

The selection of high quality supplements enables a practitioner to achieve consistent clinical results and helps build client trust. Poor quality products—of which, unfortunately, there are many on the market—may be ineffective or erratic in their results. These products perpetuate mistrust among conventional healthcare practitioners, and ultimately contribute to an erosion in the general public's faith in nutritional and botanical therapeutics. Therefore, it is incumbent upon the nutritional practitioner to knowledgeably select high quality products and to educate his or her clients in the proper use of these products.

The primary objective of this article is to elucidate the variables relating to supplement quality, such as purity and potency. The reader will learn how to question suppliers about their products. Additionally, general suggestions are provided for deciding which products best suit your clients' needs, and how to determine a product's optimum use.

For many, it is a shock to learn that dietary supplements sold in the United States do not have to be registered with any state or federal government agency. Anyone can produce and sell a dietary supplement, and there is considerable leeway in how they manufacture it, what ingredients are used, and how the product may be labeled. Invest the time to learn up front about the products you recommend in your practice and you will reap the rewards in the long run.

### **So many choices...so few choices**

Walk into any natural foods store, and you can easily be overwhelmed by the vast number of shelves brimming with hundreds of dietary supplements. Despite the outward appearance of dozens of companies to choose from, most of these companies share a common denominator. You see, only 3% of supplement companies actually manufacture their own products. Most buy their raw materials from one of a small handful of suppliers, generally pharmaceutical companies (e.g., Merck, Hoffman-La-Roche, Eastman-Kodak, Burroughs-Wellcome, Upjohn, Monsanto, and Bristol-Myers). These pharmaceutical giants produce crystalline-pure vitamins, minerals and amino acids. These raw materials are purchased by the supplement manufacturer, who then coordinates the assembly of the tablets or capsules you purchase. While a small number of companies assemble the product in house, most "job out" or sub-contract production to an assembler. In the manufacturing process, a number of substances may be added to the crystalline pure nutrient.

## **Anatomy of a Dietary Supplement**

### **What exactly is in there?**

Although we purchase dietary supplements for their nutrient constituents, a number of additional ingredients may be present in the product. Among these agents are binders, fillers, excipients, lubricants, disintegrants, colorants, sweeteners, flavorings and coating materials.

The presence of these agents is not always identified on the product label. In fact, if the label does not explicitly state that no binders, fillers or excipients have been used, you can be certain you are ingesting these agents along with your vitamins, minerals, herbs or other nutrients. These additives are often the cause of digestive upset, sensitivity or allergic reactions to dietary supplements. A reputable company will clearly identify, on the product label or in its catalog, any excipients that have been used and those which the product is free of (e.g., "free of wheat, corn, yeast, soy, and dairy").

Let's take a closer examination of the types of additives commonly found in dietary supplements.

EXCIPIENTS are "inert" substances added to the raw materials in order to achieve a desired consistency or form for the manufacturing process. Tablets cannot be manufactured without excipients; capsules can, but are not necessarily excipient-free. Binders, fillers, lubricants and disintegrants are common types of excipients. Inclusion of these items indicates cost-cutting for profit.

While excipients are selected on the basis of their being basically "inert," in reality there are no truly inert agents. Even the most hypoallergenic additive can cause problems for sensitive individuals. The best strategy is to get full disclosure of the excipients in the product and ensure they are not substances to which your client is reactive. You may also want to select products that do not contain common allergens, such as wheat, corn, milk, yeast, fillers, additives, and artificial colors or flavors.

A relatively new philosophy among a small number of supplement manufacturers is to select *bio-active*, rather than "inert" excipients. Bio-active excipients are purposefully chosen for their ability to (1) facilitate break-down of the product in the gut, (2) maximize the absorption of the product, and/or (3) compliment the effects of the nutrients, providing a synergistic effect. Often called a "base," these excipients are concentrates of var-

ious plant or animal-derived foods, providing a source of phytonutrients or bioactive amines in the supplement.

Fillers are a type of excipient used to take up empty space in a capsule or tablet. Most assemblers offer production of only a limited number of tablet or capsule sizes. If space remains after inclusion of the proper amounts of nutrients, then a filler is added. The filler ensures a perfect fit of the ingredients to a particular size mold for tablet compression or to a particular capsule size.

Fillers vary widely from company to company. Many manufacturers will choose the cheapest filler available to cut production costs. Nonfood grade fillers—such as talc or silicon—can be used and may lead to digestive or absorptive problems. Common food-grade fillers are corn starch, lactose (milk sugar), cellulose (an insoluble plant fiber), sorbitol, and calcium phosphate. These too can cause problems with allergies or sensitivities.

