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## JOHN'S CORNER

### ORGANIC FERTILIZERS AND NUTRIENTS 33: SEA MINERALS

*by John Ferguson*

Today I want to talk about a new and exciting area of research for plant and ultimately human nutrition that is known as sea minerals. There are many new products emerging that show great promise in re-mineralizing our soils. Last December I attended a advanced soil science conference led by researchers from the USDA and several major universities, where one of the focal points was on re-mineralizing our soils. Several books I recently read (Geotherapy, The Soil Will Save Us, etc.) all focused on the re-mineralization of our soils as critical to increase productivity and quality of our foods, and to reduce insect disease and weed problems from agriculture to our flowerbeds and to fight global warming by storing carbon in our soil.

For years we were taught that all we needed to grow plants were 16 nutrients (elements). As we followed this advice the problems in agriculture and horticulture, animal health on our farms and ranches, to human health exploded and have become exponentially worse. We now know that hundreds of human health problems are caused or aggravated by nutritional deficiencies and similarly in animals. Studies have found that the human body has 90 elements in it in almost the exact ratio as found in seawater. Hence, many researchers started asking how will these nutrients get into our bodies if they are not in our food supply (vegetable or animal sources). Continuing the line of thought, how will these minerals get into our plants (or the animals that eat the plants) unless they are in our soil! I became very interested in this subject over 20 years ago when I had some health issues that the medical approach was expensive surgery. While deciding if I was going to have surgery I met a doctor at a organic farming conference whom convinced me to try a nutritional approach. It worked and only cost a few hundred dollars versus the tens of thousands that surgery would have required. This doctor has a famous lecture available on CD called "Dead Doctors Don't Lie", By Joel Wallach, DVM, N.D. It is an excellent lecture on nutrition, trace minerals and health (available at some health food stores or online for only a couple dollars).

This brings us back to today's subject of minerals from the sea. Below is a chart showing all the different minerals in seawater (Note: I am using the word minerals to actually describe elements since most readers are more comfortable with that terminology).

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(936) 321-6990 Metro • (936) 273-1200 Conroe • Fax (936) 273-1655



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I first started reading research articles from Israel about using sea water for fertilizer over 25 years ago. Many described how they were reclaiming the desert and successfully growing crops using sea water for fertilization and irrigation. Since then there has been a lot of research from all over the world in this area. A couple of the first books on the subject were Sea Energy Agriculture by Maynard Murray, PhD and Fertility From The Deep Ocean by Charles Walters (both books are available from the ACRES, USA bookstore).

