



Growing Nutrient Dense Food

Course Description:

This workshop will give you an understanding of what nutrient dense food is, and how to test your food, using a refractometer, to see how nutrient dense it is.

You will learn how our food communicates with our bodies, and how the strength and clarity of that communication largely determines our health today and for our children and grandchildren tomorrow.

You will then learn some key principles behind growing nutrient dense food, and how to use that understanding and information to design your best way to grow nutrient dense food using your choice of a range methods from brought fertilizer to doing it all yourself via the compost heap, and the biochar burner... and more..

You will get to see how the Koanga Institute is doing this in a practical way.

Learning Objectives:

Defining nutrient dense food

Learning to Using a refractometer

Understanding why we need nutrient dense food

Understanding Weston Price's research and findings connecting a nutrient dense diet to health

Understanding the principle 'environment determines genetic expression of Epigenetics and how our food communicates with our bodies via the junk DNA

Understanding what our current situation is re nutrient dense food

Understanding key principles of Biologic Ionisation, or how a healthy cell grows.

Understanding Crop Health Transitions

Develop appropriate ways for us to grow nutrient dense food in our own gardens, including short medium and long term solutions involving brought in fertiliser, biochar , soldier fly farming, worm farming, compost making, foliar feeding, carbon cropping, choosing specific crops to sequester needed minerals, making our own fertilisers etc.

Course Length: [2 days 8 sessions] *1/2 hours each*

Teaching Outline:

Session 1

Define nutrient dense food

- Ask the students to do this

Theory and practice of using a refractometer

- The true measure of the mineral supply coming from the soil is the sugar content of the juice of those plants.

- Brix testing determine the nutritional density of most foods, and the sap of plants. Plants assemble out of water soluble minerals through photosynthesis anything from simple sugars to hormones and complex fat chains. They are the so called sap solids.
- The higher the plant sugar content, the higher the previously absorbed amount of minerals, the higher the nutrient density of the tested plant.
- The refractometer measures the dissolved solids in the plants sap. The unit to measure is called BRIX (One degree Brix is 1 gram of sucrose in 100 grams of solution and represents the strength of the solution as percentage by mass)
- Those solids are sugars, vitamins, minerals, amino acids, proteins, hormones, and others.
- When plants are grown in soil with balanced and high fertility, the BRIX reading of the plant sap and juice of the produce is significantly higher than the same plant grown in less than ideal conditions.
- Refer to handouts around refractometer use and Reams chart

Time of day

Leaf samples only

Consistency in sampling technique.. reasons..

Implications of testing other parts

Patterns rather than 1 off readings

Consistency in Time for juice extraction

Weather

Importance of keeping records... use our sheet

Connection between available calcium/acids and blue fuzzy or straight line

Connection between soluble phosphate in soil and brix from bottom to top of plant

Compare with Reams chart

Sugar natural antifreeze, the higher the sugar the more resistant to cold

- Other ways to tell if food is nutrient dense

Seeds and grain

Dents

Cracks

Opacity

Shriveled

Dullness

Dusty

- Evaluating Fruit

- Seeds... seedless vegetables less nutritious... either poorly nourished or genetically developed to produce no seed... either way doesn't nourish us. Number and maturity of seed is a measure of quality... seed quality in nuts and fruit also true

- Knife Test, Weight test, Appearance and Feel, Disease, **Storeability** see Beddoe p 140

- Evaluating nuts: Dark discoloration, shriveling, size, taste,

- Evaluating Vegetables
 - Brix testings
 - Appearance, hydration, sunken eyes, hollow center, potatoes, brassicas
 - Insect attracting? Storability, state of plant?

Session 2

Why nutrient dense food

- Weston Prices work and findings... connections between diet and health
 - Indigenous peoples were getting 10x fat soluble vitamins and 4x minerals in their diets
 - Sacred food = high content of Vitamin A
- Epigenetics ‘environment determines genetic expression’
 - Only 3 elements of our food that we know communicate with our ‘junk’ DNA... fatty acids, vitamins and minerals
 - The clarity and strength of that communication determines the clarity and strength of the tags that are placed on our DNA which determines how it expresses.
 - Nutrient density of the food is determined by brix and how the food is processed

- Explanation: We are alive because the body is constantly repairing and regenerating itself. Every cell in our body gets replaced within 6 months. To replace a cell the body has to replicate the DNA of the previous cell to produce an equal “daughter cell”.