Flowing agents and lubricants are added to optimize the flow of crystallized raw materials through the tableting or capsuling machine. They prevent raw materials from clumping or caking during the manufacturing process or storage. Lubricants are added to prevent compressed tablets from sticking to the machinery during manufacture. These materials are added in very small amounts (usually less than 1%). Common lubricants include vegetable stearin (similar to vegetable shortening), magnesium stearate, calcium stearate, stearic acid, and silicates (i.e., silica). Magnesium stearate, calcium stearate and stearic acid may reduce the bioavailability of a supplement by increasing is the amount of time it takes to dissolve [Werbach 1997:80].

Binders are substances that give cohesive quality to powdered materials. They hold the ingredients together for tablet formation. Some common binders include cellulose, gum arabic, lecithin, honey and sorbitol. Although the FDA classifies binders as "generally recognized as safe" (GRAS), acacia or gum arabic, a vegetable gum binder, can cause mild to severe asthma attacks, rashes or allergies in some individuals [Mindell 1998:20].

Disintegrants are added to assist tablets in breaking down after consumption, thereby releasing their active ingredients. The most common disintegrant is modified cellulose which works by swelling when wet.

Colorants are added to provide a uniform appearance of the finished product. An extensive array of synthetic coloring agents are approved by the FDA. Look for natural coloring agents, such as beets, carrots or chlorophyll.

Flavors/sweeteners are generally used only in liquids, chewable tablets and some powder mixes. Chewable

vitamin C wafers and children's chewable multiple vitamins usually include appreciable amounts of sweeteners. Sweeteners commonly used include fructose, malt dextrose, sorbitol, or maltose. A small number of products contain the herbal sweetener, stevia (although the FDA prohibits the herb from being labeled as a sweetener). When liquids or powdered supplements are chosen, it may be preferable to select an unsweetened product to which the client can add a drop or two of stevia.

Coating materials are substances used to protect tablets from moisture and prevent them from crumbling during manufacture, shipping and storage. Coatings also mask unpleasant flavors or odors, making tablets easier to swallow. Zein (often listed as "vegetable protein coating") is a natural, corn-derived protein, and is a clear film-coating agent. Brazil wax, a natural product derived from palm trees, is also frequently used. Some companies actually use *shellac* in their tablet coatings: it may be listed as "pharmaceutical glaze." Shellac is insoluble in an acidic medium, such as the stomach. If your client has compromised exocrine pancreatic function, resulting in acidic conditions in the small intestine, a shellac-coated supplement cannot be broken down or assimilated.

The coating or shell of capsules is usually made of gelatin, an animal by-product. Strict vegetarians may not find these products suitable. Vegetarian gel caps, derived from potato extract, are available but are used by only a small number of companies. Additionally, clients with hypochloridia or achloridia may be unable to break down the protein gelatin of these capsules. Until their digestive capacity improves, they may open the capsule and empty its contents into food or drink.

A number of excellent, conscientious companies have developed which eschew the use of binders, fillers, and other excipients. The companies adhere to a philosophy called "pure encapsulation." By employing the use of many different capsule sizes, these companies eliminate the need for fillers. Other innovative manufacturing processes eliminate the need for flowing agents and binders. At best, no adulterants are added to the nutrients.

### **Natural vs Synthetic**

From a chemist's standpoint, natural and synthetic nutrients are basically the same: their molecules contain exactly the same elements. However, the molecular structure of synthetic nutrients does differ from natural nutrients in that the elements are arranged in a slightly differing fashions.

According to Judith DeCava, MS, NC, author of *The Real Truth about Vitamins and Antioxidants* [1996], natural vitamin complexes differ significantly from chemically pure, synthetic nutrients. They may be identical in chemical characteristics (containing the same numbers

and kinds of atoms), but they differ from each other in their structure or configuration. Synthesized nutrients are mirror-image duplicates of natural nutrients.

While many will argue this small difference is inconsequential, it appears that the body can tell the difference. A case in point: natural vitamin E is three times more absorbable than its synthetic counterpart [Prasad 1994]. Additionally, natural source nutrients may contain co-factors, enzymes and myriad phytonutrients which provide a synergistic effect.

The table below summarizes the natural and synthetic sources of a number of vitamins:

### Natural and Synthetic Sources for Common Vitamins

VITAMIN	NATURAL	SYNTHETIC
A	fish oil, lemon grass	(source not given) acetate, palmitate,
B complex	Brewer's yeast	(source not given)
B1	yeast	thiamine mononitrate or hydrochloride
B2	yeast	riboflavin
Niacin	yeast	niacin, niacinimide
B5	Yeast, liver, rice bran	calcium D-pantothenate
B6	Yeast	pyridoxine hydrochloride
B12	Liver, Micro-organism fermentation	cobalamin
C	citrus, rose hips, acerola berries	ascorbic acid (source not given)
D	fish oil	ergosterol, Calciferol
E	vegetable oil, wheat germ oil, mixed tocopherol d-alpha tocopherol	dl-alpha tocopherol, d-alpha tocopherol acetate or succinate
K	alfalfa	menadione
PABA	yeast	aminobenzoic acid
Folic Acid	yeast, liver	pteroylglutamic acid

Inositol	soy beans, corn	
Choline	soy beans	choline chloride or bitartrate
Biotin	liver	d-Biotin

Source: DeCava, 1996.

