Allergens

Learning Objectives

- Given an ingredient statement, determine which ingredients are allergens or have allergen components
- Incorporate specific allergens recognized by the designation country your company exports to in the allergen control program
- Identify foods included in the Big 8 Allergen groups by their common and specific names
- Evaluate raw materials for the presence of allergens during the purchasing process
- Identify allergens in products supplied to you and allergen cross-contact risks at your suppliers' plants
- Compare documentation from received materials to approved specifications and review for accuracy
- Store raw materials and finished products using practices that will prevent allergen cross-contact
- Review formulas to identify allergens present and use that information for scheduling and label or ingredient statement confirmation
- Control rework to ensure that no undeclared allergens are introduced into products that do not declare them
- Reduce the risk of allergen cross-contact by scheduling production appropriately
- Use dedicated utensils and containers and personnel practices when handling allergens to prevent cross-contact
- Verify the accuracy of ingredient statements at the time of packaging or label development to confirm that the correct package or label is being applied at the time of packing
- Clean equipment to remove allergen proteins and use methods to validate that the cleaning was effective

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What is a Food Allergen?

A food allergen is any product or ingredient containing certain proteins that can potentially cause severe, occasionally fatal, reactions in a food allergic person. Allergen proteins are naturally occurring and cannot be eliminated by cooking. Although, there are medications to manage allergic symptoms, currently there is no cure for food allergy.

There are certain key words and phrases within this definition that are important to note. The reaction-causing elements are naturally occurring proteins. These are the proteins that make up the food or ingredient. It is important to understand that it is not a contaminant, but the food itself that causes the reaction. Even though all food allergens are proteins, not all proteins are food allergens.

The protein in the food cannot be eliminated through cooking. For food safety, we often rely on adequate cooking for elimination of harmful agents (namely, pathogens). However, with allergens, they are not eliminated through cooking.

In order to eliminate an allergenic protein, the food must be refined through a process that separates oils from proteins. Soybean oil is an excellent example of a highly refined oil in which all protein has been removed. Since the soy protein is no longer present, soybean oil would not cause an allergic reaction.

- It is the protein that causes the reaction.
- The allergen is not a contaminant in the food, but is naturally occurring.
- Food allergens are not eliminated by cooking.

Allergic Reactions

When a person eats a food he or she is allergic to, his or her body misidentifies benign protein as an invader and reacts against it. An allergic reaction is a body's immune system responding to a trigger that indicates a harmful invader, when in fact, the agent is not harmful. The reaction can range from mild discomfort to anaphylactic shock.

Anaphylactic shock typically occurs rapidly after contact with the allergic trigger. It involves closing of the airway and is life threatening. It is estimated that more than 200 people die each year from food allergic reactions and that more than 30,000 people visit emergency rooms each year to seek aid to a reaction from a food allergen. The amount of food allergens that people can tolerate varies. Because of this, reactions are not the same for all people.

- An allergic reaction is an immune system response that can range from mild to life threatening.
- The life threatening reaction comes in the form of anaphylactic shock in which the airway restricts and death can occur in minutes.

Unfortunately, there is no known cure for food allergies. In fact, the only way to prevent a food allergic reaction from happening is to avoid the food altogether. Knowing this, it is very important that the food industry play a role in protecting consumers.

Recognized Allergens

There are more than 160 known foods that will cause an allergic reaction. However, 90% of reactions are caused by just eight foods. These are referred to as the Big 8.

Since they account for the majority of reactions, these are the foods that are focused on in allergen control programs. The Big 8 Allergens are:

- Peanuts
- Tree nuts
- Wheat
- Soy
- Milk
- Eggs
- Fish
- Shellfish

The Big 8 Allergens are recognized internationally. It is important to understand that there are additional food allergens identified and recognized regionally, such as throughout Europe and Asia. There are even country-specific allergens within a continent. While the United States only recognizes the Big 8 Allergens, Canada has identified additional allergens.

