ESSENTIAL MINERALS FOR HEALTHY LIVING

EXECUTIVE SUMMARY

Minerals of life – including major minerals, trace minerals, and ultra-trace minerals – must be obtained from diet and other external sources. Without them, life could not exist. Our bodies depend on them for nearly every aspect of our metabolism.

In modern times our food and beverages have become depleted of most minerals due to poor agricultural soil. In addition, at least 16 additional lifestyle choices work to deplete our bodies of minerals. Consequently, rampant mineral deficiencies lie at the root of a large number of diseases of civilization.

Our bodies are adapted to using minerals in certain proportion to one another. We require a complex array of dozens of minerals for optimum health.

Since foods, beverages, and lifestyle choices drive mineral deficiencies, the best strategy for restoring mineral balance is by supplementation. The most appropriate forms for such supplementation, based on our own biology, are ionic forms.

Dead Sea salts provide the complete set of more than 70 minerals that our bodies can use most effectively – i.e., in ionic form. The PURCON Process purifies and concentrates the raw salts in a three stage procedure that takes up to two years. The final product is ***IonicMin™*** **by ProActive Nutra**.

Health benefits of Dead Sea salts also derive from their external use in Dead Sea salt baths and cosmetics.

THE MINERALS OF LIFE

The word “mineral” is used in several different ways. Geologists describe the mineral makeup of rocks based on their chemical composition. The total number exceeds 4,000 minerals, with about 100 new ones being discovered every year.

Biologists, on the other hand, refer to minerals – i.e., the **minerals of life** – as those naturally occurring elements that are important for the metabolism of living organisms. This narrows down the category considerably, since there are only 94 known elements that occur naturally.

Examining the composition of organisms reveals how significant the naturally occurring elements can be for metabolism. For example, in order of percent body mass, human elemental composition consists mostly of oxygen (65.0%), carbon (18.5%), hydrogen (9.5%), and nitrogen (3.2%) – a total of 96.2%.

These are the major elements – the “Big Four” - that we get from the food we eat, the air we breathe, and the water we drink.

The remainder of our body mass is made up of the minerals of life. They are classified into two categories based on their relative abundance. These categories are the major minerals and the trace minerals.

Like the Big Four elements, all major and trace minerals are also supposed to be obtained from what we eat and drink. Unfortunately, this is far from the case in modern times. Modern foods and beverages are simply not as healthful as they used to be. They are particularly deficient in many of the minerals of life.

Dietary mineral depletion is now the norm.

Mineral deficiencies lead the way in the development of untold numbers of health disorders, like never before in human history.

Unlike certain vitamins and other nutrients that our bodies can synthesize, all minerals must be ingested.

Looking at our own mineral composition once again gives us an idea of what we should be taking in on a daily basis.

1. Major Minerals

Besides the Big Four, human life depends just as much on the 3.8% of body mass that makes up the major and trace minerals. There are seven so-called major minerals. In order of descending percentages of our body composition, they are:

- Calcium (1.5%)

- Phosphorous (1.0%)
- Potassium (0.4%)
- Sulfur (0.3%)
- Sodium (0.2%)
- Chlorine (0.2%)
- Magnesium (0.1%)

These are called “major minerals” because they are so abundant in our bodies. Note that the percentages cited here add up to 3.7% of body mass.

This means that all of the trace minerals together comprise only 0.1% of the total elements that we are made of. Yet without such a seemingly microscopic amount of these minerals, human life would not exist.

Here is what we know about our trace minerals composition.

2. **Trace Minerals**

All trace minerals together add up to less than 0.1% of our mineral composition. Of these, the elements thought to be of greatest biological importance, in alphabetical order, are:

- Boron
- Chromium
- Cobalt
- Copper
- Iodine
- Iron
- Manganese
- Molybdenum
- Selenium
- Tin
- Vanadium
- Zinc

3. **Ultra-Trace Minerals**

Additional mineral elements may also have a biological role at super low levels. These can be referred to as **‘ultra-trace’ minerals’**, which include the following, in alphabetical order:

Actinium	Hafnium	Rhodium
Astatine	Holmium	Rubidium
Antimony	Indium	Ruthenium
Barium	Iridium	Samarium

Beryllium	Lanthanum	Scandium
Bismuth	Lithium	Silicon
Bromine	Lutetium	Silver
Cesium	Neodymium	Tantalum
Dysprosium	Niobium	Tellurium
Europium	Osmium	Terbium
Fluorine	Palladium	Thallium
Gadolinium	Platinum	Thorium
Gallium	Praseodymium	Titanium
Gold	Rhenium	Tungsten
		Ytterbium

The list of ultra-trace minerals is still not the final word on which elements are biologically important. Physiological roles of minerals are under continual scrutiny. Research has discovered the importance of certain ultra-trace minerals – e.g., silicon, iridium, and rhodium.

