STUDY GUIDE

IS ORGANIC FOOD WORTH THE COST?

KEY TERMS: organic, efficient, marketing, pesticide, pathogens

NOTE-TAKING COLUMN: *Complete this section <u>during</u> the video. Include definitions and key terms.*	**CUE COLUMN:** *Complete this section <u>after</u> the video.*
How much more land does an organic farmer need to grow meat than a conventional farmer does?	What misconceptions do many people have about organic food?
What was the increase in leukemia, in terms of percentage, for farmers who had handled Pyrethrin over farmers who hadn't handled it?	How can organic food actually be worse for Americans?
All the pesticides in use in the U.S. likely cause how many deaths per year?	

DISCUSSION & REVIEW QUESTIONS:

- Towards the beginning of the video, Dr. Lomborg points out that,"...everywhere we are urged to eat organic: it's more nutritious, pesticide-free, and protects animals and the environment. At least, that's what we are told, or rather, sold. And thanks to a lot of very effective marketing many people believe it." Given the lack of evidence for such claims, why do you think that the marketing people are so effective with propagating such nonsense- to the point of mass amounts of people stubbornly believing it as truth? What other baseless claims might the marketing people be successful with in regards to organic food?

- Dr. Lomborg refutes such 'conventional wisdom' by pointing out that, "...while pigs and poultry on organic farms may enjoy better access to open areas, this 'freedom,' studies show, also increases their exposure to parasites, pathogens and predators." Considering this to be the case, why do you think that some people argue that letting pigs and poultry be 'free range' is better for their well being? Explain. Even though the trade-off for letting pigs and poultry be free range is exposure to such dangers, do you think they should be free range? Why or why not?

- Then Dr. Lomborg explains that, "...more land for agriculture means less land for nature. If U.S. agricultural production was entirely organic, it would mean we would need to convert an area bigger than the size of California entirely to farmland. Economically, the lower productivity of organics means we have to commit more resources - land, labor and capital. The total cost to the US economy of going organic would run to about $200 billion annually." How do you think that organic food advocates would try to justify 'less land for nature' as being okay if it meant more organic food could be grown and made available? Do you think that devoting so much more 'land, labor, and capital' for organic food, rather than for conventional food, would be worth it? Why or why not?

- Later, Dr. Lomborg states that, "Organic food is a first world luxury. And while buying it is just as valid as any other luxury purchase, one should resist any implied moral superiority - as for example, when fashion designer Vivienne Westwood famously exclaimed that people who can't afford organic food should 'eat less.'" What do you think that Ms. Westwood was really expressing with her snarky statement? Do you think that people who advocate for organic food choices often imply 'moral superiority?' Why or why not?

- At the end of the video, Dr. Lomborg urges, "So next time you see organic produce at the supermarket, don't just swallow the marketing campaign without some critical thought." What do you think Dr. Lomborg wishes for you to critically think about? Do you think that you will heed his advice? Why or why not?

EXTEND THE LEARNING:

CASE STUDY: Organic Food Pesticides

INSTRUCTIONS: Read the article "The Risk-Monger's Dirty Dozen – 12 highly toxic pesticides approved for use in organic farming," then answer the questions that follow.

- What reason did 95% of consumers who bought organic food give for purchasing organic food, according to a U.K. poll? What is the only difference between organic pesticides and those used in conventional farming? According to the author of the article, what are the three big lies that organic food lobbyists use? Which of the 'dirty dozen' pesticides is highly poisonous to fish (yet approved for organic farming around the world)? Which one is highly toxic to bees? Which one does a Cornell study show is hazardous to birds (and bees)? Which one would kill all of the fish in your pond in small doses? Which one has a residue that can enhance the onset of Parkinson's disease in humans if consumed? What harmful effects can Methyl Bromide have?

- Why do you think that organic food advocates tend to ignore the preponderance of evidence regarding pesticide use and all of the negative consequences from such use in the organic food industry? Do you think that many ignorant consumers would like and pay higher prices for organic food if they knew how much the organic food industry was hurting bees, farmers, and other parts of the environment? Explain.

- In what ways does this article support Dr. Lomborg's claims, if any?

QUIZ

IS ORGANIC FOOD WORTH THE COST?