If your company is exporting a food or ingredient to another country, the recognized allergens at the destination country must also be included in the allergen control program.

Because allergen reactions are based on a population's exposure to a food and its collective immune system response, recognized allergens may change over time as eating habits and immunology change.

The Big 8 – A Closer Look

Tree Nuts

While the list of internationally recognized food allergens is referred to as the Big 8, there are truly more than 8 foods that are involved. For example, tree nuts are a recognized group of food in the Big 8, but each individual tree nut is a unique allergen. A person allergic to one type of tree nut may not be allergic to another type. This means an allergen control program must treat each individual tree nut as a separate allergen.

The tree nut category includes: almonds, Beech nuts, Brazil nuts, butternuts, cashews, chestnuts, chinquapins, coconuts, filberts (also known as hazelnuts), Ginkgo nuts, hickory nuts, lychee nuts, macadamia nuts, pecans, pine nuts, pistachios, shea nuts, and walnuts.

Fish

Just as tree nuts are a single group of foods, fish (also referred to as fin fish) is a group differentiated from shellfish. Each fish must be treated as a unique allergen. The list provided here is only a partial list. Another challenge to overcome in the identification of fish ingredients is that they may not be listed by their common names.

The fish category includes:

- Anchovy
- Bass
- Carp
- Cod
- Flounder
- Grouper
- Herring
- Mackerel
- Monkfish
- Pollock

Shellfish

Shellfish is also a group. It refers to the crustacean shellfish, which are shrimp, crab, lobster, crayfish, langoustines, prawns, and sea urchins. In the USA, shellfish allergens do not include molluscan shellfish, such as oysters, clams, and mussels. However, some countries do include the molluscan shellfish as allergens. It is important to understand the recognized shellfish for your products' destination countries.

Wheat

There is a common misconception that gluten is an allergen. Gluten is not an allergen. Gluten is known as a sensitizing agent that can cause a reaction in sensitive individuals, however it is not an immune system reaction and therefore, is not an allergen.

Wheat, which happens to contain gluten, is a true allergen. Gluten is found in grains other than wheat. A person who is allergic to wheat does not necessarily have a sensitivity to gluten. The grains that are not allergens, but do contain gluten are barley, oats, and rye. Wheat may also be identified in your ingredients by other names, such as Triticale, durum, semolina, or spelt.

Milk

Milk is one of the Big 8 Allergens. Although it is a subtle distinction, the correct term to be used is milk, not dairy. The allergen is associated specifically with cow's milk as opposed to other milk, such as goat's milk. The milk in your ingredients may be readily identified as milk, but it may also be listed in other terms, such as casein, whey, butter, cream, or lactose.

Eggs

Eggs from any type of poultry are considered allergenic. Other terms that you may see used for eggs are albumin and yolk. When you see these terms, you have the presence of an egg allergen.

Some types of egg substitutes may contain egg white, otherwise known as albumin.

Other Names

Because there are so many names by which The Big 8 Allergens may be identified, it is useful to make a notation of these other names.

- **Tree Nuts** (each tree nut is a unique allergen)
  - Almond, Beech Nut, Brazil Nut, Butternut, Cashew, Chinquapin, Coconut, Filbert/ Hazelnut, Ginko Nut, Hickory Nut, Lichee Nut, Macadamia Nut, Pecan, Pine Nut, Pistachio, Shea Nut, Walnut
- **Wheat**
  - Triticale, Durum, Semolina, Spelt
- **Milk**
  - Casein, Whey, Butter, Cream, Lactose
- **Egg**
  - Albumin, Yolk
- **Fish** (each fish is a unique allergen)
  - Anchovy, Bass, Carp, Cod, Flounder, Grouper, Herring, Monkfish, Pollock, Rockfish, Salmon, Sardine, Shark, Snapper, Sturgeon, Tilapia, Trout, Tuna
- **Shellfish** (each shellfish is a unique allergen)
  - Shrimp, Crab, Lobster, Crayfish, Langoustines, Prawns, Sea Urchin

Control Measures

An allergen control program includes multiple control measures. For products that intentionally contain an allergen, the most important measure is to ensure that the included allergen is properly declared on the ingredient statement. The other key part of an allergen control program is to ensure that if a specific allergen is not intended to be in the product, measures are taken to prevent its introduction. There are numerous ways that an unwanted and undeclared allergen can get into a product.

