2018 Food Science CDE General Knowledge Exam -- Iowa FFA

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. The lower limit of moisture by sun drying is approximately ____ percent.
a. 10
b. 15
c. 20
d. 30

____ 2. Foods high in ____ or other solutes dry more slowly.
a. protein
b. salt
c. sugar
d. water

____ 3. ____ is when water goes from a solid to a gas without passing through the liquid phase.
a. Transfusion
b. Sublimation
c. Evaporation
d. Condensation

____ 4. Reducing the volume and weight of a product saves ____ during processing.
a. time
b. energy
c. money
d. flavor

____ 5. Low-temperature ____ evaporators are used for heat-sensitive foods.
a. ultrafiltration
b. osmosis
c. vacuum
d. drum

____ 6. Sun-dried ____ are the best known of all dried foods.
a. tomatoes
b. peppers
c. raisins
d. mushrooms

____ 7. To dry fruits out-of-doors, humidity below ____ percent is best.
a. 60
b. 70
c. 80
d. 90

____ 8. ____ are used in medical research and therapy in many hospitals and universities.
a. Radioisotopes
b. Microwaves
c. Satellites
d. Mice

____ 9. Foods that are sterilized by irradiation can be stored for ____ without refrigeration.
a. years
b. months
c. weeks
d. days

____ 10. Microwave radiation is often called ____ radiation.
a. ionizing
b. nonionizing
c. electrical
d. magnetic

____ 11. Irradiation causes undesirable flavor changes in ____ products.
a. dairy
b. grain
c. meat
d. vegetable

____ 12. In ____, FDA approved the use of irradiation to control pathogens in fresh and frozen red meats, such as beef, lamb, and pork.
a. 1988
b. 1975
c. 1997
d. 1990

____ 13. ____ are the most heavily used additives.
a. Minerals
b. Vitamins
c. Gums
d. Sweeteners

____ 14. Sequestrants are ____ agents.
a. cheating
b. chelating
c. chilling
d. charcoal

____ 15. ____ dissolve in water and are made as powders, granules (small hard pieces), liquids, or other special-purpose forms.
a. Dyes
b. Lakes
c. Sweeteners
d. Gums

____ 16. ____ make a food acid or sour.
a. Flavorings
b. Texturings
c. Colorings
d. Acidulants

____ 17. ____ containers come in direct contact with the food.
a. Secondary
b. Primary
c. Tertiary
d. All of the above

____ 18. The outside of the steel can is protected from rust by a thin layer of ____.
a. tin
b. copper
c. aluminum
d. silver

____ 19. Paper used for ____ cartons must come from sanitary virgin pulp.
a. milk
b. juice
c. eggs
d. butter

____ 20. ____ containers are versatile but often expensive.
a. Paper
b. Glass
c. Plastic
d. Metal

____ 21. Retortable pouches for packaging have ____ layers.
a. three
b. two
c. four
d. five

____ 22. Fats and oils contain ____ times more energy than proteins and carbohydrates.
a. 2.25
b. 2
c. 1.5
d. 3

____ 23. ____ make up the major components of fat, butter, shortening, and oil.
a. Compounds
b. Composites
c. Spingolipids
d. Triglycerides

____ 24. Each gram of fat contains ____ kcal.
a. 8
b. 9
c. 7
d. 6

____ 25. The first step in the refining process of many oils is ____.
a. degumming
b. refining
c. bleaching
d. winterization

____ 26. Monoglycerides and diglycerides are used as ____ in a variety of foods.
a. emulsifiers
b. flavor
c. calories
d. color

____ 27. The U.S. Surgeon General recommended that fat be reduced to ____ percent of the total dietary calories.
a. 20
b. 30
c. 15
d. 25

____ 28. One of the most common physical tests performed on fats is a determination of the ____ point.
a. boiling
b. cooling
c. melting
d. separating

____ 29. Which organization issues the National Primary Drinking Water Regulations?
a. FDA
b. NRA
c. EPA
d. USA

____ 30. Turbidity of water is ____.
a. taste
b. smell
c. cloudiness
d. content

____ 31. In some food processing plants, ____ peeling is used to remove skins from soft fruit and vegetables such as tomatoes.
a. hand
b. machine
c. boiled
d. caustic