Newer discoveries in cell physiology also point to the importance of, for example, supplemental iodine for counteracting the negative impact of bromine and fluorine. Bromination and fluoridation are common processes that add these harmful minerals to processed foods and drinking water.

Without knowing the complete story of every single mineral – more than 70 in all – the best strategy for optimal health is to make sure that we get a balanced intake of all of them in proportion to their occurrence in nature. For this purpose, the most important source for such a balanced supplement profile is the mineral deposits in the Dead Sea.

WHY DO WE NEED MINERALS?

Minerals have roles in every single bodily process, and the human body cannot produce them on its own. They must be obtained from diet and supplementation.

The requirement for minerals is akin to the requirement for eating.

The human body relies on mineral electrolytes – i.e., ***ions*** – for performing the bioelectrical functions that give us life. This means that the ionic form of minerals is the biologically active form.

Minerals are typically described individually for their separate roles in metabolism. However, they actually work synergistically to coordinate virtually all of our critical cellular processes.

1. Main Roles of Major Minerals

- Calcium: Important for healthy bones and teeth; helps muscles relax and contract; important in nerve functioning, blood clotting, blood pressure regulation, immune system health
- Phosphorus: Important for healthy bones and teeth; found in every cell; part of the system that maintains acid-base balance
- Potassium: Needed for proper fluid balance, nerve transmission, and muscle contraction
- Sulfur: Guides protein structure and function as component of the sulfur-containing amino acids, methionine and cysteine
- Sodium: Needed for proper fluid balance, nerve transmission, and muscle contraction
- Chlorine: Needed for proper fluid balance, stomach acid
- Magnesium: Found in bones; needed for making protein and for muscle contraction, nerve transmission, immune system health

2. Main Roles of Trace Minerals

- Iron: Part of a molecule (hemoglobin) found in red blood cells that carries oxygen in the body; needed for energy metabolism
- Zinc: Part of many enzymes; needed for making protein and genetic material; has a function in taste perception, wound healing, normal fetal development, production of sperm, normal growth and sexual maturation, immune system health
- Iodine: Found in thyroid hormone, which helps regulate growth, development, and metabolism; every cell in the body has iodine receptors
- Selenium: Antioxidant; component of antioxidant enzymes
- Copper: Part of many enzymes; needed for iron metabolism; essential for collagen structure in skin
- Manganese: Part of many enzymes
- Chromium: Works closely with insulin to regulate blood sugar (glucose) levels
- Molybdenum: Part of some enzymes
- Nickel: Thought to be involved in protein structure; may activate certain enzymes related to glucose
- Silicon: Plays a vital role in assisting calcium for the growth and maintenance of joints and bones; helps increase the amount of collagen in bones and skin
- Vanadium: Aids in the production of red blood cells; slows down cholesterol formation in blood vessels; reduces high blood sugar by mimicking the effects of insulin
- Cobalt: An essential component of the structure of vitamin B-12, also called cobalamin, which has key role in the normal functioning of the brain and nervous system and the formation of red blood cells

RAMPANT MINERAL DEFICIENCY

Federal guidelines provide Recommended Daily Allowances (RDA) for vitamins and minerals. Such guidelines are based on nutritional intakes that are supposed to prevent symptoms of deficiency.

Population surveys show that even the low-level federal RDA for the following minerals is not met by significant proportions of people in the U.S. (It is, in fact, a worldwide phenomenon.) The latest data from the U.S.D.A. reveal the following:

Percentage of the U.S. Population NOT Meeting the RDA	
Selenium	15%
Phosphorous	21%
Copper	31%
Iron	34%
Iodine	40%
Zinc	42%
Magnesium	68%
Calcium	73%

Essentially, what all surveys and studies now show is that rampant mineral deficiency is a worldwide phenomenon.

