is a high intake). In addition, any herbs, which can actively encourage mobilization and excretion of heavy metals, will also further assist in reducing an individual's overall exposure [46].

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## Herbs used in Heavy Metal Detoxification

### Garlic

*Allium sativum* contains alliin as the main sulfur-containing amino acid. Garlic demonstrated a protective effect against heavy metal poisoning in rats. Oral co-administration of garlic with cadmium or organic mercury compounds for 12 weeks resulted in a decrease in the accumulation of heavy metals in liver, kidneys, bone and testes. (These are the target organs of cadmium poisoning.) [47]

Garlic at the higher dosage produced a decrease in mercury accumulation in the brain for animals treated with methyl. Garlic juice almost doubled the survival of rabbits exposed to severe lead poisoning. [48]

### Mercury

The oral feeding of fresh garlic to rats during the intraperitoneal injection of lead or cadmium reduced the accumulation of these metals and the biochemical alterations in the blood, liver and kidney. [49]

Oral administration of aqueous extract of fresh garlic reduced the clastogenic (gene damaging) effect caused by exposure to inorganic arsenic in mice [50].

### Milk Thistle

*Silybum marianum* fruit contains flavanolignans: silybin, silychristin, silydianin and 2,3-dehydro derivatives.[51] This flavanolignan mixture is commonly referred to as silymarin.

Oral administration of silybin (100 mg/kg/day, administered as silybin- $\beta$ -cyclodextrin complex) protected against iron-induced hepatic toxicity in rats. [52].

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The flavanolignans of *Silybum marianum* have demonstrated antioxidant activity and protection against drug-induced liver damage in clinical studies.

Silymarin (240 mg/day) also improved liver function in patients with liver disease caused by exposure to toxic levels of toluene or xylene. [53].

### **Cilantro**

The reputation of cilantro (*Coriandrum sativum*) is based on two published studies which purport to establish that it helped to eliminate mercury from patients in a number of cases [54], [55].

### **Conclusion**

Detoxification is essential for good health to exist. Our body must eliminate toxins daily or we would die immediately. Since our environment is more toxic today, our livers are over stressed with environmental toxins to deal with daily. Processing other toxins, when the liver is stressed, may be delayed. Detoxification is also a lifestyle change. For it is by the way we live that determines our health and how our liver processes toxins.

The dietary supplements discussed in this article are certainly not the only natural compounds capable of supporting and facilitating the detoxification process.

Although the focus of this article is on the use of dietary supplements, which may help promote liver detoxification, it should be understood that toxic overload should be treated with a comprehensive approach that also includes adapting to a healthier diet and reducing exposure to xenobiotics. Furthermore, since there can be side effects associated with a serious program of detoxification, it should generally be attempted with the help of a healthcare professional who is knowledgeable about the process.

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