

## **NATIONAL ORGANIC COMMENTS**

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TM - NOP (National Organic Program)  
Room 4007-So., Ag Stop 0275  
Washington, D.C. 20090-6456

### **RE: Docket Number TMD-94-00-2**

Safe Tables Our Priority is a nonprofit, grassroots organization consisting of victims of foodborne illness, family, friends and concerned individuals who recognize the threat pathogens pose in the U.S. food supply. S.T.O.P.'s mission is to prevent unnecessary illness and loss of life from pathogenic foodborne illness. We believe that in the United States today, people should not be made seriously ill, permanently injured or killed by pathogens such as bacteria or viruses in our food. Members of our organization include Nancy Donley, President, whose only son Alex died of *E. coli O157:H7* contaminated hamburger; Laurie Girand, whose daughter was hospitalized for a week with kidney failure from unpasteurized Odwalla apple juice, which had been marketed with the slogan "Drink It and Thrive"; and the Bernstein family, whose daughter Haylee was hospitalized for 14 weeks and survived with brain damage and vision impairment. Three members of the Bernstein family were poisoned by organically certified lettuce.

S.T.O.P. has been instrumental in reforms related to meat and poultry HACCP and juice labeling and juice HACCP. Our comments today are directed at the pathogen-related food safety implications of USDA's National Organic Program (NOP) Proposed Rule.

### **Consumers Perceive Organic as Safer, Regardless of USDA's Position**

On page 65869 of the Federal Register dated 12/16/97 in which the Proposed Rule is described, USDA states (**bold** emphasis is our own):

"Our requirements address the systems used to produce an agricultural product rather than the physical qualities of the product itself. **No** distinctions should be made between organically and non-organically **produced products in terms of quality, appearance or safety.**"

However, nothing could be further from the truth. Environmental concern alone has not fueled the explosive growth in the organic foods industry; rather, the growth in organic foods is a direct result of the consumer perception that organic foods are safer and therefore are healthier for consumers. Safety distinctions between organic foods and conventional foods are made daily by the organic foods industry, conventional and pro-organic press, and consumers. Below we have identified three different quotes that specifically invoke the organic produce's marketing position of superior safety, and thereby superior health benefits (**bold** emphasis is our own).

"Buy organic produce when possible and practical. Produce that is certified organic usually is as close as possible to being free of all chemical residues. Transitional produce may still contain some residues from soil contamination, but should be **safer** than conventionally grown produce."

-- from the best-selling pregnancy book "What to Expect When You're Expecting," Eisenberg, Murkoff, and Hathaway, 1991 (target audience: pregnant women)

"Buy organic... If all food growers were required -- by consumer pressure and by law -- to grow **safe** food, they would find a less expensive way, and the cost would decrease. Look for the label 'certified organically grown food.' This certification means that food is grown according to strict standards with third-party verification by an independent organization or state government agency. Certification includes on-farm inspections, soil and water testing, and careful record keeping."

-- from "The Baby Book: Everything You Need to Know About Your Baby - From Birth to Age Two", Sears and Sears, 1993 (target audience: parents)

"At Earthbound Farm, we believe top quality products and food **safety** are achieved simultaneously. From seed to soil, from picking to packing, every necessary step is taken to ensure our products are the best they can be. For both our salad greens and row crops, food safety and quality assurance begins in the field. All new ground is tested for chemical residues prior to farming. Our compost and fertilizers are tested for pathogens, and our water is tested for harmful bacteria."

--Earthbound Farm website, 4/23/98 (target audience: consumers)

Hence, USDA's position that "no distinctions should be made between" conventional foods and organic foods, does not accurately reflect actual consumer perception.

Fueling this perception is the consumer belief that the long term effects of pesticide residue and the excessive use of antibiotics in food animals result in negative health consequences, particularly to children, and can result in chronic health issues such as reduced fertility or cancer.