It is doubly unfortunate that RDAs for preventing symptoms of deficiency are much lower doses than what we actually need for optimal health.

The RDA for iodine, for example, is 150 micrograms per day. An estimated 40% of the U.S. population doesn't even get that much. The scenario is much worse in the eyes of Dr. David Brownstein, who has worked with thousands of patients to restore optimal iodine levels. Based on his experience, Dr. Brownstein estimates that at least 95% of our population gets well below the optimal dose of 12.5 milligrams a day (i.e., 12,500 micrograms).

The above table represents the easiest minerals to survey. However, we can assume that all major and trace minerals follow a similar pattern. The validity of this assumption is supported indirectly by the documented nutrient depletion of soils in the U.S. and around the world.

The past century or so reveals a sordid history of degradation of agricultural lands that has led to current levels of mineral depletion.

> *The alarming fact is that foods - fruits, vegetables and grains - now being raised on millions of acres of land that no longer contain enough of certain*

> *needed nutrients, are starving us - no matter how much we eat of them.* (U.S. Senate Document 264, 1936)

> *In March, 2006, the United Nations recognized a new kind of malnutrition - multiple micronutrient depletion. According to Catherine Bertini, Chair of the UN Standing Committee on Nutrition, the overweight are just as malnourished as the starving. In essence, it is not the* ***quantity*** *of food that is at issue - it is the* ***quality****.* (Thomas, 2007)

SOURCES OF MINERAL DEFICIENCY

Nutrient depletion of soils is just one of several environmental, dietary, and lifestyle influences behind current mineral deficiencies.

1. Soil Depletion

First and foremost, because of soil depletion, food crops grown decades ago were much richer in vitamins and minerals than the varieties that most of us get today.

> *Findings released at the 1992 Rio Earth Summit confirm that mineral depletion of our global topsoil reserve is rampant. At the time, U.S. and Canadian agricultural soils had lost 85% of their mineral content. Asian and South American soils were down 76% while throughout Africa, Europe and Australia, soils were depleted by 74%, 72% and 55%, respectively.* (Marler et al., 2006)

Massive mechanized farms do use mineral fertilizer for replacing the three most in-demand elements for plant growth: nitrogen, phosphorous, and potassium. The N/P/K ratios in different fertilizers are determined based on soil types and crop species.

This is a simplistic approach that not only does not provide crop plants with optimal minerals, it also doesn't provide the diversity of necessary minerals in foods – major and trace – that consumers require for optimum health.

N/P/K fertilizers fail miserably to account for the depletion of dozens of minerals in our heavily abused crop lands.

Even organically grown crops are lacking in minerals. Organic refers to crops that are not exposed to pesticides and herbicides and has nothing to do with soil mineral content.

2. Big, Beautiful Produce

Fruits and veggies have been artificially selected over time for their size and appearance. Becoming bigger and more appealing has a dilution effect on the

nutritional content of plants. This effect is compounded by elevated levels of atmospheric carbon dioxide.

3. **Pharmaceutical Use**

Many drugs, both prescription and over-the-counter, are known to deplete calcium, potassium, and magnesium. Antacids, acid blockers, and cortisone are the biggest offenders.

4. **Low Stomach Acid**

Appropriate amounts of stomach acid are needed in order to break down minerals to make them more absorbable, particularly calcium and zinc.

5. **Birth Control Pills**

Birth control pills deplete magnesium and zinc.

6. **Caffeine**

Caffeine-containing beverages such as coffee and colas speed up the excretion of calcium and magnesium.

7. **Alcohol**

Alcohol increases the passage of magnesium through the kidneys. It also causes depletion of calcium, zinc, iron, manganese, potassium, and chromium.

8. **Dark Sodas**

Dark sodas contain excess phosphorous, which leads to the elimination of calcium and potassium.

9. **Sugar**

Every molecule of sugar our bodies requires 54 molecules of magnesium to process it. Sugar-caused insulin spikes also use up our zinc. Sugar also depletes magnesium, potassium and chromium and robs bones of minerals in general.

10. **Stress**

Stress depletes magnesium.

11. The Standard American Diet (SAD)

Refined and processed foods are deficient in most minerals. Higher consumption of these foods is a significant contributor to mineral deficiencies from such nutrient-poor foods.

