



A Is For Apples, Alar, and Antibiotics

...and A Call to end antibiotic use in apple and pear production, especially organic

*Eds. Note. To most organic consumers, finding out that antibiotics are used in organic and conventional apple and pear production will come as a surprise. The fact has not been hidden –many members of the National Organic Standards Board in their public decision making process have been attempting to remove these antibiotic uses (the only currently allowed in organic production) for nearly a decade. Despite its very public decision making process, it's fair to say that most consumers are not aware of the Board's work to oversee the National List of Allowed and Prohibited Substances and advise the Secretary of Agriculture on all issues related to the Organic Foods Production Act. With the growth of the organic market to \$30 billion and increasing public scrutiny of organic practices however, most consumers may assume antibiotic use in apple and pear production was disallowed when their use was prohibited from organic animal and dairy production in 2000, as federal organic standards were taking shape. The agricultural use of antibiotics –in this case for a bacterial disease known as fire blight (*Erwinia amylovora*)– represents a serious public health concern. Its use contributes to bacterial resistance in human pathogens that are increasingly difficult to control with the same antibiotics when they are life-threatening in a medical setting. Beyond Pesticides wrote about this subject in the Summer 2011 issue of Pesticides and You, after the NOSB took up the topic earlier that year and established a 2014 phase-out of antibiotics that is up for reconsideration.*

By Terry Shistar

The National Organic Standards Board (NOSB) in April 2013 is again considering whether to eliminate antibiotics used in organic apple and pear production.¹ The Washington State Horticultural Association, California Pear Advisory Board, and U.S. Apple Association, representing organic apple and pear growers in California and the Pacific Northwest, petitioned the NOSB last year to allow oxytetracycline's continued use. The Board also received a petition in 2013 from the same group of petitioners, joined by the Michigan State Horticultural Society, to continue the use of streptomycin, which it will take up at its November 2013 meeting. The debate is reminiscent of what happened 23 years ago when the "Alar scare" threatened conventional apple growers. It is ironic that the now-thriving organic apple industry, which grew from the collapse of the apple industry during the Alar "scare" is now ignoring a similar threat to not only organic apples, but perhaps public trust in the organic label. Peter Montague, PhD, then-director of the Environmental Research Foundation, referred

to the events surrounding Alar in apples as the "Alar rebellion."² Will we now see an "Antibiotics rebellion"?

A is for Apples (and Alar)

The growth regulator daminozide, or Alar, was first registered in 1968.³ Its function was to prevent apples from falling off the tree when they ripened, which benefited apple growers, providing a longer harvest period and fruit that had fewer blemishes. Daminozide was contaminated with a reactant, unsymmetrical 1,1-dimethylhydrazine (UDMH), which was also produced when Alar was digested or when it broke down with heat –such as when apples were made into apple sauce or juice.

In 1973, concerns started surfacing about the health effects of Alar, particularly the UDMH metabolite/contaminant. A study published in the *Journal of the National Cancer Institute* found that UDMH causes cancer in mice. In 1977, another mouse study confirmed the first, and research was published showing that it causes cancer in hamsters. The following year, there was a study



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conducted by the National Cancer Institute (NCI) providing evidence that UDMH causes cancer in rats. Although these studies should have been enough to ban Alar, it was not until 1985 that EPA announced its intention to initiate cancellation of Alar —after UDMH had been judged a “probable human carcinogen” by the International Agency for Research on Cancer (IARC), the Carcinogen Assessment Group within the U.S. EPA, and the U.S. National Toxicology Program (NTP).

EPA backed down in 1986, saying it needed more studies. Nevertheless, some grocery chains and processors of juice and baby foods announced they would not accept Alar-treated apples, and the Washington State Apple Commission encouraged growers not to use the growth regulator. In spite of the announcements, 30% of the apples sampled at one of those grocery stores in 1988 did contain Alar.

In 1989, the Natural Resources Defense Council (NRDC) issued a report that looked at the hazards of 23 pesticides found in fruits and vegetables commonly consumed by children under the age of six, concluding that the pesticide regulatory system was inadequate to protect children. The CBS documentary show *60 Minutes* featured one of those chemicals —Alar, which was still being used in spite of the actions of processors and grocery stores— in a segment called “A is for Apples.” Notwithstanding industry claims that Alar was used on only 5% of apples, independent samples found residues of Alar and UDMH in 22-79% of apples across the country. The public reacted swiftly, cutting apple purchases by 50%.

