

# **Mainstream Ethnic Foods of Concern in the US Marketplace and Their Impact on Food Safety**

*A Manual Supplement to the Website*

## **INTRODUCTION**

This project entitled, "*Mainstream Ethnic Foods of Concern in the US Marketplace and Their Impact on Food Safety*," was funded by the USDA Integrated Research, Education, and Extension Competitive Grants Program, Award No. 2008-51110-04332 and the College of Tropical Agriculture and Human Resources of the University of Hawaii at Manoa.

### **Definition of Mainstream**

The commonly used notion of *mainstream* is poorly defined. The Project Collaborators aimed to reach a definition of *mainstream* as is generally used today. The definition was necessary before identifying ethnic foods that have entered mainstream American cuisine.

Using experimental design of ideas (Mind Genomics® IdeaMap®.Net), we studied how combinations of phrases fit the poorly defined notion of *mainstream*. Results of our research indicated that for most consumers, the notion of mainstream is defined as that which is "most read, heard, and talked about ... almost every day," the "product most people buy ... found everywhere," or "what most of the population prefers." Results further defined two distinct mindset segments: Segment 1 relied on the characteristics or attributes of the product or offering to form their concept of mainstream. In contrast, Segment 2 relied on the behavior of other people toward the product or offering. Just visit any shopping mall in the United States and the food offerings in the food courts identify *Mainstream Ethnic Foods*. One might also call them *Mall Foods*. By purchasing these *Mall Foods*, which at one time were considered simply ethnic foods, consumers used their purchasing power to assimilate *Mall Foods* into the mainstream American cuisine. These *Mall Foods* are the contemporary *Mainstream Ethnic Foods* in the U.S.

### **Identified Mainstream Ethnic Foods**

Using traditional Zoomerang® as the survey instrument, we asked food inspectors belonging to the Association of Food and Drug Officials (AFDO) at that time (2010) which ethnic foods they think have entered mainstream American cuisine. Their work made them particularly familiar with the ethnic foods that were sold in their localities. We then asked which of these mainstream ethnic foods they considered were of food safety concern in the US marketplace. Interestingly, the surveyed food inspectors stated the same ethnic foods: sushi, candy (due to the ink on the candy wrapper), unpasteurized cheeses, salsa, guacamole, hummus, and preserved eggs. These mainstream ethnic foods that inspectors have identified with food safety concerns have already been previously analyzed and the results published in the literature. This information is included in the website described below.

### **Consumer Attitude Toward Mainstream Ethnic Foods**

Another survey completed in 2013 was conducted on consumers regarding their attitude and behavior toward Mainstream Ethnic Foods, their origins, their safety, food safety inspection by food inspectors, and their judgment of the economic value of these foods. We used Rule Developing Experimentation (RDE) and the Mind Genomics® IdeaMap®.Net technology for this survey. Results indicated that consumers identify Italian, French, Mexican, and Asian (Chinese, Filipino, Japanese, Vietnamese, and Thai) foods as having entered Mainstream American cuisine, have positive attitudes toward them, will pay for these foods, and like their good eating characteristics. They identify Mainstream Ethnic Foods as fitting their cultural restrictions, continuing traditions, and introducing food diversities.

### **Mainstream Ethnic Foods Database—A Website**

To integrate all these findings, we created a publicly available database of mainstream ethnic foods that is searchable, expandable, and posted on the PI's website. Those mainstream ethnic foods identified from the first survey were inputted into this database. Published scientific information about the specific food was also included. Initially designed for food inspectors only, the web-located database was broadened to educate the food industry, as well as anyone interested in Mainstream Ethnic Foods. The website may also be used by students.

Through this website, we intend to provide the food inspector or regulator, food manufacturer, policy makers, and the consumer information on food safety to familiarize them with the food and to assist in inspection work, bill drafting, product or process development or improvement, or purchase decision. Please note that this website is not intended to be exhaustive or critical of any food due to its origins.

This website is dynamic. It will change and develop with the changes and development of consumer preferences. If you would like to add information to this website, please address to:  
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### **Supplemental Manual**

This short manual may be used to supplement the web-located database of mainstream ethnic foods. This manual is suitable as introductory instruction material for food inspectors, food industry members, and the consuming public.

We hope you find this website educational and helpful.

The Project Collaborators  
August 30, 2013



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## **FOOD SAFETY CONCERNS**

### **INTRODUCTION**

Results of our studies indicate that food safety concerns of food inspectors (or Food Safety Inspection Officers) for mainstream ethnic foods in the United States are not different from their concerns for foods found in mainstream American cuisine. This is because the ethnic foods have become mainstream –i.e., they are no longer different from the other mainstream American foods due to their origins.