The control measures for preventing cross-contact include:

- Purchasing
- Receiving
- Storage
- Formula control
- Scheduling
- Handling
- Process flow
- Packaging
- Sanitation

Purchasing

As part of the acquisition process, all raw materials must be evaluated for the presence of allergens. Raw materials include ingredients, processing aids (such as pan-release agents), and packaging (such as poly film). Processing aids and packaging have been known to have wheat and soy components.

The person assigned to review the ingredient statements for the raw materials should be well-versed in food terminology to ensure proper identification of allergens that are not listed by their common names.

Supplier questionnaires can also be useful to identify the allergens that are in the product supplied to you, as well as cross-contact risks at the supplier's plant where additional allergens may be handled.

Supplier Questionnaire

1. Which allergens are in the product you sell to me?
2. Which allergens are in your plant?

Receiving

Ingredient declarations may be found on specification sheets or directly on the product.

During receiving, there are several activities that must be completed to support the allergen control program. Upon receipt, it should be confirmed that the material received is identical to the material ordered. This is especially important when receiving raw materials that have multiple components, such as seasoning blends. The ingredient statement on the product should be compared to the ingredient statement on the approved specification.

If packaging materials that contain ingredient statements are being received, they should be reviewed for accuracy against the approved specification.

When bulk loads are being received, documentation that demonstrates either that the vehicle is dedicated to a single product or that it was adequately washed before being loaded must be provided. Carryover of allergens from prior loads can happen if there's not an adequate wash. If shared lines, screens, or hoses are being used to unload bulk products with different allergens, the lines must be cleaned between use for allergens and non-allergens.

The wash certificate will indicate the wash date and prior load for your bulk tanker.

CLEANING CERTIFICATE

WASH NUMBER
91866

WASH TYPE
Food Transport, Inc.

CUSTOMER INFORMATION

BILL TO ID#	MISC		TERMS	
	Ordered By		Type	Net 15 Days
	Phone		PO #	KCM3204809
	Shipper		Bill of Lading	

SERVICE

	TIME	DATE
Arrive	10:36	8/22/2011
Start	19:00	8/22/2011
End	20:00	8/22/2011

UNIT INFORMATION

Tractor #..... Trailer #..... 5300 Container #..... # of Comps.....1

CLEANING - SANITIZING - INSPECTION SERVICES PERFORMED

INSPECTED AREA	INSPECTED BY
Dome/Vents/Ports	589
Suckline	589
Valve(s)	589
Hoses and Hose Tubes	589
Caps and Gaskets	589
Tank Interior	589

COMP	PREVIOUS PRODUCT
1	Corn

CLEANING STEP(S)	COMPLETED BY
Cold Water Pre-Rinse	589
Hot Flush	589
Blow Dry	589

SEAL NUMBERS
54261 - 54271 - 54227 - 54230 - 54260 - 54259

Storage

Once raw materials are received, they must be stored. The focus on storage in allergen control is generally on raw material storage, but these measures may also be appropriate for finished goods, depending on their form and how they are packaged.

In storage, the first step is to segregate allergens from non-allergens. An exception may be made if a given allergen is in all products produced. For example, ingredients with milk may not need to be segregated in an ice cream plant if all the finished products contain milk. Similarly, ingredients with wheat may not need to be segregated in a bakery if all the finished products contain wheat.