1. Organic food is not healthier for you, nor is it better for animals and the environment than conventionally farmed food.

a. True
b. False

2. Animals on organic farms are _____.

a. often healthier than animals on regular farms
b. more likely to get cancer
c. not generally healthier than animals on regular farms
d. more likely to live longer

3. The total cost to the US economy of going organic would run to about _____ annually.

a. $200 billion
b. $700 billion
c. $900 billion
d. $2 trillion

4. How much more land does it take to produce organic crops?

a. 59%
b. 82%
c. 127%
d. Over 200%

5. What did Stanford University's 2012 comprehensive comparison find?

a. Organic foods are not nutritionally superior to conventional alternatives.
b. Organic foods are slightly nutritionally superior to conventional alternatives.
c. Organic foods are nutritionally superior to conventional alternatives.
d. None of the above.

QUIZ - ANSWER KEY

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https://risk-monger.com/2016/04/13/the-risk-mongers-dirty-dozen-12-highly-toxic-pesticides-approved-for-use-in-organic-farming/

The Risk-Monger's Dirty Dozen – 12 highly toxic pesticides approved for use in organic farming

Posted by riskmonger on April 13, 2016

Originally published on November 12, 2015

It is commonly believed that organic farmers do not use pesticides and that organic food is therefore safer to consume than conventionally farmed fruit and vegetables. In a UK poll, 95% of the consumers bought organic food because they wanted to avoid consuming pesticides. This belief could not be further from the truth. The US organic industry has approved over 3000 toxic pesticides for use in organic farming, many of which are neurotoxins or with a toxic profile requiring "Danger" labels.

If a farmer has a pest, fungus or weed problem, he or she has to address it with a toxic agent or suffer the consequences. Pesticides certified for use by organic farmers, like conventional ones, are designed to kill (with all of the environmental health consequences that entails) – if they did not, they obviously would not be used.

The condition for organic pesticides is that they must originally come from a natural source, but this does not imply that natural chemicals are any less deadly (Ebola is natural). The only difference between organic pesticides and those used in conventional farming is that organic toxins are rarely tested for health and environmental safety and there is no testing for toxic residue levels on organic produce. So we know a great deal about the levels of risk in eating conventionally grown food (and the risk is minimal) but almost nothing about the risks from organically grown food.

Three big lies

The fact that organic farmers use pesticides should not be a big deal. A year's consumption of well-tested synthetic pesticide residues have been known to be far safer than drinking a single cup of coffee, and if we ever decide to start testing organic approved pesticides, we will probably have similar results. The problem is that the organic industry lobby lies about the safety of conventionally-farmed produce day-in, day-out. It seems like everyone working in the organic industry just got used to lying to others all the time (remember that cute Swedish family that were taken off of conventionally farmed food for a week? They were still eating pesticides, just organic-approved pesticides but they were not tested for those. The Co-Op supermarket chain in Sweden lied! … as did every organic industry lobbyist and social media food guru that spread that fiction video).

There are three big lies that the organic food lobbyists commit every moment of every day that indicate either a total brain-washed stupidity or a complete lack of integrity (… probably both).

1. **That organic food costs more because farmers don't use pesticides.** It is one thing to lie about the widespread use of pesticides on organic food, but to do so in order to charge more money to consumers you have just frightened is a charlatanism worthy of imprisonment.

2. **That organic food is safer than conventional food because they don't use pesticides.** This is in fact not only a blatant lie, it is reckless endangerment. We have volumes of data on synthetic pesticides, and regular testing of these residues on food – we have nothing at all about the safety of pesticides used on organic produce. What is worse, consumers have been led to believe they only have to rinse conventionally farmed produce – that there are no toxic residues on organic produce. All produce needs to be properly rinsed, not to wash away trace elements of pesticide residues, but to prevent the spread of pathogens like E coli (which is much more prevalent on organically grown produce).
3. **That organic farming is safer for the environment because they don't use pesticides.** Many of the pesticides approved for use in organic farming on the Risk-Monger Dirty Dozen list below have proven to be highly toxic to bees and other wildlife – far more than the well-tested neonicotinoids that the organic industry has put so much effort into raising doubt on. Just because something is natural in its origin does not mean it has no effect on the environment (just think of an oil spill!)

