4-H Food and Nutrition Project

Food and Nutrition Project enrolls over 12,000 students
The 3rd largest project in IOWA

- Address the food safety concerns of county/state fair projects
- Training of judges for consistent scoring
- Adapt score cards so that learning is facilitated
- Include food safety education within projects
  "Digging Deeper – Food Safety"

4-H Food and Nutrition Project

The three projects we will talk about tonight:

- Food and Nutrition Exhibits (nonproduct)
  - Exhibit guidelines
- Food Preparation and Safety
  - Food safety
  - Inappropriate foods and why
  - Quality – displays and examination of product
- *Go the Distance*
  - Project guidelines

Project/Program Objectives

Food and nutrition related projects and programs help 4-H'ers to:

1. Develop life skills, particularly in decision making, learning how to learn, communication, leadership and citizenship.
2. Take responsibility for making healthful food choices and establish a fitness plan based on knowledge of one's nutritional needs, lifestyle and physical condition.
3. Develop skills in planning, selecting, preparing, serving and storing food.
4. Gain knowledge and understanding of psychological, social, economic and cultural influence of food choices.
5. Recognize how national and worldwide policies relate to food availability, personal food choices and nutritional status of populations.
6. Acquire knowledge and skills of career opportunities in food and nutrition.

4-H Food and Nutrition Project

Food Safety Concerns

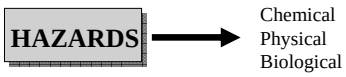
4-H Food and Nutrition Preparation and Safety Projects must be designed and executed to reduce the potential for food borne illness.

Critical considerations:

- o Prevention of pathogen growth
- o Prevent introduction of pathogens during preparation

Food Safety

What causes food to be unsafe?



Microbiological hazards are considered the biggest risk to humans.

Microorganisms are important because:
- loss of shelf life and product quality
- major cause of food borne illness

Food Microbiology

Bacteria are the major foodborne concern to food processors and consumers.

Pathogenic bacteria are those that cause illness, examples: *Salmonella, Staphylococcus, Clostridium, E. coli* O157:H7, etc.....

Conditions for Growth

What Microorganisms need to grow

F Food 

A Acidity 

T Time 

T Temperature 

O Oxygen 

M Moisture 

Bacterial Growth - Food

Bacteria, yeasts, and molds can grow on just about anything... but like carbohydrate and proteins.

Think about the foods that spoil the quickest... These are the ones we are concerned about.




Bacterial Growth - Effect of pH

The acidity of a food is measured by the pH.

Neutrality is at pH 7.0

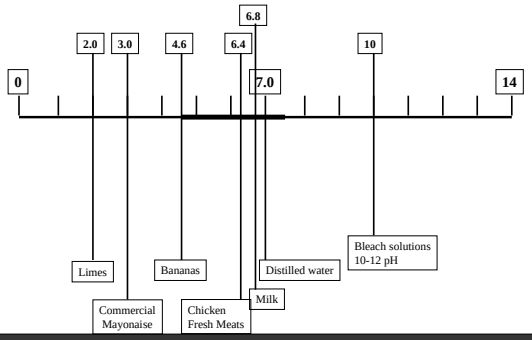
0-7 = acid, 7-14 = basic

The lower the pH (higher the acidity), the less likely is the food to support bacterial growth.

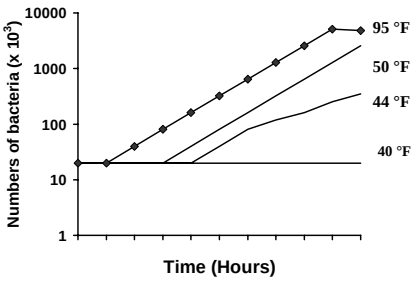
Potentially hazardous foods are those in the range of pH 4.6 to 7.5

Acetic, lactic, phosphoric acids are used to preserve foods by lowering the pH.