### What's the difference between Food-Grown, Food-Based and Food-Formed Nutrients?

Many supplement companies use the word "food" on their label to give the appearance that their product is completely natural. Unfortunately, this is not necessarily an accurate representation. Supplements labelled *food based* are made by adding purified synthetic vitamins to a base of food, such as wheat grass, spirulina, or herbs. Both *Food Grown*" and *Food-formed*" supplements are made by "feeding" synthetic vitamins and inorganic minerals to a base of living yeast. Through fermentation, the yeast incorporates the nutrients, which become part of a living food. Proponents claim these products have increased absorption, are metabolized more completely and offer a synergistic effect by providing nutrient co-factors present in the food base. Critics call this type of supplement manufacturing a mere marketing gimmick: they point out that taking one's supplements *with meals* easily provides the needed enzymes and co-factors required for optimum absorption and metabolism (without the added cost of higher-priced supplements). Additionally, food-grown supplements generally have lower potencies, requiring numerous tablets to get the desired nutrient levels to promote health. A final concern is the yeast base, which may present difficulties for those allergic to yeast or experiencing *Candidia* overgrowth.

Yet another approach to supplement manufacturing entails concentrating foods for their nutrient content. These *Whole Food Concentrates* are freeze dried encapsulations of vegetables, juices, green foods, or other whole foods. Flash or low-heat pasteurization is used to dry and concentrate the product. This method guarantees the inclusion of all the nutrient cofactors—such as phytonutrients and other as yet unidentified nutrients which are present in foods but absent from most chemically-pure vitamins. Although pasteurization destroy enzymes, this method does retain the original structure of nutrient and nutrient ratios.

### Finding Quality Supplements

**Cheaper is not (necessarily) better.  
Expensive is not (necessarily) better.**

First, and foremost, do not let cost be your determining factor. While it doesn't make sense to pay extra for an identical product, an inferior product, no matter how cheap, is a waste of money. When it comes to health, product quality is a top priority, not price. In the long run, you will get better results—and actually save your clients money—by using the right product, rather than continuing to use products that provide no benefit.

## **Packaging and Potency Preservation**

The bottle in which a supplement is packaged should optimally protect the purity and potency of the product through the expiration date listed on the label. Most nutrients can be degraded by exposure to light, heat or moisture. Opaque or dark-colored containers are preferable. Supplements should be stored away from direct sunlight or heat sources (under 80°F). The silica packet enclosure should remain in opened bottles to protect against moisture.

Vitamins gradually lose their potency over time. Most products have a shelf life of 1-2 years. Do not purchase a product that does not list the expiration date on the bottle. This date is generally 18-24 months following the date of manufacture. Discard within 6 months following the expiration date. An exception is probiotics, which expire within 12 months or less, and should be discarded on the expiration date.

Ideally, a product should maintain its potency right up to the expiration date. Discolorations (such as mottling on the surface of a tablet) can be signs of unwanted interactions between ingredients (e.g., oxidation of minerals by vitamin C) and loss of potency.

## **Descriptive label**

Look at the amount of information you are getting on the label. The best manufacturers provide you with as much information about the ingredients on the label as physically possible. Does the product state merely "calcium...500mg" or does it provide specific information on the form of calcium provided, say "calcium citrate" or "calcium carbonate"? Does it offer the milligram weight of the total chelate or of the elemental amount of calcium alone? Shoddy manufacturers do not provide milligram amounts or are not descriptive about the form of the nutrient. An incomplete label is a red flag! Never buy a supplement that does not clearly list the amount of each ingredient on the label.

## **Does the product actually contain what is stated on the label?**

The National Nutritional Foods Association (NNFA) is a trade organization that offers a "true label" program, assuring accuracy in label claims. The NNFA offers ethical manufacturers the opportunity to independently verify the quality of their product. Founded in 1935; it is the largest U.S. natural products trade organization; manufacturers can "register" products when they join the NNFA.

