The "Garden of Eden" Fallacy and the Good Food Debate

We all feel better knowing we were eating food that is "good for us". While most of us cannot resist some "naughty foods", at least occasionally, most of us would prefer to avoid ingesting things that would do actual damage to our bodies.

Central to this is the idea that some foods are good for us and some things like synthetic pesticides should be avoided or at least minimised. Put starkly, unless bent on self-harm, one does not ingest poisons.

But where does this concept of good foods (right through to "whole foods", etc) come from?

It seems almost axiomatic that eating "natural foods", fresh fruit and vegetables, we are protecting the body's temple from impurities, hence the significant price differential for Certified Organic foods.

But is there any truth in this?

Whether people are personally religious or not, this belief runs deep at least in contemporary Western culture, mirroring the Biblical story of the Garden of Eden filled with perfect fruits for Adam and Eve to eat. Despite the expulsion from the Garden, there is still some feeling that some foods represent things we should eat and, even more importantly, that we should feed to our children as being best for them.

How does the real world accord with this belief?

Aside from the information readily available for anyone who does a Wiki search for toxins in food plants (try it for yourself), one of the most relevant papers on this area is from Bruce Ames and colleagues published in the Proceedings of the National Academy of Sciences of USA in 1990[1].

This paper was provocatively titled: "Dietary pesticides (99.99% all natural)".

[1] BN Ames, M Profet & LS Gold, Proc Natnl Acad Sci USA 87, 7777-7781, 1990. Full text available on line at no charge.

Just some background: the PNAS (as it is commonly abbreviated), is a highly prestigious, stringently refereed scientific journal of the highest integrity, and Bruce Ames is one of the most respected names in biological science, having made major advances in the determination of the cancer causing potential of both natural and synthetic compounds. He is no friend of the synthetic chemicals industry having pioneered simple tests for carcinogenicity that have seen many compounds either being taken off the market or never reaching the market.

Bruce Ames is a real friend of the environment if ever there was one.

In this paper, Ames and his colleagues demonstrate or, rather, compile some of the evidence, that plants contain natural pesticides. Think about it: if they didn't, some insect or animal would long ago have eaten them all and none would have survived to set seed. In fact common food plants contain many toxic chemicals – the list they quote of substances in cabbage is quite an eye-opener!

In fact, they estimate that even in the average American diet with all of their industrialisation of agriculture that still 99.99% of pesticides in their diet is derived from natural plant compounds.

Is this that strange? Just recall that the most toxic compounds known are of natural plant origin[2]. Just one interesting example is the Ricin protein produced naturally by the castor oil bean plant. While it is safe to spoon castor oil into our childrens' throats (my parents did it with me!), the bean itself contains a protein called Ricin of unparalleled potency as a poison. Indeed, it has been the subject of many efforts to "weaponise" it for use in biological warfare. Just one molecule of Ricin will kill a human cell.

The castor bean plant is exceptional but really not that much of an exception. Think about plants in your garden. Would you encourage your child to go around chewing on their leaves, stems and roots?

[2] This why I find it extremely strange that household products are advertised as containing "only natural plant extract". Presumably by this thinking, a fly spray containing hemlock extract would be just the thing to put around the kids' bedrooms.

If we accept that common food plants contain poisons (read the Ames paper and do that Wiki search suggested above if you don't), how then should we think about the foods we eat?

Rather than thinking that the environment contains a number of "whole foods" that will be good for us to eat, rather we should realise that we live in a hostile environment full to things that don't want to be eaten.

While the third planet from the local sun is the closest thing we know to date for habitation by the species *Homo sapiens*, it is full of different life forms all struggling to survive. They are not just there to give *H. sapiens* a free lunch.

While animals can run away (or fight back), plants don't have the flight or fight options so they make toxins[3].

Accept that all of our common food plants contain poisons. In fact, one of the largest organs in the body is the liver and one of its primary roles is to detoxify poisons from our foods. Blood from the stomach and intestines goes straight to the liver before distributing the goodies from digestion to the remainder of the body. For example, our livers can detoxify a compound naturally present in avocados but rodents can not. Avocados are deadly poison for rodents. Similarly, chocolate and onions are toxic to dogs. Don't be put off your chocolate or avocado just because some other species cannot eat it, just don't think humans are somehow special in our ability to metabolise toxins and try eating gum leaves like a koala.

All this makes sense of the old adage of "nothing in excess". Mix up the foods you eat. Give your liver a chance to detoxify your plant poisons.

This does not mean we don't need to be vigilant about new man made compounds. No one wants a new substance like PCBs (polychlorinated biphenyls) to be introduced into the environment, especially when our bodies are under constant challenge from plant toxins.

[3] It makes you wonder if our common food plants were subject to the type of approval process for safety that new drugs go through, whether any of them would be approved for human consumption.

However, one unfortunate corollary of this is that a vegetarian diet cannot be considered the safe and pure option. In fact, being a vegetarian is maximising the intake of natural plant pesticides toxins.

It would make an interesting debate whether the toxin load from “organic foods” (i.e. grown without synthetic pesticides) is really significantly different from the same food plants produced through commercial, pesticide-using agriculture, especially since the synthetic pesticides have been subject to extensive testing where the natural plant pesticide compounds have not. Indeed, lack of protection of food plants by synthetic pesticides and consequent increased challenges from insect pests may well result in the induction of higher levels of natural pesticides in “organics”.

This is obviously a contentious subject and I urge you to read the Ames article and extend your reading to include research into toxins in common food plants.

In summary, even for the non-religious, contamination of rational thought processes by the ancient beliefs, namely the “Garden of Eden” story, has had bizarre consequences in an area where, *a priori*, one would not suspect it, namely the choice of the foods we eat every day.

D.M. Woodcock PhD, 22/12/2010