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### **Quotable Quotes:**

**"Does anyone at the Food and Drug Administration (FDA) ever watch the PBS program 'The News Hour'? They certainly should on February 8 the program's segment on food irradiation gave ample reason for the agency to approve irradiation of produce to kill illness-causing (pathogenic) bacteria."**

***American Council on Science & Health***

**"ACSH applauds PBS for presenting accurate information about the utility and safety of food irradiation. At a time when most public health experts are encouraging Americans to consume more plant-based foods, it is increasingly important to make sure that such food is as safe as possible. The ball is in the FDA's court irradiation to protect the safety of produce should be approved without further delay."**

***American Council on Science & Health***

**"Weird things are happening. As soon as we think we understand a bacteria, the bacteria changes."**

***Gary Acuff, head of Texas A&M University's Animal Science Department***

**"Last year was the worst in four years. And it wasn't just one or two of the packers that supply to us. It was several. That 0.17 isn't uniform across the industry," he said. "Some processors have greater problems with E. coli than others. So, don't take your eye off the ball. It's not licked yet."**

***Dane Bernard, vice president with West Conshohocken, Pa.-based Keystone Foods, a global supplier of patties to McDonald's Corp. and other foodservice operators.***

**Electron-beam irradiation holds promise as an alternative technology for preventing ground beef from becoming contaminated with pathogenic bacteria such as Escherichia coli O157:H7. *US Meat Animal Research Center Press Release***

**"I hope that the people of Hawaii can now better judge for themselves about irradiated foods and the controversy surrounding the proposed irradiator at Honolulu airport. On my next visit to the United States, I am looking forward to eat high-quality irradiated papayas and mangoes from Hawaii and I hope that many consumers will have the free choice also to do so." *Dr. Henry DelincÈe, Institute of Nutritional Physiology, Federal Research Centre of Nutrition and Food, Karlsruhe, Germany***

**"Dr. Au also states in his declaration that he has reviewed relevant documents and studies. He ignores, however, several studies which have been published in the mean-time (2002-2005, the time between his affidavit of Dec. 10, 2002 and his recent declaration of Sept.29, 2005) which clearly show that 2-dodecylcyclobutanone is not mutagenic (Sommers**

2003, Sommers and Schiestl 2004, Gadgil and Smith 2004). So this confirms my doubts that Dr. Au may be a respected environmental toxicologist, but that his knowledge of toxicology in the field of food irradiation is restricted." *Dr. Henry DelincÈe, Institute of Nutritional Physiology, Federal Research Centre of Nutrition and Food, Karlsruhe, Germany*

"Food irradiation can also be used with fresh produce. In the past decade, produce has been responsible for more foodborne illness than meat or poultry. Unfortunately, [food irradiation for fresh produce has only been approved for killing insects and to delay spoilage and sprouting, not for pathogen control](#). Food irradiation is a safe and effective tool that should be more widely used to protect Americans from foodborne illnesses." *Molly Lee is the Earhart Foundation Research Associate at the American Council on Science and Health ([ACSH.org](http://ACSH.org), [HealthFactsAndFears.com](http://HealthFactsAndFears.com)).*

While Mueller said he is pleased with some improvements in food safety since his son's death, he believes that the United States still has a long way to go before eradicating the problem. He said he has been working to promote irradiation, which can complement the most recognized step to safety ---- cleanliness. *Rainer Mueller, Encinitas, California; Father of Eric Mueller, a 13 year old boy who died from Hemolytic Uremic Syndrome (HUS) acquired from eating an E. coli O157:H7-contaminated hamburger.*

### ***In This Update:***

**FDA Must Move to Safeguard Food Supply: Approve Irradiation of Produce!  
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**'20/20' segment to feature local E. coli tragedy**

**Texas A & M Teaching Module: Improving Safety of Complex Food Items using Electron Beam Technology**

**Food Irradiation Research and Technology text book now available from IFT & Blackwell Publishing**

**FDA Must Move to Safeguard Food Supply: Approve Irradiation of Produce!:** American Council on Science & Health (*February 12, 2007*):

Does anyone at the Food and Drug Administration (FDA) ever watch the PBS program "The News Hour"? They certainly should! On February 8 the program's segment on food irradiation gave ample reason for the agency to approve irradiation of produce to kill illness-causing (pathogenic) bacteria.

