



Versatile Extracts Work Wonders on Food Surfaces

Some extracts including black tea and grape seeds can do more good for foods than consumers would probably expect. The extracts can kill dangerous bacteria, extend shelf life, add color and enhance freshness. All the processors need to do is work the extract into an invisible edible film on the food surfaces.

“We are incorporating these extracts that have excellent antimicrobial activities into the edible films,” said Navam Hettiarachchy, a University of Arkansas food science professor who is leading a research project on the topic for the Food Safety Consortium. “We are going to use these in food products such as poultry, sausage, meat and minimally processed fresh-cut fruits and vegetables as a dip or spray.”



In the University of Arkansas food science lab (from left) professor Navam Hettiarachchy and graduate students Chun-Kai Yang and Ronny Horax implement the industrial soy film manufacturing process.

Hettiarachchy’s team found that black tea hot water extract was potent in inhibiting the growth of *Listeria monocytogenes*. Grape seed extract was effective in inhibiting *Salmonella*

typhimurium and *E. coli* O157:H7. The two types of extracts were the most successful against pathogens among several extracts screened from plants, herbals, vegetables, beans, grains and bran.

The extracts can then be incorporated into any of several edible films — including soy protein, whey protein, gluten protein, carboxymethyl cellulose, carageenan and pectin — that is applied to a food product in a variety of ways.

“You can spray it, you can dip it, you can wrap it,” Hettiarachchy said.

The use of extracts in the film on products can extend their shelf life for about two weeks. “Also, these extracts serve as antioxidants because when you keep the meat for a long time, it becomes

Continued on page 2

Knowledge of Irradiation Heightens Consumer Acceptance

The more consumers know about irradiation, the more likely they are to have a positive attitude toward the technology. If the source of their knowledge comes from the government rather than industry, their likelihood of a positive attitude is even greater.

“If we’re thinking in terms of public health benefits from irradiation, it’s a matter of who should be informing the

public about it,” said Sean Fox, an associate professor of agricultural economics at Kansas State University who directed a consumer survey for the Food Safety Consortium. “If U.S. Department of Agriculture information has more credibility, maybe there’s a more active role for USDA to play in educating the public about the technology.”

KSU researchers mailed a survey to

residents in Manhattan, Kan., and Topeka, Kan., with questions about beef purchases and their knowledge of food irradiation. One-third of the audience was provided no information about irradiation except for a brief statement about its effect on foodborne pathogens. The other two-thirds received a brochure with answers to frequently asked questions about irradiation.

Continued on page 2

Versatile Extracts... continued

rancid,” Hettiarachchy said. “The extracts prevent rancidity and kill or minimize the pathogens.”

The edible film coating can also delay the ripening of tomatoes by two to three weeks. “You can keep the freshness of baby carrots, which usually dry up. The coating keeps the color and the crunchiness for a longer period of time.”

The edible films in these experiments use malic acid, an organic acid that occurs in apples. “Consumers are used to eating apples that contain malic acid,”

“We are going to use these in poultry, sausage, meat and minimally processed fresh-cut fruits.”

Hettiarachchy said. “So when you incorporate the malic acid in the film-forming solution, it not only has the

effect as an antimicrobial, it also acts as a plasticizer.” The plasticizer makes the film more flexible.

That flexibility is helpful

when the film is used to coat egg shells. Hettiarachchy explained that the flexibility prevents breakage of the eggs during transit, which currently averages 10 percent but could be reduced to 2 percent with this innovation.

Egg shells are also less susceptible to

Salmonella when they are coated with the extracts’ film. “Usually *Salmonella* can penetrate the egg shells. So when we coat the whole egg with film solution we prevent the microbes from entering points of entry through the shell.”

The plant extracts are doing the major share of the work in working with organic acids when the edible coating film is applied to food products. These findings have generated a patent.

“Many industries are interested in the edible film we have developed,” Hettiarachchy said. “I hope we can commercialize this film in a year’s time. The film has unique properties and can find numerous applications.” ■

Knowledge of Irradiation... continued

But of those brochures, half were written to suggest that the information about irradiation was from an industry source and the other half was said to come from information provided by USDA and the Food and Drug Administration.

Everyone who received a survey was asked what they would do if their local store sold hamburger patties “treated by irradiation to control *Salmonella*, *E. coli* and other foodborne bacteria.” The survey asked whether they would buy non-irradiated patties at \$1.69 a pound or irradiated patties at various prices ranging from \$1.79 to \$2.09 a pound.

