Building Nutrient Dense Food… One Brix at a Time…

The Brix Edition

Back to Your Roots Soil Solutions Inc.

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What's Wrong With Today's Food?

If you farm, garden or eat you need to know this!

The Medical Research Council and later the Ministry of Agriculture Fisheries and Foods and the Royal Society of Chemistry in the United Kingdom have compiled nutrient data for over fifty years on produce and crops.

Food was analyzed for Water Content, Total Nitrogen, Protein, Fat, Available Carbohydrate, Mineral Content and Acid-Base Balance from 1940-1991. The conclusion pertaining to mineral content is nothing less than alarming.

Loss of **49**% of their Sodium content
Loss of **16**% of their Potassium content
Loss of **24**% of their Magnesium content
Loss of **46**% of their Calcium content
Loss of **27**% of their Iron content
And a massive **76% loss** of their Copper content

The impact of poor nutrition on health is common knowledge. As long ago as the early 17th century it was known that scurvy was caused by a lack of fresh fruit and vegetables. For more than a hundred years we have known about vitamin deficiency diseases and the effects of poor nutrition on populations historically in Europe and the US and to this day in the developing world. In addition to micronutrient and mineral deficiency we now suffer from indiscriminate chemical exposure from our environment.

The combination of these factors is leading to outbreaks of various diseases of epidemic proportions which are now beginning to be widely recognized as the primary cause of so called degenerative diseases.

In March 2006, the UN acknowledged a new kind of malnutrition. Catherine Bertini, Chairperson of the UN Standing Committee on Nutrition said: "The overweight are just as malnourished as the starving, and nutritional programs in poor countries need to target rising obesity alongside hunger".

She also suggested that we need a new definition of malnutrition because food availability is not really the issue. It is the quality of the food that is the problem. This new type of malnutrition, which can be categorized as multiple micronutrient depletion has been termed 'Type B malnutrition'.

(Continued on next page)

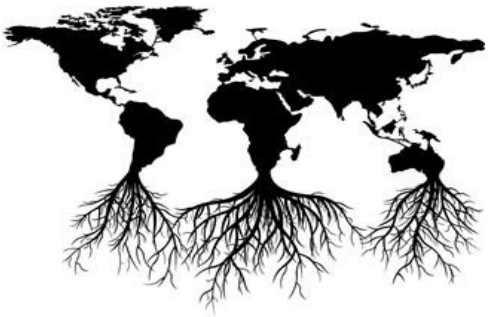
Inside this issue:

- You cannot buy - nor grow - good food until you can first identify good food.
- Quality: this, indeed, is the needed revolution in Agriculture

What's Wrong With Today's Food? (Continued)

Did You Know?

As a sugar levels (BRIX) increases in the plant the more likely the plant can withstand lower temperatures (frost) and develop resistance to drought. Sugar in the plant sap will draw moisture from the air (humidity) and lessen drought damage. Increased sugar in the sap of the plant will prevent freezing as well.



Not only was the mineral content loss a concern but also the ratios of minerals were altered. For example in 1940 the Calcium to Phosphorous mineral ratio was 1:2 and in 1991 the ratio was 1:1. Yet another disturbing change.

One could ask how we ever got ourselves to this sorry position. The list below gives some of the reasons why the mineral content of food has diminished over time

i. favoring varieties of crops and animal breeds for their presentation rather than nutritional quality.
ii. increased use of trace element free NPK fertilizers.
iii. the inevitable soil depletion of essential minerals through continuous
crop growing and contributed to by the overuse of NPK fertilizer with
its consequent damage to endomycorrhizal fungi that help liberate essential minerals from the soil.
iv. inherent soil deficiencies of essential minerals due to parent bedrock
material, the amount of organic matter present, the ionic potential of
differing trace elements, the degree of soil oxidization and soil pH.

So what is the way forward into the 21st Century? One component to the resolution of this dilemma would be for all parties concerned to recognize the current gravity of the problem (without apportioning blame) and resolve
to rectify the situation by implementing appropriate policy changes in both government and industry.

