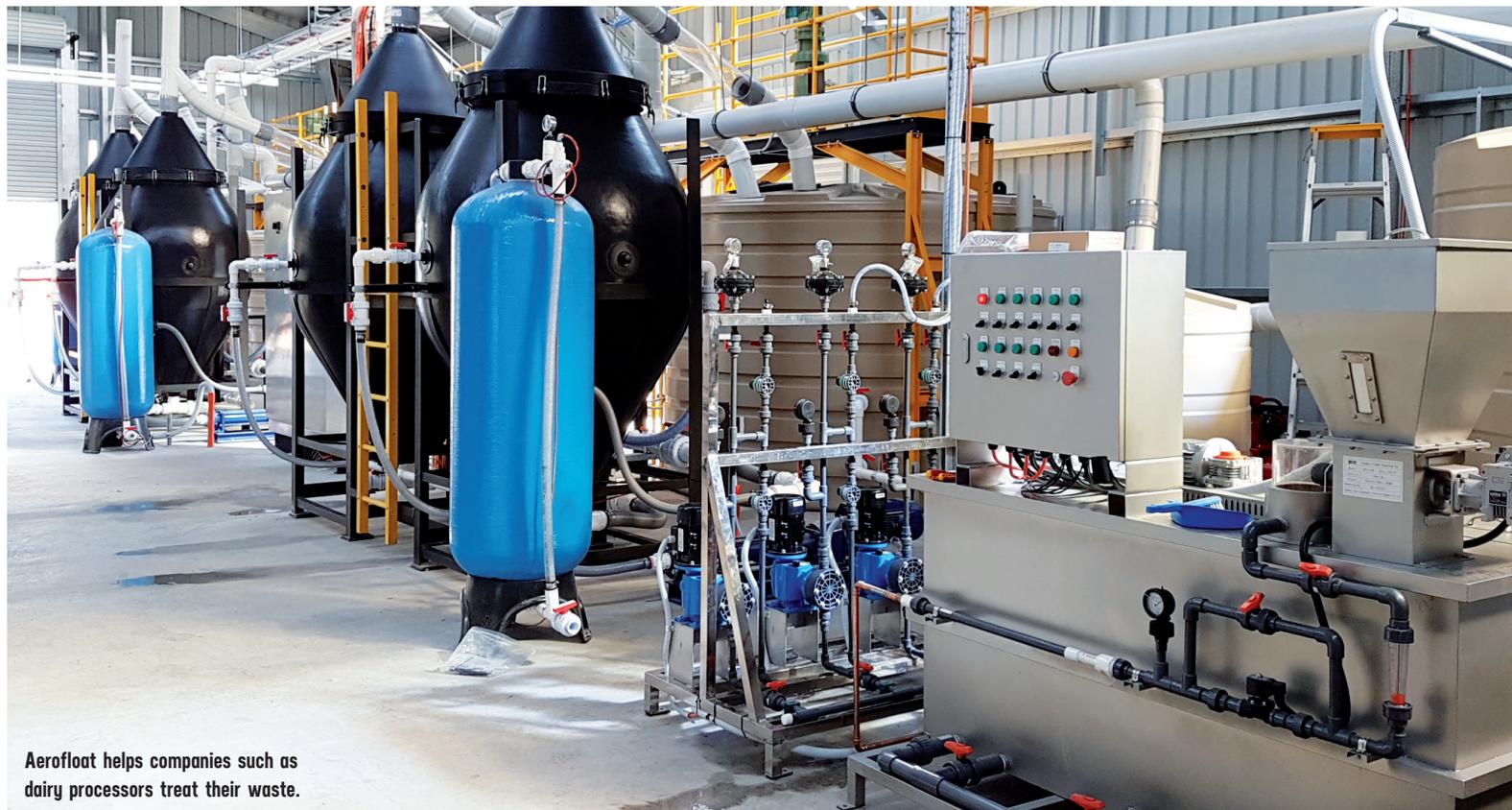


Dairy processing plants, fat balls and blocked sewers

Blocked sewers caused by giant balls of fat is just one problem that can occur if dairy food manufacturers don't treat their waste properly. *Food and Beverage Industry News* explains.



Aerofloat helps companies such as dairy processors treat their waste.

If you head over to the National Farmers' Federation website, it gives you a run down: there are 8,594 dairy farms in Australia, a national dairy herd of 1.6 million cows, and more than 9 billion litres of whole milk being produced per year with the farm gate value of about \$4 billion.

While farmers, dairy food processing factories and exporters see dollar signs, others like Aerofloat's Ray Anderson, are aware that the process wastewater generated at these factories needs to be treated before being released into the environment.

Anything not used in the primary product that is sold on the shelf, is waste – including all the washdown water and storage tank cleaning water. And this is where food processing managers need to do research on the best solution to

minimising and getting rid of waste.

You would think within the modern food processing environment that this would be a relatively easy fix. But Anderson, who is Aerofloat's managing director, said it's not that simple as the wastewater quantities and quality from different dairy processing plants can vary significantly. As such, there are different approaches and methods of treating the wastewater that is produced by different industries.