12. Anti-Nutrients

Grains and legumes contain anti-nutrients – substances that bind to minerals and inhibit their absorption. The most common anti-nutrients are phytic acid and lectins. In addition, oxalates in spinach and certain other greens bind to calcium and prevent its absorption.

13. Exercise

Excessive exercise causes the excretion of minerals in sweat.

14. Pregnancy

Mineral needs of women increase substantially during pregnancy and breastfeeding. Iron deficiency is especially common during pregnancy and lactation.

15. Vegetarian/Vegan Diets

The best sources of many minerals are from animal foods. In addition, a plant-based diet is accompanied by a higher level of anti-nutrients that diminish the absorption of minerals.

16. Heavy Metal Toxicity

Mercury in amalgam fillings and vaccines blocks the absorption of magnesium and zinc. Aluminum in antacids, anti-perspirants, and many cosmetics impedes the utilization of calcium, magnesium, and phosphorous. Lead binds with calcium and makes it unusable for the body.

17. Microbiome Imbalance

A dietary offshoot of the SAD is a failure to maintain a balance of friendly bacteria that aid in the absorption and utilization of dietary minerals.

18. Aging

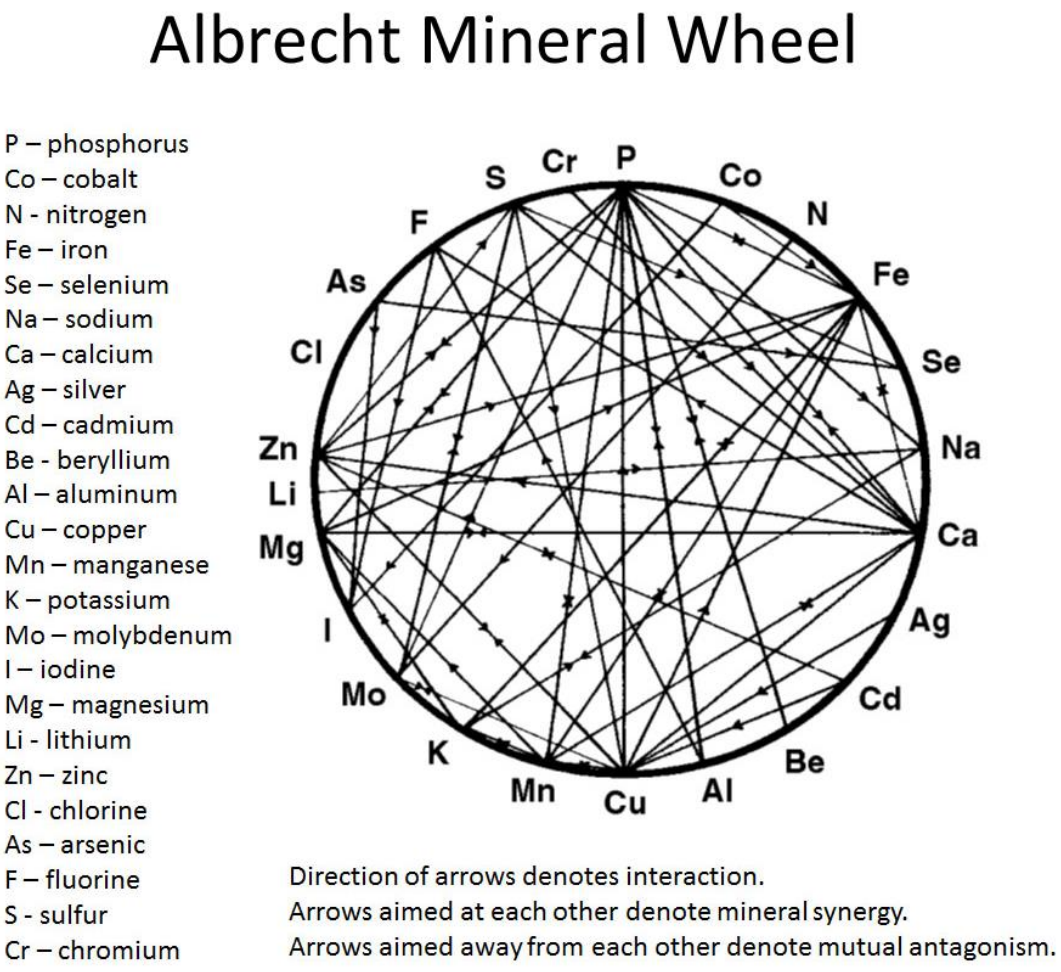
As you age, your body becomes less efficient at extracting and absorbing nutrients from the foods you eat and the supplements you take. Aging therefore puts a premium on supplementing with the right minerals in the right amounts.