*The truth is organic foods can only be safer than conventional foods if they harbor neither excessive chemical residues nor life-threatening pathogens.* Many of the emerging, virulent organisms are found in intestinal tracts and feces of various animals including cattle, sheep, hogs, poultry, wild birds, and deer. For these organisms to reach people through produce, animal fecal matter must come into contact with fruits or vegetables. Current practices in the organic foods industry, specifically fertilization with manure and composted animal manure, facilitate the potential pathogen contamination of food.

Ironically, the market segment most attracted to reputedly-healthier foods is that of people seeking better health. Unfortunately, this market segment includes individuals most susceptible to pathogens:

- seniors, considered to be anyone over the age of 50;
- pregnant women (for whom *Listeria monocytogenes* can cause second and third trimester miscarriage and meningitis in newborns)

- the immune impaired (which includes people who have suffered liver damage, have reduced stomach acid from the use of antacids, and otherwise healthy people on antibiotics)
- and parents on behalf of children.

Thus, those most likely to suffer from foodborne illnesses are attracted specifically to produce that is perceived to be safer, when in fact that produce may have been grown in association with life threatening organisms. If contaminated produce is consumed uncooked or lightly cooked by an at-risk individual, it can kill that person within days.

Fancy Cutt lettuce, which was certified organic(1) by Quality Assurance International is only one example of how contaminated organic produce can cause a life-threatening, multi-state outbreak. In this outbreak, *E. coli* O157:H7 contaminated, organically certified lettuce was shipped to Illinois and Connecticut and caused a detected 61 illnesses, leaving at least one child with lifelong injuries, which include seizures, blindness and brain damage. While the lettuce was not known to be fertilized specifically with manure, it was next to a cattle farm and inadequate control of environmental conditions, improper rinse water quality, and poor sanitation conditions resulted in citations following the outbreak.(2)

In short, consumers perceive organic produce to be safer for many reasons. The public considers organic safety standards among the highest standards in the U.S. today, which is one of the reasons why organic products command premium prices. Organic practices and the Proposed Rule support the use of animal manure and composted animal manure in the production of organic produce. Cattle and sheep feces today increasingly harbor *E. coli* O157:H7, a biohazard level 2 pathogen. Poultry feces frequently contains *Salmonella* and *Campylobacter*. Therefore, the application of raw or composted animal feces as a fertilizer to produce crops, particularly crops that will be served uncooked or lightly cooked, represents a threat to public health. This threat must be addressed in the overall national standards for organic produce lest further outbreaks by organic producers lead consumers to lose confidence in the safety implied by organic standards.

### **Responsibility of USDA to Protect Organic Reputation for Safety**

In the overview to the Proposed Rule, USDA states,

"Although we acknowledge that the use of animal manure, whether applied directly to the field or composted, is common in organic agriculture, there is inadequate data to make the determinations necessary regarding the safety of the crop after application of raw manure."

We strongly disagree. Organizations such as Primus Laboratories of Santa Maria, CA [phone: 805-922-0055], now exist that can conduct microbiological testing and water, soil, and plant tissue analysis. HACCP standards in other industries have shown that by tightening critical control points and testing as part of a verification process, microbial loads in foods can be dramatically reduced. If USDA's Agriculture Marketing Service unit does not have enough data, it merely needs to ask other

government agencies such as the Food and Drug Administration, the Centers for Disease Control and Prevention and USDA's Food Safety and Inspection Services for further information.

### **General Data on *E. coli* O157:H7**

The pathogen *E. coli* O157:H7 is considered to be potentially deadly in very small doses of fewer than 10 organisms; some would even say a single organism. Approximately 5% of children consuming it will develop life-threatening symptoms known as Hemolytic Uremic Syndrome(3), of these 5-10% will die, and another percentage go on to develop kidney failure and other complications as a result of the injuries they sustain in the battle for their life. In a recent study, *E. coli* O157:H7 was found to be present in 63% of cattle feedlots sampled(4). Sheep and deer have also been known to harbor the organism, with epidemiologists generally now believing that any ruminant can be a reservoir.