When an industry is built entirely on a lie, it is time for regulators to stop looking away. The organic industry lobby has indicated its lack of legitimacy and integrity and should face the policy purgatory it has invoked on others. I would suggest that until the organic industry can guarantee that their pesticides are safe, they should be taken off of the market.

So while lobbyists for the organic industry continue to push the big lie and expand their market through fear campaigns (deep down, I'm sure they must be morally exhausted from carrying around such a heavy yolk of hypocrisy), I decided to focus on a group of toxic pesticides approved for organic farming. These are by no means the most toxic, but rather the ones I have seen widely discussed. All pesticides below are exponentially more toxic and carcinogenic than glyphosate.

Methodology

I am using the LD50 measurement for lethal dose toxicity. The US EPA defines LD50 as a standard measurement of acute toxicity that is stated in milligrams (mg) of pesticide per kilogram (kg) of body weight. As the EPA explains, an LD50 represents the individual dose required to kill 50 percent of a population of test animals (e.g., rats, fish, mice, cockroaches). In this case I am using data from rats exposed orally (generally via liquid exposure). LD50 values are standard measurements so we can compare relative toxicities among pesticides. The lower the LD50 dose, the more toxic the pesticide, the higher the dose, the less toxic.

For a benchmark, I will use glyphosate (the active ingredient in Roundup) that the anti-pesticide, anti-GMO activists funded by the organic industry lobby are screaming is probably carcinogenic, the cause of autism, obesity or whatever else we can be scared of. The LD50 for glyphosate is 5600 mg/kg meaning it is slightly toxic. For reference, the WHO (that recently published that famous monograph on glyphosate), considers any measurement over 2000mg/kg to be slightly toxic – its lowest level of measured toxicity. By comparison, baking soda found in most biscuits (LD50: 4220 mg/kg) and acetaminophen taken daily by many individuals (LD50: 1944 mg/kg) are more toxic than glyphosate. See a nice benchmark toxicity table.

All of the pesticides approved for use in organic farming in the Risk-Monger Dirty Dozen list below have an LD50 toxicity measurement much lower than glyphosate (meaning they are more toxic).

The Risk-Monger's Dirty Dozen

1 – Boron (LD50: 560 mg/kg)

Boron is used by organic farmers as a fertiliser. Prolonged or repeated ingestion of boron residues may affect the brain, liver and heart. Chronic poisoning (from ingestion, skin absorption, or absorption from body cavities or mucous membranes) causes anorexia, weight loss, vomiting, mild diarrhea, skin rash,

alopecia, convulsions (or other nervous system disturbances), and anemia. I can never understand how organic lobbyists criticise the use of synthetic fertilisers when they promote boron or cow manure.

2 – Acetic Acid (LD50 3310 mg/kg)

The EFSA 2013 risk assessment on acetic acid found many data gaps and the need for further information, in the same way as neonicotinoids had data gaps, but they did not ban the use of acetic acid in organic farming because, at a more diluted level, this chemical is known as vinegar … and humans eat it.

Acetic acid at a concentration equal or above 90% used in organic farming is classified, in the US, for skin corrosion as "1A" and must have the hazard statement H314 "Causes severe skin burns and eye damage". Studies have identified high long-term risk for mammals, a high risk for honeybees and for non-target arthropods. Often pro-organic activists promote a cocktail of acetic acid, salt and soap as an herbicidal alternative to glyphosate. See an analysis of how much more toxic this mixture is to humans and the environment than glyphosate.

3 – Copper sulphate (LD50: 300 mg/kg)

Copper sulphate is used as a fungicide by organic farmers in over 100 applications despite its far higher toxicity when compared to synthetic alternatives. See a comparison between the organic use of copper sulphate and the much less toxic Mancozeb (LD50 ranging from 4500-11,200 mg/kg), the synthetic equivalent, used by conventional farmers.

It is widely known that copper sulphate is nasty stuff for humans, animals and the environment. Here are some quotes from a pro-organic research document produced by Cornell University.