MINERAL BALANCE

Our bodies are adapted to using minerals in certain proportion to one another. Excess or deficient amounts of any one mineral influence the uptake and activities of others.

Appropriate mineral interactions are extremely complex with one another and with vitamins and other nutrients. These interactions are best visualized by the **Mineral Wheel** developed by Dr. William Albrecht. (Walters 1975)

The Mineral Wheel is the most comprehensive explanation for the dynamic relationship among minerals. As such, it depicts the perfect relationship among a complex array of minerals in your body.



Note that certain trace minerals are missing, such as boron and silicon. These are now known to have important roles in human health.

The Mineral Wheel mostly shows mineral synergies. In addition to these, the effects of well-known toxic minerals – e.g., aluminum, cadmium, fluorine, and others not on the

wheel (lead, bromine) – are canceled out when all minerals are in the appropriate physiological amount relative to each other.

The key for these interactions is the *proportional amounts* of all minerals together.

The take-home lesson about mineral balance is this:

Mineral supplements work best when they come from natural sources that contain all major and trace minerals in natural proportions to one another.

As we will see later, the best natural source for a complete mineral supplement is the Dead Sea. Dead Sea salts contain the right proportions of all the minerals that are chronically depleted by poor diet and lifestyle choices.

WHAT TO DO ABOUT MINERAL DEFICIENCY

Mineral-depleted diets, derived from depleted soils and processed foods, is at the heart of rampant mineral deficiencies in the 21st century. In addition, mineral-depleting lifestyle choices compound the problem.

Overcoming or reversing nutritional deficiencies by eating better or by making lifestyle changes is not practical or effective for most people.

This is a conundrum that emphasizes the importance of mineral supplementation.

Mineral supplementation is therefore an absolute must for overcoming mineral-depleting diets and lifestyle choices that underlie modern deficiencies.

Supplementation with minerals one at a time is not a simple solution. While such a strategy may address specific deficiencies, it is insufficient for getting the appropriate balance of all of the minerals that we need for optimal health.

Selecting the best mineral supplement is, however, a source of major confusion for consumers. The confusion stems from the wide variety of forms that mineral supplements can take.

In addition, marketing claims about different mineral supplements are often over-hyped, speculative, market-oriented, and even dead wrong.

EDUCATING CONSUMERS ABOUT MINERAL SUPPLEMENTS

Education consumers with reliable, science-based information about mineral supplements is crucial. Consumers must be armed with the right information for making the best choices for their health. This entails understanding what the different forms of

minerals are, which ones are most effective based on actual human biology, and where to get them.

1. Forms of Minerals

The main forms of minerals in supplements includes chelated, organic, colloidal, rock-based inorganic, and ionic. These are briefly described here:

- Chelated minerals: chelated basically means “firmly bound” – usually to an amino acid or other carbon-based molecule; minerals do not dissociate easily from their chelate in the digestive system

- Organic minerals: similar to chelated minerals, except bound to more easily ionizable organic moieties (e.g., citrate)

- Colloidal minerals: mineral colloids are aggregate particles without an electrical charge; they are small enough to remain suspended in liquid, yet too large to be readily absorbed through cell membranes in the mouth, esophagus, and digestive tract

- Rock-based inorganics: minerals harvested in mines, from oyster shells, or from coral that are tightly bound to inorganic moieties (e.g., carbonate, silicate)

- Ionic minerals: electrically charged minerals (‘ions’) that the body easily recognizes, transports, and takes in through cell membranes

Every form of minerals is available in supplement form. Each one is marketed as the ‘best’ based on its benefits for human health. Marketing claims are sometimes supported by research and sometimes not.

The clearest thinking on how to determine what is best, though, is based on the actual biology of minerals – i.e., how we are adapted to using them.