Segregation of allergen versus non-allergen is the first step, but is not the entire segregation process. Remember, each individual allergen must be treated as an individual threat. Therefore, among the allergens there must be segregation. An excellent approach for segregation is "like-above-like" in which no allergen is placed above a product that does not contain the same allergen. For bulk materials, the best form of segregation is dedicated bins, silos, or tanks. When this is not feasible, a thorough clean-out between products is needed.

Formula Control

Formula control is an integral part of the allergen control program. Each formula must be reviewed to identify which allergens are present. This information will be used for scheduling and label or ingredient statement confirmation.

Rework must be strictly controlled to ensure that no undeclared allergens are introduced by adding an allergen back into a product that is not going to declare it. The best rework policy is "like-into-like" in which only the same product can be reworked back into itself. The key is to ensure that no undeclared ingredients (especially allergens) are added into a product that does not declare that ingredient.

Scheduling

When allergens are kept in mind when scheduling production, the risk of cross-contact by allergens can be reduced. In addition, when a cumulative approach is taken, the amount of downtime for detailed cleaning between products is reduced.

The concept of building allergens means to start a run with a product that has the least number of allergens first. This may even be a product that has no allergens. Subsequent products would then have the same allergens as prior runs plus additional allergens. For example, a line may run a product with just wheat, followed by a product with wheat and soy, followed by a product that contains wheat, soy, and egg. Since each prior run contained a sub-set of the allergens in the current run, there is no need for an allergen changeover cleaning.

Keep in mind that anytime a prior product has an allergen not in the subsequent product, allergen changeover cleaning must occur. For example, if a product with wheat and soy is followed by a product with wheat and egg, there must be an allergen changeover since soy was in the first product, but not in the second.

Schedulers can also reduce the risk of cross-contact by scheduling allergens on lines dedicated to those specific allergens.

Handling

During the handling of allergens, there is a risk of cross-contact. One way to reduce the risk is to have dedicated utensils and containers for allergens. If feasible, individual scoops and containers may be labeled for specific allergens, such as milk, walnuts, and almonds. If there are numerous allergens, the approach may simply be to have scoops and containers labeled for allergen use. These would then need to be cleaned between uses for non-like allergens.

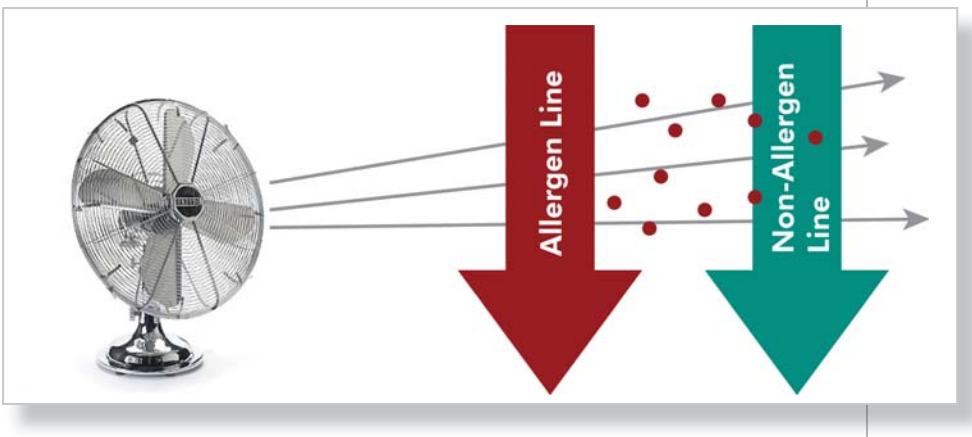
As personnel are handling allergens, especially dusty ones, there is the potential for their hands, arms, and outer garments to become coated with allergens. Therefore, it is important that when personnel change from handling one allergen to another allergen that they change outer garments, including gloves, aprons, and smocks, and that they wash their hands with soap and water. Hand sanitizers will not be effective against allergens since they do not remove protein.

