

## ***New Insights on the Consumer Benefits of Organic Food and Farming***

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### **Overview**

The American diet is varied, rich, and tragically flawed. This is why the government has recently called for dramatic changes in eating patterns. It is why consumers are spending billions annually on nutritional supplements, diet plans and pills, and seeking out organic and natural whole foods.

It is why health problems with roots in diet and food choices are driving health care costs through the roof. It is why we must, as individuals and families, communities, and a country, begin fixing the deep-set and serious problems embedded in our food system, and the environments in which food choices are made.

Today, I focus on new science on the consumer health benefits of organic food that will hopefully accelerate long-overdue changes in public attitudes and dietary patterns. But first a key point – adult consumers that switch from conventional to organic foods, but change little else in their diets and lifestyles, are not likely to notice much of a difference in their health.

There is near universal agreement that the three most important changes needed in the American diet are --

- Better balance in caloric intake relative to daily energy needs.
- Double or more the servings of fresh and lightly processed fruits and vegetables, especially those high in fiber and brightly colored (and hence high in antioxidants).
- Dramatically reduce intakes of saturated fat, sugar, and salt.

We think that consuming organic food is a strong contender for the fourth most important change in our food system and food choices, especially for families having and raising children. An overview of science that supports our view follows.

**But remember and remind people – the benefits of organic food are directly linked to, and are dependent on sound food and lifestyle choices.**

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## Nutritional Status

According to the U. S. Department of Agriculture (USDA), Americans are “overfed and undernourished.”<sup>1</sup> The average American currently consumes about 520 more calories than we did in 1970 (Economic Research Service 2006). This 520-calorie increase in daily food consumption, coupled with more T.V. time and less exercise, is why the country faces epidemics of childhood obesity and diabetes. It is enough to cause about 30 pounds of weight gain in about 400 days.<sup>2</sup>

Rather modest changes in eating habits and exercise can eliminate this excess caloric intake for many children – one less soda, or switching to a diet soda, two or three less bites of food each meal, ordering small fries instead of “large,” walking or running an extra half-mile a day, or 30 more minutes of active play or participation in sports (Butte et al., 2003; Hill et al., 2003).

Despite being overfed, as a nation we are undernourished. The ERS estimates that 12.6 million households in America fall short of basic food needs at some point during the year. Government and private food aid programs like WIC and the school lunch program fail to make up the difference in about one-quarter of these households, impacting millions of children.

The average American consumes about a third of the 9 (or more) daily servings of fruits and vegetables the government says we all need. Fiber intake is far from adequate. Most of us consume inadequate levels of 2.9 essential nutrients on a daily basis.<sup>3</sup> Pregnant women, the developing child in the womb, and children through adolescence, have special nutritional needs, and face serious consequences if nutrient intakes lag below needs for extended periods. Inadequate nutrition is a key risk factor in a significant portion of congenital birth defects, infant deaths, and pre-term deliveries.

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<sup>1</sup> The USDA issued in September 2005 a valuable resource for assessing the nation’s nutritional challenges. A searchable nutrient database on common foods was released [www.ars.usda.gov/foodsearch/](http://www.ars.usda.gov/foodsearch/) and a report entitled “What We Eat in America, NHANES 2001-2002: Usual Nutrient Intakes from Food Compared to Dietary Reference Intakes.” The report covers consumption of 24 nutrients, and reports distributions of consumption (5%, 10%, 25%, 50%, 75%, 90%, and 95<sup>th</sup> percentiles of consumption) by age and sex. It makes for chilling reading (in more ways than one).

<sup>2</sup> It takes about two calories of excess intake to produce a pound of weight gain in the average human. There are about 3,500 calories in a pound of stored fat; about 7,000 calories of excess intake will leave a person a pound heavier, if there is no change in exercise levels. So, consuming 500-extra calories a day, for 14 days, would lead to a pound of gain. How can we gain so much weight over Christmas, after just a few days of indulgence? The combination of over 1,000 extra calories a day and less exercise than normal will lead to rapid weight gain.

<sup>3</sup> Based on the percent of individuals consuming inadequate levels of 24 nutrients, as reported in “What We Eat in America” (see footnote one).

The USDA's "What We Eat in America" report (see footnote one) estimates that well over 95% of women of child-bearing age have daily Vitamin E intakes of less than 11 milligrams of tocopherol (a form of Vitamin E). The Recommended Dietary Allowance (RDA) during the last six months of pregnancy is 15 mg. Vitamin E intake is less than one-half daily needs for about 75% of women. The higher levels of Vitamin E in organic milk, especially milk from cows on rich, legume-based pastures, will help narrow this gap.