### **Survival Data on *E. coli* O157:H7 in Feces and Soil**

Scientific studies have proven that the Organic Foods Production Act (OFPA) 60 day limitation on application of raw manure is insufficient based on the survival abilities of *E. coli* O157:H7 in both feces and soil. Without specific requirements in the National Organic Program Final Rule defining appropriate qualities of animal manure and extending the period prior to its application, safety will be compromised.

In "Fate of Enterohemorrhagic Escherichia coli O157:H7 in Bovine Feces," published in Applied and Environmental Microbiology, July 1996, authors Wang, Zhao and Doyle traced the survival rate of *E. coli* O157:H7 at 41, 71.6 and 98.6 degrees Fahrenheit. At the lowest temperature, the organism survived between 63 and 70 days in feces. The authors noted that the moisture content was highest in the lowest temperature feces, which implies that O157:H7 may be more easily cultured if kept moist. This may also suggest that, in fact, the organism may survive more readily in colder climates which have shorter growing periods. Arguments by farmers in colder climates that they have shorter growing cycles and should therefore be allowed to apply raw manure more freely are contradicted by data.

In "Survival Of The Verotoxigenic Strain *E. coli* O157:H7 in Laboratory-Scale Microcosms," published in the Proceedings of the International Conference sponsored by the Water Chemistry Forum of the Royal Society of Chemistry of the U.K., Dr. Maule compared survival rates of O157:H7 in cattle feces, cattle slurry, river water, and soil cores at 64.4 degrees Fahrenheit:

"It is evident that of all the model ecosystems tested, *E. coli* O157:H7 survived best in the soil cores... The current study has shown that *E. coli* O157:H7 seems to survive for long periods both in cattle faeces and in soil. Thus, it seems that once pasture land becomes contaminated with this organism, it may remain viable for several months... When enteropathogenic microorganisms are exposed to the environment they are often injured and when attempts are made to enumerate them on selective media, as in the present study, they may die or simply not grow (Singh and McPeters, 1990). This can lead to underestimation of bacterial numbers, thus the figures given for *E. coli* O157:H7 survival in laboratory ecosystems in this study may be much lower than the real situation."

Dr. Maule's latest data on O157:H7 survival in soil indicates that O157:H7 can survive **for at least 130 days in soil**, e.g. over 18 weeks or over 4.3 months.

To date, S.T.O.P. knows of no data showing that the survival of *E. coli* O157:H7 is adversely affected by generic composting processes. Indeed, heat treatment must be to 160 degrees Fahrenheit to kill *E. coli* O157:H7. Heat treatment to 180 degrees Fahrenheit is required to kill *Salmonella*. Irradiation also can kill both pathogens.

### ***Consumers Unable to Eliminate Pathogens from Raw Produce***

Unfortunately, if soil or water contaminated with *E. coli* O157:H7 comes into contact with fresh produce, it is virtually impossible to eliminate the organism without a killstep such as irradiation, ozonation, or heat treatment. By comparison, techniques such as chlorine rinses have been insufficient in containing outbreaks.(5) The only steps available to consumers are rinsing produce with bleach or cooking it, options that are unreasonable for many fruits and vegetables normally served raw, such as sprouts, wheat grass, mixed greens, and berries. Indeed, studies have shown that while pathogenic organisms can be reduced by washing, they are not eliminated.(6) Because consumers can be sickened by ingesting even a minute amount of microbes, it is imperative to resolve contamination issues at a farm level before produce reaches the consumer.

