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Taking Garlic the Right Way

Dosage Form Determines the Potency of Your Garlic Supplement

Despite the fact that allicin is widely reputed as the most potent constituent amongst the organosulfur compounds in garlic (often used to standardize garlic supplements), it is **a very unstable molecule, degrading at 23°C within hours upon exposure to air - making it a somewhat non-ideal constituent in carrying out medicinal actions in our body.**[1]

As a matter of fact, allicin does NOT exist in an intact clove of garlic. It is only formed from its **precursor alliin** catalyzed by alliinase when the garlic is structurally damaged such as being chewed or chopped. [1]

Due to allicin's highly volatile state, it has been suggested that the best way to administer garlic is by chewing the whole clove fresh since allicin does not become available in garlic unless tissue damage occurs; the action of chewing fresh garlic triggers the **conversion to allicin via the action of alliinase on alliin.[2] Minced or cooked garlic, on the other hand, has trace or no allicin left.** Though being the seemingly best route of administration, eating fresh garlic is often NOT a desirable method due to retained odour and irritation of the stomach linings.

In order to minimize the odour, some suggest taking freeze-dried fresh garlic supplements containing mostly alliin and alliinase so that alliin can be converted to allicin upon ingestion.

However, alliinase works optimally at pH 6.5 and is completely obliterated under the acidic conditions found in the stomach.[1]

Therefore, only trace or no alliin will be converted to allicin in the stomach - making such a supplement much as less bioactive.

For that reason, many manufacturers utilize the **enteric coating technique** to preserve the activity of alliinase since the enteric-coating tablets ONLY release **their contents at pH 7-9 (ie. enteric pH)**.

Such administration retains the potency of ingredients including alliin and alliinase and **allows alliinase to convert more alliin to allicin after being released in the small intestine** - optimizing the effect of the garlic intake.

However, is there a better choice of "vessel" to preserve alliinase?

Alliimin DR Packs Active Alliin & Alliinase with "pH Controlled-Release (pHCR) Capsule" NOT "Enteric Coated" Tablet. WHY?

A **pH controlled-release (pHCR) capsule** is made of pH-sensitive water soluble vegetable fiber. The capsule shell breaks down at **pH 6** - chyme's pH at the very beginning of the duodenum - **within 5 minutes.**

In contrast, the enteric coating (made with cellulose, saturated fatty acids and wax) starts to disintegrate at **pH 7-9** and takes about **30-45 minutes** to fully release its contents.

The use of pHCR capsule allows alliin and alliinase to interact early and ensures the higher allicin yield compared to enteric coated tablet.

Alliimin DR is a potent concentrate of freeze-dried fresh garlic:

- Lab-certified to yield **10,000 mcg allicin/g** from alliin and alliinase.
- Utilize the **pH Controlled-Release Vegetarian Capsules (disintegrate at pH 6)** to retain alliinase activity.
- **Magnesium Stearate Free**
- Stomach-friendly & Refluxed Odour Free
- Timely release & better absorption of the active constituents.

Alliimin DR is one of the best natural antimicrobials that can be combined

with Echinaea supplements (eg. Coldefenxin) to help with cold/flu, parasitic infections, and other microbial infections. The use of pH controlled-release capsules makes it not only more potent, but also beneficial as an adjunct with anti-Candida/ dysbiosis protocols.

Reference:

1. Amagase Harunobu. Significance of Garlic and Its Constituents in Cancer and Cardiovascular Disease. J. Nutr. (2006). Vol136: 716S-725S.
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Ingredient FOCUS

How Bioavailable Is Your Lutein Supplement?

During the mid-summer season, ultraviolet (UV) light can generate a lot of free radicals not only on our skin, but also in our eyes. Fortunately, our system is able to quench these free radicals using one of the most important carotenoids for our eyes - lutein.

Lutein is one of the only 2 antioxidants (the other being zeaxanthin) that are readily taken into the lens & macula lutea of the eye. The skin is the second largest repository of lutein in the body. Due to its specific deposition in the eye and skin and its reported protective role, lutein is believed to play an important role in reducing light-induced oxidative damage in the eye and skin.

According to data from an eye disease case-control study [1], people with adequate serum lutein and zeaxanthin concentrations (> 0.668 micromol/ L) **had 70% less risk of developing neovascular Age-related Macular Degeneration (AMD)** than those with low serum concentrations (<0.247 micromol/L).

That being said, **the absorption rate of lutein is often criticized.** How do we make sure **enough lutein and/or zeaxanthin are uptaken and transported to targeted organs?**

There are 3 major factors that dictate the bioavailability of a lutein supplement:

- **The form of lutein (free form vs. esterified form)**
- **The carrier matrix**
- **The inclusion of other carotenoids in a formula.**

1) Free Form vs. Esterified Form

The FREE (unesterified) form of lutein is the only form directly absorbed by the human body and found in the human serum.[2]

In a double-blind, randomized clinical trial involving 72 healthy adults (23-52 yo), the subjects were randomly divided into two groups - **free form lutein group (fL) and esterified lutein group (Le).** The fL group and the Le groups were administered daily with 12.2 mg of free lutein and 27 mg of lutein ester, respectively. Fasting blood was obtained to measure serum lutein levels at baseline and then weekly.

The results showed that the absolute changes in serum lutein, per mg daily dose, were significantly greater in fL vs. Le groups throughout 28 days of supplementation. **There was an average of 17% better total absorption for fL vs. Le** (p=0.0187).

2) The Difference in the Carrier Matrix

Different carrier matrices can also make significant difference in lutein's absorption, whether it is the lutein in our supplement or diet. For instance, both eggs and green leafy vegetables such as spinach and kale are rich in lutein; however, lutein from eggs is >35 times more absorbable than that from green leafy vegetables.[3]

In supplemental lutein, a right carrier matrix can **enhance absorption rate even in free form lutein.** In a randomized, double-blind, 2-phase, crossover trial, 48 healthy subjects were administered with a single dose of either 20 mg **free form lutein in a polysaccharide matrix (Product A)** OR **miroencapsulated FloraGLOR Lutein (Product**

B). Plasma concentrations of lutein were determined by HPLC and regularly followed for 4 weeks. The results showed an increase of **34.5% and 169.7% from baseline in the maximal plasma lutein [ ] following ingestion of Product A and B, respectively.**

3) The Inclusion of Other Carotenoids in a Formula

Vitamin A is another crucial vitamin for vision health, and beta-carotene is considered by many companies the "better source" of vitamin A; however, **adding carotenoids (eg. beta-carotene) to a lutein-containing formula is NOT a good idea.** Research has shown that taking other mixed carotenoids with lutein will decrease the absorption of lutein significantly because they compete for the same absorption receptors in the gut linings, as well as eyes & skin).

OptiFort is a synergistic formula specifically designed to improve visual acuity and eye fatigue, as well as slow the progression of macular degenerative diseases and cataract.

- **Utilizes FloraGLOR Lutein with ActileaseR Technology (6 mg lutein/capsule)** - clinically proven to be absorbed by the body into the bloodstream and, more importantly, deposited into the macula increasing macular pigment optical density (MPOD).
- **Laboratory-certified *Vaccinium myrtillus* containing 25% anthocyanidins, 36% anthocyanosides** that improve night vision, modulate retinal enzyme activity, and increase microcirculation.
- Clinical proven dosage ratio of essential antioxidants for eyes that help to prevent AMD, cataracts, glaucoma and retinopathy.