Key measures to take to prevent allergen cross-contact include the use of dedicated containers and ensuring that employees change gloves and outer garments between handling of various allergens.

Process Flow

Poor process flow contributes significantly to allergen cross-contact. When processing lines cross there is an increased risk of allergens from lines above to fall on product below. Traffic created by people and forklifts can also be a vector for transferring allergens from one area to another. Consider the impact of personnel whose job function requires them to go from line to line, such as Quality Control Technicians, Maintenance Personnel, or Supervisors. While moving through the plant, they may be carrying allergens with them. This can be managed with personnel dedicated to specific lines or areas; procedures for preventing cross-contact, such as changing gloves; or washing hands.

Not only can allergen particles travel on people, they can travel on air currents. Air flow or inadequate dust collection could intensify an allergen threat. Barriers, such as walls and partitions are an excellent way to prevent allergens from being carried on air currents from one area to another.



Process Flow Diagram
Two lines are running adjacent to one another. The red line is running an allergen and the blue line is not. Given the placement of this fan, allergen particles are likely to be transferred from the red line to the blue line resulting in an undeclared allergen.

Packaging

One of the most common causes of a product being marketed with undeclared allergens is that the wrong packaging gets put on the product. The packaging may be wrong by being intended for a different product or by being obsolete. It is imperative that procedures are in place to verify the accuracy of ingredient statements at the time of packaging or label development and to confirm that the correct package or label is being applied at the time of packing. If your facility has obsolete labels or packaging materials, they need to be adequately secured until they can be destroyed to prevent inadvertent use.

It is especially important that employees follow verification procedures during changeovers when the facility switches from one product to another and when splicing a new roll of roll stock or bringing a new pallet of packaging materials into the packaging area.

Sanitation

Sanitation is one of the most important tasks in allergen control. Effective cleaning procedures will ensure that any product residue, including allergen proteins, have been removed. The sanitation program must also include methods to validate that the cleaning was effective. This can be accomplished with visual inspection and/or with allergen protein test kits. There are numerous allergen-specific test kits available that can be used in-house or you may send samples to an outside lab for testing.

It is largely beneficial to have dedicated tools for cleaning allergens. This reduces the risk of cross-contact. Keep in mind that the removal of soil is what eliminates the allergen. While sanitizers are important from a microbial standpoint, they are ineffective against allergen protein.

Dedicated cleaning tools and allergen testing are key components of an effective sanitation program that will support allergen management.

Labeling

One of the most important ways of allowing allergenic people to know what is in the product they are buying is the label. Most allergen issues and recalls are caused when products do not have the correct ingredient statement or when finished products are placed in the wrong package.

For products that intentionally contain allergens, the only control measure is adequate labeling. This provides the information necessary for food allergic persons to make appropriate decisions. All allergens intentionally included in the product must be declared.

If the product falls under FDA jurisdiction and is available for retail sale, each allergen must be declared using its common name or plain language. For example, if your product contains whey, you must also use the word milk in your declaration.

Many companies have opted to use precautionary statements on their packages. These statements read “May contain” or “Manufactured in a facility that…” These statements are voluntary and are not required. The important thing to know about these statements is that they are not a substitute for allergen control. A product may still be subject to a Class I recall if the ingredient listed in the precautionary statement is found.

Allergen Reference Card

Use this Allergen Reference Card as you contribute to your company’s allergen control program. When you are ready, proceed to the workshops to apply what you have learned about allergens to real-life situations.

Allergens
Reference Card

Food Allergen
- Protein
- Not contamination
- Not eliminated by cooking

Allergic Reaction
- Immune system response
- Mild to life threatening
- Anaphylactic shock

Big 8 Allergens
- 90% of reactions
- Internationally recognized
- Peanuts
- Tree nuts
- Wheat
- Soy
- Milk (cow's milk)
- Egg
- Fish
- Shellfish

Additional Allergens
- Country/region specific
- Can change over time

Labeling
- Plain language for retail

Precautionary Statements
- Not a substitute for control
- Voluntary
- "May contain" etc...

