Food Manufacture

Temperature Control

Lesson 5

Understand the importance of temperature control in food manufacturing to ensure food safety is never compromised.

FOODSPHERE

Freezing a product involves storing it at or below -18°C.

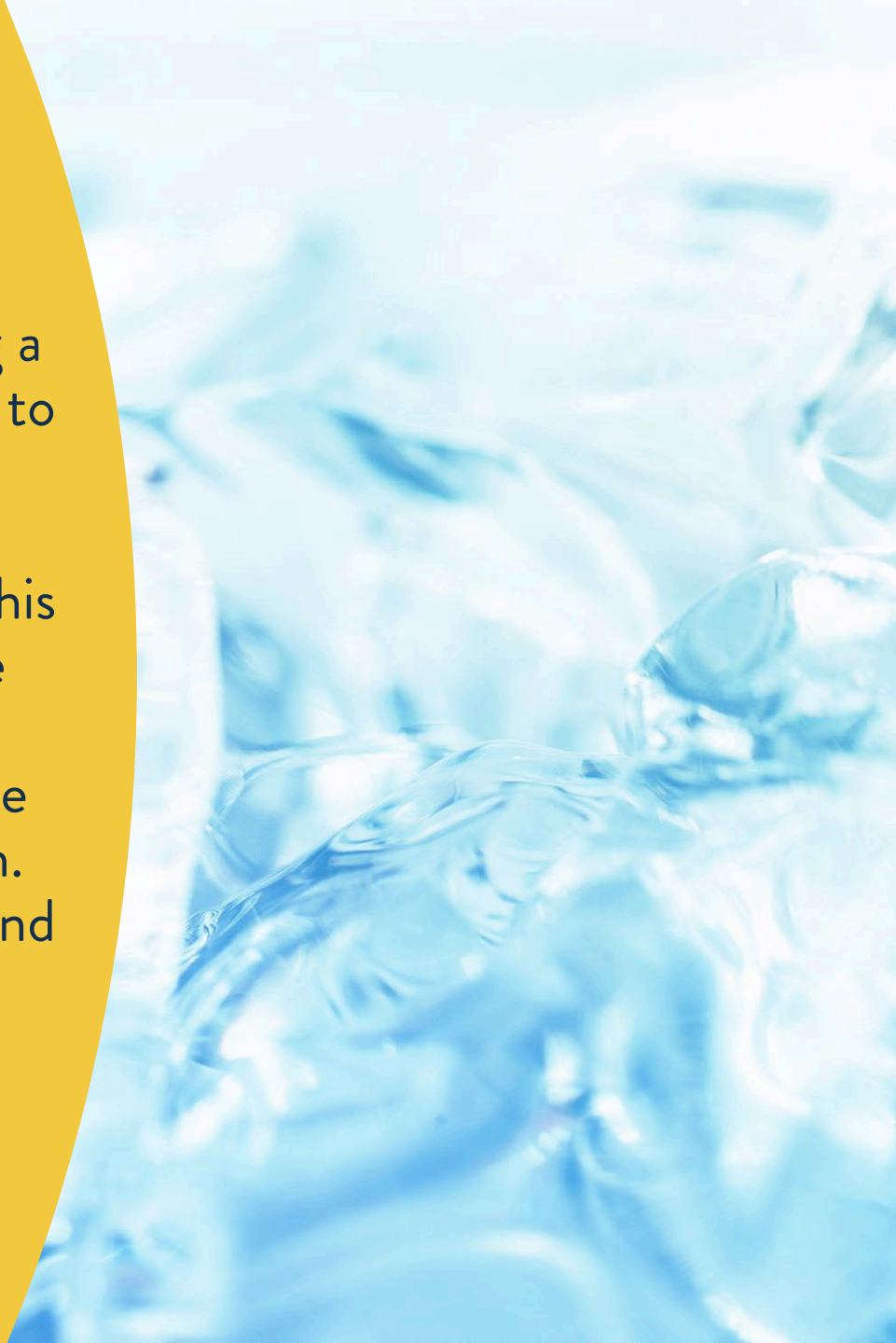
Freezing a product does not kill any bacteria on it but stops it from growing and becoming dangerous, causing food poisoning.

When a product is being frozen it cools rapidly then it slows at the thermal arrest stage where more heat is required to be extracted from the product to convert the liquid into ice crystals. Then once approximately 55% is ice the temperature starts to fall rapidly again.

There are 3 main methods of freezing:

- Cold air blowing continuously or in batches e.g. blast freezer
- Direct contact with cold surfaces e.g. plate freezer
- Immersion or spaying with a refrigerated liquid e.g. liquid nitrogen freezer

Deep freezing involves cooling a product quickly by exposing it to temperatures of -30°C to -50°C until the products core temperature reaches -18°C. This process allows the water in the product to form more fine crystals and does not affect the quality of the product as much. Freshness, flavours, textures and nutrients are all maintained in the product.



There are lot's of different types of freezers:

- Air blast freezer or cold storage freezer
- Spiral belt freezer
- Carton freezer or box freezer
- Fluidized bed freezer, IQF freezer or tunnel freezer
- Plate freezer or block freezer
- Immersion freezer or brine freezer
- Contact belt freezer
- Impingement freezer or flat product freezer
- Cryogenic freezer

Freezer burn of a product is when a product has lost moisture due to freezing. This is because of the product becoming dehydrated due to being stored incorrectly and frozen for a long time.

The quality of the product is affected by freezer burn.
Sometimes the safety of the product can also be affected if the product has been exposed and contamination could have occurred.

To prevent freezer burn products must be stored safely, fully covered and in airtight containers if possible. A good stock rotation system will prevent any products being left frozen for a long time.

Stock rotation of product is essential using a first in first out (FIFO) system is the best practice to follow. In a freezer it maybe difficult to rotate stock without emptying the whole freezer which maybe a lengthy job putting the temperature of the product at risk. A safer practice to follow is to use first use labels on the oldest stock so it is picked first.

No hot products should be placed into the freezer it must be at a temperature of 8°C or below. A hot product would heat up the freezer and compromise the safety of the other products.

Product stored in a freezer must be stored safely not overstocked and allow air to flow throughout the freezer so it can work effectively.

Product must be stored off the floor for food safety reasons. Freezers must be kept clean and tidy with doors kept closed when not in use to maintain the correct temperature and prevent any food safety risks.

Revision Activity 5

List a method of freezing?