Reference:

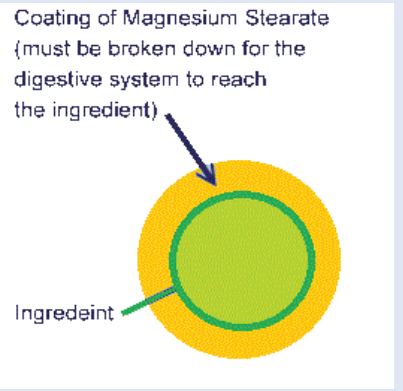
1. Ribaya-Mercado JD, Blumberg JB. Lultein and Zeaxanthin and Their Potential Roles in Disease Prevention. Journal of American College of Nutrition (2004). 23(6): 567S-587S.
2. Stahl W., S.H., Biological activity of carotenoids and their availability in the human organism. Natural Antioxidants and Food Quality in Atherosclerosis and Cancer Prevention, 1996. Kumpulaninen J.T., Salonen J.T., eds,: p. 95-101
3. Norkus EP, Norkus KL, Dharmarajan TS, Schierle J, Schalch W. Serum Lutein Response Is Greater from Free Lutein Than from Esterified Lutein during 4 Weeks of Supplementation in Healthy Adults. Journal of the American College of Nutrition (2011). 29(6): 575-585.

Clinical FOCUS

L-Leucine - The Lubricant for Higher Absorbability

Lubricating agents are something that cannot be avoided in the process of manufacturing natural products - whether it's capsule or tablet form.

Most commonly used lubricants are **long-chain saturated fatty acids, such as stearic acid of magnesium stearate (MgSt).** MgSt works very well because it can easily form a coating on each particle of active ingredients and help reduce friction. Evenly coated powder with MgSt can also prevent moisture from seeping through and help extend the shelf life of active ingredients. That being said, **MgSt also prevents the ingredients from being dissolved in the GI tract, and consequently, delays/decreases their absorbability.**



Why L-Leucine?

L-leucine is an essential amino acid that is commonly used in prevention of muscle atrophy, especially in elderly patients. L-leucine can also be used as an alternative lubricant to MgSt. It is **water-soluble and will not affect the absorption of active ingredients.**

There are two common ways to make L-leucine: hydrolysis and fermentation. Most hydrolyzed L-leucine is not vegetarian friendly because more than **70% of L-leucine in the market is made from hydrolyzed bird feather**, which is contaminated with **higher heavy metals** than the fermentation process of L-leucine. On the other hand, **the starting materials used in the fermentation process are natural vegetarian sources** with fewer burdens on both the ecosystem and the body.

In order to keep the highest bioavailability of active ingredients and provide the safest possible, vegetarian product line, **Vita Aid ONLY uses L-leucine from fermented vegetables as a lubricant.**

Iron - The "Loved & Hated" Supplement

Choosing the Best Source of Iron: Tolerability & Bioavailability Are the Key

The latest report[1], by researchers at the University of Massachusetts Amherst School of Public Health and Health Sciences and Harvard, has shown that **women consuming diet rich in iron were 30 to 40% less likely to have premenstrual syndrome (PMS) than those consuming less amounts.** It is one of the first pioneering studies to evaluate the association between dietary iron (as well as other minerals) intake and PMS.

This case-control study involved 3000 women who completed food frequency questionnaires throughout the 10-year period. The results showed that women who consumed the most **non-heme iron** had a 30 to 40 % lower risk of developing PMS. The average level of iron intake in the lower risk group was roughly 20 mg per day, which is higher than the current RDA of 18 mg per day for premenopausal women. One of the proposed mechanisms of this beneficial effect is that **iron is the cofactor of tryptophan hydroxylase, which is involved in the production of serotonin.**

However, iron is "notorious" for its poor absorption & tolerability, and therefore, choosing the optimal source of iron is very important.

Iron Bisglycinate (Amino Acid Chelate) Shown with Better Bioavailability & Tolerability

Since the 1980's, numerous studies have been done to investigate the bioavailability & tolerability of ferrous bisglycinate chelate compared to various other iron salts. And the results have been quite consistent. [2,3,4]

In a clinical trial [2] involving 40 infants (6-36 months old) with iron-deficiency anemia (IDA), the subjects were randomized to receive 5 mg/kg of iron from either ferrous sulphate (FeSO4) or ferrous bisglycinate chelate for 28 days. Both groups had significant hemoglobin increases ($p < 0.001$); however, **only the ferrous bisglycinate chelate group had significant increases ($p<0.005$) in plasma ferritin, and that increases were about 3 times of that of FeSO4. The apparent iron bioavailability (%AB) of ferrous bisglycinate chelate was 90.9% while that of FeSO4 was 26.7%.**

The study concluded that **ferrous bisglycinate chelate was absorbed and retained 3.4 times greater than FeSO4 in those IDA infants.**

Practitioners are often hesitant with supplementing iron to cancer patients due to the concerns of GI side effects, which can compound their sufferings from chemotherapy. Therefore, supplementing the **minimum therapeutic dose** becomes very crucial.

In a recent clinical trial involving 24 cancer patients with mild-moderate iron deficiency anemia, the subjects were randomized to receive either **105 mg of iron from FeSO4 for 60 days** OR **28 mg of iron from ferrous bisglycinate chelate for 20 days and then 14 mg for 40 days.**

The results showed that **both FeSO4 and ferrous bisglycinate chelate elevated the basal hemoglobin and ferritin significantly.** However, no GI tract adverse effect was found in the ferrous bisglycinate chelate group while **17% of the FeSO4 individuals suffered from diarrhea and constipation.**

These data suggest that in mild non-chemotherapy-induced iron deficiency anemia, **ferrous bisglycinate chelate given at 28 mg daily for 20 days and then 14 mg daily for 40 days has similar efficacy and lower GI toxicity than FeSO4 given at the conventional dose of 105 mg daily.**

The Difference is in the Bonds

Following oral administration, **ferrous bisglycinate chelate is recognized by the body as a dipeptide and absorbed intact** into the mucosal cells of the intestine, and it is subsequently hydrolyzed into its iron and glycine components. [5]

The iron salts, on the other hand, need to dissociate first in the intestinal lumen before they could be

uptaken via passive or facilitated diffusion. The commonly used iron salts - eg. ferrous sulfate, ferrous gluconate, ferrous fumarate - have been shown to **yield side effects that are mediated by non-absorbed iron,** including epigastric pain, nausea, vomiting, abdominal cramps, and constipation.

Many studies have credited ferrous glycinate chelate's better bioavailability and tolerability to the mechanism that iron **amino-acid chelates prevent iron from binding to inhibitors in food, such as phytate and tannins.**

Oxygheme supplies one of the most bioavailable vegetarian sources of iron supplement with other essential vitamins for healthy heme production and integrity.

- Contains iron in amino acid chelated form, **providing MFP factor-like absorption promoting effect** for better bioavailability and GI tolerance.
- Complete micronutrients (vitamin C, B9, B12) for support of hemoglobin production and integrity.
- Red beet juice extract is used for anemia or blood deficiency in traditional Ayurvedic and Chinese Medicine.

Reference:

1. Chocano-Bedoya PO, Manson JE, Hankinson SE, Johnson SR, Chasan-Taber L, Ronnenberg AG, Bigelow C, Bertone-Johnson ER. Intake of Selected Minerals and Risk of Premenstrual Syndrome. Am J Epidemiol (2013).
2. Pineda O, Ashmead HD. Effectiveness of treatment of iron-deficiency anemia in infants and young children with ferrous bis-glycinate chelate. Nutrition 2001;17:381-4.
3. Layrisse M, Garcıa-Casal MN, Solano L, Baron MA, Arguello F, Llovera D, et al. Iron bioavailability in humans from breakfasts enriched with iron bis-glycine chelate, phytates and polyphenols. J Nutr 2000;130:2195-9.
4. Iost C, Name JJ, Jeppsen RB, Ashmead HD. Repleting hemoglobin in iron deficiency anemia in young children through liquid milk fortification with bioavailable iron amino acid chelate. J Am Coll Nutr 1998;17:187-94.
5. Jeppsen RB, Borzelleca JF. Safety evaluation of ferrous bisglycinate chelate. Food Chem Toxicol 1999;37:723-31.