DNA: The DNA is nothing but the construction plan for building the cell. The DNA is rather general, it contains the construction information for every cell in our body, in other words even though not all cells are equal the stored DNA in every single one is identical. This construction plan that we know as the double helix spiral is made out of 84 different minerals. To “reproduce” a specific cell the DNA polymerases reads only specific parts of the DNA, called the relevant DNA. To replicate a DNA the body rebuilds a clone of the previous DNA. This can only happen in the presence of all 84 minerals.

As well as replicating our DNA our body is repairing our DNA constantly. Through the process of replication parts of the DNA wear out and need replacing or repairing.

Relevant DNA: Those is the “tagged” sections of the DNA. Depending on the type of cell that needs building, the DNA is tagged in a specific way. Those tags direct and activate the DNA polymerases that it is about to read a relevant section. Only those sections get replicated to build cells or protein complexes. If the whole DNA needs replicating, well obviously everything will get replicated.

Only about 15% of our DNA contain relevant information. The rest is considered the “junk DNA”.

Junk DNA: The remaining 85% of our DNA that scientists could not locate to a specific coding function. This part is what we know through the science of epigenetics is what communicates with our environment. In other words, the healthier our environment, the healthier our Junk DNA, the healthier our genetic expression. More explanation will follow in the paragraph “A metaphor”.

Tags: Are the way of showing the DNA polymerases which parts have to get replicated. Tags are also used to mark faulty section of the DNA that need repairing.

DNA-Polymerases: This is the enzyme in our body that encrypts, translates and replicates the DNA. (simplified) It also holds the ability to place and remove tags.

A metaphor: specific cells are the specific landscape of a country, the DNA are train tracks connection city A with city B (beginning and end), which are departed in sections. The relevant DNA are some of these sections, they are marked with a Flag and have an information box at the beginning. There is only one ideal most economical way through the landscape. Different cells = different landscape= different routes the tracks take. Which means different information is required to rebuild the tracks if necessary. At the beginning of each section is an information box holding the exact instructions on how to rebuild or repair the previous section. The DNA polymerase is the train driving the tracks collecting the information out of the info boxes that are marked with a flag. If the DNA polymerases finds the tracks to be in bad conditions, faulty or unroadworthy it will call the emergency crew to repair or replace the discoveries. To direct the emergency crew it puts down flags that mark the area of concern.

Ideally: the DNA polymerases train drives down the track, collects all the relevant information without any interruption. The collections put together make sense. The tracks can get rebuild without any interference.

Reality: the DNA polymerases drives along, the tracks need repairing several times, the delivery of the information flow gets slightly delayed but is possible in the end. The tracks can get rebuild.

Worst case scenario: Parts of the tracks are unroadworthy, anywhere in a relevant section or just the normal tracks. The emergency crew has to rebuild the tracks, but because the environment has changed the tracks don't follow the original way they went. Like through a flooding or a land slide. The detour still connects the two cities. The DNA polymerases will from now on drive the detour and always collect the information for rebuilding this new route. The route, the DNA, has changed. This is how cancerous cells develop. It takes about four to six detours to create a harmful cell. In other words, it takes about four to six generations to make the DNA unreadable or have the nature of the original cell so grotesquely changed that the end product became unrecognisable.

Communication with junk DNA: The body has an interest to always keep its tracks as well as possible maintained. That is relevant for the whole track system, relevant or not. This is determined by the amount of available minerals, which are the parts to maintain the DNA. If all the minerals are available, during the process of replication or reparation, the assembling will happen without interference. The less available minerals there are, the more compromises the DNA polymerases has to make. Like replacing the missing link with a similar one, short cutting, etc. This is changing the original and will get from that point on get replicated. The weaker the DNA becomes and is more likely to code a malfunctioning, carcinogenic cell.

Environment determines genetic expression: The process of creating DNA that codes malfunctioning cells is to a great extend reversible. A healing environment will benefit the healing of DNA. Environment can be anything from harmful EMFs, radioactivity, toxicity and other disturbing factors to impacts like friends, happiness and the air we breathe. Most often the obvious disturbing factor in modern humans is malnutrition.