NNFA member manufacturers must submit the label of every product they produce to the NNFA's Director of Science and Quality Assurance. Periodically, the NNFA randomly submits supplements to independent laboratory testing to evaluate whether the ingredients listed on the label agree with the lab's analytical report. If there is a problem, NNFA's Compliance and Label Integrity Committee (ComPLI) notifies the manufacturer of the discrepancy and requests immediate action to correct the situation. If no action is taken, the NNFA publishes

their finding in their official trade newsletter. As a result, stores may drop the product or even the company's entire line. Additionally, if the offending manufacturer fails to resolve the problem, it may be barred from displaying its products at national trade shows.

Companies whose products pass the NNFA random analyses may not use this information to promote their products. To find out if your supplement manufacturer is a NNFA member company, call the NNFA's headquarters in California at (714) 622-6272.

## **A Certificate of Analysis**

Many ethical companies conduct regular "audits" of their products (especially when a subcontracted manufacturer is employed) to ensure quality control, and that the product meets label content claims. You may want to ask the company for a document called the "Certificate of Analysis." It tells what was found in a specific product. Be certain to ask for a Certificate of Analysis that corresponds to the lot number marked on the label of the product.

Determine whether the certificate was issued by an in-house or independent laboratory (both can be valid). A reputable laboratory will hold a membership in a professional society, which certifies lab's capabilities and performance. Some common professional societies include: the American Society of Microbiology (ASM), the Association of Official Analytical Chemists (AOAC), the American Chemical Society (ACS), the American Council of Independent Laboratories (ACIL), and the American Oil Chemists Society (AOCS).

A valid certificate will contain the name, address, and phone number of the laboratory, will be signed and dated by the lab director, and will specify the lot number of the product tested. The certificate should detail what tests were administered and how, and whether the certificate gives results for raw materials or the finished product. Check to make sure that the key ingredients in product were tested, ideally, in their raw and finished forms.

Don't expect the analyzed contents to be in perfect agreement with the label claims: they rarely are. But they should be within 5-10 percent of the label claim. An error greater than 10 percent indicates there is a problem with quality control in the manufacturing of that product.

## **Good Manufacturing Practices**

Because of a lack of uniform self-policing within the supplement industry, the FDA has imposed a standard of manufacture called Good Manufacturing Practices (GMPs). These standards are mandated on the entire dietary supplement industry, whether they are NNFA members or not. Any manufacturers out of compliance faces legal action by the FDA. If serious, the FDA can shut down the manufacturer.

The objective of GMPs is to ensure that the consumer is provided "safe dietary supplement products which are not adulterated or misbranded, which have the identity and provide the quality of dietary ingredients declared on the label, and which meet the quality specification that the supplement is represented to meet." GMPs entail

## Tips for Selecting High Quality Herbal Products

### Traditional preparations versus standardized extracts?

Standardized extracts are quickly becoming the industry standard. They offer guaranteed and consistent levels of "active" constituents of the herb (regardless of differences in growing, harvesting or plant characteristics). Standardization is usually expressed as a percentage of the total weight of the extract. For example, milk thistle may be standardized to contain 70-80% silymarin. Using standardized products allows for accuracy of dosing and consistent clinical results. Yet many traditional herbalists argue against the use of standardized products.

The debate centers around the assumption that a single extracted constituent is superior. Traditional herbalists explain that herbs work via gentle, subtle synergistic actions of the full complement. Also, unlike drugs, herbs may not work via only one mechanism of action. Assuming that an isolated "active ingredient" is a substitute for the full-spectrum compound is like assuming the top three musicians can stand in for the full orchestra! They also point out that whole herb compounds are generally free from side effects, suggesting complementary components of the herb protect against unwanted side effects.

One option is to use isolated fractions for short-term duration to achieve a desired effect, then use full-spectrum preparations for gentle balancing and tonic effects over the long term.

### Industry standards for quality herbal ingredients

When purchasing herbal products, look for a seal from the trade organization known as the American Herbal Products Association (AHPA). Companies that belong to AHPA work together to set standards of quality for growing, harvesting, storage, and manufacturing of herbal products.

### Does the company have liaisons with European companies?

Countries in Europe, Asia and India have integrated botanical medicine into healthcare, and often have strict government controls regarding these products (such as the Germany's Commission E). These companies produce high-quality and well-researched products; companies with connections to these should be at the top of your list. These companies are attempting to bring you the best available product. Liaisons such as these also provide the assurance that a preparation matches the form used in research and clinical settings.

all aspects of manufacture: personnel training, physical make-up of plant, sanitation of buildings and facilities, equipment used in manufacture; production and processing controls, warehousing, and distribution procedures.

Many excellent companies choose manufacturing practices that are even more stringent than those mandated by the FDA's Good Manufacturing Practices. Look for a company that offers a guarantee: this indicates that the maker has confidence in their product.