Mg Deficiency Associated with Green Leafy Intake

Do you know that one of the **major causes of Magnesium Deficiency** in North American Population is **inadequate consumption of green leafy vegetables?**

Dark green leafy vegetables are the primary calorie-wise, natural source of magnesium; other food sources of magnesium include nuts, legumes, and whole grains. [Click here for the list of Mg-rich foods]

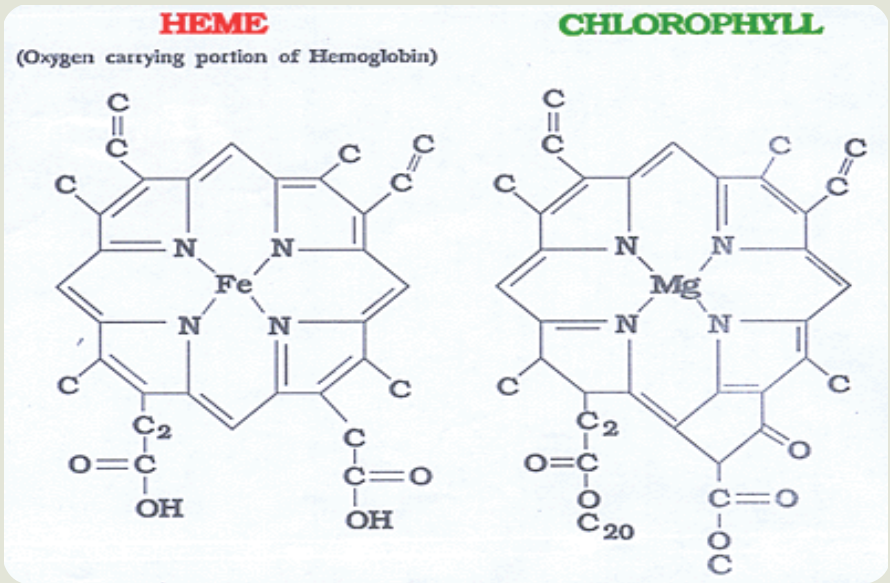
Natural chlorophylls have a structure similar to that of heme, but with Mg in the centre instead of Fe. (*Note: commercial chlorophyll extract contains Copper instead because natural chlorophyll is unstable.)

That being said, most people are just not including dark green leafy vegetables in their diet. And even though they are included in some people's diet, dietary sources alone usually do not supply adequate amounts. For example [1]:

1. **1 cup of raw spinach** (one of the richest Mg-containing vegetable) only supplies **~24 mg Mg** (cooked - 157 mg).
2. **1 cup of raw chopped broccoli** only supplies **~19 mg Mg** (cooked - 33 mg).

Prevalence of Magnesium Deficiency

Current RDA recommends daily intake of <u>at least</u> 320 mg (female) and 420 mg (male). However, the mean intake for females and males in the U.S.A., according to the Department of Agriculture, is 228 and 323 mg, respectively. **In fact, more than 75% of North American population falls far short of the daily magnesium requirements.**[2]



Magnesium is involved in more than 300+ metabolic reactions in our body including metabolism of macronutrients, synthesis of neurotransmitters, energy production and storage, cell growth, etc. Hence, it can be depleted easily when the body is under chronic mental and/or physical stress such as in certain disease states. Therefore, magnesium supplementation becomes very crucial in the maintenance of our health.

Clinical Applications of Oral Magnesium

Magnesium yields promising effects for migraines, normalizing metabolism, relieving symptoms of dysmenorrhea and muscle cramping in pregnant women, and promoting bone mineralization.[3]

Nonetheless, magnesium can also be used for the following **more specific, off-label therapeutic actions:**

1) Sugar Craving: [4,5]

Evidence has shown that large amounts of magnesium are found in the hippocampus (the emotional, thought and memory center), and deficiencies may form the emotional environment which encourages car-

bohydrate cravings. Moreover, dopamine, the "pleasure neurotransmitter", is a magnesium-dependent neurotransmitter.

2) Prevention of Estrogen-Induced Thrombosis: [6]

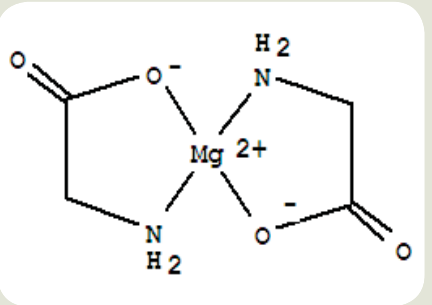
Evidence has shown that estrogen enhances Mg utilization and uptake by soft tissues and bone; it may explain the increased prevalence of CVD and osteoporosis when estrogen levels decline in menopause. However, **estrogen-induced shifts of Mg can be harmful when estrogen levels are high and Mg intake is sub-optimal.** The resultant lowering of blood Mg can increase the Ca/Mg ratio, thus favoring coagulation. With Ca supplementation in the face of commonly low Mg intake, risk of thrombosis increases.

3) Insulin Resistance: [7]

Decreased intracellular Mg is associated with decreased ability of insulin to stimulate glucose uptake in insulin-sensitive tissues, such as adipose and skeletal muscle tissues.

Bioavailability & Purity of Magnesium

Bioavailability - Commonly seen magnesium oxide is a poorly absorbed form (<4%) and is used as a laxative/stool softener in conventional medicine. Magnesium citrate is probably one of the most absorbable mineral salts (~35% absorption); however, its absorption is highly dependent on the acidity of the stomach. On the other hand, **magnesium bisglycinate is the most bioavailable form (~80% absorption) because our body**



recognizes it as an essential nutrient (ie. amino acid) and uptake it readily.

Purity - The chelating ratio of bisglycino-magnesium is actually inversely proportional to its percentage of magnesium content because **bisglycino-magnesium is a huge molecule and contains only ~13-14% of magnesium.**

For instance, in a highly pure bisglycino-magnesium **product containing 150 mg Mg per capsule, the total content weight should be around 1200-1300 mg unless it also contains other magnesium salts (ie. non-chelated) with lower molecular weight such as MgO.**

Vita Aid provides **Bisglycino-Mg of the highest purity with each capsule supplying 150 mg of Magnesium from 1200 mg magnesium bisglycinate.**

Reference:

1. Self Nutrition Data. http://nutritiondata.self.com
2. Alaimo K, McDowell MA, Briefel RR, et al. Dietary intake of vitamins, minerals, and fiber of person ages 2 months and over in the United States: Third National Health and Nutrition Examination Survey, Phase 1, 1988-91 Adv Data. 1994;(258):1-28.
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4. Pfeiffer, C. Carl, Ph.D., MD., Mental and Elemental Nutrients, Keats, CT, 1975, p. 24.
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6. Seelig MS. Interrelationship of magnesium and estrogen in cardiovascular and bone disorders, eclampsia, migraine and premenstrual syndrome. J Am Coll Nutr. 1993. 12(4): 442-458.
7. Takaya J, Higashino H, Kobayashi Y. Intracellula magnesium and insulin resistance. Magnesium Research 2004. 17(2): 126-136.

Taking Up to 420 Micrograms of MK-4 Has No Benefit in Cardiovascular & Bone Health - The Latest Study Shows

The latest research [1] in Japan, published in November 2012, has confirmed the much higher bioavailability of Menaquinone-7 (MK-7) than that of Menaquinone-4 (MK-4). The study was divided into two parts - **Study 1 (Comparing the Absorption) & Study 2 (Comparing the Bioavailability).**

Study 1 examined the serum Menaquinone-4 (MK-4) and Menaquinone-7 (MK-7) levels throughout a 48-hour period after the subjects were administered with **single-dose 420 micrograms** of either MK-7 or MK-4. Study 2 investigated the serum MK-7 and MK-4 levels after the subjects were administered with daily **60 micrograms** of either MK-7 or MK-4 for 7 days.

The results showed that **no serum MK-4 was detected** in either Study 1 (single-dose) or Study 2 (short term intake) of the study. On the other hand, **the serum MK-7 levels showed significant increases after both single dose** (highest at 7 ng/ml after 6 hours; 1 ng/ml at 48 hours) **and 7-day-daily-intake** (8 ng/ml).