Our DNA needs feeding: Our body wants to live. Every second it will try to reach its full potential, the absolute state of health. The more minerals we absorb and the better environment we create for our DNA the healthier our body and mind will be. The closer we will get to this state of supreme health. Tags can get changed and replaced, DNA can be rebuilt. It is all up to us.

- Clarity and strength of the communication of the environment with our DNA is also determined by our cellular memory. We recognise the food of our own ancestors.
 - Explanation: this is simply because every mineral we find in nature is always bound in a complex. These complexes of minerals get processed by specific enzymes (in a metaphorical sense the complex is a lock, the enzyme is the fitting key). Through the process of coevolution our cells have learned, our DNA has learned, which complexes surround us and which relevant DNA sections get replicated more frequently than others. The relevant parts of the DNA become more easily accessible. The production of the needed keys becomes more efficient and fluent.
 - If we change the environment we change the surrounding complexes. The processes of metabolism get handicapped. The body will try to find the right key for the new lock. BUT. Our bodies, nature in general works with the principle of least resistance. If the body does not have to change, it will try to go as far as it can with what it already has and is good at.
 - Forcing to adapt to a different environment works, but takes a lot of capacity and energy out of the system. The better nourished the system is before and during the change, the better it will cope.

What is our current world situation re access to nutrient dense food

Connection between minerals levels in soil and mineral levels in food quality/mineral and vitamins in our diet

- Healthy environment → Healthy soil → healthy plants + healthy animals → healthy humans.

Situation with seeds - hybrid seeds - enzyme blocker = unable to pick up key minerals

Situation with glyphosate

- **Glyphosate:** is the world's strongest antilife. It is a heavy metal that is highly reactive. It will bind to any reaction partner, in other words to every mineral around it. The connection is irreversible. Absorbing all minerals leaves plants without the energy they need to function. If no other minerals get applied, the plant dies.
Dangerous is the habit of glyphosate to travel through living organisms on its journey of killing life through starvation. For plants it will travel from the soil or the leaves through the whole plant and take place in every process of metabolism happening and make itself home where ever it wants. The same happens for animals that consume glyphosate contaminated food. The implication for us is, as we are the end consumers, we uptake the accumulated sum of all the previous links in the food chain. Glyphosate ends up in our bodies as well and continuous with what it is best at: kill life.

How do we get nutrient dense food

Choose our diet.. follow indigenous people's principles discovered by Weston Price..... another workshop

Choose nutrient dense food sources or learn to grow them

Session 3 and 4

Understand the principles of Biologic Ionisation or how a healthy cell grows

Bill Mollison "It's not good enough to be well intentioned, we must be well informed"

My teachers have been and still are;

Ardern Anderson

Dr Carey Reams

A.F. Beddoe (Nourishment Home Grown)

Biological Movement around the world but specifically USA and NZ and Australia

Graham Sait Nutritech Solutions

Acres USA

Grant Paton Enviromental fertilsers

Nourishment Home Grown

Creation is the putting together of light/energy into matter.

If we study this we discover how healthy cells can be built in plants, animals or humans and how to supply that healthy cell with the energy needed to sustain it on it's frequency in a best functioning condition.

Once we know that we can co operate with nature/creation through laws/patterns that build healthy productive gardens, farms and body temples!

The fundamental building blocks are the basic atomic elements as described by traditional science in the Periodic Tables.

These elements combine to form various molecular structures that make up all biologic life.

These elements all have certain chemical, physical and electromagnetic properties.

These properties are expressions of energy that are contained within the atoms of these minerals.

This energy is available and exchangeable in the growth process of plants and animals (and humans!).

The plant uses 84 different minerals. When any of these are missing or in short supply, or when something interferes with it's proper uptake, or combining into organic plant structure, the plant will begin to experience deficiency.

If the deficiency is prolonged or severe enough, the symptoms will manifest as plant disease or insect problems.

Carbon The Moisture Regulator:

Humus holding minerals and water

- Carbon can hold 4 x it's weight in water.

- The lower the carbon the less water can be applied at a time.
- Carbon forms the basis of your soil's mineral energy savings account. It holds onto soil nutrients until plant roots can use them both before and after bacteria work on them. Ideal level is 10% soil weight.