### Why aren't supplements labeled as to what conditions they benefit?

Manufacturers of dietary supplements are not legally permitted to make claims for a supplement regarding the treatment or prevention of specific diseases.

Legislation passed in 1994—the Dietary and Supplement Health and Education Act (DSHEA)—allows what are called Structure-Function claims. These claims describe the way a natural substance alters or helps maintain a bodily function of structure. Examples of structure-function claims would be "helps maintain normal vision" for vitamin A or beta-carotene containing products, or "helps balance a woman's monthly cycle" for herbal products that support the female reproductive system.

### Third Party literature

**Under the DSHEA, retailers, manufacturers, and distributors are permitted to distribute educational information that makes claims for natural substances, as long as the information is balanced, accurate, and does not mention a particular brand name. The educational information must also be written by a third party: a researcher, publisher or reporter who has no vested financial interest in the information presented. Quality third party literature has the following characteristics:**

- 1. It is written by health-care professionals or qualified research journalists with no financial interest in the product**
- 2. It's published by a publisher with no ties to the product**
- 3. The coverage is comprehensive, including information about dosages, applications**
- 4. Sources are listed, and include reputable books, magazines, medical journals, or experts. Check the publication dates of all sources for old, outdated information.**
- 4. It provides a balanced view, including information about toxicity or contraindications**
- 5. It offers fact, not fiction or mere opinion or marketing hype**

**Keep in mind that you need to evaluate the educational literature as carefully as you evaluate the nutritional supplements you purchase.**

**Does the company have a commitment to education and research?**

Good companies hire employees who are trained to offer accurate information and answer inquiries about their products. Good companies painstakingly educate the employees who will sell their product. They may have technical sheets or research abstracts available. Any claims made regarding the product will be based on research and clinical information rather than hype. Additionally, many quality companies dedicate a portion of their proceeds to further research in nutritional or botanical medicine.

## **Getting the Right Product for the Job**

**What's best form of delivery for particular nutrient?**

Dietary supplements are available in a wide range of forms: capsules, tablets, gel caps, powders, liquids, chewable wafers, sublingual tablets, and—new to the market—liquid sprays and topical gels. Additionally, both time-release and rapid dissolution formats are available for many nutrients.

Several factors govern the selection of an appropriate form. It should optimize the delivery and absorption of the nutrient, taking into account both the dissolution rate of the product and the client's digestive competence. The delivery form should be acceptable to the client and suited to his or her needs. Finally, it should be convenient. A product that offers the desired dose in 2 capsules is preferable to one that requires 8 tablets to achieve the same dose.

Children, the elderly, the very sick, and those who dislike swallowing pills will benefit from the use of liquids, powders or chewable products. These products avoid problems with digestion/breakdown of tablets or capsules and are rapidly absorbable. However, they are generally high in sweeteners to mask unpleasant tastes and may contain additives, preservatives, and emulsifiers.

Tablets are the most common delivery form. They are easy to store, and have a longer shelf-life than powders or liquids. However, because they are pressed during manufacture, they may not be the best choice for those with poor digestion. Some manufacturers use heat in the tableting process, which may destroy nutrients.

Capsules generally dissolve and release their ingredients quickly. Like tablets they are convenient and easy to store, though they may be more expensive. Enteric-coated capsules or caplets (capsule-shaped tablets) dissolve in the intestine, not in the stomach. They are best for those nutrients that cannot withstand the acidity of the gastric environment.

Gel-caps are soft gelatin capsules that many people find easier to swallow than regular capsules and tablets.

Sublingual tablets, sprays and topically applied products are absorbed transdermally, and enter directly into the bloodstream. While this delivery method has the advantage of bypassing digestion, it may place additional burden on the liver. Normal digestion and absorption from the gut delivers small amounts of nutrients at a time. The rapid entry of these delivery systems may overload the liver's capacity to process the nutrients.

Time-release products are designed to slowly release nutrients over a 6 to 12 hour time period. They are made by encasing a nutrient in tiny micro-pellets and then combining these with a special base. The cost can be double the price of regular supplements: in fact, it may be more cost effective to choose a regular supplement and take lower doses at intervals throughout the day. One consideration when selecting time-release supplements is the possibility of over-burdening the liver, which may receive a continuing supply of the nutrient rather than only with meals. While time-release supplements may be a good choice for water-soluble nutrients, they are likely contraindicated for fat-soluble nutrients.

Ostensibly, sustained-release products are designed to keep blood levels of vitamins high for several hours. Research has demonstrated that nutrients have specific absorption sites within the small intestine. If a time release product travels too far along the alimentary canal before releasing its nutrient, it may have bypassed the absorption site, yielding far diminished absorption.