### ***USDA's Responsibility***

Government has a responsibility to safeguard the public from misleading information that could cause consumers to make erroneous decisions that could lead to life-threatening ramifications. Specifically because USDA is approaching Organic Standards from a marketing perspective, e.g. "What is qualified to be called 'organic'?" it has an obligation to ensure that consumers' safety perception of organic products hold true. Therefore, not only should organic produce have reduced pesticide residue, it must also have reduced pathogenic residue. The application of raw manure and composted manure to food crops today represent a significant threat to human health. Fecal matter control in organic practices particularly should be addressed because organic practices choose to reject technology-based steps such as irradiation, which is designed to eliminate life-threatening organisms.

### **Revisions Required in the Proposed Rule**

The following areas are inadequately covered by the current Proposed Rule. These sections follow the components of the Proposed Rule in the order in which they are described. S.T.O.P. is specifically addressing:

- Definition of Soil Quality and Degradation [§ 205.2]
- Definition of Contaminant [§ 205.2]
- Land Requirements [§ 205.5]
- Proper Manuring [§ 205.7(b)]
- Soil Quality: Requirements and Testing [Overview]
- Irrigation Water [Overview]
- Manure Management [§ 205.51]

- Preharvest Tissue Testing [§ 205.431(a)]

### **Definition of Soil Quality/Degradation**

The present definition of "degradation" in the Proposed Rule says:

"Measurable evidence of damage or adverse effects over the course of two or more crop years, as determined by monitoring one or more indicators of soil or water quality."

while the definition of "soil quality" is

"Observable indicators of the physical, chemical or **biological** condition of soil."

However, in the Overview, soil quality is defined more explicitly as:

"Our proposed definition of this term encompasses physical, chemical and **biological** soil quality indicators that could readily be measured or observed at a given location. Examples of soil quality indicators commonly measured in organic farming systems include erosion, aggregation, compaction, drainage, organic content, nutrient content, pH, cation balances, presence of contaminants, leaf tissue analysis, presence of indicator weed species, **presence of pathogens**, earthworm populations and legume nodulation."

(**bold** emphasis above is our own) S.T.O.P. strongly supports using the definition of "soil quality" from the Overview in the Final Rule. As described in the Overview, soil *safety* vis a vis human pathogens is a critical component of soil *quality*. Safe soil coupled with safe water can produce safe foods; unsafe soil threatens food safety. The presence of human pathogens must be considered a significant detriment to soil quality. If, due to farming practices, uncontaminated soil comes to harbor human pathogens over time, soil degradation will have occurred.

In many places in the Proposed Rule, USDA requires that a practice "not result in measurable degradation of soil quality" and/or "does not significantly contribute to contamination of water by nitrates and bacteria, including human pathogens." We would urge that by more precisely defining the role of human pathogens in soil quality to be similar to their role in the description of water quality, USDA would improve the understanding of the rule. A phrase such as "does not result in measurable degradation of soil quality or contamination of soil by human pathogens" would clarify the role of pathogens in soil quality.

With regards to human pathogens, the phrase "significantly contribute" in "does not significantly contribute to contamination of water..." is inappropriate. Any measurable contamination of water with human pathogens is significant and should require action. "Significantly contribute to contamination" would be better clarified with the phrase used for soil "does not result in measurable contamination of water by nitrates and bacteria, including human pathogens."

In our subsequent comments, when referring to soil quality, we will be specifically addressing the soil safety component of soil quality.

### **Definition of Contaminant**

In the Proposed Rule, USDA's present definition of a contaminant is:

"A residue of a prohibited substance that persists in the environment."

S.T.O.P. believes that the definition of "prohibited substances," e.g. contaminants, should include the human pathogens *Salmonella* and *E. coli* O157:H7 because of their immediate health-implications. We therefore urge that these be included in "prohibited substances."

### **Land Requirements [§ 205.5]**

S.T.O.P. strongly supports Land Requirements that maintain separation between organically managed crop land and the possibility of biological contamination from nearby animal-related farms, whether conventional or organic. Organic crop lands located next door to cattle ranches or dairy farms are ideally situated to be contaminated with animal pathogens via dust, runoff water, well water or transference from other creatures such as pests or birds.