2. Mineral Biology

Sorting through all the possibilities of mineral supplements must focus on one thing: ***biology***. In other words, how are we adapted to getting minerals into our bodies?

Ultimately, every mineral has to be taken into cells as an ion. Non-ionized forms (chelates, rocks/shells, organics, colloids) have to be processed into ionic forms in the digestive system.

Ionic forms are already in the right form for being taken up by cells and transported through the body.

Note that the main food sources for minerals throughout human history have been plants. Plant roots are incapable of taking up chelates, organic molecules, insoluble carbonates, etc., or colloids. However, they readily take up ionic minerals.

The most readily available forms of minerals from plants, therefore, are ionic. This means that our physiology evolved to use dietary **ionic minerals**.

TAKE-HOME LESSON:

Human biology is perfectly adapted for ionic mineral supplements.

3. Sources of Ionic Minerals

Current food sources, fresh or processed, are clearly deficient in ionic minerals. One strategy for reversing this trend would, of course, be to replenish minerals in depleted agricultural soils. We already know that standard N/P/K fertilizers fail miserably to do so.

The best fertilizers for raising the full complement of minerals come from seawater – specifically seawater concentrates. Commercial plant fertilizers from seawater concentrates are now on the market. Recent studies already show that they restore all of the ionic minerals that crop plants need for better, more vigorous, disease-free growth.

Although this would be a great source of dietary ionic minerals, the current use of seawater concentrates on crop plants is on too small a scale to have much of an impact on our population at this time.

We can, however, bypass such food sources of ionic minerals by supplementing with seawater concentrates directly. Indeed, such concentrates are already available in certain areas around the world in ancient seabeds such as the Dead Sea.

Sea salts are the ideal source for ionic mineral supplements.

WHY DEAD SEA SALTS?

The Dead Sea has attracted visitors from around the Mediterranean basin for thousands of years. It was one of the world's first health resorts, widely known for its therapeutic and healing powers.

Millions of people still come to this dense body of water to revive their bodies with the minerals found in both the mud and water.

The Dead Sea is technically a landlocked lake, since it has been isolated from its connection with the Mediterranean Sea for approximately 2 million years. As such, The Dead Sea is the deepest hypersaline lake in the world. ‘Hypersaline’ in this case means more than 32% salinity, or about 10 times as salty as the ocean.

The mineral content of the Dead Sea is very different from that of ocean water. Ocean water salts are approximately 85% sodium chloride. In contrast, Dead Sea water consists of a diverse mixture of ionic salts, by weight consisting of:

Chloride	66%
Magnesium	12.8%
Sodium	11.9%
Calcium	5.1%
Potassium	2.3%
Bromide	1.5%
Sulfate	0.15%
Bicarbonate	0.07%

Plus at least 60 additional trace and ultra-trace minerals.

The

1. **Dead Sea vs. Great Salt Lake**

Dead Sea minerals are comparable in some ways with minerals harvested from the Great Salt Lake in Utah. A head to head comparison, though, reveals that Dead Sea salts provide several advantages over products from the Great Salt Lake, as follows:

DEAD SEA MINERALS	GREAT SALT LAKE MINERALS
Eco-Friendly	Footprint trenches have been made Near the GSL that become a hazard to The wildlife that lives there
The Dead Sea is deeper (over 1,000 feet). This makes a majority of the heavy metals sink to the bottom. Dead Sea water contains a greater concentration of healthy minerals versus heavy metals.	The GSL is shallower (avg. 33 feet). This causes the heavy metals to settle closer to the surface, which leads to greater amounts of metals mixed with the minerals.
High levels of magnesium (12.8% DW) and chloride (67.2% DW); low levels of sodium (12.3% DW) and sulfates (0.1% DW).	Lower levels of magnesium (3.3% DW) and chloride (54.5% DW); higher levels of sodium (32.8% DW) and sulfates (7.2% DW).
Water is more pure due to the absence of contamination by living organisms in or near it.	Water contains animal waste and decomposition products, including high levels of undesirable sulfates.

Comparisons between these two sources of ionic minerals clearly show the superiority of Dead Sea minerals as a foundation for ionic mineral supplements.

Dead Sea salts are the starting point for creating a new source of ionic minerals for supplementation, **IonicMin™ by *ProActive Nutra***. The finished product, IonicMin™, is prepared by the PURCON Process for purifying and concentrating the Dead Sea minerals into the highest value ionic minerals supplement on the market.