Of the respondents who did not receive an information brochure, 32 percent reported a positive attitude about irradiation. Of those who received a brochure with information appearing to come from an industry source, 66 percent reported a positive attitude. Of those

who received a brochure with information said to be provided by the government, 76 percent had a positive attitude.

Higher prices discouraged some respondents from choosing to buy irradiated patties. With a price of 10 cents per pound more than non-irradiated patties, 59 percent of respondents said they would buy the irradiated product. But with a price of 40 cents above the non-irradiated product, only 36 percent were willing to buy the irradiated patties.

“Some people were asked if they would buy irradiated hamburger at the same price as regular hamburger, and of those 82 percent said yes,” Fox said. “The fact that we were asking some of these people about relatively steep price

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premiums brings down the average.”

The results showed that of those who received government-produced information

about irradiation, more than 70 percent would buy the product if the price difference was only 10 cents per pound higher. “When that premium goes up to 40 cents a pound more, the percentage of those with government information who are willing to buy it is just a bit over 40 percent,” Fox said.

Fox noted that the data from the survey shows what the limits might be for public acceptance of irradiated products and what the public needs to know to buy such products. “Overall, it’s showing that when people get information about irradiation, the majority are accepting the technology.” ■



Sean Fox

The Bacteria That Wouldn't Die and ISU's Counterattack

Meat, poultry and pork processors want to avoid contamination from *Listeria monocytogenes*, but they have encountered an interesting problem: the more that the pathogenic bacterium is beaten down, the stronger it can become to rise up and wreak more havoc.

A team led by Aubrey Mendonca, a Food Safety Consortium researcher at Iowa State University, has developed a model designed to help food processors take into account the heat-resistant capacities of *Listeria monocytogenes*.

Mendonca explained that processors of cooked and ready-to-eat meats generally heat their products to prescribed levels to kill the bacteria. The challenge appears to be that some of the bacteria can tolerate high levels of heat, which is contrary to the studies and models that indicate they shouldn't be able to survive.

Mendonca knows why this happens. The predictive models use bacteria that grew in the lab, but the bacteria that survive in the processing plant environment are of a more hardy stock.

"If I wanted to starve you and other people, there's no doubt that we are going to get weak," Mendonca said.

"When you do that to bacteria, remember that they are not designed with arms and legs to run away from a problem. They have to stay there and fight. That's how they evolved for millions of years.

Bacteria have quick genetic switches so that they can produce things called stress proteins. So while they are starving, they produce stress proteins that make them stronger than in that starved state. They

are not strong enough to multiply, but they are not going to go away."

The bacteria in processing plants emerges in a hostile environment of dust, dirt and water condensing behind coolers, Mendonca said.

Back in the lab, conditions aren't so rugged. But that is where Mendonca noticed processing plants were getting their predictive models that guide them on how much to heat their foods. "Microbiologists tend to grow organisms in rich media and use them in experiments. But are those organisms in the laboratory representative of the same organisms coming out the environment? No."

Mendonca's experiments have found that when conditions in the lab are created to starve the organisms, they are the ones that are more resistant to heat when they are placed in meat.

There are practical implications for processors. Organisms that survive cleaning and sanitation may remain without nutrients on food contact surfaces and develop heat resistance.

Suppose a power shortage develops in a processing plant halfway through the heating process and the power

resumes 30 minutes later.

"Should we go to the book and use the same protocol or should we heat a little more for safety?"

Mendonca asked. "The question is are those organisms that survived the first

halfway heating resistant to the heat. Some may die, but those that survive are a little more resistant."

The model designed by Mendonca's team considers the heat-resistant



Aubrey Mendonca

capacities of *Listeria monocytogenes* when heating. In some situations, the heat should be turned up to lessen the pathogens' resistance. Also, the use of salt and sodium pyrophosphate in meat can sometimes help *Listeria monocytogenes* to survive.

"If I had a product with a high salt level and another with a low salt level and I heat them equally, the product with the high salt level may need a little more heat to kill the bacteria because there is less water available," Mendonca said, explaining that heat works best when more moisture is available. An increase in salt causes a decrease in the amount of free water in the product, so more heat is needed to make up for the deficiency and kill the pathogens.

Processors may still be able to use the models developed in less stringent laboratory conditions and still avoid resurgence of the bacteria during heating if their numbers of pathogens are consistently low. "But if the numbers get high enough, you're going to run into a problem," Mendonca said. ■

The predictive models use bacteria that grew in the lab, but the bacteria that survive in the processing plant environment are of a more hardy stock.