The author concluded that MK-7 was not only much more efficiently absorbed, but also more readily available in the serum to exert its anti-calcification and bone mineralization effect.

Minimum Therapeutic Dosage for Maintenance of Cardiovascular & Bone Health

How much daily vitamin K2 intake is enough to promote cardiovascular and bone health?

Previously, the positive effects on serum carboxylation of osteocalcin have been demonstrated with pharmacological dose of **synthetic MK-4, 45 milligrams per day.**[2]

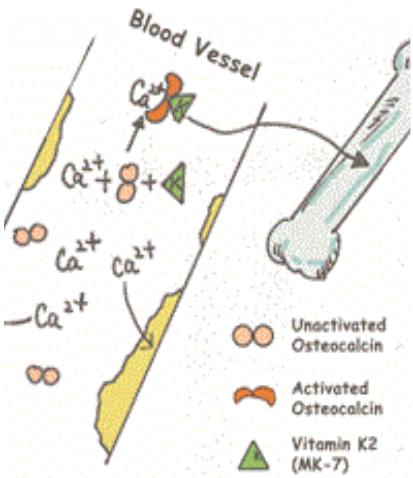
However, **Health Canada only allows maximum dose of 120 micrograms of vitamin K2** (regardless MK-4 or MK-7); hence, it is impossible for MK-4 to yield any therapeutic effect under the regulation of Health Canada.

On the other hand, in a double-blind, placebo-controlled, randomized clinical trial, [3] **daily dose 45 microgram of MK-7 for 8 weeks significantly increased the serum carboxylated osteocalcin in test subjects (n=28).** The difference in potency between MK-7 and MK-4 is as much as 1000 fold.

Os Matrice is a comprehensive calcium supplement formulated with **major and trace minerals as glycine chelates (the most absorbable form),** accompanied by daily 1000 IU of **vitamin D3** and the **120 mcg of MK-7** to promote the bone matrix strength and bone mineral density.

How MK-7 Works in Our Blood Vessels

Research has shown that the beneficial effects of natto-derived MK-7 in cardio-vasculature and bone were attributed to its very long half-life in serum.



By staying in the blood longer, MK-7 is able to activate (via carboxylation) more osteocalcins - a vitamin K2-dependent Matrix-Gla-Protein (MGP) that helps transport serum calcium to the bone. [4]

Osteocalcin is in fact the most potent and abundant inhibitor of soft tissue calcification.

Reference:
1. Sato T, Schurgers LJ, Uenish K. Comparison of menaquinone-4 and menaquinone-7 bioavailability in healthy women. Sato et al. Nutrition Journal (2012). 11:93.
2. Miki T, Nakatshuka K, Naka H, Kitatani K, Saito S, Masaki H, Tomiyoshi Y, Morri H, Nishizawa Y. Vitamin K2 (menaquinone-4) reduces serum undercarboxylated osteocalcin level as early as 2 weeks in elderly women with established osteoporosis. J Bone Miner Metab (2003). 21:161-165.
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The Psychosomatic Potentials of Probiotics - "A Big Leap Forward"

Probiotics have been shown to "affect the brain activity linked to emotion and sensation", says a recent study [1] from UCLA.

The previously proposed relationship between the gut flora profile and mood has been postulated based on **preliminary data in rodents, preclinical data in humans, and a recent report in IBS patients.** This study is the first in **clinical settings** to demonstrate the probiotic's effect on **GUT-BRAIN COMMUNICATIONS in HUMANS.**

The study involved 36 healthy women with no GI or psychiatric symptoms. They were randomly assigned into 3 groups, each group given either 1) probiotic yogurt 2) yogurt with NO probiotic (heat-treated) or 3) no intervention for 4 weeks. The probiotics included in the study were ***Bifidobacterium lactis, Streptococcus thermophiles, and Lactobacillus bulgaricus.***

Participants underwent functional magnetic resonance imaging (fMRI) before and after the intervention, to measure resting brain activity, as well as the brain's response to emotional-faces-attention tasks. The results showed that the **long-term probiotic intake was associated with reduction in task-related response involving the affective, viscerosensory, and somatosensory cortices in the brain** (49% cross-covariance; P =.004).

The gut-brain axis has been a rather well-recognized concept amongst peers in naturopathic medicine; however, there had not been much clinical research done to establish and support this connection.

This study opens up a path for future research to further elucidate the mechanisms of action in probiotics' beneficial effects **in patients with IBS or abnormal pain and stress responses associated with dysbiosis.**

Reference:
1. Tillisch K, Labus J, Kilpatrick L, Jiang Z, Stains J, Ebrat B, Guyonnet D, Legrain-Raspaud S, Trotin B, Naliboff B, Mayer EA. Consumption of Fermented Milk Product with Probiotic Modulates Brain Activity. Gastroenterology. 2013 Mar 5. pii: S0016-5085(13)00292-8. doi: 10.1053/j.gastro.2013.02.043.

Bifidobacterium lactis Bl-04 Reduces the Risk of Upper Respiratory Tract Infections

In Randomized Controlled Human Clinical Study

With the cold and flu season fast approaching, many turn to the commonly known natural remedies (eg. Vitamin C, Echinacea, Zinc). However, a specific probiotic strain has proven to be another effective choice of medicine.

A recent human clinical study [1] published in Clinical Nutrition (October, 2013) has shown that the probiotic strain - ***Bifidobacterium lactis (Bl-04)*** **– is able to help reduce the risk of Upper Respiratory Tract Infections (URTI) significantly in healthy, physically active adults.**

This clinical research was carried out by researchers from Griffith University, Australian National University, University of Sydney, and Australian Institute of Sports. **The 465 participants** in the study (241 males; 224 females) were randomly divided into 3 groups administered with different supplementations:

- **Group 1 – 2 Billion CFU/day of Bifidobacterium lactis Bl-04.**
- **Group 2 – 5 Billion CFU/day of Lactobacillus acidophilus NCFM (NCFM) + Bifidobacterium lactis Bi-07.**
- **Group 3 – Placebo.**

Following a 14-day washout phase, during which the subjects did not take any probiotic supplement, the subjects underwent a **150 day supplementation phase.**

The results showed that Group 1 (2 billion Bl-04/day) significantly lowered **the risk of URTI by 27% (risk ratio of 0.73; p=0.02) compared to placebo. Bl-04 was also able to delay the first onset of URTI in the group by ~0.8 month.** On the other hand, while there was a reduction in illness risk (risk ratio of 0.81) between Group 2 (La NCFM and Bi-07) and placebo, the data were not significant (p= 0.15).

The current use of probiotic supplementation is mostly to support patients who are more susceptible to illness. However, this study has shown that the great immuno-benefits of probiotics can extend to healthy active people as well.

In addition, scientific investigation of probiotic supplements traditionally has been targeted to quantify effects on specific physiological and clinical endpoints of individual strains. Over years of probiotic research, it has been shown that each probiotic strain can differentially alter various neuroendocrine, immune and metabolic parameters – suggesting that multi-strains can work synergistically and potentially be tailored toward specific conditions.[2,3]

Reference:

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A Promising Source of Tissue Normalizing and Anti-Tumor Agents

Laminaria spp.

Years of research has investigated and demonstrated the **anti-proliferative and anti-tumor potentials** of Laminaria spp. - brown algae/kelp.

Laminaria is commonly known for its rich content of iodine. However, it is also rich in a polysaccharide molecule called **"laminarin"**. Laminarin is a storage glucan found in brown algae, and it is used as a carbohydrate food reserve.

Both iodine and laminarin in kelp are shown to possess great potentials in prophylactic and adjunct tumor therapies as they are involved in a number of apoptotic pathways in specific tissue types.

Iodine on Fibrocystic Breast[1]

Iodine is essential to maintaining the normality of the thyroid and the breast tissue. Despite the fortification of iodine in our table salt, **more than 20% of Canadians are still mildly-moderately deficient in iodine** according to Statistics Canada [2], and **that prevalence increases with age.**

In deficiency of iodine, the breast tissue becomes more sensitive to estrogenic stimulation. The tissue would then form microcysts concentrated in potassium, which is believed to be the cause of fibrosis and cyst isolation. In fact, research has shown that an iodine-deficient state may **render the breast susceptible to physiological changes** and, consequently, lead to atypia, dysplasia, and hyperplasia.