Dr. Dale Hancock, Epidemiologist of the Disease Investigation Unit of Washington State University Veterinary Hospital is currently conducting research on the potential for contamination of apple orchards situated near dairy farms via windborne dust. A pilot study yielded sufficient data to indicate that contamination could result and that further research was warranted.

No environmental residue exceptions should be allowed merely because all the produce in the area is covered with dust from neighboring cattle pens. Farms growing organic crops in proximity to animal farms and wildlife refuges should be required to perform preharvest tissue testing and soil testing for animal pathogens, specifically *E. coli* O157:H7 and *Salmonella*.

### **Proper Manuring[§ 205.7(b)]**

In the Proposed Rule, USDA does not address the original animal source with respect to manure. It must do so. Ostensibly given the way the Proposed Rule is written, animal manure for fertilizing organic crops could come from conventional farm animals. Data from FSIS indicates that the conventional practice of fasting cattle prior to slaughter encourages the growth of the organism.(7) Conventional food animals can also be fed rendered animal parts, a process that is believed to contribute to the spread of disease. Conventional food animals are more likely to be treated with growth hormones and antibiotics. In general, because many organic practices in food animal treatment reduce the likelihood of the emergence, growth, spread and mutation of pathogenic organisms, S.T.O.P. would argue that USDA should qualify that any manure used on organic crops be from organic livestock or organic poultry to reduce the likelihood of contaminating the soil with either pathogens or prohibited substances that might have been fed to conventional animals.

The application of raw animal manure in organic crop production is based on the belief that recycling animal waste back to soil *always positively impacts the*

*environment*. Unfortunately, *E. coli* O157:H7 bacteria are not a naturally occurring product of the environment. Instead, it is generally believed that overuse of antibiotics has caused the emergence of virulent pathogenic organisms such as *E. coli* O157:H7.(8) Thus, contributing to the spread of these organisms in fact furthers ecological imbalance and the possible rise of new pathogenic strains.

In its hierarchy of Proper Manuring, USDA neither addresses the biological content of composted and uncomposted animal manure nor its impact on the environment. Rather, USDA's recommendations are based solely on the fertilizer's contribution to soil fertility. S.T.O.P. argues that when pathogens are added to a soil and continue to survive for many months after application, soil quality is reduced and soil degradation ensues. Because there is a likelihood of the pathogen coming into contact with the food, food safety is also compromised. USDA must address these issues in its Final Rule.

Based on the above data, S.T.O.P. advises that USDA should add the following qualifications to the "proper manuring" list.

1. Any composted materials (9) containing animal feces must be tested for biological content prior to application. Fecal coliform quantification and testing for the presence of *E. coli* O157:H7 and *Salmonella* should be conducted. If contamination is found, the compost must be treated as below for contaminated compost. Compost testing should be audited by an outside firm.
2. Uncomposted animal feces and contaminated compost must either be heat treated (to a temperature of 180 degrees evenly throughout (the temperature to kill *Salmonella*)) or aged. Present survival data of these organisms show no signs of a quick demise in soil. S.T.O.P. notes that previous OFPA restrictions were 60 days prior to harvest, and because current studies show the organism can survive up to 130 days, previous restrictions are off by a factor of more than 2. In addition, we note that the environment of a food plant is generally considered to be more hospitable than soil such that once an organism is transferred to the plant it might survive considerably longer. Therefore, S.T.O.P. argues that somewhere closer to 3 times the current survival rate would be more appropriate. S.T.O.P. therefore expects USDA to require a minimum of 12 months of aging on raw animal manure and contaminated compost until acceptable scientific studies have been performed establishing that either can be rendered safe from human pathogens in less time.
3. Any animal manure treatment, composted or otherwise, must occur prior to planting of the crop, not prior to harvest as was originally defined.
4. Under no circumstances should raw animal manure be applied directly to crops. Even orchard and vine grown produce is susceptible to contamination from the flies attracted to animal fecal matter by putrefaction. While not reservoirs for the organisms, insects (10) and birds (11) have been found to be carriers.
5. S.T.O.P. is appalled at the use of compost "teas" that contain animal or human faces and which can be sprayed onto produce and come into contact with human foods. Compost teas must be subjected to the same pathogen testing and elimination requirements as other forms of proper manuring.

