Organically Grown Food: A Misconception

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This subject was treated briefly by this author in 1992.[1] It is now becoming recognized that mineral deficiencies are related to the escalation of degenerative diseases.[2] An excess of minerals can create many health problems, including mental ones.[3] Some of the micronutrients, such as *chromium* and *selenium* are not required by plants, but are critically important to humans. Most of us are not entirely dependent on local produce. By consuming food (not highly processed) from many areas, such nutrients are usually adequately supplied.

Large surveys in both the USA and Canada showed that the average diet is not even supplying the *Recommended Daily Allowances* (RDAs) of most required minerals. My own *Hair Mineral Analysis Survey* of 1,000 samples, showed significant deficiencies as follows: chromium (63%), magnesium (49%), calcium (46%), potassium (39%), selenium (38%), copper (37%), manganese (36%), zinc (36%), cobalt (30%) and iron (27%).[4] Promoters of organically grown food, imply that this shortage of minerals is due, in part, to the use of "petro-based synthetic fertilizers".[5] This spurious and incorrect notion is not based on verifiable facts.

A recent article indicated that a serious fraud has been perpetrated on the American and Canadian public.[6] At this point, it is difficult to say who was responsible for this deception, but those marketing *organically-grown* produce, certainly use it to their advantage.

One of the world's outstanding soil scientists, Dr. Firman Bear and colleagues of Rutgers University, analysed the variability of minerals in five vegetable crops, grown in ten different states.[7] He reported highly significant differences due, he explained, to the variability in soil type, fertilizers used and climate. Bear's table showed five vegetable crops (snap beans, cabbage, lettuce, tomatoes and spinach), and seven minerals (calcium, magnesium, potassium, sodium, manganese, iron and copper). Under each vegetable crop, he listed the "highest" and "lowest" levels (p.p.m. of dry matter) of the above minerals.

An example of extreme variability was tomatoes grown in a particular state which contained 2,000 times more iron, than those from another location. Some clever, but unscrupulous promoter just changed the word "highest" to "organic" and "lowest" to "conventional".[6] The implication is clear; *organically grown food* contains significantly higher amounts of *essential minerals,* than those from *commercial growers.*

There are no *plant nutrients* (fertilizers) in *petro-chemicals.* The only connection might be the energy required to manufacture (synthesize) anhydrous ammonia (NH_3). To combine nitrogen from the air with hydrogen requires enormous pressure. Hydrogen is produced by the electrolysis of water. Canada, with its vast supply of water power, can produce ammonia (the starting point for other nitrogen combinations) without the use of oil or natural gas.

There is nothing synthetic about basic chemicals such as nitrogen or calcium. Plants extract these building blocks (inorganic minerals), from the growing medium. Legumes, with the help of nitrifying bacteria in their nodules, are able to obtain their nitrogen from the air. Soil and organic particles are negatively charged (-); minerals such as calcium are positively (+) charged. This prevents loss due to excessive moisture. Energy is expended by plants to pull tightly bound minerals away from the *soil,* or unrefined *rock phosphate.* Carefully manufactured fertilizers such as *ammonium phosphate,* requires little energy for absorption. Young plants do better when easily available nutrients (well designed fertilizers), are placed near their rootlets.

When ammonia (NH_3) is injected into the soil, it soon picks up a hydrogen ion (H^+) to become an ammonium (NH_{4+}) ion. Since it is positively charged, it is not easily lost through excessive moisture. During the summer, nitrifying bacteria change (NH_{4+}) to negatively charged ($N0_3$.). Surplus nitrogen in this form could then be leached into the subsoil to pollute streams and underground aquifers. With soil and tissue testing, growers are able

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to determine quite accurately the optimum application of nitrogen fertilizers. Since the cost is high and excess nitrogen could be detrimental to the crop, there is little incentive to over-fertilize with nitrogen. Wasteful amounts of nitrogen fertilizers are more likely to be applied by home owners and by the managers of well manicured golf courses.