### **Dissolution rate**

Supplements that dissolve most rapidly have the highest physiological bioavailability because nutrients have a limited and defined region of absorption in the intestinal tract [Bland, 1985]. Some companies offer an analysis on the dissolution rate of their product.

Do not confuse dissolution with solubility, which is merely a measure of a substance's capacity to dissolve in water. For example, ascorbic acid is fully soluble (capable of mixing in water), but if it is bound tightly in a product that cannot dissolve, its solubility is a mute point.

Dissolution rates are influenced by several factors: tablet compression force, type and amount of excipients, coating materials. Another factor is the digestive integrity of client. Highly compressed tablets are more marketable as they allow increased amount of agents pressed into small pill. These are generally so hard that they cannot breakdown, and are of little use. Look for comparatively large tablets that break apart easily with finger pressure.

You may want to check the disintegration of your tablet using a home testing method. In a glass container with a lid, put 1 cup water with the juice of half a lemon (to mimic stomach acid). Add the tablet. Let sit, agitating at intervals. How long does your tablet take to dissolve? 10 minutes? 30 minutes? 60 minutes? Ideally, they should disintegrate within 45 minutes [Werbach, 1997:81]. Any tablet that is still intact more than 1-2 hours, is not being absorbed. You might as well throw them away.

## A Checklist of Questions

Call the company! Their representative should be willing to address your concerns and to willingly and honestly answer your questions. You should come away from the conversation feeling confident that you are getting an honest portrayal of the product (both its strengths and weaknesses). Here's a checklist of questions you may want to ask.

- Does your company actually assemble your supplements or do you use a superassembler?
- Who in your company oversees the superassembler to ensure the job is done correctly?
- Do you have documented evidence that the job meets your specifications?
- If assembled in house, can you tell me about your compression forces and coatings?
- What are your quality control methods?
- Tell me about the age of your products: How long does it take for the raw materials you purchase to end up as a finished product on my doorstep?
- Can I speak with your chief biochemist?
- Can you give me a complete listing of all substances contained in the product (including excipients, fillers, lubricants, binders, disintegrants, coating materials, and coloring and flavoring agents)?
- Is the source of the products ingredients natural or synthetic?
- Is your company a member of the NNFA (or AHPA)?
- Can I get a Certificate of Analysis for a specific product (lot # \_\_\_\_)?
- Do you have studies on the dissolution (not solubility) and the absorbability of your product?
- Does your company have affiliations with other companies (perhaps overseas)?
- Does your company donate a percentage of profits annually toward research or otherwise demonstrate a commitment to research?
- Do you have research abstracts or technical sheets available for practitioners?

### Timing of dose delivery

To help your clients get the most out of their supplements, you'll want to recommend an effective dosing schedule. Here's a helpful method. Determine the amount of time the nutrient stays in the blood stream, then schedule the dosing to ensure adequate blood levels. Many fat-soluble nutrient peak in blood stream at 4-6 hours post-ingestion and return to basal levels 12 hours later. These are best taken twice daily. Water soluble nutrients, on the other hand, are rapidly degraded in the body. Maintaining effective blood levels of water-soluble nutrients requires more frequent administration: at least 3 times daily. When it's important to keep levels especially high (as in the case of acute or chronic illness) the dose may be repeated as often as every 2-3 hours.

### Absorption is not the only issue

While it is important to select a product with high level of absorption, there is adequate reason to believe unabsorbed nutrient has some effect. Do not be discouraged by belief that excess nutrients are being excreted and therefore wasted. Research has shown that many nutrients have

important roles to play by remaining in the lumen of the intestine rather than be absorbed for use systemically. For example, vitamin C and calcium in the large intestine offer protection against cancer by inhibiting the conversion of agents into carcinogens and to enhancing healthy flora [Prasad 1994].

### Affect of chelated counterparts

Chelation (key-lay-shun)—meaning claw—is the process whereby a mineral is bonded to an amino acid. Because the body readily absorbs amino acids (including dipeptides and tripeptides), the this process may enhance absorption of minerals, which are relatively poorly absorbed. However, the bioavailability and metabolism of mineral chelates differs depending on the properties of the chelating agent. While many mineral chelates are helpful, some are not and may even be destructive [Werbach, 1997:82].

Furthermore, products labeled "amino acid chelates" may not be true chelates, especially if they are formed from metal salts and either hydrolyzed protein or amino acids derived from hydrolyzed protein. If a mineral supplement contains true amino acid chelates, the label

should list the name of the amino acid to which the mineral is chelated.

A quick way to determine quality when selecting a multiple vitamin-mineral products is to look at the form of the minerals. Are inexpensive—and relatively unabsorbable—inorganic minerals utilized (chloride, hydroxide, oxides, phosphates, and sulfates)? Products containing more absorbable mineral chelates will cost more but are worth it for increased absorption.