Nature Follows the Line of Least Resistance

The greater the mineral content in the top soil, the less the resistance in that soil and the greater likelihood the current will stay flowing in the soil. The greater the mineral content within a plant, the easier it will be for the plant to have electric current flowing in it.

It will have better magnetism or attraction for more mineral energy. Therefore the plant will draw in more electromagnetic energy and be a top quality plant in every aspect

The Importance of Calcium

- Calcium is used by weight and volume more than any other mineral element. The result of all the functions of calcium is the manufacture of amino acids for the making of plant protein and human food.
- Thus the more calcium that is transported into the plant, the greater the plant's ability to attract nutrients out of the air- chiefly carbon dioxide, nitrogen, potassium and magnesium.
- available calcium and available magnesium need to be in a ratio of 7:1
- Calcium is the most critical mineral, and the one that is most likely to be missing
- Levels not as critical as ratio

Phosphate Controls Sugar Content

- Phosphate, the phosphorous-oxygen complex, is the carrier of the mineral from soil to plant, also the catalyst in the sugar making process, called photosynthesis, that takes place in the leaf of the plant.
- Water and oxygen are brought together in the chloroplast during the heat of the day to make crude sugar. Phosphate is the catalyst for the process. The mineral elements carried in the phosphate, are left behind when sugar is formed. This is why the higher the sugar, the higher the mineral content.
- Available phosphorous:potash ratio 1:1 garden and pasture 2:1
- Implications of not having phosphate in the soil.. Minerals go into plant in nitrate form, low brix, low level carcinogenic
- Phosphorous usually low, or locked up
Phosphate is like the usher at the wedding

Getting The Ratios Right!

- The plant uses 84 different minerals. When any of these are missing or in short supply, or when something interferes with its proper uptake, or combining into organic plant structure, the plant will begin to experience deficiency.(Law of Minimum Justice Von.....)
- If the deficiency is prolonged or severe enough, the symptoms will manifest as plant disease or insect problems

Energy Release

- Plants live off the energy release from the elements interacting as the elements synchronise in ionic molecular form in the soil. The interaction of the minerals within the soil solution is similar to the reaction seen when putting vinegar and baking soda together.

Understanding Crop Health Transitions

Stage One

- Adequate sunlight, air, water, and the right minerals in the right relationships, creates an efficient photosynthesis process where plants absorb carbon dioxide from air, water from the soil and with energy input from the sun begin producing plant sugars.. Carbs!
- Initially simple sugars, monosaccharides, fructose, glucose and dextrose.
- As this process evolves, more complex sugar, polysaccharides, begin to develop. Cellulose, lignin, pectins, and starches which are structural and storage carbohydrates and they are produced in greater quantities as plants become healthier.
- ‘Pathogens’ alternaria, fusarium and verticillium cease to be a problem at stage 1.

Stage two

- As photosynthetic energy increases plants begin to transfer greater quantities of sugars to root system and to the microbial community in the rhizosphere.
- This will stimulate them to mineralise and release minerals and trace minerals from the plant matrix in a plant soluble form.
- Plants then utilize these essential minerals as enzyme co factors which are needed to form complete carbohydrates and especially proteins
- Soluble sugars, monosaccharides, when partnered with nitrogen are base materials used to form amino acids, - insect food-
- Through the action of enzyme catalysts, these amino acids are bonded together to form peptides, from which complete proteins are formed
- Stage 2 gives plants resistance to larval insects, corn earworm, cabbage loopers and leaf miners

Stage Three

- As photosynthetic energy efficiency increases plants develop a surplus of energy beyond that needed for basic growth and reproduction of which up to 70% is translocated to the root system
- Next the plants begin to store this as surplus energy in the form of lipids (plant fats) in both vegetative and reproductive tissue: vegetative omega 3 reproductive omega 6
- Lipids are needed to form the phospho lipid cell membrane. As lipid levels increase, the membrane becomes stronger and more resilient and more resistant to fungal pathogens, mildew, blight, scab, rust, fire blight and bacterial spot.
- This will not happen without a functional rhizosphere

Stage Four

- Elevated lipid levels are then used to build complex plant protectant compounds, essential oils for protection from climate change, UV radiation, insects and herbivores.
- These compounds are called terpenoids, bio- flavanoids, carotenes, tannins and they contain anti fungal and anti bacterial properties as well as digestive (enzyme) inhibitors
- Once plants reach stage 4 they become immune to insect attack, beetles etc

- Based on an article by John Kempf of Advanced Agriculture Middle field Ohio

Session 5

How do we grow Nutrient Dense food?