Another interesting, relatively recent, positive development is the significant and growing trend wherein individuals are beginning to make their own health choices. This trend towards nutritional awareness, with the buying of locally-grown and organic produce and a greater interest in food preparation, world cuisine and animal husbandry is a powerful force and one that is likely to bring about significant changes within the food industry. Already this consumer-driven change has resulted in food labeling alterations as well as greater availability of organically-grown foods.

There is clearly still a long way to go and the next step will be to insist on the proper nourishment of the soils on which our food is grown and reared, preferably through organic, biodynamic and other sustainable farming methods, so that it will necessarily provide the minerals and trace elements that are essential for our future health and wellbeing.

The full article by R.A. McCance and E.M. Widdowson is available as a pdf download online at http://www.mineralresourcesint.co.uk/pdf/Mineral_Depletion_of_Foods_1940_2002.pdf

BRIX 101

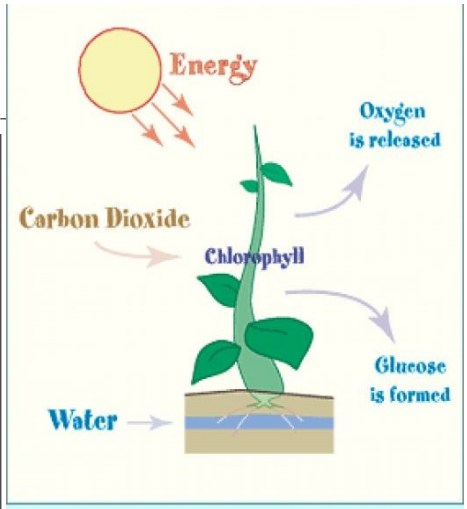
Nutrient dense crops! Brix! Refractometer! New terms looming on the horizon? Not new but not mainstream...yet.

What is a refractometer? It is a hand-held or digital instrument used to measure the amount of bend or refraction in the rays of light as they pass through plant sap. Light enters the prism and depending on the percentage of dissolved solids in the juice it will refract the light at a different angle. This angled light is projected to the eyepiece scale where the Brix concentration can be read. Simply put, it's a fuel gauge for your plant, a way to measure the sucrose or mineralization in a plant. Using a refractometer is easy, a drop of plant sap is placed on the lens, the lens is held up to a light source and looking through the eye piece will give you an instant brix reading.

What is brix? Developed by German chemist, Adolf Brix in 1897 for the wine trade, the brix scale is the measurement of sugar in a liquid. Brix varies directly with plant quality. For example, a poor, sour tasting grape from worn out land can test 8 or less brix. A full flavored, delicious grape, grown on rich, fertile soil can test 24 or better brix. Dr. Carey Reams is responsible for developing "The Refractive Index of Crop Juices" or brix chart, which grades crops as poor, average, good or excellent based on the degrees of brix reading on the refractometer.

What benefits does a high brix plant have? To the consumer high brix means better quality, nutrient density and it just plain tastes better. Armed with a refractometer and a brix chart the consumer is able to test the products they chose to purchase. With health being one of the main market drivers in the grocery market, consumers are willing to pay more for healthier produce. To the producer a high brix plant means a healthier crop. Plants that are higher in sugar are more resistant to frost, drought, and insect pressures. Insects are unable to digest sucrose as they don't have a pancreas so a high brix crop is able to withstand an insect infestation. High brix plants are more immune to molds, fungus, algae and other diseases.

So shouldn't every producer strive for a high brix, nutrient dense crop? How do you start to grow healthier plants? It all starts in the soil, balancing the soil, getting the soil back to the way nature designed it to work. This can be achieved through the use of good, clean plant available minerals, and biologically friendly products. It only makes sense that once the quality is back in the soil the quality will come back to the plant.



Photosynthesis

Did you know?

Molds, algae and fungus are simple organisms that thrive in environments that are warm, moist, lower in sugar and negatively charged. Changing the environment by increasing sugar in a plant (photosynthesis) and adding positive charge (calcium) occur of leaf and root disease will decrease.