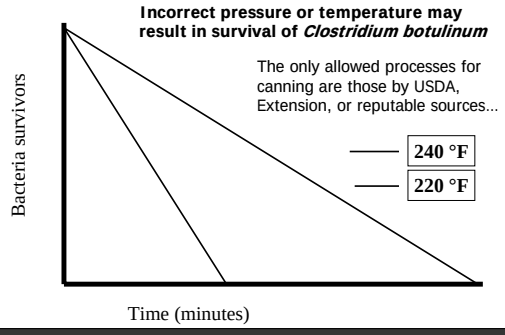
Acidity
pH Ranges of Foods



Effect of time and temperature on bacterial growth



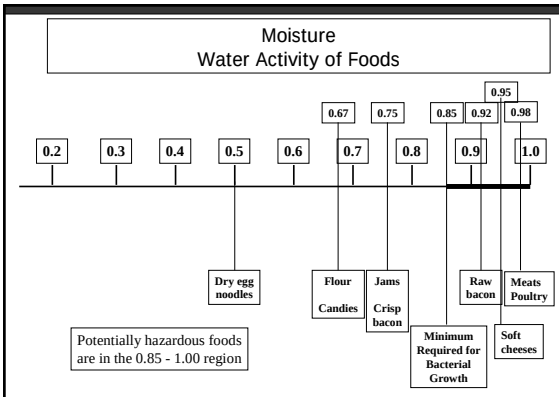
Why correct thermal processing is important

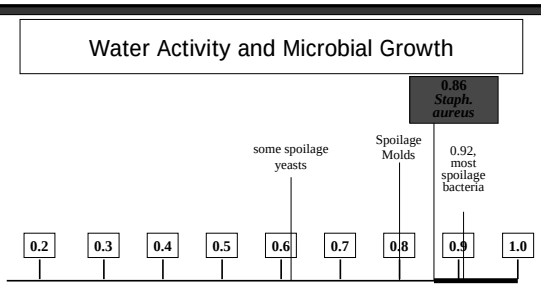


Oxygen and Microbial Growth

Microbes differ in their need for oxygen.

- Aerobic bacteria - need oxygen to grow
  - Examples: *Psuedomonas, Bacillus*
- Anaerobic bacteria - will grow only in absence of oxygen
  - Example: *Clostridium botulinum*
- Facultative bacteria - grow with or without oxygen
  - Examples: *Salmonella, E. coli, Staphylococcus*
- Microaerophilic - grow under reduced oxygen levels
  - Examples: *Listeria, Campylobacter*





Bottom line...

By recognizing those conditions that will allow bacterial growth, one can identify foods that might be potentially hazardous.

Definition of potentially hazardous food:
neutral acidity – pH range 4.6 – 7.8
water activity – 0.86 or above
stored above 40°

Hazardous food:
add hermetically sealed.

Before judging a product, ask yourself…

Should this product have been refrigerated for safety?

Would you eat this at room temperature?

Acceptable Food Exhibits

Acceptable
- Fruit flavored vinegars
- Cream cheese mints
- Caramel rolls and pineapple upside down cakes
- Most baked fruit pies, cookies, bars, breads, etc…
- Fruit jams, jellies, and preserves when processed according to a USDA or Extension publication

Thumbs up exhibits

- Whole grain muffins, breads, quick breads
- A physical activity plan or healthy eating plan or both
- Family Favorites or recipes passed down in families
- Foods preserved according to USDA guidelines
- Comparisons
- Adjusted recipes for fat, fiber, nutrition, sugar and etc.

Kid's thumbs up exhibits

- Chocolate Chip Cookies
- Anything that can be made the night before.
- Anything that tastes good!
- Grandma's anything as a poster not food!
- Anything that is shown in a magazine, on TV, and in the newspaper as a poster.

Acceptable ***if…*** Food Exhibits

Acceptable ***if*** processed according to current guidelines

Canned products

Canned salsa

Pecan/Walnut pies

Frostings, icings and glazes

Acceptable ***if…***

Canned products are acceptable if:
- they are processed according to **current** USDA guidelines, or;
- they are processed according to **current** *Ball Blue Book* specifications, or;
- they are processed according to a **current** Extension publication.

Resources:

Ball Blue Book of Preserving, 2003, Alltrista Corp.