____ 32. A successful pollution prevention program requires frequent ____ to keep employees focused and careful.
a. cleaning
b. retraining
c. expense
d. reprimanding

____ 33. ____ serves as a universal solvent.
a. Water
b. Soap
c. Bleach
d. Odor

____ 34. ____ are the tiniest, and probably the simplest form of life.
a. Viruses
b. Parasites
c. Fungi
d. Bacteria

____ 35. Molds and yeast are classified as ____.
a. viruses
b. parasites
c. fungi
d. bacteria

____ 36. Most pathogenic bacteria are classified as ____.
a. psychrotrophic
b. thermotrophic
c. psychrophilic
d. mesophilic

____ 37. Water comprises approximately ____ percent of cleaning and sanitizing solutions.
a. 80 to 89
b. 95 to 99
c. 90 to 95
d. 75 to 85

____ 38. Which agency registers chemical sanitizers and antimicrobial agents for use on food and food product contact surfaces?
a. EPA
b. FDA
c. USDA
d. HACCP

____ 39. Of the microorganisms, ____ are the greatest threat to food safety.
a. viruses
b. parasites
c. fungi
d. bacteria

____ 40. Ingredients on a food label are listed in ____ order, based on weight.
a. descending
b. ascending
c. alphabetical
d. chronological

____ 41. A daily intake of ____ calories has been established as the daily reference value (DRV).
a. 1,700
b. 1,800
c. 1,900
d. 2,000

____ 42. The word ____ on a label, means that a product contains no amount of, or only trivial or "physiologically inconsequential" amounts of, one or more of these components: fat, saturated fat, cholesterol, sodium, sugars, and calories.
a. Low
b. Free
c. Lean
d. Reduced

____ 43. The term ____ can be used on the labels of foods that can be eaten frequently without exceeding dietary guidelines for one or more of these components: fat, saturated fat, cholesterol, sodium, and calories.
a. free
b. reduced
c. lean
d. low

____ 44. Claims for ____ relationships between a nutrient or a food and the risk of a disease or health-related condition are now allowed on food labels.
a. five
b. six
c. seven
d. eight

____ 45. If all the world's undernourished people were gathered in one place, their population would be greater than every continent except ____.
a. Asia
b. Europe
c. South America
d. North America

____ 46. ____ implies a person eats but does not receive the amount of nutrients needed to keep the body healthy.
a. Undernutrition
b. Malnutrition
c. Hunger
d. Starvation

____ 47. In developing countries, the time before ____ is most difficult for meeting nutritional needs of the people.
a. planting
b. harvest
c. winter
d. spring

____ 48. Eradication of ____ is essential to improve access to food.
a. malnutrition
b. undernutrition
c. poverty
d. terrorism

____ 49. Chefs prepare delicious meals and participate in ____ to show off chefs' talents.
a. Culinary Olympics
b. Cooking Contests
c. Grand Demonstrations
d. Worldwide Classes

____ 50. ____ play an important role in the development of new foods and nonfood uses.
a. Bakers
b. Butchers
c. Chemists
d. Inspectors