Cytotoxicity of Iodine on Human Breast Cancer Cells[3]

Cytotoxicity of iodine has been demonstrated specifically on a number of cultured human breast cancer cell lines, including MCF-7, MDA-MB-453, ZR-75-1, and T-47D. The mechanism of action is proposed to be due to the **iodine-induced depletion of thiol (ie. glutathione) in the mitochondria;** in turn this creates more oxidative stress to the cancer cells and yields apoptosis eventually.

Laminarin on Metastasis and Colon Cancer Cells

Laminarin is the polysaccharide found largely in brown algae cell wall. Extensive research has shown that laminarin has anti-tumor effects - especially **its ability to prevent metastasis via the inhibition of heparanase [4] and basic fibroblast growth factor (bFGF), a heparin-dependent angiogenic factor.** [5]

In a more recent study [6] investigating laminarin's apoptosis-inducing effects on LOVO human colon adenocarcinoma cell line, **laminarin treatment** was shown to **increase the intracellular level of ROS and Ca2+.** It also **opened the mitochondrion permeability transition pore (MPTP) and induced release of Cyt-C and the activation of Caspase-9 and -3.** All of which collectively turned on the mitochondria-apoptotic pathways.

Overall, Laminaria sp. is proven a promising anti-tumor agent due in parts to its multiple actions in mitochondrial apoptosis pathways, as well as its tissue normalizing properties.

Lamiodine 800 contains 800 mcg of iodine from concentrated Natural Organic Brown Kelp (Laminaria sp.).

To manage and prevent estrogen-sensitive breast cancer or fibrocystic breast tumors, it can be combined with **Estrolief** to achieve broader spectrum of care via multiple mechanisms. Each capsule of Estrolief contains **DIM (54 mg), Ca d-glucarate (215 mg), flax lignans (100 mg; 20% SDG)**, and vitamins 6/9/12.

Reference:

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SDG Lignan from Flax Seed - A Multi-Faceted Anti-carcinogenic Agent for Estrogen-Sensitive Tumor

Many practitioners may be concerned about phytoestrogen-containing foods associated with risk of hormone sensitive cancer. However, there are 3 main classes of phytoestrogens - isoflavones, lignans, and coumestans. Lignans carry out a rather weak estrogenic effect among its class, and they have been shown to exert clinically significant anti-carcinogenic effects, [2] especially for hormone sensitive tumor.

Serum/urine enterolignans - Enterolactone (ENL) and enterodiol (END) - are suggested as one of the potential biomarkers for breast cancer risk. Numerous epidemiological studies suggest that **high intake of lignan-rich food and high serum/urine levels of enterolignans are inversely associated with the risk of breast cancer.**

Secoisolariciresinol diglucoside (SDG) - the richest estrogenic lignan in flax seeds - is **the precursor of enterolignans** with its conversion facilitated by gut microflora.[1] ENL and END are hypothesized to possess anti- and weak estrogenic properties due to their structural similarity to estradiol, suggesting them as potential anticancer agents. However, is that their only mechanism of action?

Lignan's Multi-Mechanisms of Action

A meta-analysis of 21 studies (11 cohort studies and 10 case-controlled studies) involving over 225,000 subjects with data on their estimated dietary intake of lignans concluded that high exposure to enterolignans reduces the risk of breast cancer in both pre- and post-menopausal women.[2]

The effectiveness in postmenopausal women suggests and further supports the theory that lignans exert their anti-cancer actions via multiple mechanisms other than the competitive inhibition of estrogen receptors **due to the fact that post-menopausal women usually have very low circulating serum estradiol.**

SDG have been demonstrated to affect breast cancer risk through **modulation of endogenous estrogen metabolism,** as well as competitive inhibition with estrogen receptors. [3] SDG has also been shown to be involved in the **modulation of tumor growth factor-mediated signaling pathways.** [4]

Isolated SDG vs. Flax Hull

Notwithstanding the fact that SDG is largely present in the flax hull (5%), isolated SDG have been shown to significantly reduce the growth of breast tumor cell while flax hull (providing the same dosage of total SDG) does not. [1] It is likely due to the high fibre content (56%) in flax hull, impeding the release of SDG and decreasing its absorption.

Estrolief is a Synergistic Estrogen Detoxifier formulated with:

- **DIM** - the active form of I3C that enhances the estrone conversion to the Protective Estrone (2'-OH) & exerts anti-proliferative effect on tumor cells.
- **Calcium d-glucarate** - distinctly high dosage; prevent the toxic hormone metabolites from being recycled.
- **SDG - lignan isolate from Flax Seeds** - exerts an "amphoteric effect" to reduce the estrogenic effect of the "Bad Estrogens" while alleviating mild menopausal symptoms.
- Essential vitamins - **B6/9/12** - to facilitate detoxification (ie. methylation, transamination).

Reference:

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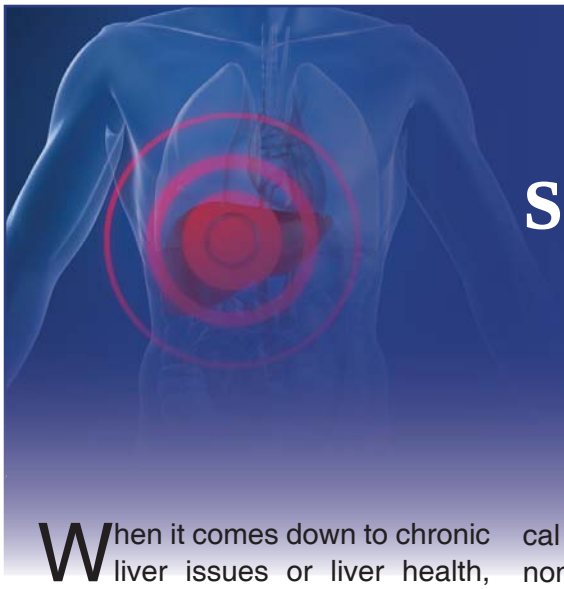

Silybins, Silymarins, and Milk Thistle

When it comes down to chronic liver issues or liver health, milk thistle is one of the first-line herbs used to protect and support the liver. However despite the largely established research & market in milk thistle, people rarely look in-depth of what qualities should be in a milk thistle extract with therapeutic value.

Standardizations: Milk Thistle Extract = Silymarins = Silybins?

Not all milk thistle extracts in the market are made equal & standardized to "silymarins", and certainly not many of them are standardized specifically to "silybins". Silybins and silymarins are not synonymous.

Silymarins are a complex of > 7 flavonolignans (eg. silybins, isosilybins, silydianin, silychristin, taxofolin, and quercetin) present in milk thistle extract. The relative abundance of each compound may **vary depending on the source, part of plant used (silymarins most abundant in seed), time of harvest, supplier, and extraction methods** - making standardization of a milk thistle extract very crucial in determining its quality. In fact, many studies often suffer from inconsistencies in clinical outcomes due to the use of non-standard silymarin (complex extract) and silybin (pure compound) preparations. [1]

Silybins are the most potent flavonolignans among all silymarins with respect to the antioxidative activity. The strong antioxidant property contributes to the more C=C double bonds in their chemical structures, as well as the fact that they are also **an active iron chelator.**[1] Iron is known to be a strong pro-oxidant, and when in abundance, is stored largely in the liver.

Besides the cytoprotective activity of silybins, proapoptotic activity of silybins in pre- and/or cancerogenic cells and anti-angiogenic activity of silybins are other important findings that bring milk thistle preparations to respective application in the cancer treatment.

What are the therapeutic doses of silymarins?