A decade ago, the usual culprits for bacteria-related food-borne illness were foods such as meat and poultry. There were numerous outbreaks of illness and indeed some deaths from foods contaminated by E. coli, salmonella and campylobacter, to name just a few. Of late, however, we have seen E. coli contamination of plant-derived foods such as alfalfa sprouts, green onions, and most recently spinach and lettuce. Since these foods are consumed raw, there is no opportunity to kill bacteria with heat, and washing doesn't remove bacteria that the plants may have taken up from contaminated soils. But irradiation can kill such bacteria without significantly altering the

foods.

Anti-technology activists have fomented unwarranted fears about irradiation, ranging from concerns that the process will make foods radioactive (it doesn't) to charges that food producers will not keep their facilities clean if they know their foods will be irradiated for safety. This latter concern is really old—it was a charge made against the introduction of heat pasteurization to kill bacteria in milk back in the 1920s. It wasn't true of dairies, and it won't be true of other food producers either.

Irradiation technology has been used in the U.S. for decades to sterilize products ranging from baby bottle nipples to surgeons' gloves—the process is well understood and well-controlled. There is no danger to workers or to the community in which irradiators are located.

In order for produce purveyors to use irradiation to safeguard their products, a petition to allow such a use must be submitted to and approved by the FDA. Such a petition has been languishing at the FDA for six years, according to information presented in the PBS report.

ACSH applauds PBS for presenting accurate information about the utility and safety of food irradiation. At a time when most public health experts are encouraging Americans to consume more plant-based foods, it is increasingly important to make sure that such food is as safe as possible. The ball is in the FDA's court—irradiation to protect the safety of produce should be approved without further delay.

However, other critics contend that the use of this technology will mask the underlying problems in food manufacturing, which produce bacteria in the first place. That is, if food is irradiated, food producers will not pay attention to maximizing food safety in the manufacturing process.

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**Don't become complacent about pathogen reductions, processors warned:** (February 20, 2007): Meetingplace.com: By John Gregerson

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LAS VEGAS — The number 0.17 — as in the percentage of beef samples testing positive for E. coli O157:H7 last year — may sound like magic to meat industry members, but scientists gathered here at the National Meat Association's 61st Annual Conference and Exhibition warned fresh meat processors today that the science of pathogens is changing, and in ways even they don't fully understand.

"Weird things are happening," acknowledged Gary Acuff, head of Texas A&M University's Animal Science Department. "As soon as we think we understand a bacteria, the bacteria changes."

Acuff and his colleagues not only have their eyes on emerging strains of E. coli and clostridium, but ongoing difficulties with salmonella, which inexplicably spiked in test samples last year.

"Last year was the worst in four years," confirmed Dane Bernard, vice president with West Conshohocken, Pa.-based Keystone Foods, a global supplier of patties to McDonald's Corp. and other foodservice operators. "And it wasn't just one or two of the packers that supply to us. It was several."

"I can tell you, it's very frustrating to go into a plant and look at air flow, at places where employees enter and leave, and find nothing, only to see E. coli or salmonella later show up on product coming out of a grinder," said Jeff Savell, leader of the Meat Science Section of Texas A&M's Animal Science Department. "There are just things about salmonella we don't fully understand, as this week's peanut butter-borne outbreak demonstrates."

'Weird'

Acuff said he was less surprised by salmonella-tainted peanut butter than cases of botulism associated with the product. "It's weird," he said, "and I don't know if it's because our surveillance methods have changed, the pathogens have changed, the environment has changed—the point being we have to remain vigilant. For instance, we can no longer assume that pathogens like E. coli are only present on the surface of the carcass."

If the discussion sounded dour, it was, which is why Bernard warned processors against becoming complacent about promising numbers. "That 0.17 isn't uniform across the industry," he said. "Some processors have greater problems with E. coli than others. So, don't take your eye off the ball. It's not licked yet."

"Things can change," Acuff concurred, "and slap you around."