Report from the Coordinator



Gregory J. Weidemann

Food safety has been an important concern for a long time, but the past 10 years can be regarded as a major new era in its development. Public attention focused on the subject in 1993 when an *E. coli* outbreak in hamburgers at Jack in the Box restaurants in the Pacific Northwest sent 800 people to the hospital.

It certainly wasn't the first time that food poisoning had set off a wave of illnesses, but the incident got the attention of government, industry, consumers and researchers in a way that no previous occurrence had.

Things are different in many respects today. Janet Anderberg, a food safety specialist with the Washington State Department of Health, recently told a Seattle television station that the outbreak changed approaches to food safety nationwide.

"In 1993, hamburger temperatures were being taken rarely, if ever," Anderberg said. "The hamburgers at that time weren't getting cooked in the middle. And the organism was allowed to survive and be ingested by the people who ordered hamburgers."

Today, thanks in part to some

important Food Safety Consortium research at Kansas State University, restaurants and consumers know they must cook meat to 160 degrees Fahrenheit at its innermost point, and that they must verify it. Today, public health officials can trace back the microbiological source of a food poisoning outbreak within hours because of technology developed by food safety researchers, a task that would have taken days a decade ago.

In the past decade, food safety personnel have learned more about the application of irradiation to meats as the federal regulatory agencies have approved the use of this technology that can kill pathogens in processed food. Scientists also have learned that while irradiation is a vital element of food safety, it is not a silver bullet. Pathogens will continue to appear throughout the process of producing and delivering food, and research scientists will continue to find new ways to fight them.

The research projects of FSC scientists that are regularly profiled in this newsletter provide some perspective on this work. The productivity from these projects makes it apparent that

over the past 15 years of the Food Safety Consortium's existence, there have been and continue to be abundant

opportunities for further development of the science of safe food.

Our consortium — centered at the University of Arkansas, Iowa State University and Kansas State University — is one of many food safety research efforts under way across the nation. The past decade has seen our tri-state consortium maintain the confidence of the Congress, which has generously provided a grant each year to support several projects at a time among our three universities and their respective emphasis on the safety of poultry, pork and beef. Most of those projects are completed in two to three years.

The FSC was founded in 1988, but it would be fair to say that by 1993 we were hitting our stride. Things haven't slowed down since then and we're ready to contribute to the next decade's research discoveries. ■

FSIS Seeks to Break the Cycle of Foodborne Illnesses

These are excerpts from remarks Elsa Murano, U.S. Department of Agriculture Under Secretary for Food Safety, at the International Foodservice Manufacturers Association's Chain Operators Exchange meeting, Feb. 24, 2003, in Miami.

... While we are well aware that foodborne illness can come from many different sources, we also recognize that some commodities face greater challenges than others. For example, raw foods of animal origin have an inherent risk of harboring pathogens. As a result, preventing and controlling harmful bacteria in these

products receives a major portion of USDA's resources under the direction of the Food Safety and Inspection Service, or FSIS.

By way of background, FSIS regulates meat, poultry and processed egg products with an inspection force consisting of more than 7,600 individuals that are deployed throughout the country — every day — in 6,400 plants and import stations. The agency inspects products that represent more than one-third of all consumer spending on food. This is an enormous responsibility and the only way to accomplish our mission is to employ science and take the guesswork

out of the system. ...

Redefining the Farm-to-Table Continuum

The fact of the matter is that our current inspection efforts, while greatly improved since 1998 with the introduction of Hazard Analysis and Critical Control Point, or HACCP system, do not extend from farm to table.

For a variety of reasons, some of them having to do with jurisdictional authorities, FSIS is focused on the processing phase of the meat and

Continued on page 6

OFPA Hears of Bioterrorism Act's Likely Effects

Last year's federal Bioterrorism Act includes major provisions for food safety and "its effects are going to be profound," an industry official told the Ozark Food Processors Association at its 97th annual convention in March in Springdale, Ark.

Regina Hildwine, senior director of food labeling and standards for the National Food Processors Association, said the legislation will have an impact "on virtually every food company, food processor, food wholesaler, food distributor, food additive manufacturer and food equipment manufacturer."

The food industry did not oppose the bill last year and was active in negotiations over its content, Hildwine said. Its provisions include the development of a national food security strategy to be written by the President's Council on Food Safety. The law also gives a high priority to increasing the Food and Drug Administration's inspections of food, especially imports, she said.