As beneficial as silybins appear to be, they are also known for their erratic bioavailability; silymarin absorption rates vary between 20% and 50% **while silybins are the least bioavailable among all silymarin constituents**. [2] For that reason, large doses of silymarins would need to be consumed in order to achieve the therapeutic effects. According to the collective data from Health Canada, [3] **the effective doses of silyamrins range from 140-600 mg per day**.

So are silybins better than silymarins on all accounts? Research has actually shown that taking isolate of silybins is LESS effective than taking silymarin complex altogether [4]. The reason is due to the fact that inclusion of other silymarin complexes covers more ground in hepatic enzyme pathways, as well as that of silybins' poor bioavailability.

The Cost-Effectiveness of Modified Herbal Ingredients

There are several herbal ingredients that are known for their poor bioavailabilities, such as curcumin, quercetin, and silybins/silymarins. Consequently, various modified forms (eg. complexation with phospholipid, micronization) of these ingredients have been developed in the market to improve their bioavailabilities. However, it is important to evaluate the cost-effectiveness of each herbal ingredient with its modified counterpart, as the modified forms are

more expensive than the natural form.

For instance, it has been shown that silybin-phospholipid complex has ~3.4 fold the bioavailability of the regular silymarins. [2] Nonetheless, because of the inclusion of phospholipids in the compound, such a form contains only 15-30% silymarins/ silybins & ~70-85% phospholipids. If you compare 100 mg of silybin-phospholipid with 100 mg of natural silybin, their overall effect in the body should be quite close (ie. silybin-phospholipid is 3.4 times more bioavailable, but the complex only contains 22.5 mg of silybins compared to 100 mg of natural-form silybins). Therefore, while the bioavailability of the modified silybins/silymarins is indeed improved, the cost-effectiveness ratios of these products are decreased because each unit of the modified silybins/ silymarins costs a lot more and contains much less active constituents.

In conclusion, when it comes down to choosing the most cost-effective milk thistle liver support product for your patients, it is imperative to look for the following qualities:

- **The standardizations of BOTH Silymarins & Silybins - complexes are involved in more hepatic pathways.**
- **The daily dosage of Silymarins (140-600 mg daily).**
- **The cost-effectiveness** (phospholipid-modified vs. pure extract)**.**

Reference:

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2. Loguercio C, Festi D. Silybin and the liver: from basic research to clinical practice. World J Gastroenterol (2011). 17(18): 2288-2301.
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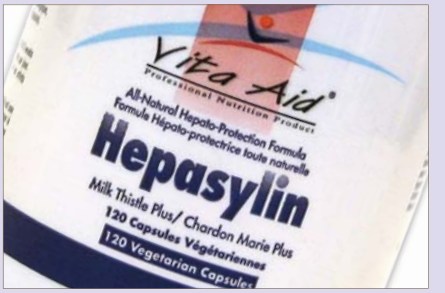
Vita Aid's **Hepasylin** is a comprehensive herbal liver tonic formula containing **Milk Thistle, Dandelion, Artichoke and Alpha Lipoic Acid**.

Each capsule contains **250 mg of milk thistle extract standardized by BOTH silymarins (80% - 200 mg) and silybins (30% - 75 mg)** - the most active compound of silymarin group - to guarantee the maximum liver-protecting effect.



Clinical FOCUS

Supercritical CO2 Hops Extract

A Potent Natural Cox-2 Anti-Inflammatory

What are the two things you think of when you see hops extract (*Humulus lupulus*) in a formula? Would they be - insomnia and menopause?

In a 2-week, randomized, double-blind and placebo-controlled clinical trial, the subjects were administered with either placebo or **daily 1000 mg of patent hop extract (Perluxan) containing 30% alpha acids.** [1] The subjects exhibiting knee osteoarthritis were selected according to American College of Rheumatology criteria.The intervention produced **a significant improvement** in WOMAC (Western Ontario McMasters Osteoarthritis Index) **pain and stiffness scores. The anti-inflammatory/ analgesic effect was comparable to 400 mg of ibuprofen.** [2]

Therapeutic Properties of Hops

Traditionally, hop tea was used to help relieve insomnia. It was later discovered that hops contain estrogenic constituents - mainly **8-prenylnaringenin (8PN)** - that can help alleviate menopausal symptoms.

Only until the past few years was hops known to be rich in its **resin-**

ous constituents (ie. alpha- and iso-alpha acids) that exert p**otent COX-2 anti-inflammatory actions.** Research findings have shown that hop's anti-inflammatory effect **only acts on the inducible (non-direct) COX-2.** This means that hop has **a lower potential for gastrointestinal and cardiovascular toxicity, which is observed with direct COX enzyme inhibitors (ie. NSAIDs).**[3]

Extraction Method Determines the Medicinal Effect of Hops

Hops are generally contra-indicated in patients with depression due to its sedative effect. Its estrogenic property can also pose a concern for hormone-sensitive, breast cancer patients. Therefore, we need to ensure that **only the resins in hops are extracted if the treatment goal is solely to bring down the inflammation.**

>> Hop Tea (water extract) - Very Effective for Insomnia

Hop's sedative constituents are water-soluble, hence, making hop tea a good traditional remedy for insomnia.

>> Alcohol Hop Extract - Relief for Menopausal Symptoms

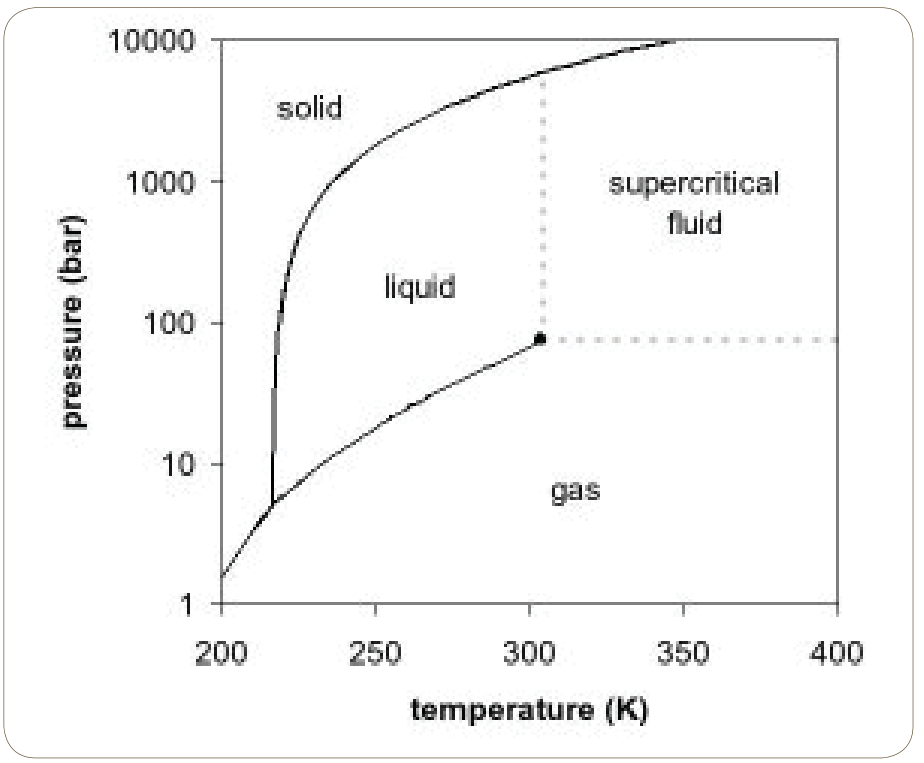
The estrogenic 8PN in hops is not as water-soluble, but can be extracted with 25-50% alcohol solvent.

>> A novel non-toxic method - supercritical CO2 extraction - can isolate the anti-inflammatory resinous constituents without the company of the sedative and estrogenic properties.

What is Supercritical CO2 Extraction?

Supercritical carbon dioxide is a fluid state of carbon dioxide where it is held at or above its critical temperature and critical pressure.