Brix and Forage

What do Brix levels in forage and grasses have to do with the health and well-being of your animals? Well, everything. "Definitely, a refractometer reading can tell you more than the naked eye", Says Terry Gompert, extension educator with University Nebraska-Lincoln. He uses a refractometer as a teaching tool and to monitor forage quality. In fact, he never leaves on a pasture walkabout without a refractometer and garlic press in his hip pocket. In his fields the Brix level of alfalfa is typically between 10 and 15. On the same field, he finds that the grasses will have Brix levels in the 6 to 12 range and it varies from species to species in the mix. Regardless of the species, the highest energy levels will always be in the lower stems and leaves, he adds. The very highest readings will be from the juice of the blossoms.

A Brix level of 22 is considered excellent for alfalfa, while 8 is average. For cereals, 18 is said to be excellent and 10 is average. Another general observation is that forages with the Brix levels greater than 12 seem to have improved resistance to insects and disease.

Dr. Anibal Pordomingo, a well-known researcher and extension specialist with the National Institute of Farming near Santa Rosa, Argentina uses a chain of perennials and annuals for grass finishing beef cattle. He has found that the best ration for finishing on grass is when soluble carbohydrates (directly measured by the presence of sugar) and crude protein are balanced with the protein being 14 to 18 percent and the soluble carbohydrates being at least 15 per cent. Young, vegetative plants tend to be too high in protein and too low in energy to produce adequate gains and marbling in a grass-finishing program. AS the plants approach the flowering stage and dry matter content accumulates, the protein and energy will come into balance.

The Brix level fluctuates with the time of day and kind of day, Gompert explains. Photosynthesis is most rapid on sunny days. The product of photosynthesis is oxygen and simple sugars, which the plant uses for its own growth or energy reserves. On a sunny day, the Brix reading will be higher later in the day than first thing in the morning. You won't see this variable on cloudy days or in shady areas.

"There is research to show that the energy content of hay harvested in the middle of the afternoon on a sunny day can be as much as two percent higher than hay harvested early in the day or on a cloudy day," he adds.

In Idaho, researchers with the USDA Agricultural Research Service found that sugars begin to accumulate a couple of hours after sunrise, peak at about 6pm and drop after sunset as photosynthesis ceases and sugars migrate to the roots. Cattle, sheep and goats strongly preferred hay cut at sundown compared with hay cut at sun-up.

At Utah State University, researchers fed a ration of 40 percent alfalfa hay to two groups of dairy cows. One group received a ration with hay cut in the morning and the other was fed a ration with hay cut in the late afternoon. The cows ate six pounds more and produced 7.5 pounds more milk per day on the ration containing late-afternoon cut hay.

"The higher the sugar content, the less hay it takes to make a pound of milk. You've also got a healthier animal and a greater chance of getting better reproductive performance. Another factor is that the total protein of the milk goes up." says Dan Skow, a Fairmont, MN, veterinarian. Dairy cows fed a high-sugar ration are happier, healthier and better producers.

To produce that high-carbohydrate hay, however, growers have to know what's in their soils — and what isn't, Skow says. His lab, International Ag Labs, in Fairmont, recommends that growers keep alfalfa ground balanced with the right nutrients to avoid hollow-stemmed hay.

"When you have hollow-stemmed hay, there's a shortage of available calcium, and boron, to the crop during the growing season."

Hay with a 1:1 calcium-potassium ratio, and a 10:1 nitrogen-sulfur ratio, plus adequate amounts of phosphorus, boron, magnesium, zinc and other trace minerals, produces solid stems. Solid-stemmed alfalfa is healthier for the cow and also provides more sugar, Skow says.