The USDA Complete Guide to Home Canning, 1994. at: www.uga.edu/nchfp/

So Easy to Preserve available at www.uga.edu/nchfp

Any Current State Extension Publications.

Comments about Canned Products

Documentation required for all canned products:

1. canning method used;
2. time and pressure used;
3. recipe;
4. source of recipe.

Not acceptable:

paraffin or wax sealing

jars that contained a commercially canned product

non matching lid and jar

More comments about canned products

Judges **will not taste**:

canned vegetable or meats

Evaluate these on

- color,
- appearance,
- texture,
- aroma.

Tomatoes must be acidified according to Extension publication or USDA. Most recipes require this already.

Canned Salsa

Fresh salsa will not hold for judging.

It will ferment.

Canned salsa must be done according to an approved Extension publication.

There is a safety concern with canned mixed tomatoes and vegetables – or salsa.

Good source of salsa recipes are at:

"www.cahe.nmsu.edu/pubs/_e/e-323.pdf"

Pecan/Walnut Pies

Yes, these are acceptable as long as a traditional recipe is followed with *no added milk or water.*

Fruit pies are moist too but more acidic. Acidic foods do not allow growth of pathogenic bacteria.

Acceptable ***if...***

Frostings, icings, and glazes are acceptable if they:

do not contain raw eggs;

are not whipped cream cheese **without** powdered sugar;

will not melt in the hot humid conditions of the FAIR.

Cream cheese frostings must contain at least

4 cups of powdered sugar per 8 oz of cheese.

Commercial meringue **powder** frostings are acceptable;

meringue from raw eggs is **NOT**!!

What about?

What about?

Yes, these are acceptable this year!!!!

No food safety considerations.

May be quality issues with hot humid weather…

What about?

Fruit Vinegars are acceptable if made with commercial vinegars.

Specific recipe must be followed,
fruit just added to vinegar
is not an acceptable product.

Do not dilute the vinegar.

We are not recommending herbed or vegetable vinegars at this time

Not Acceptable…

Flavored oils

No.

Flavored oils will not be accepted for exhibit because of the concern of botulism. Oil encapsulates spores and the oil environment is anaerobic, which is an ideal condition for botulism toxin production.

Flavored oils must be refrigerated.

What about?

Vegetables Marinated in Oils and Herbs

NO.

Same reason as the flavored oils…it is just too risky for botulism.

What about?
Refrigerator Muffins, Starters, Friendship Amish Bread

NO.

We cannot be certain that these are made to prevent the growth of and toxin production by *Staphylococcus.* The toxin is heat stable and will survive the cooking process to make judges sick.

What about?

Cake/Brownies Baked in a Jar

NO.

Anything **baked** in a sealed jar is unacceptable.

Potential botulism risk.

Cookie and cake mixes that are stored in a decorative jar are acceptable as a demonstration.

What about?

Jerky

Hamburger and Poultry Jerky is NO.

Jerky made from intact muscle... NO.

Often meat is sliced too thick and insufficiently dried. It can mold.

Salmonella is a risk to all jerkys.

What about?

Sweet Rolls with Cottage Cheese/Egg Topping?

NO.

A cheesecake type mixture for a topping implies a sugar, egg, and cream or other cheese mixture is placed to top. This would not be acceptable.

What about?

Cheesecake filling inside

NO.

This is not an acceptable product.

Cheese Danish and other cream cheese filled products are potential sources of Staphylococcus.

What about?

Homemade egg noodles

NO.

USDA "Meat and Poultry Hotline" says that noodles made with whole raw eggs should be dried and stored in the refrigerator or frozen to prevent salmonella from growing to dangerous levels.

What about?

Carmel Corn Cooked or pies baked in a paper grocery bag

Paper grocery bags should not be used because:

-the bag may not be sanitary

-the glue may give off toxic fumes

-the bag may have recycled paper and could catch fire

What about?

Raw egg in any uncooked product is not acceptable.

Salmonella can be inside the egg, even one with a clean, uncracked shell.