- So we've learned a few principles, perhaps some of the key ones, we're on the journey...
- Time to enter a design process and use everything we know to create some sensible strategies for our situation based on an understanding of the principles involved and a knowledge of the local patterns involved

It All Comes Down To The Minerals and the Microbes

- The more we can hold carbon in the soil and get the minerals in the right relationships, the more potential there is for interactions for both the building up and breaking down of mineral compounds, the more microbes we can feed and the more energy there is released that is available for plant growth

Step 1

Strategy

- * Managing and improving plant sap sugar levels

Technique

- Learn to use a refractometer
- Regular times during day eg 1:00 after lunch
- once a week minimum
- Always rub for same length of time (around 2 minutes)
- Always pick leaves from the same place on plant and from several plants
- Note weather
- Check for sharp or blurry line
- Check again ½ - 2 hours after applying minerals
- Keep good records

Step 2

Strategy

- * Understanding the physical properties, (the patterns) of your soil

Techniques

- * V.S.A. soil assessment guide

* Soil tests Reams (what's available to plant roots), Bio Services, use powerpoint and walkthrough analyzing a soil test

Hill Laboratories (what's available in the soil)

- Healthy Soils

Step 3

Strategy

Create 50% air space in your soil for strong root and anaerobic microbe growth

Techniques-

- double digging, appropriate implements behind tractor?

Step 4

Strategy

- Create ideal or as close to as possible moisture levels in soil to achieve excellent root and microbe growth
- Techniques:
 - increase humus
 - carbon levels
 - **irrigation**

Session 6

Step 5

Strategies:

To achieve high levels of carbon and humus to hold water and minerals, and microbes

Techniques

- Composting 60:1 rather than 30:1(make a compost heap)
- Biointensive
- Carbon crops
- Biochar

Session 7

Step 6

Strategy

* Right Minerals in Right Relationships , and then up to recommended levels

.....if we use low brix material to make our compost we are recycling the deficiencies.. won't grow high brix food.....

Techniques (Transition/ sustaining)

- * Blocking the leaks.. food scraps, humanure, paper, cardboard, bones,
- Mineralised Composting (refer to The Art of Composting) see examples

- Burn bones shells to ash or biochar and recycle (show then this process)
- Choosing specific compost crops.. oats and lupins for us, calcium/phosphate
- Returning humanure, via compost, soldier fly farms
- Biochar, bones, tree prunings ideal.. one years supply from ¼ acre supplies biochar for entire site each year (make biochar. Or watch somebody else doing it)
- Black Soldier Fly (check it out)
- Bringing in fert..based on Reams soil tests
- Learn to make our own fertilizer vi chicken scratch yard
- Mineralised worm farms
- Biosol, Biofert (links to recipes) see it in action if possible
- Use salt water, seaweed, fish waste, milk, leaves, iodine
- Harvesting biomass from some other appropriate

perennial situation eg wetland

* Recipes Gil Karangdang (link to website)

Session 8

Step 7

Strategies

Support Strong Active Microbe populations

Techniques

- Getting the minerals air and moisture levels right
- Compost tea (make commercial compost tea and test plants then apply test again)
- Compost (make tea with own compost and test results)
- Seedling inoculant (chjck out plant roots when grown using inoculant)
- Combo12 Koanga Balance
- Vermicast.. (put vermicast soil test in power point)
- BD 500
- BD Cow Pat Pit
- Raw Milk

Discussion/question time..

where do we all go from here once we get home

Recommended reading

- Nourishment Home Grown A.E. Beddoe
- Growing Nutrient Dense Food K. Baxter

- The Art of Composting Booklet K. Baxter
- Future Fertility Ecology Action
- Grow Your Own Fertiliser Ecology Action
- Koanga Garden Guide