
World Food Supply

Consumers Union publishes bad science on good apples

by Dr. Thomas H. Jukes

Dr. Jukes has wielded the weapon of scientific truth against the environmentalists in their wars to stop the use of pesticides, going back to the great cranberry scare of 1959, and during the long battle in the 1960s and 1970s to defend the use of DDT.

He is professor-in-residence at the Department of Biophysics and Medical Physics, professor-in-residence at the Department of Nutritional Sciences, and a research biochemist at the Space Sciences Laboratory at the University of California at Berkeley.

Jukes's fields of research have included the vitamin B complex, folic acid antagonists in cancer chemotherapy, antibiotics in nutrition, nutritional deficiencies, protein chemistry, and molecular evolution. He is the author of more than 400 articles in scientific journals. In addition, Dr. Jukes has written three books, and edited three others.

This article was written on April 14, in response to a preprint of a report, to appear in the May 1989 issue of Consumer Reports, the publication of the Consumers Union. The report, headlined "Alar: Not Gone, Not Forgotten," was written by Dr. Ned Groth and concerned the risk of the growth regulator Alar, and its breakdown product UDMH (unsymmetrical dimethyl hydrazine).

Consumer Reports "Bad Apples," dealing with Alar (daminozide) is badly flawed. The data are defective and the conclusions are political rather than scientific. The report states:

Although some apples may contain daminozide, the latest animal tests found that the chemical may not be carcinogenic. [p. 4]

and again,

Recall that daminozide is unlikely to be much of a hazard until heat-processing transforms some of it to UDMH. [p. 4]

Some of it? How much of it? We are left in the dark. In spite of the above statements, the report repeatedly states that Alar is a hazard. For example,

We have estimated that even a residue [of Alar] as low as 0.1 ppm in apple juice may pose a risk well above the EPA's criterion for public health significance. [p. 4]

Also (p. 1)

Our tests measured daminozide only: We didn't attempt the additional complicated testing required to find UDMH. If daminozide is in an apple juice, *chances are good* that UDMH is there, too [emphasis added].

Five brands are "not acceptable" because they contain 0.95 to 1.99 ppm of daminozide; an example of guilt by association.

Consumers Union's calculations are as follows:

The lower estimate [of cancer risk] considers just the UDMH in apple juice, calculated as a *small fraction* of the average daminozide level Consumers Union found in 1989 juices. The larger risk considers the higher daminozide and UDMH levels in apple juice and *added in a factor* for UDMH ingested in other foods, such as apple juice [emphasis added].

The "fraction" and "factors" are not quantified.

Summary of the above:

- 1) Daminozide is not a hazard.
- 2) Apple juice containing 1 part per million (ppm) is not acceptable, and even 0.1 ppm is too much.
- 3) Daminozide breaks down partially in heating UDMH.

What about UDMH?

We are told a) "it's a big risk"; b) it "probably" is a carcinogen; c) according to EPA, "UDMH at the levels found in the diet in 1986 may cause 45 cancers per million people, exposed over their lifetimes." According to Consumers Union, "the risk this chemical [UDMH] poses now looks to be about one-fourth as high as the EPA's projection," but "one-fourth of a significant cancer risk is still a significant cancer risk." (This is a misuse of statistics.)

Obviously we need to know the levels of intake of UDMH, and the cancer dose-response curve. We then need to compare the results with those of cancer risks from other substances in food. Only then can we place UDMH in perspective.

UDMH is $H_2N \cdot N(CH_3)_2$, a hydrazine. The general formula for hydrazines is $H_2N \cdot NH_2$. Hydrazines are present in fairly large quantities (up to 400 ppm) in mushrooms, and this led to tests for carcinogenicity, which gave positive results for various hydrazines. Levels of intake of UDMH from the Environmental Protection Agency, the Food and Drug Administration, and the U.S. Department of Agriculture ("comprehensive residue data") cited by the Natural Resources Defense Council, were 0.082 microgram per kilo of body weight by children age 1 to 5 years (1.6 microgram for a child weighing 45 lbs.). The per kilo figure for Alar was 2.95 micrograms per kilo. Perhaps this indicates that, on the average, 3% of the daminozide content of foods had broken down to UDMH.