Many old favorite recipes were written before salmonella was found inside eggs.

What about Breads?

Breads that contain normally refrigerated items such as cut-up mushrooms, chopped onions, chopped peppers, salsa and etc....

Breads that contain high protein items such as pork and beans and layers of cheese would be used in a timely manner at home.

Because of their short shelf life, these are not acceptable as a fair exhibit.

Assessing Product Quality – some help

Product quality evaluation

General Considerations

Looking for products that are appealing, characteristic, and representative of the genre of product.

Evaluation is based upon:

A. APPEARANCE
B. AROMA
C. FLAVOR
D. TEXTURE/CONSISTENCY
E. TENDERNESS
F. TECHNIQUE

Canned Product Quality

Product must have been canned using a procedure from USDA, Extension or other reputable source.

- Low acid foods – vegetables and meats must be pressure canned.
- Acidified foods – pickles, tomatoes may be water bath processed
- High acid foods – fruits, jams, jellies, preserves may be water bath processed.

Canned Product Quality

For safety, do not taste the low acid foods such as canned vegetables or meats.

There is a potential botulism risk to the judge.

Reasons:

improper time temperature relationship
poor temperature regulation
bad gauge or dial on pressure canner
over- or underfilled canner
used wrong method

ARE YOU CERTAIN THAT GUIDELINES WERE FOLLOWED???????

Canned Product Quality

Appearance
Quality of product - ripeness, color, blemishes on product
Pack - proper headspace, full, uniform pieces
Container and label - standard canning jar, adequate info

Aroma
Characteristic

Flavor
Characteristic, over processed

Texture/Consistency
Appropriate for product

Tenderness
Characteristic of product, over processed

Technique
Proper procedure or method

Canned Product Quality

Examples of jelly:

Control are in wide mouth jars

W Weak gel

F Improperly processed

Pass the jars around and observe how the jelly flows in the jar.

The weak gel flows uniformly around the jar.

The improperly processed has clumps of pectin in the matrix.

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Baked Products Quality

Items to look for:

- surface coloration
- unincorporated ingredients such as flour
- grain (texture) and color of cut product
- uniform size and incorporation of ingredients
- greasy
- shape is characteristic of product

Smell for:

- oily or rancid aroma
- overly yeasty or sour
- presence of added ingredients
- burnt

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Baked Product Quality

Flavor and Texture by Mouth:

- textural characteristics
  - tenderness
  - mouth feel/consistency
  - moistness
- flavor characteristics
  - characteristic of product
  - off flavors – yeasty, bitterness, burned, soapy
    - list goes on and on
  - bland or lack of flavor

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Yeast Breads

Characteristics will vary slightly depending upon type of bread.

- Loaf volume is good and proportional.
- Coloration is good.
- All ingredients are incorporated.
- Texture is smooth with a moderate to fine grain.
  - large air pockets are not desirable
- Crust is thin to thick depending upon type of bread.
- Crumb is soft and smooth with some elasticity.
- Flavor – no off flavors but should taste like bread.

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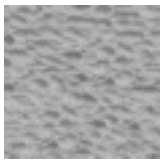
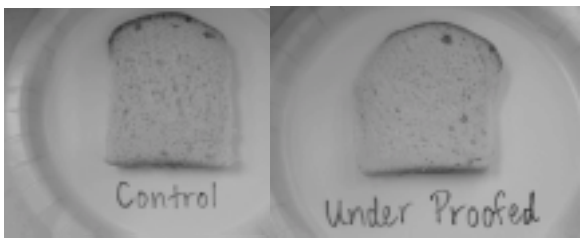
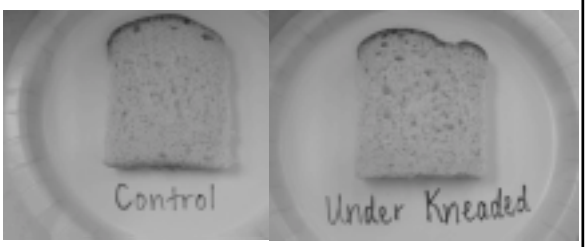
There are five breads to examine.

