Improving the flavour and functionality of cheese

Kyle Allington
Key Drivers – Cheddar cheese customers

Price
- Food inflation has hit consumers hard (Cheese prices +12% – 44% – 2023)
- Consumers willing to downtrade from brands to private label
- Bigger pack sizes with lower cost/kg

Taste, flavour & functionality
- Most consumers prefer mild cheddar for its functionality
- Most consumers feel they have less time and are busier therefore convenience is important – sliced/shredded cheese
- Consumers are looking for mature cheeses that have distinct moreish flavours

Environment/Sustainability
- Gen Z are extremely conscious of the impact of dairy on the environment
- Extended Producer Responsibility laws come into effect in 2024
- Methane emissions from dairy cows
- Reduced packaging with plastic
The Needs of Cheddar Cheese Producers

- Selling cheese earlier
- Reduced bitterness
- Flavour development
- Maintaining texture during maturation
- Increased yield
- High value whey
Maxiren®XDS

The most advanced calf Fermentation Produced Chymosin (FPC)

Our Maxiren®XDS chymosin has been taking cheese to new heights since 2014.

It delivers higher yields for all cheese types, with higher whey quality, and the highest levels of firmness and sliceability.
Maxiren®XDS

Maxiren®XDS has a superior clotting to proteolysis ratio – delivering high specificity to K-CN 105/106 to efficiently coagulate the milk.

The efficiency of Maxiren®XDS is even further supplemented by its ability to only cut the as₁₂₃/₂₄ bond and not break down other proteins.
Fast Curd Fusion

Maxiren® XDS produces cheeses with fast curd knitting due to its unique specificity when compared to other chymosins.

**Need:** Selling cheese earlier to reduce storage and refrigeration costs and reducing the amount of capital tied-up in cheese stocks.
Reduced Bitterness

Due to the high specificity, Maxiren®XDS creates a cheese with fewer bitter peptides, and it even gets better with time!

Need: Reduced bitterness.

Cheddar cheese can develop peptides which are perceived as bitter. To combat this, producers typically require the use of adjuncts to prevent bitterness developing.

The addition of adjuncts can increase production costs. Without adjuncts the cheese must be matured for longer until the bitterness is no longer perceived.
The specificity of Maxiren®XDS helps to initiate flavour development when compared to some chymosins, which typically require longer maturation times to create the same level of flavour development.

**Need:** Flavour development

The initial cheddar cheese flavour compounds come from the starter culture enzymes breaking down the $\alpha_s^1$ peptide 1-23.

Standard calf chymosin breaks down too many peptides whilst other chymosins don’t release the important $\alpha_s^1$ 1-23 peptide needed for early flavour development.
Maintaining texture during maturation

Maxiren® XDS creates a firmer less brittle cheese

**Need:** Maintaining texture during maturation.

As cheeses age, enhanced proteolysis makes the cheese texture shorter/crumblier. This results in costly losses during slicing, in off-cuts and increased downtime whilst slicing. This is even more problematic with mature and vintage cheese.
Increased yield

Maxiren®XDS has the ability bind more water in the cheese and this is coupled with lower fat and protein losses in the whey.

**Need:** Increased yield.

Recovering more total solids (fat & protein) in the cheese results in a higher yield and a cleaner whey.

Maxiren®XDS is able bind more water in the cheese. Higher moisture cheese can result in a cheese that is too soft.

However, Maxiren®XDS produces a firmer cheese, so the increased moisture is not perceived.
High value whey

Maxiren®XDS is inactive during standard whey processing conditions.

**Need:** High value whey.

The thermolability of Maxiren®XDS ensures only the minimum amount of heat is required to inactivate Maxiren®XDS. This results in higher quality proteins.

Other chymosins require a higher temperature to inactivate them and this results in lower quality whey proteins due to the higher heat treatment and the additional heating also increases operational costs.
We bring progress to life™