The relatively **low temperature** of the process and the stability of CO2 allow volatile compounds (ie. resins and essential oil) to be extracted. With particular temperature and pressure, supercritical CO2 is able to extract **JUST the resins.**



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Ingredient FOCUS

Cordyceps sinensis Cs-4

Energy, Endurance, Adrenal Tonic

Cordyceps sinensis is a unique blade-shaped fungus found primarily at high altitude on the Tibetan plateau. It has been widely used for over 2,000 years in TCM in the treatment of numerous conditions. Now being cultivated and harvested in a controlled environment, cordyceps is widely used by China's Olympic athletes to enhance their physical performances and help them set one new world record after another!

The Cs-4 strain is the variety that is used in TCM since it is implicated in the majority of clinical and pharmacological research and is the only variety approved by the National New Drug Review and Approval Committee of the Chinese government's Ministry of Public Health as an acceptable therapeutic form.

Cs-4 has been shown in human clinical studies to **increase the utilization of oxygen** in the TCA cycle and to **increase the efficiency of ATP generation**, therefore it is no surprise that Cs-4 increases physiological performance when athletes are examined during high endurance exercises.[1,2,3] Cs-4 is also an effective ingredient for strengthening adrenal function, as studies have shown that it was able to **prevent the stress atrophy of adrenal glands from the administration of hydrocortisone**[4], and also reduce fatigue in elderly patients with asthenia.

In TCM, cordyceps is used to **tonify Lung and Kidney** and, hence, also support the body's immune system (ie. **Defensive Qi**). Cordyceps has been found to enhance immune functions, such as phagocytosis of macrophages, natural killer (NK) cell activity, and anti-tumor mechanisms.[5]

Adrenergyn is a complete vegetarian adrenal modulating formula of highly potent herbal concentrates; each capsule contains **4670 mg of dried herb equivalence**. Adrenergyn is specifically designed to restore proper adrenal function and alleviate symptoms at Stages 1 (Over-stimulation) through 3 (Exhaustion) of Adrenal Fatigue.

- **Cs-4 strain of *Codyceps sinensis*** (200 mg of 8:1 Extract; **1600 mg dried herb equivalence/cap**) - **the most well-studied strain in human clinical studies to enhance oxygen utilization, ATP generation, anti-oxidation, as well as body's immune function.**
- **Eleuthero** has been shown to modulate blood pressure & cortisol levels under stress, enhance oxygen usage in cells, and increase endurance of the muscles.
- In TCM, Cordyceps tonifies ***Kidney and Lung***; Eleuthero tonifies ***Spleen and Kidney and anchors the mind.***
- **Ashwagandha** supports the hypothalamic-pituitary-adrenal axis, as well as thyroid function by enhancing T4 to T3 conversion.
- **Rhodiola** is shown to affect multiple systems to promote emotional well-being, mental clarity, and physical endurance. Like Eleuthero, it also modulates the overshooting cortisol levels.

Reference:

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Licorice - The Herbal Substitute of Desiccated Adrenal Glandular Tissue

Licorice (*Glycyrrhiza glabra*) is one of the most well-known adrenal supporting herbs. It helps increase the cortisol levels in the body during times of adrenal exhaustion.

Instead of being a direct cortisol agonist, research has shown that glycyrrhizins in licorice work via their inhibitory effect on **11-beta-steroid dehydrogenase 2**. [1,2] This mechanism of action of licorice decreases the metabolism of cortisol and **INCREASES the cortisol levels in the system.**

For that reason, long-term Licorice intake can result in increased blood pressure. As a matter of fact, long-term consumption of 100 mg or more of glycyrrhizin (equivalent to 50 g of dried licorice root) per day can potentially increase the cortisol levels comparable to those in patients with Cushing's syndrome and cause symptoms of mineralocorticoid hypertension and hypokalemia. [2]

Similar to the desiccated adrenal glandular tissues, licorice is **NOT suitable for patients with early stages (ie. Stages 1 & 2) of adrenal fatigue** where they are already over-stimulated by the constant high cortisol levels throughout the day (ie. disrupted cortisol circadian rhythm).

That being said, at **Stage 3 Adrenal Exhaustion** where the patient's adrenal glands fail to produce enough cortisol, moderate dosing of licorice can be very helpful. Common stage 3 symptoms may include persistent fatigue, muscle tension/ache, chronic inflammation, lowered immune functions, and memory/cognitive decline.

AdrenoForte DP is specifically designed to tonify the depleted adrenals and give the body a kick start to restore its physiological functions in Stage 3 Adrenal Exhaustion. Each daily serving of AdrenoForte DP supplies 4080 mg of dried licorice root equivalence.

» Free of animal glandular tissue

» Synergistic herbal combination with:

- **Licorice & Panax Ginseng** to help boost up the cortisol levels. Licorice is known for its inhibitory effect on cortisol breakdown.
- **Eleuthero** to modulate the cortisol levels to prevent them from overshoot.
- **Astragalus** - "The King Herb of Qi" in TCM - to **tonify Spleen and Lungs** and enhance the immune functions.
- Highly concentrated **Bacopa Extract** (30:1; 50% bacopasides) - a potent Ayurvedic brain tonic to support cognitive function and memory. Also known as a cooling & bitter herb - balances the tonifying effects of Licorice/ Asian Ginseng/Astragalus.

» For Stages 1 & 2 Adrenal Fatigue, adaptogens with modulating qualities in **Adrenergyn** (ie. cordyceps Cs-4, ashwagandha, rhodiola, eleuthero) are more indicated as they not only tonify but also normalize the adrenals' circadian rhythm.

Reference:

1. Farese RV Jr, Biglieri EG, Shackleton CHL, Irony I, Gomez-Fontes R. Licorice-Induced Hypermineralcorticoidism. N Engl J Med (1991). 325:1223-1227.
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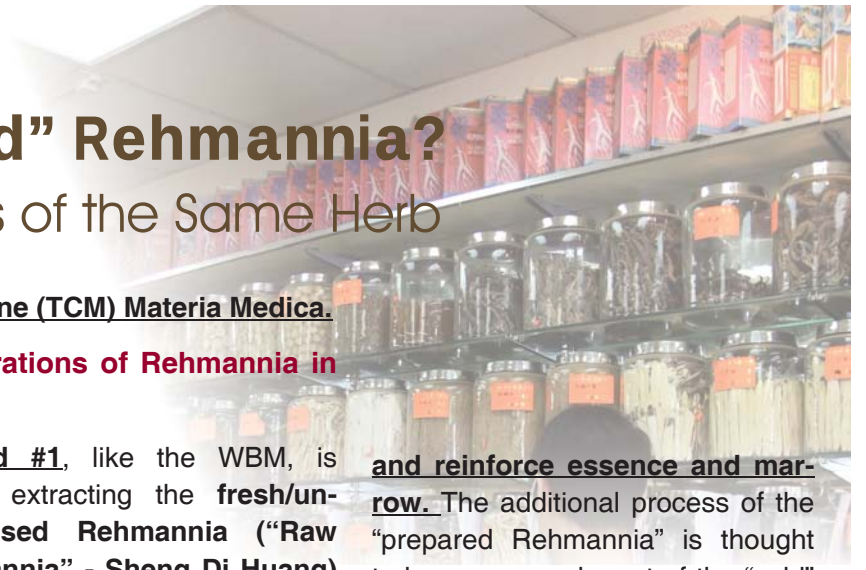
"Raw" or "Prepared" Rehmannia?

Two Different Medicines of the Same Herb



Rehmannia glutinosa root (Di Huang) is one of the most commonly used herbs in TCM Materia Medica. Its reputation in treating numerous conditions has reached Western Botanical Medicine (WBM), where it is often used to treat issues associated with hormone imbalance, such as menopausal syndrome. **However**, are you aware of the fact that **there are 2 types of *Rehmannia glutinosa* root (Di Huang) that exert somewhat "opposite" medicinal effects in Traditional Chinese Herbal Medicine?**

Two Different Medicines of the Same Herb

Due to Rehmannia's relatively new emergence in the Western Botanical Medicine (WBM) material medica, one thing not emphasized enough is its methods of preparation.