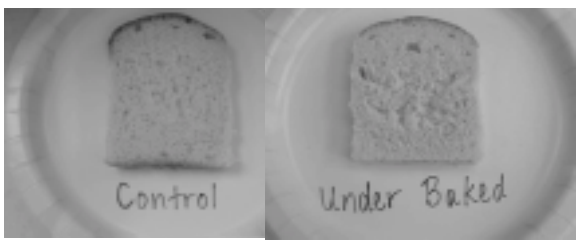
- C Control
- OP Over proofed – second rise was too long
- UP Under proofed – second rise was too short
- UK Under kneaded – poor gluten development
- UB Under baked – cooked until top was browned

Cut the loaf in the middle to show the interior. Other slices can come from one of the halves for flavor.









Muffins

A muffin should have a even rounded symmetry with a rough pebbly top that is golden brown.

The texture should be coarse but even.

Flavor will depend upon additions

Muffins

The major problem with muffins will be over working the product.

Overworking results in a variety of textural and shape defects including peaks and tunnels.

A tough gummy texture can result also.

Some oils will cause off flavors when used.

Muffins

There are three types of muffins to examine.

- LW – Lightly over worked
- OW – Extremely over worked
- Oil – wrong oil used and poorly incorporated ingredients.

Cut muffins of each treatment directly in half to observe the texture.

The oil muffins can be cut into pieces for tasting.

Cakes

There are a variety of cakes but all have similar texture and crumb.

Appearance should be rounded and uniform.

Texture should have a fine crumb without large air cells or air pockets. Product should be tender.

Flavor is dependent upon additives. White or yellow cakes should have a sweet flavor.

Cakes

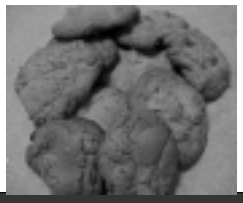
There are three cakes to observe and taste.

- Control
- Too much leavening
- Too little leavening

Cut the cake directly in half. Use one half for flavor and observe the second cake.

Cookies

Infinite variety but some considerations
- Shape – uniform and even contour generally
- Color – uniform
- Texture – characteristic of type
- Tenderness – characteristic
- Flavor – well blended



Resources for Members

Six Easy Bites ...old and new
Tasty Tidbits. Level B
You're The Chef. Level C
Foodworks. Level D

The new Six Easy Bites was given to members last fall.

New website – "www.extension.iastate.edu/nutrition"

Resources for Leaders & Judges

Leader/Helper's Guide for Foods Curriculum.
- Get two ways..county office or from ISU.
- Ask for 4-H 445 LDR
- Best $5 bargain around.

"Guidance for Preparation of Safe Foods For 4-H Fairs"
- New ISUE publication

Publications can be printed from ISUE website.
- "www.extension.iastate.edu/pubs"

Your Nutrition and Health Field Specialist...
- by phone or e-mail, and other county staff.

Don't forget Answer Line

It is free, available every day, and connects you to ISUE.

1-800-262-3804
Monday – Friday
9-12, 1-4

What about recipes and nutritional analysis?

Listing of websites available by computer:
- USDA Nutrient Data Laboratory
- "www.nal.usda.gov/fnic/foodcomp/"

Nutrition Analysis Tools and System
- "nat.crgq.com"

Nutrition Data
- "www.nutritiondata.com/index.html"

Nutritionist Pro available through Nutrition and Health Field Specialists

Nutrition Guidelines

Out with the old, in with the new...

use the most current dietary/nutrition guidelines.