"Copper sulfate is highly toxic to fish. Even at recommended rates of application, this material may be poisonous to trout and other fish, especially in soft or acid waters. … Injury to the brain, liver, kidneys, and stomach and intestinal linings may occur in copper sulfate poisoning. Copper sulfate can be corrosive to the skin and eyes. … Vineyard sprayers experienced liver disease after 3 to 15 years of exposure to copper sulfate solution in Bordeaux mixture."

This toxic chemical is approved for organic farming around the world.

The following quote catalogues the "hypocrite fatigue" that those in the organic food industry lobby must be feeling in continuing to promote the use of copper sulphate on organic produce:

Vineyard sprayers have experienced liver disease from exposure to it. It is corrosive to the skin and eyes and is absorbed through the skin. It causes reproductive problems in birds, hamsters and rats. It has been shown to induce heart disease in the offspring of pregnant hamsters that were exposed to it. It has caused endocrine tumors in chickens. Copper sulfate and similar fungicides have been poisonous to sheep and chickens on farms at normal application rates. … They are very toxic to fish and aquatic invertebrates, such as crab, shrimp and oysters. There are cases where most animal life in soil, including large earthworms, have been eliminated by the extensive use of copper-containing fungicides in orchards. It is strongly bioaccumulated and is very persistent. Once a soil is contaminated with copper, there is no practical way to remove it."

The European Commission is suggesting that the use of copper as an organic pesticide should be "minimised". … Should be minimised? Couldn't the Commission at least say: "Pretty please"? One cannot help but notice the soft-handed hypocrisy among EU regulators, forced by environmental activists to come down hard on less toxic, well-tested synthetic pesticides, and look the other way on clear evidence of one of the nastiest, highly toxic (organic) pesticides known to man. There is some serious stupid going on here!!!

4 – Pyrethrin (LD50 ranges from 200 mg/kg to 2,600 mg/kg)

Pyrethrin (in different forms and nomenclature) comes originally from chemicals extracted from flowers but now the toxic properties have been identified and synthetically manufactured (although still allowed for organic applications). It is a good thing that pyrethrins are synthetically manufactured given the environmental burden of hundreds of thousands of tonnes of flowers being produced solely for organic pesticide production.

Rather than calling these highly toxic chemicals: "pesticides", many lobbyists for the organic industry have chosen to refer to pyrethrins with the more benign term: insecticidal soap. I am sorry, but pyrethrins, naturally sourced they may be, are known neurotoxins. If I started showering with neurotoxins, I would like the authorities to let me know, and I would NOT call them "soap"! Who are they trying to fool?

Some frightening quotes once again from that pro-organic farming study from Cornell:

"Pyrethrum is highly toxic to bees. The average lethal dose (LD50) for honeybees was measured at .022 micrograms per bee (Casida & Quistad 1995). Direct hits on honeybees and beneficial wasps are likely to be lethal … Cox (2002) cites several studies indicating the possibility of a connection between pyrethrins and cancer, including one study showing a 3.7-fold increase in leukemia among farmers who had handled pyrethrins compared to those who had not. In 1999, a USEPA memo classified pyrethrins as "likely to be a human carcinogen by the oral route".

It should be noted that when European farmers were denied access to neonicotinoids by the well-lobbied and activist-influenced EFSA Bee Risk Assessment Working Group, the alternative the farmers had to turn to in order to protect their oil-seed rape was this much less efficient, highly bee-toxic class of pyrethrins. I cannot find the words to express the absurdity of all of this!

5 – Hydrogen peroxide

The HD50 toxicity measurement depends on the degree of concentration, but hydrogen peroxide is used by organic farmers as a general disinfectant to kill microorganisms on contact (so the more concentrated, the better).

It is often used to control bacterial and fungal pathogens. Once again, the pro-organic Cornell study warns: "Exposed, treated seed may be hazardous to birds and other wildlife. It is also highly toxic to bees and other beneficial insects exposed to direct contact; it should not be applied or allowed to drift onto blooming crops or weeds when bees are actively foraging. Similarly, it should not be applied or allowed to drift onto crops where beneficials are part of an integrated pest management strategy." Organic industry lobbyists and NGO save-the-bee campaigners say the very same things about neonicotinoids. The difference is that the pesticide industry has worked hard to lower the exposure from the applications of neonic seed dressings or drift, while the organic industry lobby doesn't seem to give a toss.

