

Some like it cold: the benefits of cold milk separation

Separation can be performed on milk either hot or cold. Hot milk separation is the more common of the two, but the cold approach has long been popular in some parts of the world. Nowhere is the cold separation tradition stronger than at Tetra Pak, who have been using hermetic, airtight, separators to cold-separate milk for more than 65 years.

International Food & Meat Topics spoke to three of Tetra Pak's separation experts who explain the benefits of keeping it cold.

www.tetrapak.com/processing/separation

Separating milk into cream and skimmed milk is a fundamental dairy process, as the resulting skim, or standardised milk and cream is the base ingredient for most dairy products – from consumption milk to cheese, yoghurt or milk powder.

Hot milk separation is done at a temperature of about 50°C, while cold is typically at 10°C or lower. As hot milk is less viscous than cold milk, it can pass faster through the separator, enabling higher production volumes.

However, there are many benefits of cold milk separation which should be considered.

When less means more – longer production runs

Hot milk separation is done at a temperature of about 50°C, while cold separation is typically at 10°C or lower. As hot milk is less viscous than cold milk, it can pass faster through the separator, enabling higher production volumes – and is sometimes preferred by dairies for this reason.

Cold milk separation has other benefits. It may, for example, allow longer production run time by avoiding heat-induced fouling at lower temperatures. It also reduces the potential growth of thermophilic thermoduric bacteria, which are capable of surviving high temperatures.

Only a hermetic design can handle high cream concentration at low temperature while avoiding air inclusion.

Other separator designs allow air intake, which creates a risk of churning inside the

separator and negatively impacts on cream quality. In fact, it is impossible to accomplish true cold separation at below 10°C in a separator that is not hermetically sealed. “If you want to run cold separation you need a hermetic separator – and this is a field where Tetra Pak are the experts,” says Keith Ortman, Tetra Pak Centrifugal Separation Product Manager in the US and Canada.

Minimising intervention – for a quality product

Achieving high skimming efficiency can be difficult when conducting cold separation at the typical temperature of 10°C or lower, according to Andrzej Holanowski, Tetra Pak Senior Dairy Technologist. Nevertheless, it is possible.

“We want our installations of cold milk separators to run at 10°C or lower because we know we are able to achieve good skimming efficiency at that temperature thanks to our airtight design and special machine configurations,” Andrzej told us.

How can cold milk separation benefit your production? One advantage, for powder and cheese manufacturers in particular, is that cold separation can reduce the growth of thermophilic thermoduric bacteria.

“You want as few of these bacteria as possible in your milk powder to meet quality requirements,” says Keith. “And if you use milk powder to make infant formula you need the highest quality possible. Large producers sometimes see cold milk separation as a way to improve the microbiological quality of their product.”

Strict rules surround infant formula production. As the regulations get tighter, the higher microbiological quality argument may work in favour of cold milk separation.

Hermetically-sealed for the long run

Tetra Pak's expertise in the area dates as far back as 1953 when it began using hermetic separators for cold milk separation. Hermetic, or airtight, separators prevent air ingress during the separation process.

“If you try to cold separate in a semi-open separator, the incorporation of air into cold



cream leads to fat churning, which causes clogging. It can quickly become like trying to pump cold butter,” says Keith.

Cold separation can also offer operational savings in a key area: cleaning. A cold separation line typically needs to be cleaned once a day, whereas the wet part of a hot separation line requires more frequent cleaning due to heat-induced fouling at higher temperatures.

Cleaning is a time-consuming and costly process that requires production downtime. It should be stressed, however, that as for any line, cleaning need depends on the product's properties and hygienic requirements.

Cold milk separation also poses some challenges. Separation efficiency may be slightly lower than for hot milk (though this is temperature-dependent). Also, a cold milk separator has lower capacity than an equivalent separator running on hot milk.

Out with the old, in with the cold

So when should a producer choose between cold and hot milk separation? The answer, according to Simon Beazleigh, Key Components Sales Engineer at Tetra Pak Oceania, is that it depends on your process.

“Customers can be faced with replacing or updating their separator that has come to the end of its life. These machines are typically 30 years old and may have been designed for hot milk separation,” he says.

“If the infrastructure in place supports hot milk separation, then I would recommend manufacturers continue running with a hot milk process. If there is an opportunity to redesign the process, then cold milk separation is the way to go.” ■