S.T.O.P. recognizes that farmers look to the biological content of manure for additional soil fertility and activity promoted by "good" organisms. S.T.O.P. believes



that if organic farmers continue to desire activity from organisms that die at temperatures below 180 degrees Fahrenheit, they could add these back in through cultures. In many ways, this would be similar to other organic practices which add naturally competing species selectively to improve the quality and yield of crops.

In conclusion on the subject of Proper Manuring, on page 65872 of the Federal Register, the Overview says, "Any practice, however, that could contribute significantly to water contamination by nitrates and bacteria, including human pathogens, or otherwise result in measurable degradation of soil or water quality, would accordingly not be considered proper manuring." We expect USDA to address the proper prevention of biological contamination in its Final Rule.

### ***Soil Quality: Requirements and Testing [Overview]***

S.T.O.P. deplors that neither is USDA proposing specific soil quality standards nor is it proposing that in most instances soil quality should be monitored for compliance.(12) USDA must establish independent, nation-wide, soil quality contamination standards. EPA doesn't allow drinking water to be more polluted because it is on one side of the country instead of the other; why would the U.S. government allow this to be different in our food supply? USDA must set biological contaminant requirements and mandate testing of soil immediately prior to harvest. Compliance must be required by the certifying agent.

The Final Rule must contain quantifiable requirements that reflect that the application of animal fecal matter is not furthering our destruction of the environment through the spread of pathogens. We reiterate that it takes very few O157:H7 bacteria to kill. A crop farm located near an animal farm or wildlife refuge is more susceptible to contamination from animal-borne pathogens. Therefore, if an organic crop farm is adjacent to an animal farm or wildlife refuge or downhill from either, soil testing should be mandated. A positive identification of *E. coli* O157:H7 or *Salmonella* in soil should result in crop tissue testing. Crops harboring *E. coli* O157:H7 must not be sold for human consumption.

### ***Irrigation Water [Overview]***

S.T.O.P. also finds it unacceptable that USDA is neither proposing specific water quality standards nor requiring that water quality should be monitored for compliance. despite advice from its advisory board, the National Organic Standards Board, which "recommended that irrigation and water management be addressed within an organic farm plan." S.T.O.P. concurs with NOSB. It is absolutely critical that the Final Rule address irrigation and water management in organic farm plans. Requirements should be defined and compliance enforced. The use of nonpotable or contaminated irrigation or rinsing water has very real potential for contaminating organic foods with deadly pathogens. If USDA allows the use of nonpotable water, it should be prohibited under spray conditions.

### ***Manure Management [ § 205.15]***

USDA indicates in its Overview that

"... we propose that in any area where livestock are housed, pastured or penned, manure would have to be managed in a way that does not cause measurable degradation of soil quality; does not significantly contribute to contamination of water by nitrates and bacteria, including human pathogens; optimizes nutrient recycling; and does not include burning..."

S.T.O.P expects that the same restrictions related to the application of manure be applied to the selling or disposal of manure from organic livestock or poultry. As indicated above, manure should be properly heat treated or aged prior to its disbursement or sale to ensure that soil and water safety standards are maintained with respect to human pathogens.

### ***Preharvest Tissue Testing [§ 205.431(a)]***

According to USDA, under 205.431 (a),

"General. The Secretary, the applicable governing State official, or the certifying agent may require a preharvest tissue test of any crop to be sold or labeled as organically produced that is grown on soil suspected by [that person] of harboring a contaminant."