In WBM preparation, Rehmannia root is simply harvested, dried, and extracted. In TCM, there are **2 methods** to prepare Rehmannia root **to yield two different medicines in Traditional Chinese Medicine (TCM) Materia Medica.**

Preparations of Rehmannia in TCM

Method #1, like the WBM, is simply extracting the **fresh/unprocessed Rehmannia ("Raw Rehmannia" - Sheng Di Huang)** with a desired solvent to yield the powdered extract. **The nature of "raw Rehmannia" is Bitter, Cold, and Sweet.** The actions of this preparation in TCM paradigm are to **remove heat and promote the production of body fluids, reduce heat in blood, and arrest bleeding.**

Method #2, on the other hand, requires **a preliminary wine-stewing process done on the raw herb, and then the herb is taken out and sun-dried. This preparation is repeated 9 times to yield the "prepared Rehmannia" root (Shu Di Huang).** Afterwards, the herb can be extracted with a solvent of choice to produce the powdered extract. **Shu Di Huang is Sweet & Warm in nature.** This preparation exerts the action to **nourish yin and replenish blood, and reinforce essence and marrow.** The additional process of the "prepared Rehmannia" is thought to have removed most of the "cold" properties from the herb and made it even more nourishing and sticky.

In other words, **the "raw Rehmannia" is "cold" and works to regenerate fluid and eliminate heat** while the "prepared Rehmannia" is more "tonifying" to nourish the yin/blood/essense aspect of the body and more sticky and damp-forming.

Prescribing Raw vs. Prepared Rehmannia

Due to their different natures, it is important for a practitioner to recognize the pattern of the patient's pathology prior to prescribing Rehmannia root.

For instance, if a patient is presenting symptoms of **heat/fire in the blood/body and depleted fluid** (ie. indicating relative yang excess) - such as dry mouth, constipation,

Herb	Properties	Meridians Entered	Functions	Indicated TCM Signs & Symptoms
Raw Rehmannia	Sweet, Cold, Slightly Bitter	Heart, Liver, Kidney, (Lu)	Reduce heat in blood and arrest bleeding, nourish yin & promote the production of body fluids	Febrile disease marked by deep red tongue and thirst. Yin deficiency with internal heat: skin eruptions & maculation, bleeding or spitting of blood, epistaxis, and sore throat.
Prepared Rehmannia	Sweet, Slightly Warm, sticky	Liver, Kidney	Nourishes Yin & replenish blood, reinforce essence and Marrow	Liver & Kidney Yin Deficiencies: aches and weakness of the lower back & the knees, night sweat, seminal emission, internal heat & thirst, anemia with sallow complexion, palpitation, dizziness, tinnitus, premature graying of hair.

Table 1. Comparison chart between raw and prepared Rehmannia root in the paradigms of TCM.

mouth & tongue sores, scanty coat on a red tongue, functional uterine bleeding, irritability, and insomnia - **"raw Rehmannia" is indicated.**

On the other hand, if a patient is presenting symptoms of **yin, blood, and kidney deficiencies** - such as dizziness, pallor, tinnitus, palpitations, insomnia, nightsweats, nocturnal emissions, loose stool, and fatigue - **"prepared Rehmannia" is indicated.**

Table 1 is a simple chart that illustrates the differences and similarities between the two types of Rehmannia.

Use Rehmannia with caution in cases of: Spleen Deficiency, Excessive Dampness, Loose stool (absolute contraindication with raw Rehmannia or "high dose" of prepared Rehmannia). Mild-moderate dose of "prepared Rehmannia" may be well-tolerated by patient with Spleen Deficiency.

The most representing formula of the "prepared Rehmannia" is **Liu Wei Di Huang Wan (Spirityin).** It is one of the most renowned formulas in TCM pharmacopoeias. It was first recorded nearly 900 years ago. The main therapeutic action of **Spirityin** is to **nourish Liver and Kidney yin.** It used to be reputed as the "longevity" pills because it addresses Liver & Kidney yin deficiencies, which are often the issues as our body ages, especially menopausal symptoms and some of the common symptoms seen in the elderly, like dizziness, poor memory, and weak knees/back. It is a well-balanced formulation and is quite safe to take for long-term.

Tian Wang Bu Xin Wan (Harmovex), on the other hand, is one of the most depicting formulas of the "raw Rehmannia". With "raw Rehmannia" as its chief herb, the main actions of Harmovex are to **nourish yin & blood, clear heat, moisten dryness, calm Spirit, and tonify Heart & Kidney**. It is mostly used to treat **"Deficient-Heat" pictures commonly seen in patients with busy modern lifestyle eg. students experiencing restless sleep and sleep-onset insomnia accompanied by heat signs;** the deficient yin and depleted blood/body fluids are likely caused by stress, poor diet/nutrition, and toxic exposures.

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Ingredient FOCUS

Mulberry Leaf - A Promising Anti-Diabetic Agent

In 2010, nearly 26 million people have been diagnosed with diabetes in the United States with another 57 million people estimated to have prediabetes. [1] There are 5 main approaches in medicine, used to control blood sugar:

1. **decreasing liver glucose production** (eg. metformin);
2. **increasing insulin secretion** (eg. sulfonylurea);
3. **increasing insulin sensitivity** (eg. metformin);
4. **decreasing sugar absorption in the gut** (eg. **acarbose**);
5. **inhibition of dipeptidyl peptidase 4** (DPP-4).

Mulberry (*Morus indica* L.) leaf extract is one of the newer herbs known to carry out **acarbose-like action** in our gut, and it can be a useful anti-diabetic agent.

Mulberry leaf contains a group of constituents called "iminosugars"; the most abundant iminosugars in mulberry leaf are the deoxynojirimycins (DNJ's). [2]

The DNJ's are essentially **glucose analogues that occupy the active sites of the alpha-glucosidases** in the gut and, consequently, **delay the breakdown and the absorption of sugar.** Moreover, mulberry leaf extract has been shown to exert **hypolipidemic and hypotensive** effects, which can be very beneficial for these commonly seen comorbidities in Type II diabetic (DM2) patients. [2]

In a human clinical study comparing

the **hypoglycemic & hypolipidemic effects of mulberry leaf** with those of **glibenclamide (sulfonylurea),** twenty DM2 patients were randomly divided into two groups.[3] Each group was administered with either 1 g of dried mulberry leaf three times a day, or 5 mg of glibenclamide daily, for 4 weeks. The results showed that **mulberry leaf not only demonstrated significantly better effects in glycemic control but also significantly improved serum lipid profile (P<0.001)**; whereas, glibenclamide had a moderate effect in glycemic control and a non-significant outcome in serum lipids.

GlucoBalancin (aka TermiDM) from Vita Aid is a comprehensive formula with various ingredients that exert multiple mechanisms of action to regulate blood sugar and protect against complications from chronic hyperglycemia. It can also be a good adjunctive therapy for weight management.

1. Each daily serving provides **3720 mg dried mulberry leaf equivalent.**
2. **Milk Thistle** - clinically shown to not only reduce insulin resistance, but also improve lipid profile in DM2 patients. [4]
3. **Aqueous Cinnamon Extract** - clinically proven to reduce the glucose level by increasing both the insulin sensitivity and the insulin secretion. [5] Moreover, aqueous extraction process eliminates the presence of cinnamalderhyde, which can be an irritant to gut linings in some individuals.
4. **Bitter Melon** - shown to help regulate blood sugar via multiple mechanisms: 1) contains insulin analogue - polypeptide P; 2) decreases hepatic gluconeogenesis; and 3) increases hepatic glycogen synthesis. [6]
5. **Fenugreek** - contains 4-hydroxy-isoleucine that is shown to stimulate insulin release and inhibit activities of alpha-amylase & sucrase in the gut; it is also shown to improve serum lipid profile.[7]
6. Chromium & Alpha Lipoic Acid - to help increase insulin sensitivity and reduce diabetes-associated peripheral neuropathy.

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