The USDA estimates that over 95% of women of child-bearing age consume inadequate daily intakes of iron. Nearly one quarter of women consume one-third or less of their daily needs during the last six months of pregnancy. Markedly higher iron intake is essential during pregnancy for proper oxygen exchange in light of the increase in the volume of blood needed to meet the needs of the placenta and developing child.

The average iron content of conventional fruits and vegetables has declined 15% since the 1950s (Davis et al., 2004). Organic production systems increase iron content on average about 17% (Worthington 2001; Worthington 2002).

These nutrition and diet-related problems are intimately related to childhood development, to a child's behavior and learning ability, to levels of aggression and social skills, and to whether as an adult, individuals will face health problems including diabetes, cancer, and heart disease. This is why progress must be made in promoting exercise and in changing what young people eat, and how much they eat. They need less fat, sugar, and calories and more fruits, vegetables, fiber, and whole and organic foods.

### **Nutrient Density**

Careful research based on USDA data on the nutrient content of common foods has shown a significant decline in the levels of six nutrients since 1950 – protein, calcium, iron, riboflavin, phosphorous, and ascorbic acid (Vitamin C) (Davis et al., 2004).<sup>4</sup> Riboflavin levels have fallen on average by 37% and iron and ascorbic acid content is down by 15%. These reductions widen the gap between adequate and actual daily nutrient intakes for millions of Americans.

Organic farming is a proven option to increase nutrient levels both in the soil and in harvested foodstuffs. Organic farming methods build the quality of soil over time and also increase the ability of plants to extract minerals from the soil. Several studies have shown, for example, that organic farming increases vitamin and antioxidant concentrations by, on average, about 30 percent – increases large enough to reverse the long-run decline in the concentrations of most nutrients (Benbrook 2005).

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<sup>4</sup> For a review of this important study, see the "Hot Science" item, <http://www.organic-center.org/science.htm?groupid=8&articleid=52>

About one-third of Americans have inadequate intakes of Vitamin C, with nearly 10% of the population consuming less than half of daily needs. Organic farming increases Vitamin C content by 30% on average, again more than reversing the 15% decline in ascorbic acid (a precursor of Vitamin C) levels in food since 1950.

A step as simple as switching from conventional ketchup at home or in a school lunch program, or better yet, across a fast food restaurant chain, can make a big difference. A team of USDA scientists stationed in Albany, California studied the lycopene content of 13 widely available brands of ketchup – six major national brands, three organic brands, two store brands, and two brands sold in fast food restaurants and/or vending machines.<sup>5</sup> The average level in the organic brands was 57 percent higher than the national brands, and 55 percent higher than the store brands (Ishida et al., 2004).

Other research has shown that organic grapes contain higher levels of resveratrol, a powerful antioxidant (reviewed in Benbrook, 2005). For years scientists have tried to understand why people in France and other Mediterranean countries have lower levels of heart disease than the U.S. population, despite higher levels of saturated fat consumption. The high levels of resveratrol in red wine are considered the most likely explanation. Just last year research was published showing that resveratrol is also among a class of natural chemicals that mimic the impacts of caloric restriction, and as a result can delay the aging process (Wood et al., 2004). Other scientists have shown that the antioxidants that make brightly colored produce so good for people can also help trigger in the brain a sense of fullness. This is a key step in getting people to stop eating after they have had enough, but before they overeat.

### **Avoiding Pesticide Exposure**

Americans consume about one billion servings of fruits and vegetables every day – an average of 3.6 servings per capita (nine are now recommended). About three-quarters of the servings of fresh fruits and vegetables contain one or pesticide residue, and almost half contain two or more (Baker et al., 2002).<sup>6</sup> Children consume over 100 million servings of fruits and vegetables each day with two or more pesticide residues.

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<sup>5</sup> For an overview of this research, see the “Hot Science” section of the Organic Center website, <http://www.organic-center.org/science.htm?groupid=8&articleid=55>

<sup>6</sup> Data on pesticide residues in food and water cited herein are from the annual reports and databases released by the “Pesticide Data Program,” USDA Agricultural Marketing Service. For analyses of residues in conventional and organic foods based on PDP data, see the Organic Center’s “State of Science Review” entitled “Minimizing Pesticide Dietary Exposure Through the Consumption of Organic Food.”

In intensively farmed regions, children are also frequently exposed to pesticides through drinking water. USDA data show that about half the drinking water in the nation has residues, and about 15% is contaminated with four or more pesticide residues. Like food, pesticides in drinking water account for hundreds of millions of daily “servings” for kids. These exposures to children worry scientists far more than adult exposures, because kids consume more food and water per pound of bodyweight, compared to adults, and because children cannot detoxify and metabolize chemicals as effectively as adults.