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Answer Section

MULTIPLE CHOICE

1.	ANS:	B	PTS:	1	26.	ANS:	A	PTS:	1
2.	ANS:	C	PTS:	1	27.	ANS:	B	PTS:	1
3.	ANS:	B	PTS:	1	28.	ANS:	C	PTS:	1
4.	ANS:	C	PTS:	1	29.	ANS:	C	PTS:	1
5.	ANS:	C	PTS:	1	30.	ANS:	C	PTS:	1
6.	ANS:	C	PTS:	1	31.	ANS:	D	PTS:	1
7.	ANS:	A	PTS:	1	32.	ANS:	B	PTS:	1
8.	ANS:	A	PTS:	1	33.	ANS:	A	PTS:	1
9.	ANS:	A	PTS:	1	34.	ANS:	A	PTS:	1
10.	ANS:	B	PTS:	1	35.	ANS:	C	PTS:	1
11.	ANS:	A	PTS:	1	36.	ANS:	D	PTS:	1
12.	ANS:	C	PTS:	1	37.	ANS:	B	PTS:	1
13.	ANS:	D	PTS:	1	38.	ANS:	A	PTS:	1
14.	ANS:	B	PTS:	1	39.	ANS:	D	PTS:	1
15.	ANS:	A	PTS:	1	40.	ANS:	A	PTS:	1
16.	ANS:	D	PTS:	1	41.	ANS:	D	PTS:	1
17.	ANS:	B	PTS:	1	42.	ANS:	B	PTS:	1
18.	ANS:	A	PTS:	1	43.	ANS:	D	PTS:	1
19.	ANS:	A	PTS:	1	44.	ANS:	D	PTS:	1
20.	ANS:	C	PTS:	1	45.	ANS:	A	PTS:	1
21.	ANS:	A	PTS:	1	46.	ANS:	B	PTS:	1
22.	ANS:	A	PTS:	1	47.	ANS:	B	PTS:	1
23.	ANS:	D	PTS:	1	48.	ANS:	C	PTS:	1
24.	ANS:	B	PTS:	1	49.	ANS:	A	PTS:	1
25.	ANS:	A	PTS:	1	50.	ANS:	C	PTS:	1

2018 Iowa FFA Food Science CDE

Food Safety and Quality Section
Response to Consumer Complaint

The Consumer Affairs Department at *On the Trail Foods* has received the following letter from a customer. Please respond to the consumer's complaint. Your response should contain the answers presented by the consumer. Please be concise and courteous in your response. Your response will be scored based on the identification of problem, identification of correct solution, completeness and correctness of your response, courteousness, conciseness (limit to 1 page), and appropriate grammar and correct spelling.

June 5, 2018

Dear Sirs:

I am a loyal customer of On the Trail Foods and love all your products. About a month ago, I purchased several packages of fruit and nut trail mix (contains roasted peanuts, banana chips, raisins, pineapple, apple chips, and cashews. The mix was on sale and I wanted to stock up for our upcoming backpacking trip. The sell-by date on the package is 09-10-2018. When I opened a package today, the apple chips and banana chips were not light-colored, but had a brownish-gray appearance to them. The trail mix smelled fruity and nutty, like I expected, but I didn't eat the trail mix because of the appearance. Is this product safe to eat or should I throw it out? Could you answer the following questions for me?

1. *What caused the apple chips and banana chips to turn brownish-gray in appearance?*
2. *Will I get sick from eating the trail mix?*
3. *Is there anything I can do to correct the problem or should I just throw it out?*
4. *What will your company do to make sure that this discoloration of the apple chips banana chips does not occur in your product in the future?*

I look forward to hearing from you.

Thank you.
Mia Crosby

	Points Possible	Points Received
Identification of Problem	15	
Presentation of Solution	15	
Courteousness of Response	10	
Conciseness (less than 1 page)	5	
Grammar and spelling	5	
	50	

FFA Food Science Consumer Complaint Response

June 7, 2018
50 points

School Name _____
Name _____
Contestant Number _____

Score _____/50____

Complete your response in the box below:

2018 Iowa FFA Food Science CDE

Food Safety and Sanitation Section --

In this segment of the contest, you will be given pictures/graphics to view in reference to common problems that exist within the food industry. Your task for each set of pictures and/or graphics are to: (a) identify the problem and (b) select the most appropriate solution to the problem. There will be five (5) sets of food safety and/or sanitation concerns with each question valued at 5 points for a total of 50 possible points.

When done, return this document with your answer sheet to the test proctor.

DO NOT MARK ON THIS DOCUMENT

Set #1:

Question 1: These pictures most represent which of the following food industry concerns:

a. Staphylococcus
b. Salmonella
c. Listeria
d. Botulism
e. Campylobacter

Question 2: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.; Wash raw vegetables thoroughly before eating; and Keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
b. Carefully wash fruits and vegetables, and steam oysters before eating them; Frequently wash your hands, especially after toilet visits and changing diapers and before eating or preparing food; and Thoroughly clean and disinfect contaminated surfaces immediately after an episode of illness.
c. Always wash hands with warm, soapy water; if your hands have any kind of skin abrasion or infection, always use clean disposable gloves; and keep cutting boards clean.
d. Do not eat raw or undercooked eggs, poultry, or meat; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.
e. Sterilize raw foods at the plants, pasteurization, and improving safe food handling practices in kitchens.