6 – Lime sulphur (LD50: 820 mg/kg)

Lime sulphur is made by boiling lime and sulphur together. It is sprayed on fruit trees to control diseases such as blight anthracnose, powdery mildew and some insects including scales, thrips and eriophyid mites. The Cornell study states: "Lime sulfur can be fatal if inhaled, swallowed, or absorbed through the skin. It is extremely caustic and can cause irreversible eye damage and skin burns. If mixed with an acid, it may give off extremely toxic and flammable hydrogen sulfide gas (Meister & Sine 2009)." It is extremely toxic to earthworms which play an important role in soil remediation and regeneration. For humans, it has the potential to burn exposed skin and eyes. In the US, lime sulphur has been assigned a DANGER rating.

7 – Rotenone (LD50: 132 mg/kg)

A small amount of rotenone will kill all of the fish in your pond. This deadly, highly toxic chemical is still available for use by organic farmers in products combined with pyrethrins (also highly toxic – see above) in products like Red Arrow. The Risk-Monger was shocked to learn not only that this bee-killer was not banned, but that PAN even looked the other way when faced with the nasty environmental and human consequences of this toxic (natural) chemical. Organic advocates like to claim that rotenone has been taken off of the market (also in comments on my blogs), but the fail to acknowledge that it has recently been re-approved. http://www.thefarmersdaughterusa.com/2013/06/organic-pesticides.html

Consuming organic food with residues of rotenone can enhance the onset of Parkinson 's disease. It is a pity that organic food is not tested for (natural) chemical residues so consumers could be aware of their health risks.

8 – Nicotine sulphate (LD50: 50-60 mg/kg)

Nicotine is natural, and thus approved for organic farming to control aphids, thrips, mites and other insects. It is amusing to have seen so many pro-organic campaigners arguing against the use of neonicotinoids by saying that these synthetic pesticides were using nicotine. Yes … and, like bt, so were organic farmers. But how toxic is this natural, organic-approved neurotoxin? Very! In the US, nicotine sulphate carries a Danger warning. It is an organic neurotoxin that interferes with the transmitter substance between nerves and muscles. Tests have shown that nicotine sulphate has caused abnormalities in the offspring of laboratory animals and a New Jersey State study revealed that nicotine sulphate poisoning of organic gardeners can lead to increased blood pressure levels, irregular heart-rate, and, in certain cases, death.

What does the Pesticide Action Network say about this toxic organic pesticide? Well, PAN recognises that this pesticide is probably bad news but in most cases says there is insufficient data, and recognises that it is still sold for organic farming (mea culpa!). Nicotine sulphate did not seem to make their dirty dozen list!

9 – Azadirachtin (LD50: 3,540 mg/kg)

Also known as neem oil, this toxic pesticide approved for organic farming (particularly for apples) puts all synthetic pesticides to shame in its ability to massacre foraging bee populations. The Risk-Monger has called for a ban of this nasty natural chemical that EU studies have acknowledged kills 50% of bee populations when exposed to a dose level 50 times lower than the recommended dose set for organic farmers. My demand flies in the face of the campaigning of the main organic lobby, IFOAM, who is begging the EU not to put safety requirements or data demands on Azidirachtin that would restrict this bee-killing pesticide because they claim that there are no other alternatives for organic apple growers. Hey IFOAM – how about using less toxic synthetic pesticides in order to protect bees? Unbelievable!

As for other health risks from Azadirachtin outside of bees:

"One of the most popular organic pesticides, neem, is toxic to non-target species including crustaceans and tadpoles. Neem has been shown to cause the brain disease toxic encephalopathy in children. In mice, it causes chromosomal abnormalities in bone marrow cells and damages the DNA of sperm."

I challenged the biased anti-industry activist scientists from the IUCN Taskforce on Systemic Pesticides to disprove the correlation between the decline in bee populations with the rise in organic farming (a correlation far more accurate that that drawn with neonicotinoids). These researchers have refused to look at the data (perhaps they could not find the funding from their pro-organic industry Sugar Daddies), but Azadirachtin is perhaps the best indication that organic farming is as dangerous to biodiversity, if not more, than any well-tested synthetic pesticide that the organic industry is trying to ban.