The Centers for Disease Control has found evidence of exposure to organophosphate (OP) insecticides in over 90% of children, at levels 50% or more above the levels found in adults (Centers for Disease Control and Prevention 2001; Ishida et al., 2004). Studies at the University of Washington – Seattle have shown that a predominantly organic diet essentially eliminates signs of exposure to this dangerous class of insecticides in school-age children (Curl et al., 2003; Lu et al., 2001).<sup>7</sup> Consumption of organic food, especially fruits and vegetables, will dramatically reduce dietary exposure and will help decrease the frequency of a number of health problems triggered or made worse by low-level pesticide exposures.

### **Healthy Development**

Twelve percent of babies are born prematurely, 7.6% have low birth weights, 3% have a major birth defect, and 0.7% dies in the first months of life.<sup>8</sup> Both maternal and paternal pesticide exposure in the year before conception contributes to these problems (Chapin et al., 2004). Maternal pesticide exposures during pregnancy and in the first weeks of an infant’s life can have profound, lifelong impacts on a child’s development and health (Munger et al., 1997). Such exposures can, for example, disrupt the normal process of sexual differentiation in the developing embryo, and increase the risk of both male and female reproductive problems later in life.

Studies have found pesticides in semen (Swan et al., 2003), in the placenta, and in umbilical cord blood. Paternal exposures lead to lower volumes of damaged and weakened sperm (Meeker et al., 2004a; Meeker et al., 2004b).<sup>9</sup> Pesticide exposures have recently been linked to erectile dysfunction and a loss of interest in sex (Amr et al., 1997; Oliva et al., 2002), and animal research has provided support for evidence in human studies (Brien et al., 2002). Paternal exposures have also been linked to increased risk of childhood cancers (Flower

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<sup>7</sup> One of the lead scientist in these studies, Dr. Chensung (Alex) Lu will present his recent findings during a symposium organized by The Organic Center at the February, 2006 annual meeting of the American Association for the Advancement of Science. The panel is focusing on options to reduce children’s exposures to pesticides.

<sup>8</sup> Complete data on birth outcomes is accessible in tables in the “National Vital Statistics Report” issued by the National Center for Health Statistics.

<sup>9</sup> For an extremely thorough review of the impacts of chemicals on male reproductive health, see (Toppari et al., 1996).

et al., 2004). Trying to sort out the fetal origins of adult reproductive problems is extremely complicated and a very active area of research.

Organic farming improves the health of infants and children in many other ways. For example, blue-baby disease is caused by an infant's excessive consumption of nitrates. This happens when a baby's formula is made with drinking water that is contaminated with nitrates. Breast milk can also become contaminated if a mother's tap water has high levels of nitrates.

Nitrates wind up in drinking water as a result of excessive nitrogen fertilizer use on conventional farms. Organic farming dramatically reduces excess nitrogen in the soil, and hence also nitrate levels in drinking water (Pimentel et al., 2005). In addition, organic food contains, on average, one-third lower levels of nitrates.

Many consumers appreciate that organic farming keeps pesticides, nitrates, animal drugs, and most chemical-based food additives out of the food supply. We are continually reminded, however, that there is so much we do not know, and so much research that needs to be done. A case in point -- a European study published in mid-December studied the impacts of combinations of common food additives, all of which have been carefully studied in isolation, one additive at a time, and found to be acceptably safe (Lau et al., 2005). To their surprise, they found significant neurotoxic impacts from several combinations of food additives, and at levels one would be exposed to from consumption of common, highly processed foods.

### **Help preserve the efficacy of antibiotics.**

Infections are a primary cause over 200,000 deaths annually, nearly one in every ten, and are a leading cause of deaths among children (Mokdad et al., 2004). Bacteria that have become resistant to antibiotics cause some 85,000 deaths annually, impacting the very young and the elderly most heavily. Hundreds of thousands of people suffer extended hospital stays, extra days of missed work and school, and several billion dollars in added medical care costs because of complications that arise as a result of resistant bacteria (Mead et al., 1999a; Mead et al., 1999b).

Each year there are about 25 million pounds of antibiotics fed at subtherapeutic doses to cattle, pigs, and chickens to promote growth and prevent stress-induced disease (Mellon et al., 2001). Few people know that about seven pounds of antibiotics are used on the farm for every pound used to treat human infections (Mellon et al., 2001). Farm use of antibiotics is an important source of antibiotic resistance bacteria that can find their way to humans and complicate the treatment of routine infections (Angulo et al., 2004a; Angulo et al., 2004b).

Producing animal products on organic farms virtually eliminates farming's contribution to this important public health problem, and would save the nation billions in health care costs. It would also spare tens of thousands of patients, and their families, from experiencing the panic triggered when once-effective antibiotics fail to do their job.

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