Select a product not only for its absorbability but also for the physiological effect of the attached substrate. For example, magnesium chelated to the amino acid taurine may be an excellent choice for a client who has a history of heart disease. Minerals chelated to Krebs' cycle intermediates would be a good selection for a client with fibromyalgia or chronic fatigue.

#### Metabolic properties of differing formulations

You may also want to consider the metabolic (pH) effect of the product. For instance, vitamin C as ascorbic acid gives an acidic effect. It might best be taken with meals (to enhance needed digestive acids) and by those leaning toward alkalosis. Ascorbic acid should be avoided by those who are overly acidic, prone to gastritis, or have active ulcers. Conversely, buffered vitamin C products are best utilized away from meals (so as not to buffer digestive secretions), and by those who are metabolically acidic.

Another example might be the selection of calcium. Calcium supplied in an alkaline salt form (calcium carbonate, calcium phosphate, calcium sulfate) requires the presence of adequate gastric acidity for proper absorption. If the individual is hypochloridic, these forms will be poorly absorbed. However, these forms will be balancing and beneficial for hyperchloridic clients! Conversely, the acidifying calcium citrate form is a better choice for hypochloridic individuals: indeed research showed achlorhydric subjects absorbed calcium citrate ten times better than calcium carbonate [Werbach, 1997: 88].

When selecting the optimum nutrient forms and formulations for a client, consult: *Foundations of Nutritional Medicine* by Melvyn Werbach, MD, and *The Encyclopedia of Nutritional Supplements* by Michael Murray, ND.

#### **Safety issues for taking supplements with prescription and over-the-counter drugs**

Just as nutrients interact with other nutrients, interactions can also occur between nutrients and prescription or over-the-counter medications. While the delineation of these interactions has just begun to be studied, an excellent resource for determining the safety of specific nutrients for clients taking pharmaceutical preparations is *The People's Guide to Deadly Drug Interactions: How to Protect Yourself from Life-Threatening Drug/Drug, Drug/Food, and Drug/Vitamin Combinations* by Joe and Teresa Graedon (New York, St Martin's Press, 1995).

#### **Choosing the Right Product**

Choosing the right product is critical if you want to get effective results. First, determine that the product is tailored to the needs of your client. Is it free of allergens that the client is sensitive to? Are the forms of nutrients used appropriate for the client's needs? Are they within the client's budget? Is there a product that combines several needs of the client and still provided needed nutrient amounts? Is the delivery form suitable (e.g., chewable or liquid for children)?

To ascertain the suitable form, dose and duration of a dietary supplement's use for a client, you will want to "match the studies."

#### **Match the studies**

Matching studies means doing the research to finding out what studies have been done and specifically what product was used to achieve those results. Then choose a product that most closely resembles the product used in the studies. Examine the research utilizing a nutrient for your desired clinical application, noting the form, dose, frequency and duration of administration, and the delivery method employed. You want to match your use of the nutrient as closely as possible to the use in a successful study.

To illustrate these points, consider this hypothetical example: a study reports the effective alleviation of headaches with 400 IU of the d-alpha tocopheryl form of vitamin E, taken three times daily for 4 weeks. Can you reasonably expect a client taking 200 IU of dl-alpha tocopherol twice daily for one week to achieve the same pain relieving results? Different forms of the same nutrient may have different biochemical effects in the body (for example, the d-alpha tocopherol form of vitamin E is an antioxidant; tocopheryl does not act as an antioxidant, but does offer other effects).

Ensure that the product you select was prepared in a similar manner and contains the same concentration of ingredients as the product utilized in the research. Examine the label to ensure you are getting the proper therapeutic dose utilized in the studies. Check that any additional or combined nutrients are also included in your formula to ensure your receive the full synergistic benefit. (If a study utilized ginseng combined with astragalus; your formula should provide both herbs, in the proper amount and ratios).

#### **Summary**

In closing, remember, no company manufactures the perfect replacement for high quality food! However, the considerations examined in this article will help you select the highest quality supplements to nutritionally support your clients' health and healing processes.

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## RESOURCE LIST OF SUPPLEMENT COMPANIES

### Botanical and Nutritional Products

This referral list provides contact information for a number of supplement companies that cater to healthcare practitioners. Inclusion does not constitute an endorsement nor quality assurance.