Despite their warnings to apple growers three years before and the letter they had received from acting EPA Administrator John A. Moore, PhD, stating, "There is an inescapable and direct correlation between exposure to UDMH and the development of

life-threatening tumors in mice," the Washington State Apple Commission and other apple industry groups attacked the NRDC report and the *60 Minutes* segment. Prior to the public backlash and adverse economic impact on the apple growers, their representatives principally sought to block regulatory action year after year on a chemical that EPA had targeted for cancellation. (See if this sounds similar to the current situation with antibiotics, discussed below.) Following the *60 Minutes* broadcast, they were forced to hire a PR firm to run ads using the claim of the chemical’s manufacturer, Uniroyal, that you would have to eat a box-car-load of apples each day to be harmed by Alar. On November 28, 1990, apple growers in the Washington state filed a libel lawsuit against CBS, NRDC, and the PR firm. The case was dismissed in 1992, the court’s opinion stating, “[T]he growers have failed to raise a genuine issue of material fact as to the falsity of the broadcast.”⁴ We will see the failure to address issues of material fact again.

The apple industry claimed that only a small percentage of apples was treated with Alar, but the public reaction affected all apple growers. That season Washington growers reported the industry had suffered a \$100 million loss by May. The drop in the price of apples put many growers out of business.⁵

The Explosive Growth of Organic Apple Production

Dominick Bonny, writing for the *Wenatchee Business Journal*, said:⁶

It was a seminal moment for Washington state apple growers and Roger Pepperl, marketing director for Stemilt Growers said the reason for Stemilt's investment in organics goes back to '89, Alar, and Meryl Streep.

"She was talking that everyone that ate apples was going to



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get cancer from eating Alar residue and she ended up being wrong, it was an approved substance and later on they found out she was dead wrong. It wasn't carcinogenic and it almost killed our apple industry," he said. "So in 1989, Tom Mathison, who was our founder, said he was going to work on never being held captive by people and chemicals again."

(Notice the continued denial of the facts about Alar.) Since then Stemilt's organic program has grown so large it accounts for 26 percent of Washington's organic apples and 32 percent of the Pacific Northwest's organic pears.

David Granatstein, statewide coordinator for the Center for Sustaining Agriculture and Natural Resources at Washington State University, has studied trends in organic apple production, especially in Washington state. Mr. Granatstein said,

[T]he effect of the Alar incident is obvious in the Washington data. Growers were motivated to try organic production in 1990 due to low demand and prices for conventional apples. At the time, the organic program rules required only a 1-year transition, but the rule was slated to change to a 3-year transition over the next 2 years. Thus, many growers withheld

conventional treatments after harvest in 1989 and, by following the organic production regime, had a certified crop by autumn 1990. Significant attrition of these new organic growers occurred in 1991 and 1992, mainly due to problems controlling codling moth in apples and to reduced prices for organic apples, caused by the rapid increase in supply.⁷

According to Mr. Granatstein's data, acreage in organic apples in Washington state increased from 807 acres in 1993 to 14,790 acres in 2010.⁸ As he has also shown, the growth of the acreage in organic apples comes largely from the transition of nonorganic apple growers to organic. While we can only applaud the large-scale transition to organic practices, the fact that such a high proportion of organic apple growers originated as conventional growers—and may still have dual operations—has implications for current practices and dependencies.

Apple growers making the transition to organic practices do not just start off with new orchards. They have trees planted according to the conventions of chemical-intensive orchard management. This means that varieties are the current favorites in the conventional market, grown with antibiotics because they are very susceptible to fire blight. Other practices, such as the spacing of trees, that have an impact on the movement of the fire blight bacteria, are also carryovers from chemical-intensive management systems.

Similar to those representing chemical-intensive apple growers during the Alar controversy who issued statements denying the cancer causing chemical's threat and accused public health advocates of using "scare tactics," those petitioning for continued antibiotic use in organic apple and pear production seem to be dismissing the seriousness of a public health problem.

