

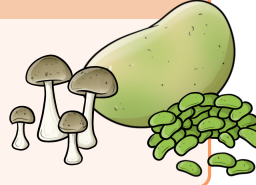
TOPIC: FOODBORNE TOXINS

Naturally Occurring Toxins

- ◆ Some toxins are _____ by organisms: _____ or microorganisms.

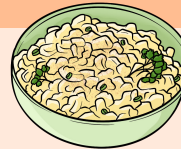
Made by Plants etc.

- ◆ _____ potatoes produce solanine → avoid consuming.
- ◆ _____ lima beans produce cyanogenic glycosides → cook properly.
- ◆ Many _____ mushrooms produce toxins → avoid consuming.



By-product of a _____:

- ◆ *Staphylococcus aureus* → Staphylococcal toxins.
 - Bacteria is killed by cooking, but the toxin is heat _____.
- ◆ *Clostridium botulinum* → _____ toxin; causes botulism.
 - **Source:** improperly _____ foods & honey.
 - **Outcome:** _____ & death; _____ at particular risk.



EXAMPLE

Answer the following questions about toxins in food.

1	Circle the food below that might contain toxins that are by-products of another microorganism: Green potatoes Death cap mushrooms Raw lima beans Canned goods
2	Circle the microorganism that may be found in this food: <i>Staphylococcus aureus</i> <i>Clostridium botulinum</i>
3	What toxin is created by this microorganism: _____
4	What are some of the effects of this toxin: _____

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PRACTICE

Many beans, including lima beans, have the potential to produce a toxic cyanogenic glycoside. What must be done to avoid exposure to this toxin?

- a) Refrigerate beans after cooking.
- b) Avoid cross-contamination with other foods.
- c) Wash beans thoroughly before cooking.
- d) Cook beans thoroughly before consuming.

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Residues & Contaminants

- ◆ **Residues:** _____ pesticides on food.
 - Pesticide levels regulated at safe levels by the _____, FDA, & USDA.
 - Washing/peeling fruits and vegetables can further _____ exposure.

◆ **Contaminants:** hazardous chemicals like _____ metals or _____ disruptors.

◆ **Lead:** affects _____ system & intellectual ability.

- Test/flush/filter water; test paint in older homes; avoid older glazed pottery.

◆ **Mercury:** affects nervous system & intellectual ability.

- Avoid certain _____: tuna, swordfish, etc.

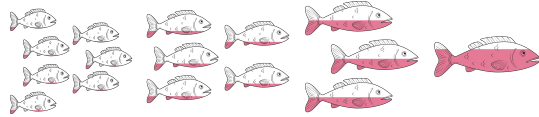
◆ **Bisphenol A (_____):** reproductive & developmental defects in animals.

- Reduce plastic use/canned foods; don't heat/microwave in plastics.

◆ **Dioxins:** reproductive harm & potential cancers.

- Avoid _____ meats.

◆ **Biomagnification:** _____ of residues & contaminants in the food chain → biggest concern in _____.



EXAMPLE

For each type of food contaminant below, explain a way to minimize consumption of that contaminant.

1	Bisphenol A: _____
2	Lead: _____
3	Mercury: _____
4	Dioxin: _____

PRACTICE

Which of the following is an example of a residue?

- a) A small amount of pesticide found on produce.
- b) A tiny amount of mercury found in fish.
- c) A trace amount of lead found in drinking water.
- d) A negligible amount of dioxin found in animal fat.

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PRACTICE

For which type of food is biomagnification a significant concern?

- a) Produce, because leafy greens are more likely to take up contaminants from the soil.
- b) Grains, because the seed part of the plant is the most likely to contain contaminants.
- c) Meat, because the fat in meat is a place where contaminants can accumulate.
- d) Fish, because some fish that we eat are higher in the food chain compared to most other foods we consume.