"The idea is to be looking for food adulteration, particularly intentional adulteration," Hildwine said. "FDA is going to conduct research on methods to detect food adulteration."

The law also provides for administrative detention of food products. The U.S. Department of Agriculture already has such authority over meat and poultry products. The new law extends that authority to other foods regulated by the FDA.

"Instead of seizure, the FDA is now going to be able to put food products on hold for up to 20 days," she said. "FDA is now also authorized to put food imports on temporary hold so that they may continue food safety and security investigations if they have reasonable and credible evidence that there is a threat."

Domestic and foreign food facilities must register by Dec. 12 with the FDA under the law. The provision applies to facilities that produce, hold and handle food products that are destined for sale in the U.S. Exempt from the registration requirement are farms, restaurants and retail stores.

"FDA has language in its proposed rule that says in some instances private residences may have to register," Hildwine said. "Private residences have to register if the food that is produced or held in that residence enters commerce." She said that means homes preparing foods for Girl Scout groups or church

bake sales would not have to register, but individual residences engaged in commerce are not exempt. "We're trying to figure out how FDA is going to enforce this. This is something that we're trying to fix."

Also addressing the convention, food allergy expert Steve Taylor of the University of Nebraska said from 6 million to 7 million Americans have food allergies that prompted up to 200 deaths and 29,000 emergency room visits in a year. Taylor, the co-director of the university's Food Allergy Research and Resource Program, said scientists now have the tools to detect potentially hazardous residues of allergenic foods that are contained in other food products.

Recalls of products with allergens that weren't listed on the labels have decreased among larger companies in recent years, Taylor said. "The people who are causing the issues now are smaller companies." He cited FDA surveys showing that 25 percent of products in some food categories contain undeclared peanuts, an allergen.

The FDA "is not going to continue to let these products go out on the market with inadequate labeling," Taylor said. "They are sometime very soon going to start hammering companies." ■

The idea is to look for intentional food adulteration.

NAFS Research to be Highlighted in New Orleans

The National Alliance for Food Safety will present a mini-symposium of its research accomplishments on Aug. 9 in New Orleans. Principal investigators who have pursued projects with NAFS grants during the past three years will deliver presentations about their work.

The NAFS is a partnership of 19 universities and the USDA Agricultural Research Service. ARS has made competitively awarded grants to collaborative projects involving NAFS university scientists and ARS scientists.

Twenty-one grants have been awarded in the past three years.

The NAFS meeting will precede the annual meeting of the International Association for Food Protection, which will meet Aug. 10-13 in New Orleans. Details about lodging and other logistics concerning the symposium will be announced later. Questions may be directed to Rebecca Tate in the NAFS facilitator's office at 979-845-2855 or rltate@ag.tamu.edu. ■

FSC Displays Work at Washington Exhibition

The Food Safety Consortium displayed summaries of its research in March before members of Congress and legislative staff at a reception on Capitol Hill. The National Association of State Universities and Land-Grant Colleges hosted the event, which featured displays from about 40 universities and research units.

“The Land-Grant System: Science and Education Working for and Serving the Needs of America” was the theme of the event. The FSC display included a large poster with photos of its research projects at the University of Arkansas, Iowa State University and Kansas State University and brief listings of major food safety work at each campus. The FSC booth also offered visitors copies of the annual report and *The Food Safety Consortium Newsletter* and free novelty items.

FSC scientists and administrators were present at the display to answer questions and discuss the Consortium’s work with visitors from federal agencies, congressional staffs and other universities. ■



Representing the FSC’s three universities at the National Association of State Universities and Land-Grant Colleges exhibition in Washington were (from left) Marty Vanier, Kansas State; Gregory Weidemann, Arkansas; and Jim Dickson, Iowa State.

FSIS Seeks... continued

poultry chain, leaving other areas — such as animal production, transportation, product distribution, storage and retail — either underserved or not served at all. Yet, ultimately, we all have a responsibility to make sure each link in this food chain is strong. I also recognize that each of you is committed to food safety and many of you must wonder whether there is something more that can be done. The person that walks into one of your outlets for the first time is not a stranger but an asset that you want to cultivate over time; an asset that can pay dividends with repeat patronage. One way to make that happen is a strong commitment to food safety.

For our part, I believe that without major changes or additions to our regulatory authority, we can expand our food safety efforts and redefine the role we play in the farm-to-table continuum

of meat and poultry. Of course, we could maintain the status quo and look to others for innovations. But this is not the time for old ideas or tired thinking. Instead, we need to see our food safety systems continue to evolve along with the great advances we see in production, transportation and processing technologies, many of which have been pioneered by companies represented in this room. ...