A is for Apples (and Antibiotics)

Apples and pears are susceptible to the bacterial disease fire blight, caused by *Erwinia amylovora*. Although fire blight is a problem for apple and pear growers throughout the U.S., growers in the arid areas of eastern Washington do not have to contend with so many other diseases, so fire blight stands out as a problem there. In addition, fire blight can destroy whole trees, especially younger trees, in a short time frame, so it is considered a more serious disease than those that affect a season's productivity.

Tetracycline and streptomycin are both registered for use in fruit trees, and both are currently allowed for use in organic apple and pear production to control fire blight. In recent years, there has been a trend toward greater dependence on the antibiotics and a greater concentration of susceptible varieties grown in high densities on susceptible rootstocks.⁹

The Connection to Antibiotic Resistance

At the same time, antibiotic resistance is a real and urgent public health threat. Both tetracycline and streptomycin are considered



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by the World Health Organization to be of “critical importance” to human medicine.¹⁰ They are used in a way –broadcast spray on trees– that exposes bacteria in the orchard, particularly in the soil, to the antibiotic.¹¹ Current science shows that environmental exposure to antibiotic use in the environment is the major cause of development and spread of antibiotic resistance in human pathogens.¹² The spread of antibiotic resistance does not require contact between the antibiotic and human pathogens because the major means of spreading antibiotic resistance is through the transfer of genes between different bacteria.¹³ Nevertheless, there is a tolerance set by the U.S. Environmental Protection Agency (EPA) for the antibiotics on the fruit, which allows its food production use and residues in the orchard and the fruit. Antibiotic uses resulting in low residues (sub-therapeutic or sub-inhibitory levels from a medical perspective) can create a high health risk.¹⁴ Tetracycline and streptomycin resistance is evident and expected to grow if urgent use precaution is not exercised.¹⁵

An article in the Summer 2011 issue of *Pesticides and You*¹⁶ includes a short history of the debate before the National Organic Standards Board (NOSB) over antibiotic use in apples and pears. In short, the use of tetracycline and streptomycin was approved reluctantly in 1995 by the NOSB, and each time they have come up for review, the Board has warned growers that it intends to end their use. Just as apple growers ignored early warnings about the findings showing that Alar/UMDH causes cancer, the representatives of organic apple and pear growers now respond to the concerns of the medical and scientific community regarding antibiotic resistance with the insistence that it is necessary or essential to production. To the extent that the petitioners for continued use have addressed antibiotic resistance in their petition,¹⁷ they have ignored current science regarding gene transfer and the impact of sub-therapeutic doses. In ignoring the threat of antibiotic resistance, they dismiss a critical public health threat.

Alternatives to Antibiotics

How great is the need for crop use of antibiotics? As pointed out in the Summer 2011 article, many, if not most, growers have ignored basic organic principles –like the choice of cultivars and density of planting. On the flip side, however, over a third of the production of Washington state organic

apples and a quarter of the organic pear production are raised according to rules that prohibit antibiotic use, a prohibition required for fruit exported to the European Union.¹⁸ New materials and methods are being developed, and the growers continue to point to something that is just around the corner. However, the tools and varieties are currently available.

Organic Integrity?

When faced with the looming loss of Alar, apple growers ignored the public health threat. As a result, when the word got out, they suffered huge losses. Now the stakes are higher –consumers understand (or think they understand) that organic products are free of antibiotics.¹⁹ Organic dairy producers in particular have sought to distinguish themselves from others through the “Organic means antibiotic-free” claim. During the Alar rebellion, apple growers using Alar brought down apple growers who didn’t use Alar. Will organic dairy and the organic label’s value be hurt this time?

What You Can Do

At its April meeting, the NOSB will be deciding whether to uphold the 2014 expiration date of tetracycline’s use in organic production. For information about how to send your comments, see the Keeping Organic Strong section of the Beyond Pesticides website: <http://bit.ly/XDoVJS>. In addition, see the shopping hints in the Summer 2011 issue of *PAY*. In addition to submitting comments to the NOSB, let the National Organic Program at USDA and the U.S. Secretary of Agriculture know how you feel about the use of antibiotics in organic apple and pear production.