Control Measures

Purchasing
- Identify allergens in raw materials

Receiving
- Ensure correct materials have arrived
- Clean any shared bulk receiving lines

Storage
- Segregate allergens vs non-allergens
- Segregate among allergens
- Like-above-like
- Dedicated bins/silos/tanks

Formula Control
- Identify allergens in each formula
- Rework only like-into-like

Scheduling
- Build allergens/cumulative approach
- Include changeover cleaning

Handling
- Dedicated utensils and containers
- Change gloves, aprons, smocks with allergen changes

Process Flow
- Crossing of lines
- Air flow
- Common surfaces

Packaging
- Confirm accurate ingredient statement
- Confirm correct package/label for product

Sanitation
- Removal of product residue
- Confirm with inspection and swabbing

Other Names (not all inclusive)

Tree Nuts *(each tree nut is a unique allergen)*	Almond, Beech Nut, Brazil Nut, Butternut, Cashew, Chestnut, Chinquapin, Coconut, Filbert/Hazelnut, Ginko Nut, Hickory Nut, Lichee Nut, Macadamia Nut, Pecan, Pine Nut, Pistachio, Shea Nut, Walnut
Wheat	Triticale, Durum, Semolina, Spelt
Milk	Casein, Whey, Butter, Cream, Lactose
Egg	Albumin, Yolk
Fish *(each fish is a unique allergen)*	Anchovy, Bass, Carp, Cod, Flounder, Grouper, Herring, Mackerel, Monkfish, Pollock, Rockfish, Salmon, Sardine, Shark, Snapper, Sturgeon, Tilapia, Trout, Tuna
Shellfish *(each shellfish is a unique allergen)*	Shrimp, Crab, Lobster, Crayfish, Langoustines, Prawns, Sea Urchin

Use this Allergen Reference Card as you contribute to your company's allergen control program. When you are ready, proceed to the workshops to apply what you have learned about allergens to real-life situations.

Slot pallets of ingredients into the racks using "like-above-like" methods for the Big 8 Allergens.

For each exercise you are provided with 8 pallets of ingredients and 8 slot locations. There is a single ingredient on each pallet.

In some instances, there may be more than one possible solution. It is only necessary to identify one option that follows "like-above-like".

Allergen Storage Example

Pallet Key:

Ingredient ID	Wheat	Milk	Egg	Soy	Almond	Walnut	Peanut	Pecan	None
A (2)	X								
C (1)	X	X		X					
F (2)									X
G (1)	X			X					
J (2)				X					

Number of pallets

Allergen Storage Example Answer

Option 1

F-None	A-Wheat
F-None	A-Wheat
J-Soy	G-Wheat + Soy
J-Soy	C-Wheat + Soy + Milk

Pallet

Allergen Storage Exercise 1

Pallet Key:

Ingredient ID	Wheat	Milk	Egg	Soy	Almond	Walnut	Peanut	Pecan	None
A (2)	X								
C (1)	X	X		X					
F (2)									X
G (1)	X			X					
J (2)				X					

Pallet

Allergen Storage Exercise 2

Pallet Key:

Ingredient ID	Wheat	Milk	Egg	Soy	Almond	Walnut	Peanut	Pecan	None
L (2)									X
N (2)		X							
P (2)		X	X						
T (2)		X							

Pallet

Allergen Storage Exercise 3

Pallet Key:

Ingredient ID	Wheat	Milk	Egg	Soy	Almond	Walnut	Peanut	Pecan	None
E (3)	X	X		X					
I (2)	X			X					
W (1)									X
Y (2)				X					

Pallet

Allergen Storage Exercise 4

Pallet Key:

Ingredient ID	Wheat	Milk	Egg	Soy	Almond	Walnut	Peanut	Pecan	None
H (2)								X	
O (2)					X	X		X	
R (2)						X		X	
Z (2)					X			X	

Pallet

Identify the Big 8 Allergens in each ingredient statement.

