

The Organic Difference, Such as It Is

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Plants do not have digestive systems, but they do have a genome like the rest of life as we know it (unless one counts viruses as a life form). However, the furor over transgenic ("genetically modified") crops has given rise to the belief among many that foodstuffs such as tomatoes do not have genes unless biotechnologists put them there and do not have toxins unless those toxins originate in factories (just this week, *New York Times* writer Marian Burros wrote another article implying the purity of organic food, and she is far from alone in purveying that message).

Having a genome does mean that plants are chemical factories and can express a variety of different chemical compounds if stimulated to do so by stresses such as microbial attack, for instance. Organically-grown plants, being less protected than those used in conventional agriculture, would therefore be expected to express more toxins to fend off attackers. Thus far, the claims for the superiority of organic plants rest on finding that they contain more phenolics and salicytes, which are not known to be nutrients. The authors of studies with these findings admit that the phenolics and salicytes were expressed for plant protection. One might reasonably predict that less-protected plants would express a variety of other toxins, some of which would be shown upon testing (or have already been shown) to be rodent carcinogens.

In the less-protected organic plants, one would also expect higher levels of the fungal, bacterial or viral infestations that triggered the increased production of phenolics, salicytes etc., as well as higher levels of insect infestations, which often carry those microorganisms to the plants, creating lesions. Unfortunately, proponents of organic food aren't interested in testing for carcinogenic chemicals and disease infestation.

Those seeking to demonstrate the superiority of organic produce have a well-established pattern of only testing for qualities that are of benefit to humans who consume them and not those that might be harmful (though those qualities might as easily be referred to as plant toxins). Even those substances that arguably have some small benefit are in such minute quantities that we gain far more from the dietary diversity that modern agriculture has made available to us than from any minuscule bonus amounts in organic produce. On the issue of the plant produced toxins, the advantage is definitely with the conventional, better-protected plants but the level of these toxins are so low in either case that it is once again wise simply to ignore the difference, which is what most people do unless false claims are made about it.

One final note: The work of Bruce Ames and two different National Academy of Sciences studies has shown that 99.9% of all toxins that we ingest are those produced by the plant itself and not the man-made pesticides used to protect it (NAS 1973, NRC 1996, Ames, Magaw, and Gold, 1990, 78; see also Ames 1992, Ames, Profet, and Gold 1990a,b and Ames and Gold 1991).

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The Environment, Our Natural Resources, and Modern Technology (*Iowa State Press: A Blackwell Publishing Company*) and a forthcoming book, *Origins of the Organic Agriculture Debate* (*Iowa State Press: A Blackwell Publishing Company*), both of which formed the basis of much of the material in this paper.

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