

# HOW DO ORGANIC FOODS STACK UP? A FOOD SAFETY AND NUTRITIONAL COMPARISON

Dr. Carl K. Winter

Department of Food Science and  
Technology, UCD

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manuscript, please e-mail me:  
[ckwinter@ucdavis.edu](mailto:ckwinter@ucdavis.edu)



# PESTICIDE RESIDUES FROM ORGANICS ARE LOWER, BUT NOT ZERO

- Pesticides, typically naturally-occurring, are permitted for use in organics if approved by National Organic Standards Board
- Some pesticides may inadvertently contaminate organic foods
- Some “organic” growers may use pesticides not allowed by organic rules

# Baker, et al, 2002

- Organic foods: 127 samples, 23% positive for pesticide residues
  - 10% of samples were positive due to persistent chlorinated hydrocarbon insecticides
  - Remaining 13% showed detectable residues of pesticides not approved for organic use
- Foods with no market claim: 26,571 samples, 73% positive for pesticide residues

# PESTICIDE RESIDUES - CONVENTIONAL VS. ORGANIC

**Table 1. Detection of Pesticide Residues in Conventional and Organic Produce: Summary of Different Monitoring Programs**

	<b>USDA Pesticide Data Program</b>	<b>CDPR Marketplace Surveillance Program</b>	<b>Consumers Union</b>	<b>Belgium</b>
<b>Conventional – Percentage Detected</b>	<b>73</b>	<b>31</b>	<b>79</b>	<b>49</b>
<b>Organic – Percentage Detected</b>	<b>23</b>	<b>6.5</b>	<b>27</b>	<b>12</b>
<b>Ratio – Conventional/Organic</b>	<b>3.2</b>	<b>4.8</b>	<b>2.9</b>	<b>4.1</b>

**Sources: Baker et al (2002) and Pussemier et al (2006).**

WHAT ARE THE RISKS  
FROM PESTICIDE  
RESIDUES IN FOODS?

# 1. BEST ESTIMATES OF DAILY HUMAN DIETARY EXPOSURE TO PESTICIDES



= X

## 2. MULTIPLY HUMAN EXPOSURE LEVELS BY 10,000 TIMES





3. FEED 10,000 X DAILY TO  
LABORATORY ANIMALS  
THROUGHOUT THEIR LIFETIMES



# 4. WHAT HAPPENS TO THE ANIMALS?



**NO ADVERSE EFFECTS  
ARE OBSERVED**

# FOOD SAFETY IN PERSPECTIVE

## Food safety priorities of FDA and WHO

1. Microbiological contamination
2. Nutritional imbalance
3. Environmental contaminants
4. Naturally-occurring toxins
5. Pesticide residues
6. Food additives

# NUTRITION DIFFERENCES

- Very little research directly comparing nutritional value of organic vs. conventional foods
- There is some limited evidence suggesting that organic foods have higher nutrient levels than conventional foods

# SPECIFIC STUDIES

- Large number of comparative studies reported in the past ten years
- Frequently look at plant polyphenolics
- Suggestive that plant polyphenolic levels are increased in organic production

# REASONS FOR INCREASED PLANT POLYPHENOLICS

- Use of synthetic fertilizers promotes plant growth at the expense of synthesis of plant secondary metabolites
- Plant stress due to insect, weeds, or plant pathogens may increase synthesis of plant secondary metabolites; more likely with organics if other pest management tools are not available

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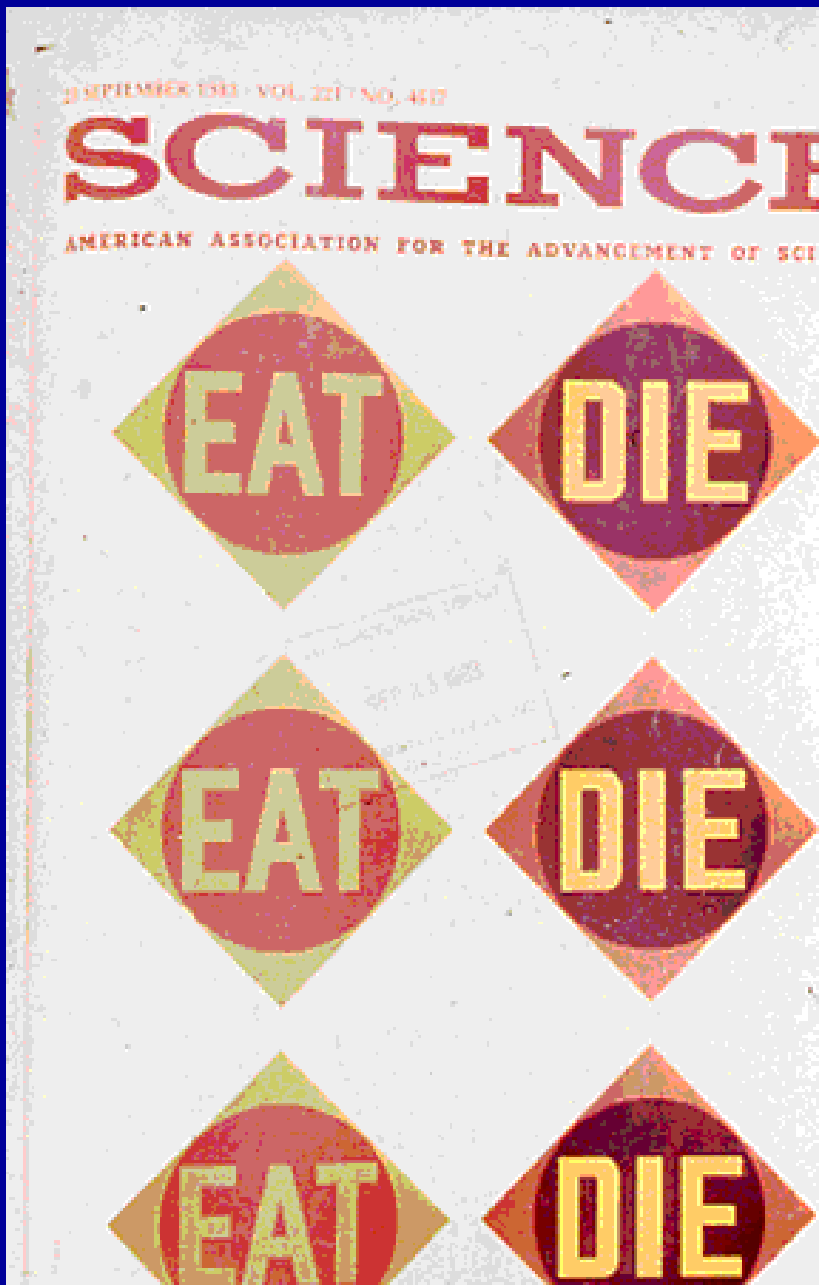


# MICROBIOLOGICAL RISKS

- US Estimates - 76 million cases of foodborne illnesses annually, including 320,000 cases of hospitalization and 5,000 deaths
- Notable recent outbreaks - spinach, lettuce, tomatoes
- Is organic food more or less safe than conventional food in terms of microbiological safety?
- More manure use in organics, but more stringent regulation of manure in organic agriculture

# SUMMARY

- Organic foods have lower pesticide residue and nitrate levels than convention foods
- Polyphenolics are higher in organics in some cases
- Naturally occurring toxins may be higher in organics in some cases
- There is concern about the microbiological safety of organic produce if it is not handled properly
- TRADEOFFS!



Manuscript reference:

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Organic Foods. *J. Food Sci.*  
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