Set #2:

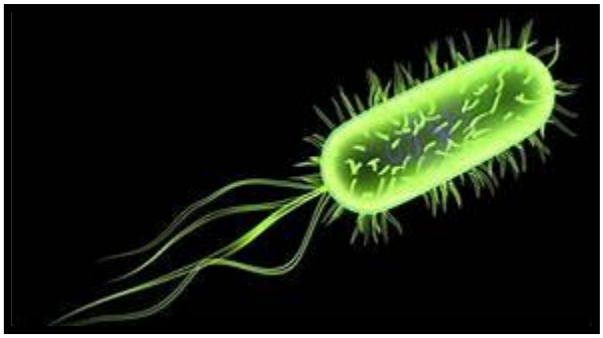
Question 3: These pictures most represent which of the following food industry concerns:

a. Cross contamination
b. E coli
c. Botulism
d. Listeria
e. Salmonella

Question 4: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Home canned products need to use higher level acids, follow strict hygienic procedures, and prepare foods using high temperatures.
b. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry; Wash raw vegetables thoroughly before eating; and Keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
c. Drink only pasteurized milk, juice, or cider; wash fruits and vegetables under running water, especially those that will not be cooked; and cook all ground beef and hamburger thoroughly.
d. Sterilize raw foods at the plants, pasteurization of milk, and improving safe food handling practices in kitchens
e. Increased regulations; over-use promotes emergence of resistant bacteria; and regulated usages to minimize residues in the human food chain

Set 3:



Question 5: These pictures most represent which of the following food industry concerns:

a. Listeria
b. Metal contamination in ground beef
c. Botulism
d. Staphylococcus
e. E coli

Question 6: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Sterilize raw foods at the plants, pasteurization of milk, and improving safe food handling practices in kitchens
b. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry; Wash raw vegetables thoroughly before eating; and keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
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e. Do not eat raw or undercooked eggs, poultry, or meat; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.

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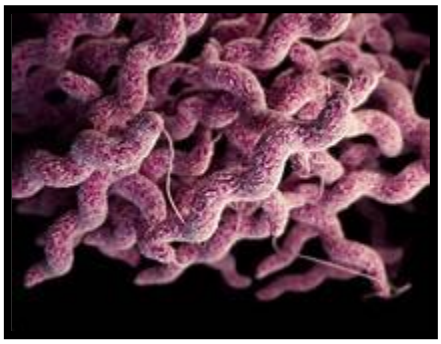

Question 7: These pictures most represent which of the following food industry concerns:

a. Campylobacter
b. E. coli
c. Salmonella
d. Listeria
e. Norovirus

Question 8: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Home canned products need to use higher level acids, follow strict hygienic procedures, and prepare foods using high temperatures.
b. Sterilize raw foods at the plants, pasteurization, and improving safe food handling practices in kitchens.
c. Increased regulations; over-use promotes emergence of resistant bacteria; and regulated usages to minimize residues in the human food chain.
d. Thoroughly cook raw food from animal sources, such as beef, pork, or poultry; wash raw vegetables thoroughly before eating; and keep uncooked meats separate from vegetables and from cooked foods and ready-to-eat foods.
e. Always wash hands with warm, soapy water; if your hands have any kind of skin abrasion or infection, always use clean disposable gloves; and keep cutting boards clean.