#### DISTRIBUTERS

##### **Emerson Ecologics**

18 Lomar Park  
Pepperell, MA 01463  
(800) 654-4432

##### **Threshold Enterprises, Ltd.**

23 Janis Way  
Scotts Valley, CA 95066  
(408) 438-6851  
(800) 777-5677

#### COMPANIES

##### **Alacer Corporation**

19631 Pauling  
Foothills Ranch, CA 92610  
(800) 854-0249  
<http://www.alacercorp.com>

##### **Allergy Research Group**

400 Preda St.  
P.O. Box 489  
San Leandro, CA 94577  
(800) 545-9960

##### **Alta Health Products**

1979 East Locust  
Pasadena, CA 91107  
(818) 796-1047

##### **AMNI**

##### **(Advanced Medical Nutrition)**

2247 National Ave.  
P.O. Box 5012  
Hayward, CA 94540  
(800) 654-4432

##### **Bio-Energy Systems**

157 N. Meridian, Suite 105  
Kalispell, MT 59901  
(800) 929-8329

##### **Bio-Tech**

P.O. Box 1992  
Fayetteville, AR 72702  
(800) 345-1199

##### **Bio-Therapeutics**

##### **(Enzyme Therapy)**

825 Challenger Dr.  
P.O. Box 1745  
Green Bay, WI 54311  
(800) 225-9245  
<http://www.enzy.com>

##### **Biotics Research**

P.O. Box 26888  
Houston, TX 77236  
(800) 231-5777

##### **Cardiovascular Research/**

##### **Ecological Formulas**

1061-B Shary Circle  
Concord, CA 94518  
(800) 888-4585

##### **Douglas Laboratories**

600 Boyce Rd.  
Pittsburgh, PA 15205  
(800) 494-0122

##### **Ethical Nutrients**

971 Calle Negocio  
San Clemente, CA 92673  
(714) 366-0818

##### **Gaia Herbs, Inc.**

108 Long Island Ford Rd.  
Brevard, NC 28712  
(800) 831-7780

##### **Herb-Pharm**

P.O. Box 116  
William, OR 97544  
(503) 846-6262

##### **Herbs, Etc.**

1340 Rufina Circle  
Santa Fe, NM 87501  
(800) 634-3727

##### **Herbs for Kids**

151 Evergreen Dr., Suite D  
Bozeman, MT 59715  
(406) 587-0180

##### **Jarrow Formulas**

1824 S. Robertson Blvd.  
Los Angeles, CA 90035  
(800) 726-0886

##### **J.R. Carlson Laboratories**

15 College Dr.  
Arlington Heights, IL 60004  
(800) 323-4141

##### **Klaire Laboratories/Vital Life**

1573 W. Seminole  
San Marcos, CA 92069  
(800) 533-7255

##### **Metagenics**

130 Ryan Court, #200  
San Ramon, CA 94583  
(800) 334-1700

##### **MMS Pro**

##### **(Murdock Madaus Schwabe)**

10 Mountain Springs Parkway  
Springville, UT 84663  
(801) 489-1500

##### **Nature's Way**

10 Mountain Springs Parkway  
Springville, UT 84663  
(800) 489-1500

##### **NF Formulas, Inc.**

Wilsonville, OR 97070  
(800) 547-4891

##### **Omega Nutrition**

65 Arlich Rd.  
Bellingham, WA 98226  
(800) 661-3529

##### **PhytoPharmica**

825 Challengar Drive  
Green Bay, WI 54311  
(800) 553-2370

##### **Planetary Formulas**

P.O. Box 533  
Soquel, CA 95073  
(408) 438-1700  
(800) 606-6226

##### **Progressive Laboratories, Inc.**

1701 W. Walnut Hill Lane  
Irving, TX 75038  
(800) 654-4432

##### **Pure Encapsulations**

490 Boston Post Rd.  
Sudbury, MA 01776  
(800) 753-2277

##### **Rainbow Light**

P.O. Box 600  
Santa Cruz, CA 95061  
(408) 429-9089  
(800) 635-1233

##### **Rx Vitamins**

200 Myrtle Blvd.  
Larchmont, NY 10538  
(800) 792-2222

##### **Seraphim**

1890 Preston White Dr.  
Reston, VA 20191  
(800) 525-7372

##### **Source Naturals**

19 Janis Way  
Scotts Valley, CA 95066  
(408) 438-1144  
(800) 815-2333

##### **Standard Process**

1200 West Royal Tee Dr.  
Palmyra, WI 53156  
(800) 848-5061

##### **Tyler Encapsulations**

22-4-8 NW Birdsedale  
Gresham, OR 97030  
(800) 869-9705

##### **Thorne Research, Inc.**

P.O. Box 3200  
Sandpoint, ID 83864  
(800) 228-1966  
<http://www.thorne.com>

##### **Vitanica**

P.O. Box 1285  
Sherwood, OR 97140  
(800) 572-4712

##### **Zand Herbals**

P.O. Box 5312  
Santa Monica, CA 90409  
(310) 822-0500