Substantial Progress Made

Enhancing our efforts does not mean we should overlook the significant improvements we have already made to the current inspection system. The Centers for Disease Control and Prevention reported last year that the rate of foodborne illnesses, across the board, has decreased dramatically over the last six years due, in part, to the introduction of HACCP.

We have also made great strides in improving the technical and scientific knowledge of our inspection force. The introduction of the Consumer Safety Officer corps is just one example of how we have continued to introduce highly skilled, scientific experts into the field to reinforce our veterinarians and front-line inspectors. We are driven by the fact that the enormity of our responsibility cries out for a science-based system and we continue to incorporate this principle into the meat and poultry inspection process at every opportunity. ...

Declaring War

Our food safety mission is simple: We are declaring war on pathogens using an arsenal that employs state-of-the-art science applied in a strategic and comprehensive manner. We have identified the enemy; recognized our vulnerabilities; developed our battle

Daniel Fung, Kansas State, was the Institute of Food Technologists Fellows University Visitation Program speaker in January in Hilo, Hawaii, where he lectured on “Control of Foodborne Pathogens.” He was also a visiting professor at the University of Hawaii where he performed a successful experiment using the Fung double tube system for rapid monitoring of *Clostridium perfringens* in water, which can indicate fecal contamination in water within six hours rather than the 48 hours under the current system in use in Hawaii.

Fung also was keynote speaker in February in Philadelphia at conferences on Rapid Methods: Establishing Best Practices for Identifying, Automating and Validating Microbiology Test Methods, sponsored by Barnett International, and Effective Management of Pharmaceutical Microbiology Quality Assurance Programs, sponsored by CBI Corp. In March, Fung was the keynote

speaker at the International Union of Food Science and Technology symposium in Shanghai, China. Also in March he was an invited professor at Monterrey (Mexico) Technological University where he delivered nine lectures on rapid methods.

Fung recently served on the USDA Post Harvest Food Safety Competitive Grant Panel and currently serves on the National Academy of Sciences Committee on New Indicators for Fecal Contamination in Water.

R.J. Danler, Elizabeth Boyle, Curtis Kastner, Harshavardhan Thippareddi, Daniel Fung and Randall Phebus, Kansas State, co-authored “Effects of Chilling Rate on Outgrowth of *Clostridium perfringens* Spores in Vacuum Packaged Cooked Beef and Pork” in the *Journal of Food Protection*, 66 (33): 501-503.

Harshavardhan Thippareddi, K. Juneja, Randall Phebus, James Marsden and Curtis Kastner, Kansas State,

published “Control of *Clostridium perfringens* Germination and Outgrowth by Buffered Sodium Citrate During Chilling of Roast Beef and Injected Pork” in the *Journal of Food Protection*, 66 (33): 376-381.

John (Sean) Fox, Kansas State, published “Existing U.S. Barrier for BSE Needs Strengthening” in *Feedstuffs*, Vol. 75, No. 8, Feb. 24, 2003. **Jutta Roosen, Jayson L. Lusk** and Fox wrote “Consumer Demand for and Attitudes Toward Alternative Beef Labeling Strategies in France, Germany and the UK” in *Agribusiness, An International Journal*, 19 (2003): 77-90. **Lusk, Roosen and Fox** also wrote “Demand for Beef From Cattle Administered Growth Hormones or Fed Genetically Modified Corn: A Comparison of Consumers in France, Germany, the United Kingdom and the United States” in *American Journal of Agricultural Economics*, 85 (2003): 16-29. ■

plan; made contingencies for setbacks; and drawn our vision for victory over foodborne pathogens. I am here today to enlist your help in this war.

We must revolutionize our role and improve the quality and depth of meat and poultry inspection in a quantum leap that will focus on the underserved areas in the current farm-to-table continuum.

Our battle plan contains three main steps to improve food safety ... These are:

1. Bridge the gaps in monitoring food safety programs;
2. Develop an infrastructure for science-base policy making; and
3. Ensure the application of validated decontamination methods from farm-to-table.

Bridge the Gaps

Bridging the gaps is a crucial step in

taking food safety to the next level. Granted, FSIS does not have jurisdiction over ranches or feedlots. However, we have the expertise necessary to develop guidelines for these critical steps in the process. I think it is time that we considered such a step, and we need the help of producers to develop such guidelines.