How big a risk is 1.6 microgram of UDMH per day for a 20-kilo child? Consumers Union places this on a political basis. We are told:

The risk from UDMH has many features that make it less acceptable to consumers than other, far larger risks that we live with daily. . . . It's not like aflatoxin in peanuts since UDMH is in foods by human hands, not nature's. . . . Not because it's a big risk, we find Alar in foods intolerable.

This is the most significant statement in the article. It reveals Consumers Union's philosophy that "only man is vile." Nature is either a) benevolent or b) we have to submit to her. Natural carcinogens are apparently "good" carcinogens.

Rational consumers, however, will be interested in a quantitation of risks. Consumers Union admits "quantitative risk assessment is an inexact science, one loaded with unnecessary assumptions and hedged with uncertainties." Consumers Union has assumed these assumptions and uncertainties in warning consumers against Alar, and in condemning five brands of apple juice.

By using similar assumptions and uncertainties, the following estimates of risks can be made:

Item	Risk
15 grams fresh mushrooms	100
1 peanut butter sandwich	30
1 liter chlorinated tapwater	1
Average UDMH consumed daily	1

Ecology chic

Consumers Union asks, "If no one is very likely to get cancer from Alar, why are so many people so upset about it?" They answer this question by saying that there are two

reasons: a) EPA's failure to reduce risks from UDMH to socially acceptable levels, and b) "UDMH is in foods by human hands, not nature's." Surely Consumers Union is being insincere! The reason so many people are upset is because of the NRDC apple scare: the "60 Minutes" TV program, the publicity by and about Meryl Streep, and the uproar by the media! Consumers Union is piggybacking on NRDC without admitting it. Consumers Union wants to make an example out of Alar, rather than evaluating its effects.

Consumers Union states that 0.1 ppm of Alar in apple juice "may pose a risk well above the EPA's criteria for public health significance." If 3% of Alar has broken down to UDMH, this would correspond to 0.003 ppm of UDMH, which is 3 micrograms per liter. It is unlikely that 3 micrograms of UDMH daily for a human being is a finite carcinogenic risk. The data from mouse studies at levels of 40 ppm and 80 ppm, are incomplete. Levels of up to 20 ppm of drinking water (20,000 micrograms per liter) showed no effect at 12 months.

The number of molecules of UDMH in 3 micrograms is about 10^{16} , which would supply about 100 molecules per body cell. For stochastic reasons, it is unlikely that this amount is likely to have an effect. For example, each cell in the human body contains about a million molecules of cadmium, a carcinogen. Extrapolation of carcinogenicity to such low levels is scientific nonsense.

Why Alar is good for you

No consideration is given to the value of Alar in increasing the supply of apples. California's state health director, Dr. Kenneth Kizer, noted that giving up fruits and vegetables "will surely result in many more cases of cancer, as well as heart disease and other chronic conditions, than would ever result from trace pesticide residues." An additional benefit from Alar is conferred by its use in integrated pest management in New England. Alar reduces the dropping of apples, and apples that have fallen rot on the ground and harbor pests that attack apples.

Consumers Union is even wrong about aflatoxin being in "nature's hands," not human. Aflatoxin contamination can be reduced by using methods to control molds including use of fungicides. In sum, Consumers Union is damaging its credibility by issuing this prejudiced and inaccurate report.

Reaction to the NRDC scare campaign against Alar was a classical example of mass hysteria. As noted by P.E. Dietz (Crosscurrents, *Fortune*, 17:60, 1988), "every major instance of mass hysteria concerning product tampering has involved a child-related product. . . . Nothing is more precious to people nor the subject of more superstition than children and childbearing." The Alar scare was reinforced by the "grape incident," which provoked one mother into having a Highway Patrol officer stop a school bus, and remove grapes from her child's lunch. The last thing we need is to have Consumers Union fan the embers of the fire.