Set 5:

Question 9: These pictures most represent which of the following food industry concerns:

a. Norovirus
b. Campylobacter
c. E coli
d. Cross Contamination
e. Botulism

Question 10: In reference to the above pictures, what would be the solution to this food industry concern/problem?

a. Carefully wash fruits and vegetables, and meats before eating them; Frequently wash your hands, especially after toilet visits and changing diapers and before eating or preparing food; and Thoroughly clean and disinfect contaminated surfaces immediately after an episode of illness.
b. Home made or processed foods need to be properly stored; when preparing foods, remember to prepare foods under sanitary conditions; if food is to be stored longer than two hours, keep hot foods hot (over 140°F) and cold foods cold (40°F or under).
c. Eat only pasteurized milk, juice, or cider; wash fruits and vegetables under running water, especially those that will not be cooked; and cook all ground beef and hamburger thoroughly.
d. Handle poultry carefully to prevent cross-contamination; utilize proper wrapping; and most egg products should be pasteurized.
e. Do not eat raw or undercooked eggs, poultry, or meat; avoid Cross-contamination of foods; and wash hands after contact with animal feces and/or reptiles.

2018 Iowa FFA Food Science CDE

Food Safety and Sanitation Section -- KEY

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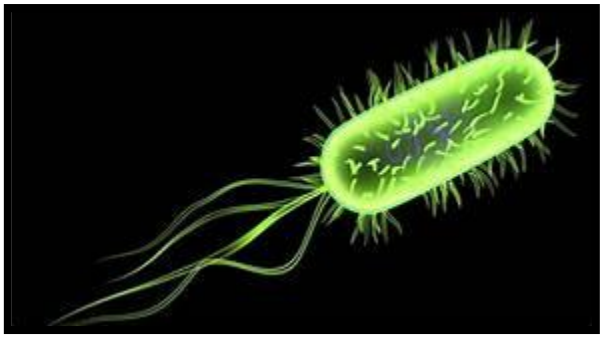

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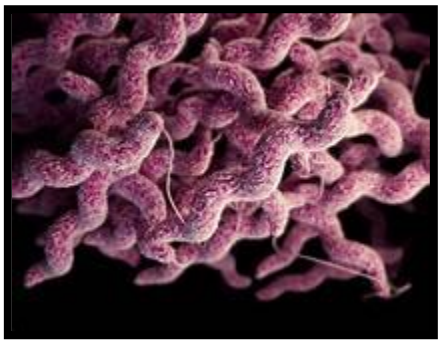

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c. Salmonella
d. Listeria
e. Norovirus

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Problem Solving/Situational Math Practicum –2018

(This year the Problem Solving is being done as a Pilot portion – you will be answering the questions/problems, but no points are assigned. Beginning with the 2019 CDE, participants will answer a series of mathematical calculations based on common food science themes, totaling 25 points per individual (100 points per team). Questions may include nutrition calculations, ingredient quantity, cost benefit analysis, estimation of cost/margin of goods sold, conversions, processing conditions, etc.

Your Name _____

Your contestant Number _____ Your FFA Chapter _____

Question 1.

A meat dish needs to remain at 185°F in order to stay safe to eat. If the dish comes out of the oven at 375°F and decreases 10°F every five minutes, how long is it safe to eat?

a. 19 minutes
b. 38 minutes
c. 95 minutes
d. 185 minutes

Question 2.

The perfect glass of sweet tea is 15% sugar. Elena is making a one-gallon container of sweet tea. How many cups of sugar are in the gallon of sweet tea?

a. 2 cups
b. 2.4 cups
c. 3.4 cups
d. 4 cups

Question 3.

Mona's famous creamy asparagus soup is made in the family's 3-gallon pot. If she adds 5 cups of heavy cream to the soup, what percentage of the soup is cream if the soup fills all 3 gallons?

a. 5.3%
b. 9.2%
c. 10.4%
d. 18.8%

Question 4.

Gina is trying to follow the recommended daily allowance for sugar. She wants to eat a cupcake that contains 28 grams of sugar, and the recommended daily allowance for sugar is 40 grams. What percentage of her daily allowance for sugar will she consume if she eats the cupcake?

a. 28%
b. 43%
c. 60%
d. 70%

Question 5.