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### **USDA Agrees to Import Pakistani Mangoes: (February 20, 2007) [thenews.com.pk](http://thenews.com.pk)**

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United States Department of Agriculture (USDA) has agreed to allow import of mangoes from Pakistan after proper irradiation to eliminate quarantine pests, said chief operating officer, Pakistan Horticulture Development and Export Board (PHDEB), Muhammad Iqbal on Friday.

He said the board has devised a comprehensive plan to produce quality mango and citrus fruit to meet international standards. Mohammad Iqbal met members of the Multan Mango Growers Cooperative Society Limited (MMGCSL) to discuss issues pertaining to the functioning of the Cooperative Society and to formulate systematic modalities to develop mango industry in the country. Babar Bajwa, Manager Technical PHDEB, also accompanied him.

Talking to the members of the executive committee of MMGCSL the chief operating officer of the board said that PHDEB has underpinned the formation of a Cooperative Society both for mango in Multan and citrus in Sargodha. He said it would now promote Good Agriculture Practices (GAP) to enable growers to produce quality fruit in line with the global demands.

Muhammad Iqbal said that members of the Cooperative Society would be guided to refine their agricultural practices for attainment of EUROGAP and other certifications. He said the society would be encouraged to export their produce on self-help basis, adding that there has been a global practice to work collectively. He appreciated the Mango Growers Association Pakistan (MGAP) for highlighting the problems of the growers. Bajwa said that government of Pakistan has succeeded in convincing USA to allow export of Pakistani mango to USA.

He said PHDEB is establishing two irradiation plants in Lahore and Karachi and will arrange visit of the members of MMGCSL to see their functioning. He said that PHDEB would also arrange briefing for all mango growers by those who have visited Singapore and Australia on study tours to learn from their experience.

The meeting was attended by MGAP president Syed Zahid Hussain Gardezi, Khizer Abbas Bukhari, Muzaffar Hayat Khan Khakwani, Nasrullah Khan Tareen, Ghulam Fareed Khan, Saleem Khan Alizai, Maj (R) Tariq Khan, Ansar Jamal and Mehr Maqbool Jangla. Speaking on the occasion, Syed Zahid Hussain Gardezi, MGAP president, lauded the government's attention to the horticulture sector, especially mango production.

He said that global connoisseurs of fruits have acknowledged the superior aroma and taste of Pakistani mango and that it's appropriate time to equip mango growers with latest technology for

mango harvesting, grading and packing.

[Source: thenews.com.pk](http://thenews.com.pk)

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**Electron-beam irradiation prevents ground beef contamination: (19 February, 2007) Institute of Food Technologists:**

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Electron-beam irradiation holds promise as an alternative technology for preventing ground beef from becoming contaminated with pathogenic bacteria such as *Escherichia coli* O157:H7.

Agricultural Research Service scientists based at the Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Neb., and their industry colleagues collaborated in tests of e-beam irradiation of samples from the surface of beef carcasses at the site where pathogens are most likely to lurk. Irradiation eliminated even extremely high levels of *E. coli* O157:H7, the tests showed.

Experiments with e-beam-irradiated ground beef and stir-fry beef indicated that the technique doesn't alter flavor or other eating qualities. The research was documented in a 2005 article in the *Journal of Food Protection* (volume 68, pages 666 to 672) and highlighted in a recent, food-safety-focused issue of *Agricultural Research* ([ars.usda.gov/is/ar/archive/oct06/beef1006.htm](http://ars.usda.gov/is/ar/archive/oct06/beef1006.htm)). [http://www.ift.org/news\\_bin/news/newsFrames.php](http://www.ift.org/news_bin/news/newsFrames.php)

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**Letter from Dr. Henry Delinc e, Institute of Nutritional Physiology, Federal Research Centre of Nutrition and Food, Karlsruhe, Germany; regarding misrepresentation of research by David Henkin of Earth Justice in the Pa'ina Hawaii proceedings via FSNET (February 13, 2007)**

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**Subject: Misrepresentation of my research by David Henkin of Earth Justice in the Pa'ina Hawaii proceedings**

I have recently been made aware of, that a private company seeks to build an irradiator near the Honolulu airport. The purpose of the irradiator is mainly to treat fruits to be exported to the US Mainland and to help prevent further infestation of alien species that will harm Hawaii's environment and further burden agriculture in the islands.