Along with better production controls, to truly revolutionize our current system in order to win the war on pathogens we need to identify other areas in the food chain that are being overlooked. ...

Risk Assessment

Secondly, our talented and dedicated leadership team has made it clear to the FSIS workforce and to the industry that we regulate, that science will dictate our food safety programs. Yet, believe it or not, there is no formal infrastructure for

science-based policy making. You cannot craft a solution in this highly complex food production world if you have not specifically identified the problem, which is exactly at the heart of any risk management strategy.

Currently, we operate under a number of different models and sometimes are required to change policy as new crises emerge. I believe there is a better way. Government, industry, foodservice, academia and all other interested parties need to come to terms on how best to conduct risk assessments. If successful, then such a plan would be the first of its kind in the world. America has always been the leader in food technology and science. Now we can demonstrate it once again in a way that will benefit all of our citizens. ...

Continued on page 8

Food Safety Digest

by Dave Edmark

The subject comes up now and again, and there was little surprise when the General Accounting Office recently called again for merging the various food safety responsibilities spread across the federal government into one food safety agency. The GAO — the auditing and investigative arm of Congress — said the level of foodborne illnesses “continues to raise concerns about the federal government’s effectiveness in ensuring the safety of both domestic and imported foods.”

The GAO said the food safety system currently has a fragmented structure and criticized “significant problems with the effective implementation of the relatively new science-based inspection system — the Hazard Analysis and Critical Control Point system (HACCP) — that was intended to enhance food safety.”

The GAO says that while it has supported the risk-based HACCP concept of food inspections, it noted that “we recommended in December 2001 that USDA proceed cautiously with modified inspections to ensure that, among other things, industry personnel are adequately trained.” USDA inspectors have not consistently identified problems and have allowed plants to remain out of compliance for

long periods, the GAO said.

It cited as an example of inconsistencies that the U.S. Department of Agriculture has the authority to require food firms to register so they can be inspected and so it can detain any suspect foods, but that the federal Food and Drug Administration has no comparable authority.

■ ■ ■

The nation’s smallest food processing plants were given the most time to make the full mandatory implementation of HACCP inspection systems. During 2002, the Food Safety and Inspection Service operated an outreach program to provide technical assistance to meet their needs.

FSIS classifies small plants as those with 10 to 499 employees; very small plants are those with fewer than 10 employees or annual sales of less than \$2.5 million.

FSIS sponsored 30 courses across the country for operators of these plants. The courses covered targeted sanitation, pathogen reduction and HACCP.

■ ■ ■

Mississippi State University recently received a grant of more than \$1 million for the study of pathogens in poultry production to determine the best point for treatment efforts. The U.S. Department of Agriculture granted the funds to MSU for a three-year project being coordinated by the university’s College of Veterinary Medicine. Researchers

from the MSU Extension Service and the USDA Agricultural Research Service will participate with scientists from Sander-son Farms and Peco Farms poultry companies.

“Our long-range goals are to assist the meat and poultry industry in meeting the requirements of current and future food safety regulations and to improve the safety of meat and poultry products,” said Hart Bailey, assistant professor of veterinary medicine. “A lot of Missis-sippians depend on the poultry industry for their livelihood, and an even larger percentage consumes poultry. Therefore, we have a vested interest in producing the best product possible.” ■

FSIS Seeks... continued

Conclusion

Certainly, the benefits outweigh the risks. I strongly believe that by declaring war on these agents, we will break the merciless cycle of foodborne illness and achieve our mission of enhancing the health status of Americans by significantly improving food safety.

We have a historic opportunity to — not only do what is right — but to do what is needed. I have a bumper sticker in my office that I try to live by everyday, although I sometimes fail to do so. It says: “what is right is not always popular, and what is popular is not always right”. Ladies and gentlemen, let’s do what is right, and in the end, we will be judged by the results we achieve, and not by the popularity of our methods. ■

The Food Safety Consortium Newsletter

is a production of the three member schools of the consortium: University of Arkansas, Iowa State University and Kansas State University. Your comments are welcome.

David Edmark, Editor
110 Agriculture Building
University of Arkansas
Fayetteville, AR 72701-1201
Voice: 479-575-5647
FAX: 479-575-7531
E-mail: fsc@cavern.uark.edu
World Wide Web:
<http://www.uark.edu/depts/fsc>

The Food Safety Consortium

110 Agriculture Building
University of Arkansas
Fayetteville, AR 72701-1201

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