2. The PURCON Process for IonicMin™

The PURCON Process is based on a proprietary manufacturing approach that capitalizes on natural solar evaporation and purification. The Process happens in three stages:

First, it takes advantage of the unique conditions of sun and wind in the southeast of the Dead Sea to raise the mineral salt concentration of the water to the point of crystallization.

Second, the concentrated brine is then slowly moved through a series of ponds. In each pond, the water is further evaporated, over and over again, until the salt is the only thing that remains.

Third, in the final stage the minerals are then cared for by ProActive Nutra by purifying one last time to ensure that over 99% of the undesirable sodium and sulfates are removed.

The whole process can take up to two years to produce the final product. In the end, IonicMin™ is the ideal mineral supplement for optimizing health and beauty.

IonicMin™ is a high quality mineral supplement providing over 70 ionic trace elements.

MINERAL EFFECTS ON SKIN

Historically, minerals have been equally important for external use as they have been for internal supplements. Bathing in Dead Sea salts has been reported to have the following health benefits:

- Effective against rheumatoid arthritis, psoriatic arthritis and osteoarthritis
- Relief from acne and psoriasis
- Relief from allergies
- Improve skin hydration and reducing inflammation
- Reduction in skin wrinkling up to 40%

Indeed, many commercial preparations of Dead Sea salts have been manufactured primarily for external use, including adding them to various cosmetics.

BIBLIOGRAPHY

Davis, DR, MD Epp and HD Riordan. 2004. *Changes in USDA food composition data for 43 garden crops, 1950 to 1999.* J Amer Coll Nutr 23(6): 669–682.

Fairweather-Tate, S and RF Hurrell. 1996. *Bioavailability of minerals and trace mineral eloements.* Nutrition Research Reviews 9: 295-324.

Groff, JL and SS Gropper. 1999. *Advanced Nutrition and Human Metabolism, 3rd ed.* Wadsworth, Belmont, CA. pp. 371-483.

Hurrell, RF. 2003. *Influence of vegetable protein sources on trace element and mineral bioavailability.* J Nutr 133: 2973S-2977S.

Katz, U, Y Shenfeld, V Zakin, Y Sherer and S Sukenik. 2012. *Scientific evidence of the therapeutic effects of dead sea treatments: a systematic review.* Semin Arthritis Rheum 42(2): 186-200.

Loladze, I. 2014. *Hidden shift of the ionome of plants exposed to elevated CO_2 depletes minerals at the base of human nutrition.* Elife 7(3): 29 pp.

Marler JB and JR Wallin. 2006. *Human Health, the Nutritional Quality of Harvested Food and Sustainable Farming Systems.* Nutrition Security Institute, Bellevue, WA.

Natural History Museum of Utah. June 2013. *Great Salt Lake FAQ.* https://nhmu.utah.edu/sites/default/files/attachments/Great%20Salt%20Lake%20FAQ.pdf

Scholz-Ahrens, KE, P Ade, B Marten, P Weber, W Timm, Y Asil, CC Gluer and J Schrezenmeir. 2007. *Prebiotics, probiotics, and synbiotics affect mineral absorption, bone mineral content, and bone structure.* J. Nutr 137: 838S–846S.

Sukenik, S, R Baradin, S Codish, L Neumann, D Flusser, M Abu-Shakra and D Buskila. 2009. *Balneotherapy at the Dead Sea area for patients with psoriatic arthritis and concomitant fibromyalgia.* Isr Med Assoc J 11(5): 321-322.

Thomas D. 2007. *The mineral depletion of foods available to us as a nation (1940-2002) -- a review of the 6th Edition of McCance and Widdowson.* Nutr Health 19(1-2): 21-55.

Walters, C. (ed.). 1975. *The Albrecht Papers.* Acres USA, Raytown, MO.

Wisniak, J. 2002. *The Dead Sea: A live pool of chemicals.* Indian J Chem Technol 9: 79-87.

Yarrow, D. 2001. *Sea energy in agriculture: Renewing the soil with sea solids.* Acres USA 31(11): 1-4.

Zeigler, A. 2014. *Seawater Concentrate for Abundant Agriculture.* Ambrosia Technology Ltd, Raymond, WA.