**Activity: Plan quality control testing**

In this activity, students learn how each stage of the cheesemaking process contributes to the final characteristics of a cheese and how testing procedures are used to control quality and consistency of the cheese.

By the end of this activity students should be able to:

* describe the characteristics of Gouda cheese
* explain the processing stages for making Gouda cheese and how each stage contributes to the final cheese characteristics
* identify where in the cheesemaking process quality control testing is carried out
* explain how each testing procedure ensures consistency of the cheese characteristics
* identify appropriate testing procedures to control cheese quality in a given or chosen cheese recipe to be made in class.

[Introduction/background](#intro)

[What you need](#need)

[What to do](#do)

[Extension activities](#extension)

[Useful links](#links)

Student handout: [Processing and quality control chart](#processing)

**Introduction/background**

In large-scale factories where cheese is mass produced by an automated process, quality control is also largely automated. In smaller-scale artisan cheese production using traditional methods, the cheesemaker manages the quality control using hands-on testing methods.

There are many interacting variables that have to be managed to produce high-quality cheese and to ensure that every batch produced is consistent.

The composition of milk changes throughout the season and differs between herds and breeds of cows. Differences in milk composition affect the quality and characteristics of cheese.

In large factories, milk is collected from many different farms and standardised, so the composition is controlled.

Artisan cheesemakers generally source milk directly from a local farm. They have to monitor milk quality from day to day and year to year and adjust their process accordingly to ensure consistent cheese quality. Temperature, humidity, timing, pH level, curd consistency, and quality and consistency of ingredients also have to be carefully monitored at various stages of the process.

There are a number of scientific tests that can be performed to ensure quality and consistency, but in a traditional process, there are also some more instinctive tests that depend on the cheesemaker’s accumulated knowledge, built up through years of experience.

**What you need**

* Samples of Gouda cheese
* Access to the video clip [Characteristics of Gouda cheese](https://www.sciencelearn.org.nz/videos/414-characteristics-of-gouda-cheese)
* Copies of the student handout [Processing and quality control chart](#processing)
* Access to or hard copies of the articles [Manufacturing Gouda cheese](https://www.sciencelearn.org.nz/resources/828-manufacturing-gouda-cheese) and [Creating different cheese characteristics](https://www.sciencelearn.org.nz/resources/829-creating-different-cheese-characteristics)
* Access to the interactives [From milk to cheese](https://www.sciencelearn.org.nz/embeds/37-from-milk-to-cheese) and [Quality control in cheesemaking](https://www.sciencelearn.org.nz/embeds/36-quality-control-in-cheesemaking)

**What to do**

1. Start by discussing some of the obvious differences in characteristics of different cheeses. Remind students about their findings in the student activity [Identifying cheese characteristics](http://www.biotechlearn.org.nz/focus_stories/cheesemaking/identifying_cheese_characteristics), or carry out this activity if you haven’t already done so.
2. Have students look at a sample of Gouda cheese and then view the video clip [Characteristics of Gouda cheese](https://www.sciencelearn.org.nz/videos/414-characteristics-of-gouda-cheese). Distribute copies of the student handout [Processing and quality control chart](#processing) and have students identify and list the characteristics described in the clip and any others they noted when looking at the Gouda cheese sample in column A.
3. Have students view the interactive [From milk to cheese](https://www.sciencelearn.org.nz/embeds/37-from-milk-to-cheese) and read the articles [Manufacturing Gouda cheese](https://www.sciencelearn.org.nz/resources/828-manufacturing-gouda-cheese) and [Creating different cheese characteristics](https://www.sciencelearn.org.nz/resources/829-creating-different-cheese-characteristics). On the [Processing and quality control chart](#processing), have students list the processing stages in column B and their purpose in column C. How does each stage contribute to the final characteristics of the cheese?
4. Have students view the interactive Quality [control in cheesemaking](https://www.sciencelearn.org.nz/embeds/36-quality-control-in-cheesemaking) and list the testing procedures in column D of the [Processing and quality control chart](#processing).

**Extension activities**

* Have students view images of large-scale cheese manufacturing in closed vats. Ask students to identify some key differences between the larger-scale process and the traditional process in the Meyer Gouda Cheese factory and consider how quality would be controlled in the larger factory.
* Plan to make a simple cheese in class in small groups – students could customise the recipe to create their own flavour. Provide or ask students to research the characteristics of the cheese and the processing steps, then discuss how each step contributes to the final characteristics of the particular cheese and what tests they would need to perform to ensure the cheese is good quality. Record the information on the [Processing and quality control chart](#processing). Alternatively, have students use standard flowchart symbols to design a flowchart that includes the quality control decision points before making the cheese.
**Note**: It is essential that students understand safety risks in cheesemaking before attempting to make cheese in class, and safe food handling practices need to be strictly enforced to ensure the cheese is safe to eat. Get student activity: [Safety in cheesemaking](http://www.biotechlearn.org.nz/focus_stories/cheesemaking/safety_in_cheesemaking)

**Useful links**

**HACCP planning for cheesemaking**

Download the PDF to learn more about Hazard Analysis of Critical Control Points (HACCP) planning for cheesemaking.

[www.internetjfs.org/articles/ijfsv10-1.pdf](http://www.internetjfs.org/articles/ijfsv10-1.pdf)

**Dairy product manufacture legislation**

Learn about food safety legislation for dairy products in New Zealand in downloadable documents on the New Zealand Food Safety Authority (NZFSA) website.

[www.foodsafety.govt.nz/industry/sectors/dairy/documents/legislation.htm](http://www.foodsafety.govt.nz/industry/sectors/dairy/documents/legislation.htm)

**Processing and quality control chart**

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| --- | --- | --- | --- |
| **A. Cheese characteristics** | **B. Processing steps** | **C. Purpose of processing step**How does each step contribute to forming the cheese and creating its final characteristics? | **D. Quality control – testing procedures**List each test alongside the relevant step. Explain how it contributes to cheese quality and consistency.  |
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