This manual may serve as a supplement to the web-located database of mainstream ethnic foods that resulted from our studies. This manual is not meant to be exhaustive. Recommendations will be given throughout the manual.

### **FOOD SAFETY CONCERNS**

The main food safety concerns for mainstream ethnic foods in the United States are:

- Cross-contamination
- Personal hygiene
- Temperature-time abuse
- Special processes used to prepare certain foods

#### **Cross-Contamination**

Definition: Cross-contamination is the transfer of harmful microorganisms from one surface to another, including foods.

Control of cross-contamination:

- Separate raw from cooked foods. Separation may be achieved using different food contact surfaces or spaces that are clearly separated or through length of handling times or exposure to temperatures when pathogens may survive, grow, and multiply.
- Wash hands thoroughly before and after handling food.
- Use only potable water.
- Separate storage areas for food and cleaning agents, including pesticides
- Food containers and surfaces must be made of materials approved for food contact, and washed, rinsed, and sanitized according to regulations.
- Protect food from foreign materials not normally present in the food.
- Use only safe food and packaging materials from approved sources

#### **Personal Hygiene**

Definition: This refers to a set of recommended acceptable practices that must be followed to protect food from contamination by the food handler.

Control of contamination by the food handler:

- Most important practice: thorough handwashing before and after handling food and certain specific activities
- No bare hand contact is allowed when handling ready-to-eat foods.
- Use clean and cleanable outer garments.
- Report any illness or injury to management.
- When ill, do not work in exposed food areas.
- Do not consume food or drink when working in exposed food areas.
- Restrict contamination with foreign particles by
  - Wearing hair restraint
  - Removing jewelry during food handling

### Temperature-time Abuse

Principle: Harmful microorganisms grow best at certain temperatures specific to those microorganisms. They can also populate readily at specific times during those temperatures. Conversely, harmful microorganisms may also be killed after exposure for a certain period of time at certain specific temperature. When food is improperly handled, harmful microorganisms are allowed to grow at temperatures if held for a period of time that supports this growth. This is called temperature-time abuse.

The 2009 FDA Food Code defines Potentially Hazardous Foods/Temperature-time Control for Safety Foods (PHF/TCS) as the new accepted terminology replacing Potentially Hazardous Foods (PHF). In the future, PHF/TCS will be further replaced with TCS. For this manual, we will be using PHF/TCS.

Control of temperature-time abuse:

- The 2009 FDA Food Code lists recommended minimum temperature-times for the following but ***you must also consult your local or State regulations for specific requirements.***

- Receiving specific foods

Food	Temperature
Frozen foods	≤0F (surface)
Refrigerated PHF/TCS	≤41F (internal food)

- Storage of specific foods

Food (uncovered with foil)	Food Temperature
Freezer	<0F
Seafood	30-34F
Chiller	≤38F (air)
Chilled foods	≤41F
Deep chilled foods	26-32F
Fresh produce	41-45F
Dry storage	50-70F

- Cooking specific foods

<b>Food</b>	<b>Minimum Temperature-time (at thickest part of the food of the ingredient with the most stringent T-t requirement)</b>
Microwave cooked foods	165F, 2 min
Poultry Stuffed foods	165F, 15 s
Ground beef or pork Chopped/flaked meat	155F, 15 s
Cooked eggs, then held	155F, 15 s
Beef roast	145F, 3 min or 140F, 12 min or 130F, 121 min
Beef steaks, pork, ham, fish, seafood (all forms), bacon	145F, 15 s
Cooked to order eggs	145F, 15 s
Fruits and vegetables	135F

- Holding foods

<b>Food (stirred then covered)</b>	<b>Temperature (every 2 hr)</b>
Hot foods	$\geq 135F$
Cold foods	$\leq 41F$

- Cooling foods

<b>Food (stirred then covered)</b>	<b>Temperature (taken every 2 hr)</b>
Hot foods	Cool hot foods to 70F within 2 hr, then to $\leq 41F$ within the next 4 hr (total of 6 hr max)
Not so hot foods	Cool to $\leq 41F$ within 4 hr

- Reheating foods

<b>Food (stirred then covered)</b>	<b>Temperature (every 2 hr)</b>
Leftovers	$\geq 165F$ within 2 hr

### **Special Processes Used to Prepare Certain Foods**

#### ***PHF/TCS Foods Identified in the 2009 FDA Food Code***

The following were identified as PHF/TCS foods and therefore, require special handling for food safety:

- Garlic-in-oil mixtures
- Raw seed sprouts
- Cut melons

- Cut tomatoes or cut tomato mixtures
- Cut leafy greens
- Heat-treated plant food
- Raw or heat-treated animal foods (or foods from animal sources such as beef, poultry, pork, mutton, fish, game animals, and other meat animals)

### ***Acidification***

Some of the products that many small businesses find relatively easy to produce are acidified foods. Although some States have defined acidified foods as “less risky,” this term may be confusing just as the term “potentially hazardous foods (PHF)” is. Both terms are technical terms that are used in the regulations.