The broader definition of contaminant would result in enabling officials to test for the presence of pathogens on plant crops. S.T.O.P. supports the ability of both certifying agents and the government to test for pathogens.

### **In Conclusion**

Organic foods are considered by consumers to have some of the highest safety standards available in the U.S. today. They are therefore considered "healthier." Consumers in less than perfect health or actively seeking improved health seek out these product and pay a premium for them. Parents feed them to their children sincerely believing they are providing the safest food available today. Tragically, these at-risk consumers are the people most susceptible to foodborne pathogens.

When the Organic Foods Production Act of 1990 was originally envisioned, our understanding of pathogens in the food supply was minimal. Today, we understand a great deal more. Animal feces are the source of many of today's life-threatening foodborne illnesses. Typically, animal fecal organisms come into contact with crops in one of three ways, through direct application, through indirect application via the soil, or through water. Because organic standards support the recycling of animal feces as a method of improving soil fertility in croplands, USDA must face the facts. To support traditional organic practices with respect to animal manure without modifying them to address pathogens is to ignore the evidence that employing these practices in the twenty-first century further contributes to environmental instability and represents an unnecessary hazard to food safety. Food safety is at the heart of the growth in organic foods. We trust that USDA will continue to keep it that way.

Laurie Girand  
Board Member on behalf of  
S.T.O.P. -- Safe Tables Our Priority

Nancy Donley

President on behalf of

S.T.O.P. -- Safe Tables Our Priority

attachments: Survival rates of *E. coli* O157:H7 in soil from Dr. Andy Maule.

#### ENDNOTES

(1) Fancy Cutt packaging indicated they had been certified by QAI. Repeated calls to QAI have not been returned as of 4/28/98.

(2) Complaint of Injunction, Civil Penalties, and other Equitable Relief, Superior Court of the State of California, County of San Benito; S. Kimberly Belshé, Director of the Department of Health Services, Plaintiff, vs. Fancy Cutt Farms, Inc., a California corporation.

(3) Dr. Patricia Griffin, Centers for Disease Control & Prevention can verify.

(4) Animal Production Food Safety, An Overview for FSIS Employees, Summer 1997, page 82.

(5) FDA Juice Safety Meetings, held December 16 and 17, 1996. Transcripts available at [www.fda.org](http://www.fda.org).

(6) Stenson, Jacqueline, "Scientists Urge Consumers to Wash Lettuce Carefully," Medical Tribune News Service, 10/2/97

(7) Animal Production Food Safety; An Overview for FSIS Employees, Summer 1997, page 82.

(8) "Because of both agricultural and medical misuse of antibiotics, *E. coli* strains of all kinds were rapidly acquiring broad ranges of resistance during the 1970's and 1980's," *The Coming Plague: Newly Emerging Disease in a World Out Of Balance*", Garrett, Laurie, published Penguin Books, 1995 page 427.

(9) Compost, as defined by USDA is: A process that creates conditions that facilitate the controlled decomposition of organic matter into a more stable and easily handled soil amendment or fertilizer, usually by piling, aerating and moistening; or the product of such a process.

(10) "Sources of Escherichia coli O157 in feedlots and dairy farms in the Pacific Northwest," Hancock, Besser, Rice, Ebel, Herriott and Carpenter, 1997?

(11) University of Lancaster and the Central Public Health Laboratory of London, 1997 study found 3% of gull droppings were infected with *E. coli* O157:H7.

(12) "In most instances, we are not proposing to require that any specific indicators of soil or water quality be monitored for compliance with this provision. Rather, we expect that appropriate and reliable indicators of soil or water quality would be chosen according to site-specific considerations, such as the nature of the crops or livestock being produced, the location and scale of the operation, and the kinds of practices being used." Federal Register, National Organic Standard, Proposed Rule, Overview, page 65870.