BACK TO YOUR ROOTS SOIL SOLUTIONS

REFRACTIVE INDEX OF CROP JUICES -- CALIBRATED IN % SUCROSE OF BRIX

	POOR	AVERAGE	GOOD	EXCELLENT
FRUITS				
APPLES	6	10	14	18
AVOCADOS	4	6	8	10
BANANAS	8	10	12	14
BLUEBERRIES	10	14	16	20
CANTALOUPE	8	12	14	16
CASABA	8	10	12	14
CHERRIES	6	8	14	16
COCONUT	8	10	12	14
GRAPES	8	12	16	20
GRAPEFRUIT	6	10	14	18
HONEYDEW	8	10	12	14
KUMQUAT	4	6	8	10
LEMONS	4	6	8	12
LIMES	4	6	10	12
MANGOS	4	6	10	14
ORANGES	6	10	16	20
PAPAYAS	6	10	18	22
PEACHES	6	10	14	18
PEARS	6	10	12	14
PINEAPPLE	12	14	20	22
RAISINS	60	70	75	80
RASPBERRIES	6	8	12	14
STRAWBERRIES	6	10	14	16
TOMATOES	4	6	8	12
WATERMELONS	8	12	14	16
GRASSES				
ALFALFA	4	8	16	22
GRAINS	6	10	14	18
SORGHUM	6	10	22	30

	POOR	AVERAGE	GOOD	EXCELLENT
VEGETABLES				
ASPARAGUS	2	4	6	8
BEETS	6	8	10	12
BELL PEPPERS	4	6	8	12
BROCCOLI	6	8	10	12
CABBAGE	6	8	10	12
CARROTS	4	6	12	18
CAULIFLOWER	4	6	8	10
CELERY	4	6	10	12
CORN STALKS	4	8	14	20
CORN (YOUNG)	6	10	18	24
COM PEAS	4	6	10	12
ENDIVES	4	6	8	10
ENGLISH PEAS	8	10	12	14
ESCAROLE	4	6	8	10
FIELD PEAS	4	6	10	12
GREEN BEANS	4	6	8	10
HOT PEPPERS	4	6	8	10
KOHLRABI	6	8	10	12
LETTUCE	4	6	8	10
ONIONS	4	6	8	10
PARSLEY	4	6	8	10
PEANUTS	4	6	8	10
POTATOES, IRISH	3	5	7	8
POTATOES, RED	3	5	7	8
POTATOES, SWEET	6	8	10	14
ROMAINE	4	6	8	10
RUTABAGAS	4	6	10	12
SQUASH	6	8	12	14
SWEET CORN	6	10	18	24
TURNUPS	4	6	8	10

Photosynthesis

Plants are designed to create sugar. It's their job. Sugar creates energy, which allows for the growth and development of the plant. The process that creates sugar in the plant is called photosynthesis.

What is Photosynthesis?

Photosynthesis is the process by which plants, some bacteria, and some protistans use the energy from sunlight to produce sugar, which cellular respiration converts into ATP, the "fuel" used by all living things. The conversion of unstable sunlight energy into usable chemical energy, is associated with the actions of green pigment chlorophyll. Most of the time photosynthetic process uses the water and releases the oxygen that we absolutely must have to stay alive.

We can write the overall reaction of this process as: **6H20 + 6C02 = C6H1206 + 602**

Most of us don't speak chemical-ese, so the above chemical equation translates as:

six molecules of water plus six molecules of carbon dioxide produce one molecule of sugar plus six molecules of oxygen

Upcoming Learning Opportunities

Education is a huge component of what we do at Back to Your Roots Soil Solutions. We truly believe that knowledge is power and encourage producers to learn as much as they can through workshops, presentations, field walks and crop tours that we put on throughout the year. Here is a sampling of the latest confirmed workshops we offer:

April 13, 2011 from 7-9pm-Gardening workshop-focusing on creating healthy soil in the garden for urban and rural gardeners at Shaw Centre, 122 Bowlt Crescent, Saskatoon, SK, No charge for attending

March 24, 2011 from 1-3pm- Soil Workshop-focusing on soil health in agriculture in both organic and conventional operations at Day's Inn, 905 North Service Road East Swift Current, SK, No charge for attending.

We are planning workshops in early June for Garden Day Tours as well as Field Walks in early July in both Manitoba and Saskatchewan. As well back by popular demand is the Tailgate Soil Testing Workshops, which comprise of a morning educational workshop on soil health, a lunch break and then an afternoon in the field putting theories to practice learning to test brix and electrical conductivity with handheld instruments.