Allergen ID Exercise 1

INGREDIENTS: SEMOLINA, DURUM, NIACIN, IRON (FERROUS SULFATE), THIAMINE MONONITRATE, RIBOFLAVIN, FOLIC ACID

Allergen ID Exercise 2

INGREDIENTS: SLICED ALMONDS, SALT, TOMATO MALTODEXTRIN, SUGAR, WHEY, CHEDDAR CHEESE SOLIDS (MILK, CHEESE CULTURES, SALT, ENZYMES), ONION, GARLIC, BUTTERMILK, NATURAL FLAVOR, NATURAL FLAVOR, CITRIC ACID, SPICE, NONFAT DRY MILK, EXTRACTIVES OF PAPRIKA, TUMERIC, AND BASIL

Allergen ID Exercise 3

INGREDIENTS: CORN SYRUP, WHEAT FLOUR, CITRIC ACID, ARTIFICIAL FLAVOR, RED 40

Allergen ID Exercise 4

INGREDIENTS: RECONSTITUTED VEGETABLE JUICE BLEND (WATER AND CONCENTRATED JUICES OF TOMATOES, CARROTS, CELERY, BEETS, PARSLEY, LETTUCE, WATERCRESS, SPINACH, SALT, VITAMIN C (ASCORBIC ACID), NATURAL FLAVORING, CITRIC ACID

Allergen ID Exercise 5

INGREDIENTS: WATER, HYDROLYZED VEGETABLE PROTEIN (CORN, SOY, WHEAT), RED WINE VINEGAR, TOMATO PASTE, WORCESTERSHIRE SAUCE (VINEGAR, MOLASSES, HIGH FRUCTOSE CORN SYRUP, ANCHOVIES, WATER, HYDROLYZED SOY AND CORN PROTEIN, ONION, TAMARIND, SALT, GARLIC, CLOVES, CHILI PEPPER, NATURAL FLAVOR, SHALLOTS), DATE PASTE, NATURAL FLAVOR, YEAST EXTRACT, ONION JUICE, SALT, GUAR GUM, SODIUM BENZOATE, GARLIC JUICE, SUGAR, CORN SYRUP SOLIDS, SPICES

Bonus questions

(1) Which components of the HVP are Big 8 Allergens?

(2) Which components of the worcestershire sauce are Big 8 Allergens?

Allergen ID Exercise 6

INGREDIENTS: CANOLA OIL, SUNFLOWER OIL, SOYBEAN OIL, SOY LECITHIN, DIMETHYL SILICON, AND PROPELLANT

Allergen ID Exercise 7

INGREDIENTS: BEEF, BROWN SUGAR, LESS THAN 2% OF SALT, SPICES, AND NATURAL FLAVORINGS, NATURAL SMOKE FLAVOR, SODIUM NITRITE

Allergen ID Exercise 8

INGREDIENTS: LIGHT TUNA, WATER, VEGETABLE (SOY) BROTH, SALT

Allergen ID Exercise 9

INGREDIENTS: RICE SYRUP, COCOA (PROCESSED WITH ALKALI), GLYCERIN, RICE FLOUR, SUGAR, WHEAT STARCH, SOY PROTEIN ISOLATE, HONEY, FRACTIONATED PALM KERNEL OIL, WHEY, MALTODEXTRIN, NATURAL FLAVOR, CANOLA OIL, LACTOSE, DEXTROSE, SALT, SOY LECITHIN

Allergen ID Exercise 10

INGREDIENTS: POPPING CORN, PALM OIL, LESS THAN 2% OF: SALT, POTASSIUM CHLORIDE, NATURAL AND ARTIFICIAL FLAVOR, BUTTER (CREAM, ANNATTO), COLOR ADDED, TBHQ AND CITRIC ACID