In October of 2005, David Henkin from Earth Justice filed a request for hearing with the US Nuclear Regulatory Commission (NRC) in the licensing proceeding of Pa'ina Hawaii, the irradiation company. Numerous contentions were raised, among them the allegation that irradiated food is unsafe to eat. Mr. Henkin claims that "special circumstances" exist for the raising of a radiation facility which will treat food for human consumption and wants the NRC not to approve the application of Pa'ina Hawaii. He relies in his comments strongly on the arguments of Dr. Au, an environmental toxicologist from the University of Texas. Dr. Au focuses in his declaration of Sept., 29, 2005 strongly on the formation of a recently-discovered unique class of radiolytic products that are generated on irradiation of fat-containing foods, namely the 2-alkylcyclobutanones (2-ACBs) and claims these compounds to be genotoxic and mutagenic. As one of the researchers on the topic of toxicity of 2-ACBs in irradiated fat-containing food I want to make a few comments which will make clear that Dr. Au is grossly overestimating the risk of eating irradiated papayas.

First of all, I am wondering that David Henkin has chosen Dr. Au as his witness since it is well-known that Dr. Au is not reliable as an expert in food irradiation. Already 2003, I pointed out that Dr. Au is greatly exaggerating the potential risks of food irradiation and does not stick to the scientific facts (Opinion on the Expert Affidavit on Safety Issues of Irradiated Food for School Children sworn by Dr. William Au with date of Dec. 10, 2002. My opinion was expressed on April 02, 2003, available still today in the internet

[http://www.mnbeef.org/opinion\\_on\\_the\\_expert\\_affidavit\\_.htm](http://www.mnbeef.org/opinion_on_the_expert_affidavit_.htm)). At that time I accused Dr. Au of committing perjury, since he claimed that 2-ACBs are mutagenic although his claims were not

substantiated by the literature he cited, which was in fact our work. Obviously, in 2002 Dr Au was not telling the truth and his affidavit was of no value. Mr. Henkin could have easily searched the internet to find out about Dr. Au's past as an expert witness. Since my name is quoted in his allegations, the least Mr. Henkin could have done is contact me to verify Dr. Au's testimony. Hiring an expert that is not telling the truth and thereby committing perjury is not becoming.

Exactly, this is the situation with Mr. Henkin's witness. Unfortunately, Dr Au has not learned anything in the mean-time, since he again in his present declaration of Sept. 29, 2005 testifies that 2-ACBs have been shown to be mutagenic (reference again to our work). He declares under penalty of perjury that he has read his own declaration and knows the contents thereof to be true of his own knowledge. In his declaration he mentions a recent article on health hazards from the consumption of irradiated food which he co-authored (Ashley et al., 2004). In this article it is correctly written, that our studies did not depict 2-dodecylcyclobutanone (2-DCB) as mutagenic. So Dr. Au is contradicting himself and his own knowledge. So again he is committing perjury.

Dr. Au also states in his declaration that he has reviewed relevant documents and studies. He ignores, however, several studies which have been published in the mean-time (2002-2005, the time between his affidavit of Dec. 10, 2002 and his recent declaration of Sept. 29, 2005) which clearly show that 2-dodecylcyclobutanone is not mutagenic (Sommers 2003, Sommers and Schiestl 2004, Gadgil and Smith 2004). So this confirms my doubts that Dr. Au may be a respected environmental toxicologist, but that his knowledge of toxicology in the field of food irradiation is restricted. He simply ignores relevant papers about the mutagenicity of 2-ACBs, and he sticks to his old wrong opinion – even contradicted by himself in his peer-reviewed paper (Ashley et al., 2004) – that 2-ACBs are mutagenic.

Another case where Dr. Au shows his ignorance of the literature about food irradiation toxicology is in his above-mentioned paper Ashley et al., 2004. In this paper Dr. Au alleges the authors of the WHO Technical Report 890 (1999) "High-Dose Irradiation: Wholesomeness of Foods Irradiated Above 10 kGy" that they have ignored 5 peer-reviewed publications of Vijayalaxmi and co-workers in their Table on "In vivo mammalian mutagenicity studies". However, Dr. Au has not recognized that this Technical Report – as its title clearly expresses – is dealing only with irradiation of foods above 10 kGy. Since the wheat experiments of Vijayalaxmi and co-workers were carried out with radiation doses below 10 kGy, these studies of course are not mentioned in the High-Dose Report. In a previous publication by the WHO "Safety and nutritional adequacy of irradiated food" (1994), the work of Vijayalaxmi is carefully reviewed and evaluated. So nothing remains of Dr. Au's allegation.