Acidified foods are low acid foods, with the exception of carbonated beverages and those held under refrigeration, to which an acidifying agent or food(s) had been added, not as a flavor enhancer, but to achieve a finished product with final pH equilibrium  $\leq$ pH4.6 and water activity  $>$ 0.85. Acidified foods are subject to registration (Form FDA 2541) and filing requirements (Form FDA 2541a).

Foods are not considered acidified if:

1. The low acid food is in a “small” amount, defined in practice as
  - a.  $\leq$ 10% w/w), **and**
2. The final equilibrium pH of the finished product does not differ significantly from the pH of the predominant acid ingredient (i.e., all the acid ingredients combined), defined in practice as
  - a.  $>$  0.4 pH shift for predominant acid ingredient with pH $<$ 3.8
  - b.  $>$ 0.3 pH shift for predominant acid ingredient with pH between 3.8-4.2
  - c.  $>$ 0.2 pH shift for predominant acid ingredient with pH 4.2; and
  - d. any pH shift for predominant acid ingredient with pH $>$ 4.2..

Some acidified foods, called pickles or pickled products, were low acid foods with a final pH $<$ 4.6 achieved by fermentation by acid-producing microorganisms or by marinating in an acid solution. In the absence of known illnesses or deaths from such commercially fermented products, the US FDA advised that regulations on acidified foods (i.e., registration and process filing requirements) would not apply to pickles or pickled products.

This section on Acidified Foods stipulates that a pH meter is necessary during product preparation.

For complete information on process requirements, please refer to the FDA’s Draft Guidance to the Food Industry – Acidified Foods.

<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/AcidifiedLACF/ucm222618.htm>

### ***Reduced Oxygen Packaging (ROP)***

Definition: Reduced Oxygen Packaging is the packing of foods in a sealed package with a reduced oxygen level, with the potential of supporting the growth of anaerobic bacteria including *Clostridium botulinum* and production of its deadly toxin. Reduced oxygen packaging is very attractive to retailers because of the advantages to product qualities. ROP includes:

- Vacuum packaging
- Modified atmosphere
- Controlled atmosphere
- Sous vide
- Cook-chill

If using any of the above packaging, please consult your local food inspector (or Food Safety Inspection Officer) or Food Safety Regulatory Agency.

### ***Packaging Juice***

Although most fruit juices are acidic and are therefore non-PHF/TCS foods, certain vegetative pathogens, including *E coli* O157:H7, have been known to grow in these juices and cause foodborne illness. On the other hand, most vegetable juices and other fruit juices are low acid foods and are PHF/TCS foods. These low acid juices will support the growth of vegetative pathogens, including *Clostridium botulinum*, *Salmonella*, and *Cryptosporidium parvum*.

Control of food safety concerns:

- All packaged juices prepared by a *commercial* processor must be pasteurized or treated by a method validated to achieve a 5-log reduction of pathogens before they are sold.
- All packaged juices prepared by a *retail* processor must carry a Warning Statement on the label instead of pasteurization or a treatment to achieve 5-log reduction.
- Only juices served by the glass directly to the consumer are exempt from treatment or a Warning Statement on the label, unless sold to highly susceptible populations (in which case, the juice must be pasteurized).

### ***Other Special Processes***

***Sprouting.*** Sprout growing conditions are ideal in supporting the growth and exponential multiplication of pathogens, such as *Salmonella*, *E coli* O157:H7, and *Listeria monocytogenes*. Pathogen contamination may be taken up to the sprout tissues by the roots of the seed causing internalized contamination. Biofilm formations have also been observed on sprouts, protecting entrapped foodborne pathogens from sanitizers and disinfectants. Sprouts are a high-risk product.

Control of food safety concerns: Strict sanitary handling of sprout seeds, the growing, its environment, harvesting, and transfer are necessary in controlling food safety concerns because pathogens will be present in the sprouts even when grown under sanitary conditions.

***Meat and Poultry: drying, curing, smoking; fermentation of sausages***

**Seafood: curing, smoking, drying.** These are highly specialized processes that cannot be sufficiently discussed in this supplement. It is highly recommended to consult the other sources listed in the References at the end of this supplement.