If the amount of bacteria in a bowl of fruit can be represented by the equation $B = 2^t$ where B represents the bacteria count in thousands and t represents the hours since refrigeration, how much bacteria can be expected three hours since refrigeration?

a. 2,000
b. 6,000
c. 8,000
d. 10,000

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a. 2,000
b. 6,000
c. 8,000
d. 10,000

IOWA FFA
FOOD SCIENCE AND TECHNOLOGY CAREER DEVELOPMENT EVENT
2018

TO: Product Development Team
FROM: Marketing Research and Development
SUBJECT: Development of a convenience breakfast product

TASK: Using the materials, pricing information, and nutritional information for potential ingredients provided, design a convenience breakfast product to meet the needs of the target market described.

The newly-issued Dietary Guidelines for Americans emphasizes choosing healthier, nutritionally-balanced foods for all meals and snacks, particularly breakfast. An important group of consumers is the teenage (13-17 years old) customer. According to the National Institute of Health, 62% of all teenagers begin the day without eating breakfast, or with a poor choice of high fat breakfast foods with little nutritional value. With the demands of schoolwork, extracurricular activities, and too little sleep, many teenagers cite being in a hurry or having too little time to eat as the reasons for failure to eat breakfast. One of the most serious consequences due to failure to eat breakfast is a decreased metabolism resulting in an inability to concentrate during the school day.

Since it is extremely unlikely that teenagers' schedules will become less demanding, a tremendous market potential exists for a highly convenient breakfast product that tastes good. Also, because teenagers tend to eat what is readily available, the successful product will appeal to the primary food purchaser of the household – typically adult women.

Since the typical teenager consumes over $1,300 in "convenience foods" per year, a well -developed highly appealing product presents excellent potential for an increase in total sales and profit for the company. Focus group research indicates show the ideal final price of such a product should be somewhere between $2.00 - $3.50 per item. In addition to the cost of producing the breakfast product based on the ingredients of the product, there is a cost of $.30 per serving associated with packaging, labeling, marketing, and distributing the product. The company needs to make at least a 20% profit, on top of the cost of production, packaging, labeling, marketing, and distribution, to be competitive in this market. While accomplishing this, we expect the product to include a minimum of four main components. However, your team may choose to include more than four components.

Your team needs to develop a nutritious and delicious convenience breakfast product to improve the breakfast eating habits of teenagers. Remember, your team needs to address concerns such as: ***economics, nutrition, quality control, product safety, equipment, distribution, and formulations***. In other words, explain why you chose to create the product you created and how such a product meets the needs described above. You also need to identify a catchy name for this product and design the front label so as to attract the target audience. This is a team event and it is very important for your group to equally present material and provide answers to the judges' questions.

Teams should also prepare a reasonably accurate nutritional analysis label for their product.

Nutritional and Price Information

Food Item	Unit Serving Size (oz. mass)	Calories	Fat (g)	Sodium (mg)	Carbs (g)	Potassium (mg)	Sugar (g)	Protein (g)	Price (per serving)
Bagel	3.6	310	3	440	58	0	5	11	$0.72
Waffle	1.2	105	4.5	230	13	0	2	2	$0.12
Pancake	1	70	1.1	200	13	0	2.7	2	$0.14
French Toast	2	120	3	170	20	0	3	4	$0.32
Tortilla	1	140	3	450	24	0	0	4	$0.20
Vegetable Sausage	1.75	135	6.5	310	6	0	1.5	15	$0.63
Ham	2	180	16	620	1	0	1	7	$0.36
Sausage	1.2	120	11	130	0	0	1	4.5	$0.37
Bacon	1.6	55	4.5	230	0	0	0	3.5	$0.50
Egg	2.4	70	4.5	65	1	0	0	6	$0.12
Cheddar Cheese	1	110	9	180	1	0	0	7	$0.21
Mozzarella Cheese	1	80	6	170	1	0	0	8	$0.21
Hummus	1.5	70	0	20	23	0	0	9	$0.15
Red Pepper Strips	1	6	0	0	1	55	1	0	$0.13
Jalapeno Pepper	1	5	0	410	0	0	0	0	$0.25
Green Onions	1	10	0	5	2	70	1	0	$0.13
Black Olives	.5	25	2.5	125	1	0	0	0	$0.17
Salsa	1	10	0	250	2	0	2	0	$0.19
Syrup	2	210	0	140	52	0	31	0	$0.22

Conversion factors: 16 oz. (mass) = 1 lb = 454 g