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Endnotes

1. See also "Antibiotics in Fruit Production: A challenge to organic integrity" in Pesticides and You, Summer 2011, pages 12-16. <http://www.beyondpesticides.org/infoservices/pesticidesandyou/Summer2011/antibiotics-fruit.pdf>
2. Rachel's Environmental Health Weekly #535, February 26, 1997.
3. The source of history in this article is a series in Rachel's Environmental Health Weekly by Peter Montague, issues 530-535, January 22-February 26, 1997. <http://www.rachel.org/>
4. The opinion was affirmed by United States Court of Appeals for the Ninth Circuit, opinion in *Auvil v. CBS "60 Minutes"* October 2, 1995. <http://www.cspinet.org/foodspeak/laws/60min1.htm>
5. Dominick Bonny, 2010. From Alar to Organics: how the Washington apple industry took adversity and turned it into opportunity. *Wenatchee Business Journal* Nov. 1, 2010.
6. Dominick Bonny, 2010. From Alar to Organics: how the Washington apple industry took adversity and turned it into opportunity. *Wenatchee Business Journal* Nov. 1, 2010.
7. David Granatstein, 2000. Trends in Organic Fruit Tree Production, 1988-1998. P. 7.
8. Granatstein, 2000. P. 12. Elizabeth Kirby and David Granatstein, 2010. Recent Trends in Organic Fruit Tree Production: Washington State 2010. Powerpoint slide #9.
9. Paul W. Steiner, PhD, 2000. A Philosophy For Effective Fire Blight Management, Presented at the State Horticultural Association of Pennsylvania Annual Meeting, January 2000. <http://www.caf.wvu.edu/kearneysville/articles/PHILOSOPHY2000.html>
10. WHO, 2009. Critically Important Antimicrobials for Human Medicine, http://www.who.int/foodsafety/foodborne_disease/CIA_2nd_rev_2009.pdf See Table 1.
11. Tetracycline TR, April 1, 2011. Lines 291-326. Mycoshield label <http://www.cdms.net/ldat/ld246008.pdf>
12. American Academy of Microbiology, 2009. Antibiotic Resistance: An Ecological Perspective on an Old Problem. <http://academy.asm.org/images/stories/documents/antibioticresistance.pdf> (pp.1-5, 10.)
13. American Academy of Microbiology, 2009. (p.8.)
14. <http://www.fda.gov/downloads/AnimalVeterinary/GuidanceComplianceEnforcement/GuidanceforIndustry/UCM052519.pdf> See Table 6, p.22.
15. 2011 Tetracycline Technical Review <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5090416>, lines 549-551: "There is a high probability that oxytetracycline resistant bacteria are present in the environment as a consequence of pesticidal use of oxytetracycline which may have negative health consequences for humans (EPA, 2006)." American Academy of Microbiology, 2009. p.2: "Controlling antibiotic resistant bacteria and subsequent infections more efficiently necessitates the prudent and responsible use of antibiotics. It is mandatory to prevent the needless use of antibiotics..."
16. "Antibiotics in Fruit Production: A challenge to organic integrity" in PAY, Summer 2011, pages 12-16.
17. <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5098930>
18. Washington State Department of Agriculture printout, "International Organic Program—EU Compliant Operations, March 10, 2011. http://agr.wa.gov/FP/Pubs/docs/wsa_eu_compliant.pdf
19. <http://www.organicitsworthit.org/quick/antibiotics-101> "Go organic! By law, organic products must be made without the use of antibiotics Organic farming systems rely on ecologically based practices such as cultural and biological pest management, exclusion of all synthetic chemicals, antibiotics, and hormones in crop and livestock production." (Accessed 1/20/2013.)" <http://www.organicvalley.coop/why-organic/antibiotics/> "Organic Means No Antibiotics" <http://www.earthsbest.com/products/product/2392320005> (Earth's Best First Pears): "USDA organic: no growth hormones, antibiotics, steroids or potentially harmful pesticides or herbicides." Even USDA expects it: http://www.usda.gov/wps/portal/usda/usdahome?navid=ORGANIC_CERTIFICATION "U.S. producers are turning to certified organic farming systems as a potential way to lower input costs, decrease reliance on nonrenewable resources, capture high-value markets and premium prices, and boost farm income. Organic farming systems rely on ecologically based practices such as cultural and biological pest management, exclusion of all synthetic chemicals, antibiotics, and hormones in crop and livestock production.



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