Dr. Au also refers to one of our papers in his declaration stating that laboratory rats were fed a **very low** concentration of 2-ACBs in drinking water (Horvatovich et al., 2002). The uptake of 2-ACBs by the rats corresponded to about 1 mg / day. The daily uptake of 1 mg 2-ACBs per rat corresponds roughly to a daily consumption of about four irradiated (3kGy) cooked chickens (~1000 g, 12.5% edible fat) – and that every day up to 6 months. Therefore, I would not call this a very low concentration, but instead a very high concentration. We have used this high concentration of 2-ACBs in order to observe a possible toxicological effect – a usual procedure in toxicological experiments. It would have been desirable to do this experiment with a range of concentrations, thereby also estimating the concentration of 2-ACBs which causes no adverse effects. However, lack of capacity did not enable such a large experiment, and therefore only one concentration was tested. The estimation of the no adverse effect level in these kinds of experiments remains to be tested.

Since the amount of 2-ACBs formed is dependent on the radiation dose and the fat content in the food, it would be interesting to look at papayas. Papayas for quarantine treatment to eliminate fruit

flies would be irradiated with a dose of about 250 Gy, so a much smaller dose than that used for poultry or beef. The fat content of papayas is also smaller than that of chicken, around 6% for whole papayas. So the amounts of papaya that the rats need to consume to achieve an intake of about 1 mg/day would amount to about 90 kg per rat per day. But there is an additional practical point which Dr. Au has totally ignored.

**The proof of the papaya is the eating !** This is a slightly changed wording that everybody knows. This is also valid for irradiated papayas. It is correct as Dr. Au mentions in his declaration that 2-ACBs have been found in papayas and mangoes. They are even used to detect whether these tropical fruits have been exposed to a radiation treatment. However, the analysts trying to detect the 2-ACBs in papayas and mangoes ñ Ndiaye et al. 1999 and Stewart et al. 2000 are cited by Dr Au - these analysts use the seeds from the papaya and the mango kernels to isolate the fat, because the overwhelming quantity of lipids in these fruits is found in the seeds and not in the fruit flesh. Thus the dominant part of 2-ACBs is found in the seeds and not in the edible part of the fruit. The amount of actually consumed 2-ACBs will be extremely small, since the fat concentration in the edible flesh is only about 0.1%.

Since feeding experiments with quite high amounts of 2-ACBs such as the Raltech study (Thayer et al. 1987) in which highly irradiated (~58 kGy) chicken meat was fed to mice and dogs for long-term consumption yielded no adverse effects which could be attributed to irradiation, the safety factor for low-dose irradiated foods such as papayas and mangoes must be high ñ particularly when only a very small part of the radiation-induced 2-ACBs in these fruits will be consumed.

Food irradiation is toxicologically perhaps the most thoroughly investigated food processing technology in the world. A long list of mayor institutions endorses the irradiation of foods as safe, including the World Health Organization (WHO), the Centre for Disease Control (CDC) and the US Food & Drug Administration (FDA)

In conclusion, I hope that the people of Hawaii can now better judge for themselves about irradiated foods and the controversy surrounding the proposed irradiator at Honolulu airport. On my next visit to the United States, I am looking forward to eat high-quality irradiated papayas and mangoes from Hawaii and I hope that many consumers will have the free choice also to do so.