Organic matter, such as from plant residues and animal manure, is used as food for microorganisms, worms and other soil inhabitants. After digesting it, the resulting waste material provides readily absorbable inorganic minerals used by growing plants. Before plants absorb minerals, they must be in the ionic (inorganic) state. Plants cannot distinguish a mineral ion coming from decomposed organic matter, over one supplied from fertilizers.

The small country of The Netherlands uses more fertilizers per hectare, than any other; the quality of their produce is unexcelled. Competent growers have successfully used both animal and green manures, long before there ever was an Organic Movement.

Competent growers are quite skilled in the efficient use of fertilizers. When so applied, the predictable result will be a vigorous crop, with concomitantly higher yields. Such results are not possible when *any* essential nutrient is lacking. This is known as The Law of the Minimum, developed in the last century by von Liebig.[8] When micronutrients are called for, they are added by the manufacturers. Usually a large part of the plant is cultivated back into the soil to produce increased organic matter. With high yields and more residue going back to the soil, adequate future production is assured. Such soils encourage earth worms and the many essential microorganisms. Besides ensuring proper aeration, it helps to hold nutrients and moisture.

While a Professor of Plant Science at the University of Manitoba, I directed a greenhouse project.[9] We grew superb crops in a greenhouse at Thompson, Manitoba. Tomatoes had never been grown that far north before. Since soil was lacking in this part of the Canadian Shield, we depended on local peat moss as a growing medium. It has a great capacity to hold air, water and minerals (inorganic). While it holds minerals well, it contains *none.* With help from countries such as Finland, I developed *Manitoba Mix.*[10] This is a combination of major, secondary and micro nutrients. I did an experiment in starting tomato plants using this mix in 100% peat moss. More dry weight was produced than comparable seedlings grown in excellent garden soil. The misuse of pesticides should be of concern to all growers irrespective of the method os supplying nutrients. Consumers demand attractive, unblemished produce; growers respond by attempting to control insects, diseases and weeds. Agricultural industries develop (synthesize) pesticides to prevent such annoyances. Fortunately, governments have control over the licensing and the safe use of pesticides. Industries must go through rigorous research to register a new product. The following criteria must be met: (1) when used *according to directions,* it must provide the control promised; (2) it must be safe to applicators and those consuming the final produce. This is a long, arduous and expensive procedure; to the grower it must be cost effective. There is no incentive to use any more than necessary. As natural successful means of pest control becomes available, prudent growers have every incentive to adopt them.

It is unfortunate, but we all encounter harmful chemical compounds through the air we breath, the water we drink and the food we eat. It is prudent to minimize such exposures as much as possible. It is also critically important to support our body organs, especially the immune system, to overcome such toxins. The first line of defence should be an adequate level of essential minerals. The marvels of chemistry have revolutionized and greatly added to our way of life; let us not denigrate the proper and safe use of chemicals.

It is estimated that 60 percent of the food most Canadians and Americans consume, comes from white flour, sugar and fat. These are grossly deficient in the precious minerals we must have to keep us healthy in body, mind and spirit.[11] The main reason these foods are mineral deficient, is that it increases their shelf life. Microorganisms, like humans require these same minerals.

Questionable additives often high in phosphorus, are used extensively by the food industry. Popular, well promoted "soft drinks." are "loaded" with this mineral. Over consumption of animal proteins is also contributing to excess acid forming phosphorus. To overcome the resulting excessive acidity requires essential minerals such as *calcium,*

magnesium, manganese, zinc and iron.[4] This robs our body of *highly essential minerals.* Too much protein should be avoided; a diet tending towards vegetarianism has considerable merit.[12] A reduction in food calories and a lower animal-based diet would have an added bonus. It would reduce the extravagant use of our land and other resources and benefit the environment.[13]

We should concentrate on whole foods, avoiding "junk" ones (those with no added sugar, says A. Hoffer[14]). We should also eat a goodly amount of vegetables and fruit in order to stay healthy. Whether or not the food is grown according to "*organic principles"* is of much less consequence. If there is any doubt concerning the lack or excess of body minerals, the analysis of human hair is the logical first step towards recognition and normalization.[15]

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