10 – Methyl bromide (LD50: 214 mg/kg)

Methyl bromide is a fumigant used by organic farmers to combat spiders, mites, fungi, plants, insects, nematodes, and rodents. Animal studies show that methyl bromide can affect the brain, kidneys, nose, heart, adrenal glands, liver, testes, and lungs. Methyl bromide also contributes to the destruction of the ozone layer. Because of the high risk of poisoning, it is strongly advised that organic farmers get professional sprayers to apply methyl bromide.

11 – Homemade concoctions (LD50: ???)

One of the most frightening things about the explosion of amateur organic farmers is the wide availability of recipes for these hobby farmers to make their own pesticides in kitchen sinks. Earlier in this blog, we provided a link to a site showing that a homemade mixture of salt, vinegar and soap was more toxic as an herbicide than glyphosate. Mother Earth News offers a wide selection of home-brews with base chemicals that are not designed for consumption or direct release into the environment. Most small organic farmers do not have a sufficient knowledge of basic chemistry to be making their own pesticides.

If NGO activists are campaigning against chemicals because of the unknown risks from chemical cocktails, why are they condoning all of these organic pesticide concoctions being dumped onto the soil and on people's untested food?

12 – Citronella oil, eucalyptus oil, garlic extract

A recent study published in the Oxford Journal of Insect Science showed that when adult worker bees ingested citronella oil, eucalyptus oil, garlic extract, neem oil, or rotenone, they suffered from 42% to 60% higher mortality rates than workers fed with uncontaminated control diets.

While the Risk-Monger has in the past questioned the value of lab-tests that fed bees any chemical contaminants, we need to be reminded that farmers today have been denied the crop protection benefits of three neonicotinoids on the basis of data from lab tests alone (sanctified by EFSA). If these types of lab-based feeding tests also show that bees have a 42% to 62% higher mortality from exposure to organic pesticides then EFSA and the European Commission need to decide whether they want to ban all pesticides, approved for organic or conventional farming applications, or get a little bit more reasonable and consistent in how they regulate what farmers can and cannot use on their crops. Just because a bunch of loud-mouthed activists have money to run silly campaigns, does not mean that regulators have to listen to their nonsense.

The same, but different?

The only difference then between conventional synthetic pesticides and organic farming approved pesticides is that with the synthetic plant protection products you get mountains of safety data and regular pesticide residue monitoring while with organic-approved pesticides, you pay a lot more money to get nice feel-good stories built on well-fabricated lies that they are safer for human consumption, bees and the environment.

I am fully aware that facts don't matter and you want to feel good about the food you eat, but are you really OK with giving your money to this group of well-funded liars in the organic industry lobby?

Disclaimer: Although these pesticides approved for organic farming are far more toxic than glyphosate (or almost any other well-tested conventional pesticide), the purpose of this exercise is to highlight the stupidity and lack of integrity of the fear-mongers who attack conventional crop protection materials in order to try to gain market share for organic food. The risk to any well-tested pesticides is so low compared to other natural toxic exposures as to make any activist fear-campaigning ridiculous and unfounded.

There are more toxins in that cup of coffee you drank while reading this blog than in an entire year of conventional pesticide residues on the fruit and vegetables you consume (and probably organic pesticide consumption as well, but I am afraid there, we just don't know because there is no pressure from NGOs like PAN to test them). My intention was not to make people more afraid, but to realise how gullible we have become to such mal-intentioned individuals paid by the organic food industry lobby.

How do you deal with stupid?

So what should we make of all of this? Two points, first that the organic lobby (from the organic trade associations to the Food Babes and Mamavations of the world) have been knowingly lying in making people afraid about our well-tested, safe food chain. Secondly, that they are either very stupid people for thinking that their pesticides are not as toxic or that they think the rest of us are stupid for believing them (probably both).

And with this, the Risk-Monger will be launching a ten-part blog series until the end of the year entitled: **How to deal with stupid**. Because one way or another, we need to put a little bit of common sense into the incomprehensible level of stupid that has been spreading out of control on food policy debates.