Control of food safety concerns: At a minimum, the following must be managed:

- Securing materials from an approved safe source.
- Having a validated process that will kill the pathogens of concern (e.g., *Trichinella spiralis*)
- Monitoring water activity to be <0.88 for dried ready-to-eat product
- Curing and brining at controlled temperatures and times ( $\leq 41\text{F}$ )
- Smoking at controlled temperatures and times
- Packaging suitably to prevent contamination
- Labeling that it is ready-to-eat if RTE

**Addition of additives.** Most PHF/TCS foods are prepared with a shelf life of 7 days at 41F. Shelf life may be extended with the addition of food and packaging additives such as acetic acid, sodium bicarbonate, benzoic acid, enzymes, organic acids, and sodium chloride. Sugar is often used as a flavoring agent but may also serve as an additive, as in jams and jellies.

Control of food safety concern: Use only GRAS or FDA approved additives and only for their specific function and at the recommended levels.

## RECOMMENDATION

There are many educational materials (including free materials) available on basic safe food handling practices, such as the Basic Food Safety for Food Handlers:

[http://manoa.hawaii.edu/ctahr/pacific-afsp/?page\\_id=161](http://manoa.hawaii.edu/ctahr/pacific-afsp/?page_id=161)

Additional references are cited at the end of this manual.

It is highly recommended, however, that food inspectors request the training course on FD312 (Special Processes at Retail) that is newly updated in 2013 and conducted by the University of Tennessee in collaboration with former AFDO officials and the US FDA. The PI of this project on Mainstream Ethnic Foods was part of their curriculum development team. Please contact Business Manager Meredith York ([mcody@utk.edu](mailto:mcody@utk.edu)) for information.

**Table A. Interaction of pH and a<sub>w</sub> for control of spores in food heat-treated to destroy vegetative cells and subsequently packaged**

a <sub>w</sub> values	pH values		
	4.6 or less	> 4.6 - 5.6	> 5.6
≤ 0.92	non-PHF*/non-TCS FOOD**	non-PHF/non-TCS FOOD	non-PHF/non-TCS FOOD
> 0.92 - .95	non-PHF/non-TCS FOOD	non-PHF/non-TCS FOOD	PA***
> 0.95	non-PHF/non-TCS FOOD	PA	PA

\*PHF means Potentially Hazardous Food

\*\* TCS food means Time/Temperature Control for Safety food

\*\*\* PA means Product Assessment required

**Table B. Interaction of pH and a<sub>w</sub> for control of vegetative cells and spores in food not heat-treated or heat-treated but not packaged**

a <sub>w</sub> values	pH values			
	< 4.2	4.2 - 4.6	> 4.6 - 5.0	> 5.0
< 0.88	non-PHF*/ non-TCS food**	non-PHF/ non-TCS food	non-PHF/ non-TCS food	non-PHF/ non-TCS food
0.88 - 0.90	non-PHF/ non-TCS food	non-PHF/ non-TCS food	non-PHF/ non-TCS food	PA***
> 0.90 - 0.92	non-PHF/ non-TCS food	non-PHF/ non-TCS food	PA	PA
> 0.92	non-PHF/ non-TCS food	PA	PA	PA

\* PHF means Potentially Hazardous Food

\*\* TCS food means Time/Temperature Control for Safety food

\*\*\* PA means Product Assessment required

Page Last Updated: 11/09/2009

Note: If you need help accessing information in different file formats, see [Instructions for Downloading Viewers and Players](#).



## REFERENCES

Saulo, A.A. October/November 2013. It's Not All about the Science. An e-article in Food Safety Magazine.

<http://www.foodsafetymagazine.com/magazine-archive1/octobernovember-2013/ite28099s-not-all-about-the-science/>

Saulo, A.A., Moskowitz, H.R., and Rustia, A.S. 2013. Going Mainstream—What does it truly mean anyway? *Journal of Food Products Marketing* 19 (3): 153-175

Saulo, A.A. and Moskowitz, H.R. 2011. Uncovering the Mind-sets of Consumers toward Food Safety Messages. *Food Quality and Preference* 22:422-432

Do It Right! A free downloadable educational package on “Basic Food Safety for Food Handlers.” [http://manoa.hawaii.edu/ctahr/pacific-afsp/?page\\_id=161](http://manoa.hawaii.edu/ctahr/pacific-afsp/?page_id=161)

2009 US FDA Food Code

<http://www.fda.gov/downloads/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2009/UCM189448.pdf>

<http://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/UCM2019396.htm>

September 2010 Draft Guidance for Industry: Acidified Foods (UCM227099)

<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/AcidifiedLACF/ucm222618.htm>