*Dr. Henry DelincÈe, Institute of Nutritional Physiology, Federal Research Centre of Nutrition and Food, Karlsruhe, Germany*

## Bibliography

- Ashley BC, Birchfield PT, Chamberlain BV, Kotwal RS, McClellan SF, Moynihan S, Patni SB, Salmon SA, Au WW (2004) Health concerns regarding consumption of irradiated food. *Int. J. Hyg. Environ. Health* **207**, 1-12.
- Burnouf D, DelincÈe H, Hartwig A, Marchioni E, Miesch M, Raul F, Werner D (2002) Etude toxicologique transfrontaliÈre destinÈe | Èvaluer le risque encouru lors de la consommation d'aliments gras ionisÈs. Toxikologische Untersuchung zur Risikobewertung beim Verzehr von bestrahlten fetthaltigen Lebensmitteln. Eine franzsisch-deutsche Studie im Grenzraum Oberrhein. Rapport final / Schlussbericht INTERREG II, Projet / Projekt No. 3.171 in: Marchioni E, DelincÈe H, eds. *Berichte der Bundesforschungsanstalt f,r Ernhrung, Karlsruhe*, BFE-R602-02.
- DelincÈe H (2003) Opinion on the Expert Affidavit on Safety Issues of Irradiated Food for School Children sworn by Dr. William Au, with date of Dec. 10, 2002. [http://www.mnbeef.org/opinion\\_on\\_the\\_expert\\_affidavit\\_.htm](http://www.mnbeef.org/opinion_on_the_expert_affidavit_.htm).
- DelincÈe H, Pool-Zobel BL (1998) Genotoxic properties of 2-dodecylcyclobutanone, a compound formed on irradiation of food containing fat. *Radiat. Phys. Chem.* **52**, 39-42.
- DelincÈe H, Pool-Zobel BL (1999) Genotoxizitt von 2-Dodecylcyclobutanon. In: Lebensmittelbestrahlung ñ 5. Deutsche Tagung, Karlsruhe, 11-12 Nov. 1998 (Knrr M, Ehlermann DAE, DelincÈe H, eds) *Berichte der Bundesforschungsanstalt f,r Ernhrung, Karlsruhe*, BFE-R699-01, pp.262-269.
- DelincÈe H, Soika C, Horvatovich P, Rechkemmer G, Marchioni E (2002) Genotoxicity of 2-alkylcyclobutanones,

- markers for an irradiation treatment in fat-containing food ñ Part I: Cyto- and genotoxic potential of 2-tetradecylcyclobutanone. *Radiat. Phys. Chem.* **63**, 431-435.
- Gadgil P, Smith JS (2004) Mutagenicity and acute toxicity evaluation of 2-dodecylcyclobutanone. *J. Food Sci.* **69**, 713-716.
- Horvatovich P, Raul F, Miesch M, Burnouf D, DelincÈe H, Hartwig A, Werner D, Marchioni E (2002) Detection of 2-alkylcyclobutanones, markers for irradiated foods, in adipose tissues of animals fed with these substances. *J. Food Prot.* **65**, 1610-1613.
- Ndiaye B, Jamet G, Miesch M, Hasselmann C, Marchioni E (1999) 2-Alkylcyclobutanones as markers for irradiated foodstuffs. II. The CEN (European Committee for Standardization) method: field of application and limit of utilization. *Radiat. Phys. Chem.* **55**, 437-445.
- Raul F, GossÈ F, DelincÈe H, Hartwig A, Marchioni E, Miesch M, Werner D, Burnouf D (2002) Food-borne radiolytic compounds promote experimental colon carcinogenesis. *Nutrition and Cancer* **44**, 189-191.
- Sommers CH (2003) 2-Dodecylcyclobutanone does not induce mutations in the *Escherichia coli* tryptophan reverse mutation assay. *J. Agric. Food Chem.* **51**, 6367-6370.
- Sommers CH, Schiestl RH (2004) 2-Dodecylcyclobutanone does not induce mutations in the *Salmonella* mutagenicity test or intrachromosomal recombination in *Saccharomyces cerevisiae*. *J. Food Prot.* **67**, 1293-1298.
- Stewart EM, Moore S, Graham WD, McRoberts WC, Hamilton JTG (2000) 2-Alkyl-cyclobutanones as markers for detection of irradiated mango, papaya, Camembert cheese and salmon meat. *J. Sci. Food Agric.* **80**, 121-130.
- Thayer DW, Christopher JP, Campbell LA, Ronning DC, Thompson GM, Wierbicki E (1987) Toxicology studies of irradiation-sterilized chicken. *J. Food Prot.* **50**, 278-288.
- Vijayalaxmi (1975) Cytogenetic studies in rats fed irradiated wheat. *Int. J. Radiat. Biol.* **7**, 283-285.
- Vijayalaxmi (1976) Genetic effects of feeding irradiated wheat to mice. *Can. J. Genet. Cytol.* **18**, 231-238.
- Vijayalaxmi (1978) Cytogenetic studies in monkeys fed irradiated wheat. *Toxicology* **9**, 181-184.
- Vijayalaxmi, Sadasivan G (1975) Chromosomal aberrations in rats fed irradiated wheat. *Int. J. Radiat. Biol.* **27**, 135-142.
- Vijayalaxmi, Rao KV (1976) Dominant lethal mutations in rats fed on irradiated wheat. *Int. J. Radiat. Biol.* **29**, 93-98.
- WHO (1994) *Safety and nutritional adequacy of irradiated food*. WHO, Geneva.
- WHO (1999) *High-dose irradiation: wholesomeness of food irradiated with doses above 10 kGy*. Report of a Joint FAO/IAEA/WHO Study Group, WHO, Geneva, Technical Report Series No. 890.