"I wouldn't call any of these waste streams challenging. I'd call them all treatable as long as you know what you are doing," he said. "If there is a lot of fat and suspended proteins, as is the case if you're treating wastewater from a milk bottling plant, you can remove the fats, proteins and lactose but you need to understand how to do that. You need to be able to understand the chemistry. The fats

and suspended protein (casein protein) can be removed by physical means, whereas the dissolved protein (whey protein) and lactose are soluble and need to be removed by biological processes. First, you need to be able to add the right chemicals to be able to bring the fats and casein protein together so they can be separated from the clean water. This separation can be done with a technique called dissolved air flotation (DAF)."

If a local sewerage authority has the capacity, they may be prepared to accept the discharge from the process, providing the suspended fats and proteins are removed to low concentrations. If there is no local sewerage authority, then the remaining soluble contaminants need to be removed by a biological process before the water is discharged to land or the river system. There are different

types of biological processes available but the use of Moving Bed Bio-film Reactors (MBBR) processes are common. This is a process where the wastewater is aerated in the presence of micro-organisms, which are attached to millions of small pieces of plastic bio-media.

It is also important that the company producing the waste knows the local regulations when it comes to treatment. Every council, state and municipality has different standards and ignorance is no excuse if a company is found in breach of these regulations.

"A company needs to understand the regulatory requirements for the local sewage authority if you have a sewer available," said Anderson. "If you don't have a sewer available, you then need to have an understanding of what the regulatory requirements

are of the Environmental Protection Authority (EPA) in terms of treating and releasing back into the environment, or onto the land for irrigation purposes.”

The majority of food processing facilities are connected to the sewer; however, trade waste charges can become excessive depending on the volume and quality of the wastewater being discharged. So, this becomes another factor in considering the wastewater treatment processes employed. If a processing factory is in an area where they cannot put these by-products down the sewer, the company needs to be able to treat the wastewater to a high standard that allows them to discharge it into the rivers, or to irrigate the land.

“The industry needs to be able to engage a reputable design and construct contractor who can provide an economic analysis and advise on the most efficient and cost-effective process for treating the wastewater – whether that is DAF-only or DAF and biological, as well as the issues of disposal of the residues from the processes. That involves having a sound understanding of biological process engineering, being able to choose the most cost effective process to treat that wastewater given the availability of land or space and finish up with a water quality suitable to be able to be discharged to sewer, the environment or land,” said Anderson.

Although there are different ways of treating dairy waste, as a general rule, most dairies will require a DAF

treatment for removal of any residual fats and proteins, even in cheese and yoghurt manufacturing where most of this suspended material is removed for making the product. If a company does not comply with the stringent discharge standards, they may be charged a penalty.

Aerofloat’s wastewater treatment systems can help with both the solids removal and the soluble contaminant removal of milk processing wastewater. Firstly, the wastewater is chemically treated to coagulate and flocculate (pull together), the solid particles and the chemical treated stream is then transferred to Aerofloat’s proprietary AeroDAF to float and separate the particles – this removes the fats and the suspended protein. The second phase uses a biological process to treat the dissolved lactose or sugar. Again, Aerofloat typically uses the MBBR biological treatment technique– the AeroMBBR. In some instances, if sufficient land is available a hybrid version of the Activated Sludge / Sequence Batch Reactor (SBR) technology can be more economically employed.

The final consideration is understanding what to do with the by-product once separated.

“You can send the waste left over to a composting plant, or plough it into the land as a carbon supplement,” said Anderson. “Some people use it for making compost material. Wherever possible, food processors should try and use that separated waste and concentrated waste for some form of



Fat from cheese-making facilities can end up blocking pipes.

beneficial reuse.”

“Sometimes the water can be used for irrigating the land and making it more lush for the cows to feed on the grass again,” he said. “Sometimes with the whey component they separate that out into tanks and send it off to pig farmers as pig food.”

So why is it important to treat dairy wastewater by these means? The most common problem is the amount of fat constituent in the wastewater. In the past, small boutique cheese makers have started up and as part of their manufacturing process they would put in grease traps. “These traps act like a gravity separation piece of equipment for the flotation of fats, but they don’t work properly as the flows increase and due to the temperature of the wastewater,” said Anderson. Those small cheese factories grow and put more water down the sewer, and

nearly all of them have problems with high levels of fats being discharged to the sewer. The fat going into the system can have major implications on causing the formation of fat balls, which block the sewers and can cause sewer overflows.

“We were advised of an instance recently where a cheese maker had been discharging, on a regular basis, a high level of fat and it caused a blockage in the sewer that flooded one of the neighbour’s factories,” he said. “The discharge of fats into a sewer is a major problem internationally for sewage authorities. It’s not just from dairy waste, it is from other places, such as abattoirs, food processors and large commercial kitchens. Anything that has wastewater containing fats, oil or grease in them can contribute to this problem.

“Over time, the fats accumulate in the sewers, and you might not know it causes an issue until there is a complete blockage. There are some pretty horrific stories of fat balls blocking sewers. Places like London where you have these spherical fat balls a couple of metres in diameter that have blocked the sewerage pipes.”

According to Anderson, it is however, not all bad news, especially if those responsible for the waste take charge in a responsible manner. He even sees some good outcomes. “By installing a wastewater treatment system, companies can significantly reduce their trade waste costs.”

What is important is that dairy food and beverage processors are responsible for the discharge they put into the sewage system or on surrounding land. This is why it is critical that correct equipment is used when disposing of dairy waste.



Treating dairy waste is essential in order to comply with resolutions.