Dates and locations will be announced in future newsletter as well as available on our website at www.back-to-your-roots.com under events

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Meet Our Team

Our head office in Shellbrook is manned by: **Cindy Nikolaisen,** President, **Deb Agrey,** Market Coordinator, **Evelyn Keyowski,** Office Manager and **Glenda Henry,** Customer Care Coordinator. Our office hours are 9am until 4pm from Monday to Friday. Our office is located at 208 2nd Avenue West and if you are in Shellbrook we would love to pour a cup of coffee for you and discuss soil health.

In Saskatchewan **Roger Puetz, Gary Bertoia, Gillian Thiessen, Chuck Hawkins, Doug Nikolaisen and Mark & Kara Schiestal** make up our sales team.

Lorne Muller is the Manitoba Territorial Manager and our sales reps in Manitoba are **Ron Catt, John Ness, Nick Boundy and Stead Farm Supplies.**

With literally decades and decades of experience in all aspects of agriculture including organic and conventional farming, raising livestock, dairy operations and gardening we would love to share our experience and help you grow nutrient dense food one brix at a time.

Our sales reps contact information is available on our website or if you would like to call our Head Office at **306.747.4744** we would be happy to refer you to the closest area representative.

Message from the President

As spring approaches, so does the anticipation for another year of farming. Will the snow melt, will we float away, or will we even get the crop in? After visiting coffee row, I have heard that 1950, 1953, and 1958 were just like last year and 1923, 1944, and 1949 are just like this year….. I guess we will just have to wait and see!

Back To Your Roots Soil Solutions has started another undertaking to help get information to producers. We are launching a new project to publish and distribute a series of newsletters to explore the concepts of plant health and food quality. Every 6-8 weeks we will be sending out a new edition covering the topics of BRIX, biology, energy, weeds, insects, soil structure and compaction, water, and other topics of interest. If there is something you would like more information about, let us know.

We are planning a really busy summer with lots of field walks, Tailgate Soil Testing workshops, and tours with top soil specialists. Plan to come out and see what we are doing and how this approach to plant and soil fertility could affect you. Watch the website and check in at the office to make sure you don't miss out on attending these events. We will be including the dates, times and locations in all the newsletters as well. Hope you see you there.

We have hired several new staff on at the office this past month. As we grow, we need to ensure we stay efficient and flexible to the changing needs of our customer base. If you have any concerns or ideas that we need to know, please contact us.

I am very excited about the upcoming season. Soil health is vital to the health of the plants that grow from it. Take a few minutes to browse through the newsletter. It could change the way you do business!

Thanks for your support.

Cindy Nikolaisen, President

Did you know?

80% of a plant is made up of Nitrogen, Oxygen, Carbon and Hydrogen all of which come from the air. The other 20% should be make up of 80% calcium and the rest are Phosphate and all the rest of the trace minerals. The higher the BRIX level, the more efficient this process becomes.

Come and See Us

Spring is just around the corner and once again Back to Your Roots will be exhibiting at the Gardenscape Show in Saskatoon, SK at Prairieland Park Exhibition Center. Come visit our booth (#433) to learn more about soil health in regards to growing nutrient dense food and meet our staff. While there don't forget to enter our door prize draw. We will be featuring our High Brix Manufacturing Garden "Lawn and Garden Complete Kit" as well as doing refractometer demonstrations.

Dates and hours include: Friday, March 25, 11:00 a.m. to 10:00 p.m., Saturday, March 26, 9:00 a.m. to 8:00 pm and Sunday, March 27, 11:00 a.m. to 5:00 p.m.

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Check Our Website

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Mission Statement

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Our mission is to provide consumers with access to environmentally friendly products that address soil problems and facilitate sustainable farming practices. With focus on proper soil analysis and evaluation, our goal is to assist producers to identify the underlying causes of the soil problems and develop understanding to correct these problems.

The management of Back to Your Roots Soil Solutions Inc. makes no attempt to portray ourselves or our sales representatives as agronomists. Please use our services and information at your own risk.