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### **Better Ways to Diagnose -- and Prevent -- Foodborne Illness; American Council on Science & Health (February 23, 2007)**

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On Tuesday, the Food and Drug Administration (FDA) approved [the new E. Coli diagnostic test called ImmunoCard Stat](#). The approval of this test is timely given the recent E. coli outbreaks in the American food supply. In the fall of 2006, an E. coli outbreak linked to contaminated packages of California spinach caused three deaths and over 200 infections in twenty-six states. In December of 2006, at least [thirty-nine people in New York and New Jersey became ill after consuming E. coli-contaminated food from Taco Bell restaurants](#).

E. coli can be a serious threat to human health. It is transmitted to humans primarily through consumption of contaminated foods, such as raw or undercooked ground meat products, contaminated produce, and raw milk. Symptoms caused by E. coli include abdominal cramps and diarrhea, which may in some cases progress to bloody diarrhea. Fever and vomiting may also occur.

E. coli isn't the only pathogen to invade our food supply. In the past week, four food products have been recalled due to contamination. On February 19, Oscar Meyer chicken breast strips were recalled after samples tested positive for listeria, a bacteria that can cause serious illness. On February 16, Dole Fresh Fruit Co. recalled cantaloupes imported from Costa Rica after some were found to be contaminated with salmonella. On that same day, certain jars of Earth's Best Organic 2 Apple Peach Barley Wholesome Breakfast baby food were also recalled because they may be contaminated with *Clostridium botulinum*, the causative agent of potentially lethal botulism. On February 14, ConAgra Foods Inc. recalled its Peter Pan peanut butter and batches of Wal-Mart's

Great Value peanut butter after they were linked to the salmonella outbreak that caused illness in approximately 300 people in thirty-nine states.

Numerous safety measures are in use at every level of the American food supply chain. Yet, despite this, roughly 5,000 Americans die every year due to foodborne illness, according to the CDC. Please see our publication [Eating Safely: Avoiding Foodborne Illness](#).

It appears more could be done to ensure food safety in America. Food irradiation is a measure that could greatly reduce illness from foodborne pathogens and make our already safe food supply even safer. Irradiation has been approved by the FDA as a method to increase the safety of fresh and frozen meat, poultry, shell eggs, crustaceans, and dried food. It is used widely to kill pathogens in spices, vegetable seasonings, and, to a certain extent, ground beef and poultry. Food irradiation can also be used with fresh produce. In the past decade, produce has been responsible for more foodborne illness than meat or poultry. Unfortunately, [food irradiation for fresh produce has only been approved for killing insects and to delay spoilage and sprouting, not for pathogen control](#). Food irradiation is a safe and effective tool that should be more widely used to protect Americans from foodborne illnesses.

***Molly Lee is the Earhart Foundation Research Associate at the American Council on Science and Health ([ACSH.org](#), [HealthFactsAndFears.com](#)).***

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**'20/20' segment to feature local E. coli tragedy;** By: Shannon Wingard - For the North County Times (February 23, 2007):

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ENCINITAS ---- Rainer Mueller said he continues sharing the story of his son's death from E. coli poisoning in hopes that it may help others avoid the same tragedy that struck his family 13 years ago.

