Organic Foods? Buy or Bypass: A Comparative Study Analyzing the Effects of Pesticides on Nutritional Content, Heavy Metal Toxicity and Pesticide-Induced Diseases

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The organic food market is the fastest growing food sector, yet it is unclear whether organically raised food is nutritionally superior to conventionally grown food and whether consuming organic food bestows health benefits. This research aims to clarify that by evaluating the differences in nutritional value, heavy metal and pesticide content between organic and conventional food. Pesticide testing is conventionally extremely expensive and time-consuming, often involving complex techniques such as high performance liquid chromatography. Consequently, a novel colorimetric paper-based assay was invented for the detection of pesticides. The creation of this cost-effective and efficient method to detect pesticides can be extremely useful in third world countries and the military, where simple bioassays are essential in the first stages of detecting disease and for monitoring environmental and food-based toxins in the field. The pesticide detection test indicated that the difference between the content of pesticides in organic and conventional foods is up to 51%. Furthermore, there was a ~15% increase in deleterious, carcinogenic heavy metals and a ~33% decrease in preventative nutrients in unwashed conventional produce as compared to organic produce. The health parameters tested using the model organism Drosophila melanogaster indicated that organic diets substantially increased fertility, activity, and lifespan. In addition, further experimentation indicated that washing conventional produce reduces pesticide content to such a degree that the difference in health parameters, heavy metal and nutrient content between organic and washed conventional food becomes statistically insignificant. This discovery has the potential to entirely change our food industry.

Awards Won:

First Award of $5,000