Toxins and Viruses

These resources provide a comprehensive learning module to understand the reasons of practical food safety procedures. They are ideally suited to a wide range of learners, as they more than fulfill the requirements of Basic Food Hygiene (NVQ Level 2) and so provide the resources to meet the mandatory requirement for all FE and HE hospitality students to obtain this qualification.

Through an understanding of the scientific reasons for a food safety the student achieves the knowledge of how to manage food safety in an operational unit and also from the large company's perspective for the implementation of HACCP, making the resource suitable for HE students to enter management roles in industry.

Contents

This resources looks at the potential risks of food contamination coming from toxins and viruses.

Section 1. Learning Outcomes

By the end of this section you will have learnt;

1. What can cause food poisoning apart from bacteria,
2. The dangers of toxins found in fish,
3. The importance of always purchasing your supplies from a reputable dealer,
4. The importance of being aware of news as certain sources of shellfish are banned at times,
5. Why you should always store shellfish at 0c,
6. How toxins are produced by moulds and can cause serious illness.

Section 2. Introduction

In the previous section you have learnt how bacteria can live in and on our food and how we can control these germs through temperature and good hygiene practices in accordance with the safe

food handling recommendations.

So now let us look at other living contaminants - toxins and viruses, both of which are hazards of shellfish and other foods.

Section 3. Toxins

Toxins are the poisons produced by bacteria. They cannot be detected by normal means and so there are certain foods, which we must handle with particular care. Surprisingly, one of the most common sources of such toxins is fish, especially if it has been frozen and not properly defrosted.

The correct handling and storage of smoked, canned and above all defrosted smoked fish is important, as the toxin, scombrotoxin causes serious rapid illness. This can be avoided by correct storage and defrosting in a refrigerator.

The problem can arise from defrosting under water (especially if hot water is used) and if the fish is kept too long at ambient temperature, or even above 4c as on a chilled shelf for salads.

Fish and Shell Fish

In some fresh fish and shellfish toxins can be found (sometimes at certain seasons be particularly careful of fish from the Gulf of Mexico and the Caribbean during summer).

These undetectable toxins are not produced by the fish, but by dinoflagellates and algae or other items in the fish's diet.

These toxins accumulate in fish such as the neurotoxin, tetrodotoxin, found in the Japanese puffer fish, a delicacy. If the fish is not properly cleaned, rapid and violent death will occur. Fish which can be infected with these poisons include Barracuda, Sea Bass, Groupers and of course, the puffer or Fugu fish of Japan.

At certain times even the shellfish from Britain's coast can be infected with these toxins and so fishing is banned. Scientists are still trying to find the reason why these and other fish are resistant to these poisons, as by normal inspection it is impossible to detect that anything is wrong.
It is therefore very important to always purchase from reputable fish suppliers who will be aware of such hazards, so there is no chance of a toxin-contaminated fish finding its way into the kitchen.

Sometimes there is a public warning about eating fish or shellfish from a specific region. Always discard all suspected items and never serve that food until the warning is removed.

These outbreaks are seasonal and unpredictable and are undetectable to the human eye.

The golden rule is; never take a chance – always discard anything you fear may be suspect and always use a reputable supplier.

Fish can be infected with parasites, animals which live inside the fish. These are usually worms, nematodes, and can be a serious hazard if eaten alive.

Usually these worms are killed by cooking but the serious hazard is when the fish is prepared raw for dishes such as sushi.

The fish must be frozen first, this will kill all the worms.

An example of this, is that all salmon exported from Scotland to Japan (the home of sushi) is first frozen.

Never prepare sushi from fresh (non-frozen) fish.

Section 4. Toxins- mould.

Plant Toxins

Toxins are also produced by moulds - fungi. These are called mycotoxins.

Your only safeguard is to purchase your supplies from reputable dealers.

These toxins are found on various items such as apples, nuts and cereals which have been infected with a mould.

Aflatoxin is the product of common visible moulds as found on fruit and other foods, therefore when mould is visible discard all items that may have come into contact with it.

It is not safe simply to cut away the mouldy portion as the toxin will remain within the flesh which you have wished to save and so the food will still be harmful.

Therefore you will be placing your customer at risk - discard all items with any furry fungus growth immediately with all adjoining items which could have been contaminated with the fungus.

These toxins will not be broken down or rendered harmless by cooking. Some instances of unacceptable levels of these toxins have been found in apple juice (from the moulds which grow on apples) but usually government tests control the quality of these products.

The results of such poisoning include serious liver damage and causing the start of cancer.

Section 5. Viruses

Viruses are another form of poisoning which is probably on the increase and causing unreported food poisoning incidents. However, as viruses are killed by normal cooking temperatures, they are a hazard mainly found in raw seafood such as oysters.

However cooked seafood, such as mussels may be contaminated through cross contamination with other shellfish. Shellfish are filter feeders and so concentrate viruses from sewage: they can therefore become a serious hazard. Once again we realise the importance of purchasing from a reputable supplier who is knowledgeable about the source of the product.

Indeed the importance of selecting the best source for raw seafood and shellfish cannot be over emphasised.

The common small round virus, the Norwalk is a frequent cause of gastroenteritis.

This virus which can be found in seafood is usually transmitted from person to person by the oral-fecal route.

It is a sign of poor hygiene, especially improper hand washing after visiting the toilet.

Outbreaks of the Norwalk virus have occurred on cruise ships where many people live closely together.

Good personal hygiene and proper handling and sourcing of seafood is vital to prevent an outbreak.

As the virus is easily passed between people it is vital to always practice good hygiene as an outbreak on a cruise ship, holiday resort and worst of all hospitals and care homes will have disastrous results.

Section 6. Key Points

Living contaminants and their derivatives are:

- Bacteria
- Viruses
- Moulds
- **Toxins** - the poisons produced by bacteria and moulds
- **Parasites** - such as worms, nematodes (round worms)

Section 7. Safe Food Handling Practices

Daily Routine.

1. Always purchase your food from reputable suppliers and ensure that they are knowledgeable about their source and any possible hazards or bans in certain areas.

2. Check all seafood an arrival; if the shellfish should be alive, such as oysters and mussels - discard any dead items and immediately store at 0c.

3. Be aware of the news in case there is a fishing ban on certain sea foods, and question your supplier.

4. Store shellfish away from all other foods at 0C.

5. Wash the shells before preparing shellfish as they may be contaminated: if not washed contaminants will easily be passed from one to another.

6. At all times be aware of the hazards of shellfish and take extra care when preparing them.

7. Always prepare sushi and other raw fish dishes from frozen fish, to ensure that all parasites have been killed.

8. Always discard any item with mould and those items which have been in contact with the mouldy item. Do not attempt to salvage any food by cutting away the visible mouldy portion, as this is very likely to cause food poisoning.

Credits

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