Allergen ID Exercise 11

INGREDIENTS: WHOLE GRAIN ROLLED OATS, DEHYDRATED APPLES, SUGAR, SALT, CINNAMON, CALCIUM CARBONATE, NATURAL FLAVORS, CITRIC ACID, GUAR GUM, SUCRALOSE, NIACINAMIDE, VITAMIN A PALMITATE, REDUCED IRON, PYRIDOXINE HYDROCHLORIDE, RIBOFLAVIN, THIAMIN MONONITRATE, FOLIC ACID

Allergen ID Exercise 12

INGREDIENTS: BULGAR WHEAT, SALT, PARSLEY, ONIONS, MOLASSES, GARLIC, SPEARMINT, HONEY, BLACK PEPPER

Allergen ID Exercise 13

INGREDIENTS: CHICKEN STOCK, CORN, POTATOES, WHITE CHICKEN MEAT, CARROTS, CELERY, MODIFIED FOOD STARCH, CONTAINS LESS THAN 2% OF: VEGETABLE OIL, WHEAT FLOUR, FLAVORING, DEHYDRATED ONIONS, POTASSIUM CHLORIDE, SUGAR, SALT, COLOR ADDED, SOY PROTEIN CONCENTRATE, YEAST EXTRACT, DEHYDRATED BUTTER (CREAM, SALT), SODIUM PHOSPHATE, DEHYDRATED BUTTERMILK, HYDROLYZED SOY PROTEIN, BETA CAROTENE, SPICE, SEA SALT, DEHYDRATED GARLIC, NATURAL FLAVORING (EGG, SOY, SESAME), DISODIUM GUANYLATE, DISODIUM INOSINATE, DEHYDRATED CHICKEN, CHICKEN FAT, NATURAL SMOKE FLAVORING

Bonus questions

(1) Which components of the dehydrated butter are Big 8 Allergens?

(2) Which natural flavorings are Big 8 Allergens?

Create production schedules on a single production line with the fewest allergen changeovers.

The products needing to be produced each day are outlined below. There is a detailed clean (effective allergen removal) at the conclusion of each day.

There may be multiple options.

Allergen Schedule Example

Formulas to be run Monday:

A - Wheat, Milk, Soy

B - Wheat, Milk, Soy, Almond

C - Wheat, Milk

D - Wheat, Egg

E - Wheat, Soy

2 - Allergen Changeover

Allergen Schedule Example Answer

Option 1

Formula C
Formula A
Formula B
Allergen Changeover
Formula D
Allergen Changeover
Formula E

Schedule

Formulas to be run Monday:

	Formula Schedule
A - Wheat, Milk, Soy	
B - Wheat, Milk, Soy, Almond	
C - Wheat, Milk	
D - Wheat, Egg	
E - Wheat, Soy	
2 - Allergen Changeovers	

Formulas to be run Tuesday:

	Formula Schedule
A - Wheat, Milk, Soy	
E - Wheat, Soy	
I - Wheat, Milk, Pecan	
O - Wheat, Milk, Egg	
2 - Allergen Changeovers	

Formulas to be run Wednesday:

	Formula Schedule
P - Wheat, Milk, Soy, Almond	
Q - Wheat, Milk, Soy	
X - Wheat, Milk, Soy	
Y - Wheat, Milk	
Z - Wheat, Milk, Soy, Pecan	
1 - Allergen Changeover	

Formulas to be run Thursday:

G - Wheat, Milk, Soy, Walnut

H - Wheat, Milk, Walnut

K - Wheat, Soy, Peanut

L - Wheat, Milk, Soy, Peanut

M - Wheat, Milk, Egg, Peanut

2 - Allergen Changeovers

Formula Schedule

Formulas to be run Friday:

N - Wheat, Milk, Soy

R - Wheat, Milk, Soy

S - Wheat, Milk

Y - Wheat, Milk

Z - Wheat, Milk, Soy, Pecan

Formula Schedule