That desire was part of the reason Mueller agreed to be interviewed for a two-hour special on food safety, which airs at 9 tonight on ABC's "20/20." Mueller, a computer analyst for the city of Encinitas, said he also wanted to talk about food irradiation, a method of decontaminating food that he believes is the answer to food safety concerns.

"I tell my story and let people know what's happened. From that, people can make the correct decision," said Mueller, adding that "if enough people become outraged by what's happened, they can really effect a change."

When his son, Eric, was 13 years old, Mueller said he became violently sick with an illness that his doctors struggled to diagnose. Since E. coli wasn't well known in 1993, Mueller said he didn't understand what caused his son's death until afterward.

A few months later, he said he thought he found the answer by searching his son's symptoms on the internet. Everything he found pointed to E. coli, he said, and his suspicions were soon confirmed by a leading expert, he said.

That's when he got involved with the then-Leucadia-based Safe Tables Our Priority, or STOP, an organization that creates awareness of E. coli. In 1994, he joined the group's board of directors and was elected its president two years later.

With the organization, he helped organize a symposium in Washington, D.C., in 1995 to alert Congress to the fact that the food inspection laws then in place were written a century ago. The following year, he was asked to be part of the group that rewrote the regulations.

Mueller said his endeavors earned him an invitation to the White House to meet then-President Clinton, and a later invitation to watch as the president signed the new regulations into law. Although he had to decline the last invitation, he said he was amazed at how much one organization ---- Safe Tables ---- could accomplish.

"We pulled together and changed the meat inspection laws in this country against some of the largest lobbying groups," he said.

In 1998, Mueller established his own organization, Eric's ECHO, to assist and educate victims and families on E. coli poisoning. Since then, the organization has become "one of the pre-eminent Web sites for E. coli information around the world," he said.

While Mueller said he is pleased with some improvements in food safety since his son's death, he believes that the United States still has a long way to go before eradicating the problem. He said he has been working to promote irradiation, which can complement the most recognized step to safety ---- cleanliness.

He said the irradiation process uses electron beams, those used to broadcast images on a television, to eliminate "all living material in food."

He believes this method is important for meats and produce, because "you can scrub all you want on the outside of it, but it is showing up on the inside of the products." He said he believes information, which he provides through Eric's ECHO and mentions during the "20/20" interview, is the only way to alter public perception.

For more information on Eric's ECHO, go to [www.ericsecho.org](http://www.ericsecho.org)

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### **Improving Safety of Complex Food Items using Electron Beam Technology.**

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Texas A & M University has recently completed a USDA sponsored project was called "Improving Safety of Complex Food Items using Electron Beam Technology." The titles of the four teaching modules are:

Lesson 1 : Microbiological Safety of Fresh Fruits & Vegetables

Lesson 2 : Control of Microbial Growth & Foodborne Disease Pathogens in Fresh Fruits & Vegetables

Lesson 3 : Current Strategies used to Eliminate or Reduce Pathogenic Microorganisms from Fruits and Vegetables

Lesson 4: Science and Applications of Electron Beam Irradiation Technology

The lessons may be accessed by all at

<http://aggiehorticulture.tamu.edu/foodsafety/foodsafetyissues.html>

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**Irradiated Foods** Booklet Provides Science-based Information on Food Irradiation: The American Council on Science & Health booklet on irradiated foods can be downloaded from:

**<http://www.acsh.org/publications/booklets/irradiated2003.html>**.

**Food Irradiation Research and Technology** published by Institute of Food Technologies Press and Blackwell Publishing is now available. To order your copy phone (515) 292-0140 or 1-(800) 862-6657. You may order online from Blackwell Publishing at:

**<http://www.blackwellprofessional.com/>**

To download the new American National Cattlewomen(ANCW) food irradiation brochure go to **[:../..../Irradiation/Brochure 2-18-04.pdf](http://www.ancw.org/Irradiation/Brochure%202-18-04.pdf)**

***Food Irradiation Update is being sent as an update on food irradiation by the Minnesota Beef Council. If for any reason you do not want to receive these updates please hit Reply and ask us to delete you from the list of recipients.***

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For more information on food irradiation go to **<http://www.mnbeef.org>**