Element	Atomic weight	ppm	Element	Atomic weight	ppm
Hydrogen H2O	1.0079	110,000	Molybdenum Mo	0.09594	0.01
Oxygen H2O	15.999	883,000	Ruthenium Ru	101.07	0.0000007
Sodium NaCl	22.989	10,800	Rhodium Rh	102.905	.
Chlorine NaCl	35.453	19,400	Palladium Pd	106.4	.
Magnesium Mg	24.312	1,290	Argentum (silver) Ag	107.870	0.00028
Sulfur S	32.064	904	Cadmium Cd	112.4	0.00011
Potassium K	39.102	392	Indium In	114.82	.
Calcium Ca	10.080	411	Stannum (tin) Sn	118.69	0.00081
Bromine Br	79.909	67.3	Antimony Sb	121.75	0.00033
Helium He	4.0026	0.0000072	Tellurium Te	127.6	.
Lithium Li	6.94	0.170	Iodine I	166.904	0.064
Beryllium Be	9.0133	0.0000006	Xenon Xe	131.30	0.000047
Boron B	10.811	4.450	Cesium Cs	132.905	0.0003
Carbon C	12.011	28.0	Barium Ba	137.34	0.021
Nitrogen ion	14.007	15.5	Lanthanum La	138.91	0.0000029
Fluorine F	18.998	13	Cerium Ce	140.12	0.0000012
Neon Ne	20.183	0.00012	Praesodymium Pr	140.907	0.00000064
Aluminium Al	26.982	0.001	Neodymium Nd	144.24	0.0000028
Silicon Si	28.086	2.9	Samarium Sm	150.35	0.00000045
Phosphorus P	30.974	0.088	Europium Eu	151.96	0.0000013
Argon Ar	39.948	0.450	Gadolinium Gd	157.25	0.0000007
Scandium Sc	44.956	<0.000004	Terbium Tb	158.924	0.00000014
Titanium Ti	47.900	0.001	Dysprosium Dy	162.50	0.00000091
Vanadium V	50.942	0.0019	Holmium Ho	164.930	0.00000022
Chromium Cr	51.996	0.0002	Erbium Er	167.26	0.00000087
Manganese Mn	54.938	0.0004	Thulium Tm	168.934	0.00000017
Ferrum (Iron) Fe	55.847	0.0034	Ytterbium Yb	173.04	0.00000082
Cobalt Co	58.933	0.00039	Lutetium Lu	174.97	0.00000015
Nickel Ni	58.710	0.0066	Hafnium Hf	178.49	<0.000008
Copper Cu	63.54	0.0009	Tantalum Ta	180.948	<0.0000025
Zinc Zn	65.37	0.005	Tungsten W	183.85	<0.000001
Gallium Ga	69.72	0.00003	Rhenium Re	186.2	0.00000084
Germanium Ge	72.59	0.00006	Osmium Os	190.2	.
Arsenic As	74.922	0.0026	Iridium Ir	192.2	.
Selenium Se	78.96	0.0009	Platinum Pt	195.09	.
Krypton Kr	83.80	0.00021	Aurum (gold) Au	196.967	0.000011
Rubidium Rb	85.47	0.120	Mercury Hg	200.59	0.00015
Strontium Sr	87.62	8.1	Thallium Tl	204.37	.
Yttrium Y	88.905	0.000013	Lead Pb	207.19	0.00003
Zirconium Zr	91.22	0.000026	Bismuth Bi	208.980	0.00002
Niobium Nb	92.906	0.000015	Thorium Th	232.04	0.0000004
			Uranium U	238.03	0.0033
			Plutonium Pu	(244)	.

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There are many products in the market that are essentially sea minerals. One of the first types is sometimes called coral calcium. It is mined from ancient coral reefs found in sedimentary rocks. It will have high levels of calcium (Ca) in the form of  $\text{CaCO}_3$  with some magnesium (Mg) in addition to the other minerals. If your soil is low on calcium this type product might be a good choice. However, if your soil has plenty of calcium then this product can cause problems.

The next class of sea minerals comes from ancient salt deposits which are mined and sold. One of the benefits of ancient mined deposits is that they are free of modern pollution products. My wife and I use a brand of Sea Salt from the Redmond company that we love as it makes all food taste better and we get these trace elements every time we use it. This same company also has bagged minerals for use in horticulture and agriculture.

The next group of sea mineral products comes from sea water by evaporating the water and there are many brands in the market. I have read several interesting articles on one brand that removes the sodium before selling it and has had many favorable articles in the literature. It is called SEA-90 and is OMRI certified for use in organic production.

Most of these products are very easy to use as they can be applied as any granular fertilizer according to the instructions on the bag. Many can also be dissolved in water and the applied as a soil drench or sprayed on as a foliar application.

#### **SUMMARY:**

Sea Minerals are an exciting new method of improving the fertility of our soils and ultimately improving our health. They are becoming more available and are relatively inexpensive. The biggest issue is that they are relatively new to the market and there is a lack of experience in using them in our area.

#### **PROS:**

- excellent source of all minerals
- often used as an ingredient in organic fertilizers
- unlimited resource
- many brands available

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- stimulate beneficial microbes
- sometimes used in animal feed
- some brands a good source of calcium
- does not burn plants
- naturally helps plants be more insect and disease resistant
- mined products are free from pollution
- helps plants absorb other nutrients better
- improves flavor of vegetables and fruits fertilized with them
- increase production and yields of all crops
- matures crops faster (less days to harvest)
- reduces transplant shock
- increases a plants heat tolerance
- increases a plants drought tolerance
- reduces mortality rate in livestock grazed on treated pasture
- better weight gain in cattle and with better flavor of meat

**CONS:**

- limited availability in some areas
- large swings in quality of product
- lack of experience in horticulture industry on proper usage.