Nutrition Guidelines

- Dietary Reference Intakes (DRI)
  - Should be used when assessing nutrient adequacy
  - www.nal.usda.gov/fnic/etext/000105.html
  - Tables can be downloaded and printed as a reference

Food Guide Pyramid

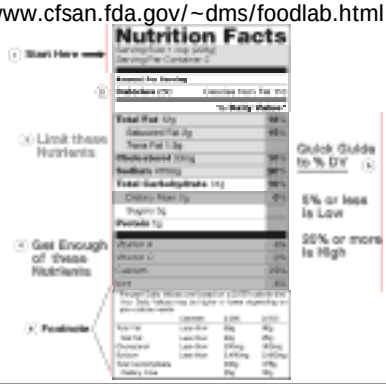
http://www.nal.usda.gov/fnic/Fpyr/pyramid.html

Food Guide Pyramid for Young Children

Dietary Guidelines

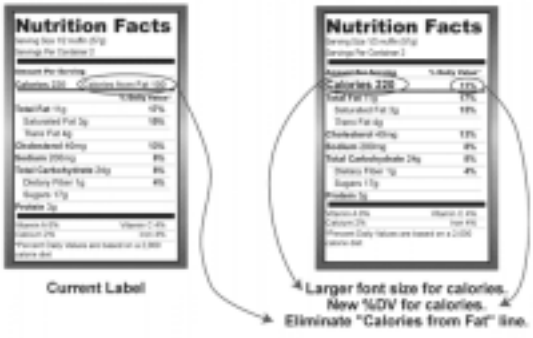
http://www.health.gov/dietaryguidelines/

http://www.cfsan.fda.gov/~dms/foodlab.html



Current Label

Proposed Label



Label Fables

Total carbohydrates
32 gms

Non-effective carbs
17 gms

Net or effective carbs
15 gms

What is the Glycemic Index?

Blood glucose response to a standard dose of carbohydrate of a given food

High glycemic foods
increase the blood sugar quickly, followed by a quick fall in blood sugar

Low glycemic foods
increase the blood sugar more gradually and sustains a slightly elevated blood glucose for a longer period of time

Low carb/high protein diets

Categorize carbohydrates
- Good vs bad
- Tricklers and gushers
- Slow and fast

Is the glycemic index as simple as -

Simple?	Complex?
Doughnut – 76	WW bread – 73
Puffed rice cereal – 82	WW spaghetti – 32
Pear – 33	All Bran – 38
Skim milk – 21	Carrots – 92
Jelly beans – 80	Split peas – 32
Banana cake - 41	Wheat crackers - 67

Factors influencing the glycemic index:

Structure of the carbohydrate
Intestinal motility/absorption
Food particle size
Mechanical and thermal processing of food
Content and timing of previous meal
Nutrients accompanying the carbohydrate
Fat, fiber, protein, etc...

And the research says:

"Protein decreases perceived hunger, provides more satiety"

Studies were not well-controlled for other factors influencing satiety such as fiber, energy density, glycemic index, fat, etc...
Some evidence for short satiety but a lack of evidence for longer term satiety

Eisenstein et al, Nutrition Reviews 60(7):189-200, 2002

And the research says:

"Higher protein intake increases energy expenditure by increasing the thermic effect of food"

Protein has approximately 2x the thermic effect as carbohydrate or fat
In a 2000 calorie diet of 15% or 30% protein this is only a 23 calorie difference

Eisenstein et al, Nutrition Reviews 60(7):189-200, 2002

And the research says:

Review of 7 diets of the same caloric value and varying amounts of protein

No difference in weight loss or fat loss

Eisenstein et al, Nutrition Reviews 60(7):189-200, 2002

And the research says:

High protein diets followed for 12 weeks and 1 year

No difference in weight loss or fat loss

Farnsworth et al 2003; Foster et al, 2003

And the research says:

There is little long-term evidence regarding the health effects of high-protein diets.

Go the Distance Classes

A – Any exhibit by an individual 4-Her which is an outgrowth of an individual's goal to explore the areas of nutrition and physical activity for personal development.

B- Any exhibit by one or more 4-Hers which is an outgrowth of a goal to provide leadership in the areas of nutrition and physical activity in a group setting (family, club, community).

C – Any exhibit by one or more 4-Hers which displays citizenship in the areas of nutrition and physical activity within a community (senior living center, school).

Go the Distance Class

- What was the goal(s)?
- How was the idea for the exhibit determined and developed?
- What responsibilities were completed by each participant involved in the learning experience?
- What did you learn about nutrition and physical activity?
- What plans do you have to continue this interest?

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