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| **Case study: Who’s to blame?** |

A cheese producer can no longer produce their star cheese: *La clé des champs*. For a few months now, the taste of their cheese hasn’t been the same. They’ve carefully checked all the production steps. Their milk still comes from Ferme Jolie and all the equipment in the production chain is in order. The milk preparation process has even been improved. The temperature and humidity of the ripening room have not changed. They don’t understand what’s going on. They’ve decided to hire your company to help them identify and eliminate the cause of his problem, because they know that the biodiversity and metabolism of the microbial flora used to produce cheese are essential to the development of a superior final product, but they don’t know where to start.

With your team, you must identify, for each of the production steps presented below, an organism (pathogenic or not) that could affect the cheese production.

 **At the farm**:

The owner of Jolie Farm decided to modernize their barn, as the number of days with temperatures above 30 degrees Celsius is increasing and this affects their production. The renovations began a few months ago. During the renovations, their cows are left on pasture, so they consume more alfalfa, fresh hay, but also the new species of grasses that grow more abundantly with the temperature changes, including purple loosestrife, leafy spurge and garlic mustard. In addition, a stream allows cows to drink directly from the field. The Jolie farm was initially composed only of Canadian cows, but for a few months now, nearly 50% of the cows have been replaced by Holstein cows because their milk yield is greater. In addition, milking is done in a portable module the owner borrowed from one of their neighbours. The unit is not as well ventilated and the temperature in the milking area is much higher than when milking in a barn.

**Milk preparation**:

The processing plant has been upgraded to use the thermalization method of milk instead of pasteurization. This method does not heat the milk to such a high temperature.

**Curdling**:

The processing line has not changed. But the cleaning products for the tanks have been changed in order to reduce the chemicals used. In addition, a new water recovery process has been installed. This process allows the reuse of the water needed for the cheese cleaning process and thus reduces water consumption by 80%.

**Ripening room**:

The conditions of the ripening room haven’t changed, but it has been open for guided tours for a few months now. Visitors are advised not to touch the shelves or materials in the room, so they do not need to wear protective equipment.

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| **Project** |

Your team will need to prepare a presentation to introduce the identified microorganisms to the owner of the processing plant and the dairy farmer.

Each team member must choose one of the microorganisms identified in the previous step and present:

Its binomial name

Its systematic classification (KPCOFGS)

Its anatomical and physiological characteristics with a picture

Its role in its environment

A way to control or eliminate this individual.

As with all research work, you must always indicate your sources for the information and images.

You will need to present your organism to the class.