Pack-Age®

Reducing food waste sustainably: a natural cheese ripening solution

HEALTH · NUTRITION · MATERIALS

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

Food production is ever increasing to meet continuously evolving consumer requirements. Moreover, the global population is expected to reach 9 billion by 2050 which increases pressure on the food industry to produce supply to meet the growing demand.[1] This subsequently has a long-term knock-on effect on the environment and the planet. There is a need to find scalable ways to help create more efficient food production with the use of less resources. Manufacturers can introduce such measures to specific parts of the value chain.[2] This paper examines how cheesemakers can optimize their production processes to do more with less.

Consumers worldwide have developed a growing taste for cheese. The market is expanding exponentially and global production is estimated to reach 25 million tons by 2020 (a 23% increase on 2012 figures).[3] With many varieties available all over the world, hard and semi-hard cheeses, such as Gouda and Parmesan, are among the most popular types. Production of these cheeses is on the rise and their volumes are expected to reach over 10 million tons in the next five years.[4] Consistent high quality is one of the main considerations for manufacturers as well as consumers. There are also wider societal concerns on which cheese production has an impact in the long term, such as growing global initiatives to reduce food waste.

A challenge for the food industry worldwide

Food waste is clearly a highly relevant topic across the industry. The effect that production has on the environment and communities around the world concerns all processors and retail. It is estimated that one third of global food is wasted annually (around 1.3 billion tons a year) at a great economic and environmental cost.[5] Some countries have started to implement initiatives to tackle this problem. For example, the French national assembly has already passed legislation that bans supermarkets in France from throwing away or destroying unsold food, and instead tells them to donate it to charities and for animal feed.[6] There is also an increasing number of emerging organizations tackling food waste on a national scale, from educating about food waste and sustainability to even restaurants in the Netherlands serving food that would otherwise be discarded[7]. Despite the efforts that leading food industry players are taking to minimize this impact and modernize production processes and facilities, there remains plenty of room for innovative solutions to reduce food waste in a sustainable way much earlier in the process.

Insight:

Cheese losses due to inefficient processes

Currently, Gouda and Parmesan manufacturers lose around 220,000 tons of product per year due to spoilage caused by waste from slicing and grating due to cutting dry rind and coating.[8] This amounts to the yearly production of around 7 cheese factories. If production methods do not change as volumes grow, the annual food waste just from Gouda and Parmesan will exceed 275,000 tons, equal to the yearly production of 8 cheese factories.

Reasons for cheese waste

Various factors contribute to cheese waste, one of them being spoilage due to mold growth on the cheese during the ripening process. Cheese waste can also be triggered by moisture evaporation during ripening, resulting in a thick crust, which makes the product less fit for consumption. Slicing, grating and shredding the cheese can also cause manufacturers to throw away parts of cheese attached to the rind and coating as they are removed.

Most Parmesan and significant part of Gouda cheeses are ripened naturally. This process involves air-drying and applying a coating or cleaning the rind, sometimes even with alcohol or ascorbic acid to protect its surface. One of the challenges of this natural cheese ripening process is that one treatment is not sufficient to prevent some mold growth, so these treatments often need to be applied on average four times. Coatings and part of the rind need to be removed at the final stage, all of which incurs additional labor and product waste as the cheese is further processed.

Pack-Age® - a natural cheese ripening solution to reduce food waste

Pack-Age® is a moisture-permeable membrane which enables cheese to mature naturally, without the risk of spoilage by mold. It also eliminates crust removal as cheese ripens without having to apply a coating and development of a strong dry rind can be avoided. In the case of Gouda and Parmesan, it has been calculated that Pack-Age® can increase yield by 121,000 tons per year. Pack-Age® limits drying losses by retaining up to 50% more moisture inside the cheese. This characteristic makes it possible to obtain a higher yield, thus reducing the amount of milk needed to produce the same volume of cheese as it would require using a different ripening process; the utilization of milk is increased by 11% in Gouda and 12% in Parmesan respectively.[9] Furthermore, because Pack-Age® prevents mold growth on the cheese and does not create a

[1] *PwC, From sun to glass (2015)*
[2] *Ibid*
[3] *PM Food & Dairy Consulting. 2014. World Cheese Market 2000-2020. Aarhus: PM Food & Dairy Consulting*
[4] *Ibid.*
[5] *United Nations, 2014. Food Wastage Footprint: Impacts On Natural Resources*
[6] *http://www.assemblee-nationale.fr/14/amendements/2736/AN/922.asp*
[7] *http://www.instock.nl/food-waste-becomes-dinner-in-amsterdam*
[8] *Denkstatt report*
[9] *Denkstatt report*

strong dry rind on the cheese, it therefore reduces cutting losses. The whole cheese can be used when it is processed further, for example, when grating Parmesan or slicing Gouda. This results in 200,000 tons less cheese being wasted, which is the equivalent of the production of around 7 cheese factories. For the consumer it means that they can eat more cheese of what they have bought, as nearly 50% less rind needs to be thrown away.

Future proofing production

Sustainability is a growing priority throughout the entire food chain including cheesemakers. Using less milk per kilogram of cheese would mean fewer cows would be needed for milk production, with a consequent reduction in CO2 emissions. In the soy-to-milk value chain, the largest concentration of greenhouse gases is produced in dairy farms – around 73% of total emissions in the chain.[10] More recently, the European Union announced its decision to remove European milk quotas established over 30 years ago. This enables dairy companies to grow their production to meet the rising consumer demand for dairy.[11] However, this potentially increases the possibility of uncapped manufacturing and overproduction, with consequences for associated food waste and the environment. The European Commission has already reported a decrease in milk prices and an increase in production, compared to last year, significantly lowering the value, and affecting farmers and producers.[12] This only contributes to the volatility of the dairy market and its ability to remain stable while the new initiative takes place.

It remains vital to consider how to balance the demands of the market with sustainability aspects in order to lower the impact on the planet and its limited resources. Cheese manufacturers can contribute to this initiative by introducing process efficiency to their production. Pack-Age® can help achieve significant cheese waste reduction and at the same time improving yield, hence requiring less milk to produce the same amount of cheese than with a different ripening method.

Insight:
Gaining green credentials
Pack-Age® can reduce the amount of milk needed for global cheese production by 7.6 billion pounds of milk per year, by increasing product yield and eliminating cutting losses. This reduction is equivalent to milk from 400,000 cows that also produce 6.25 million tons of CO_2 every year.

Meeting consumer needs

There are many opportunities for food manufacturers to up their game and deliver what their customers are asking for – good quality, longer shelf life, better taste and texture throughout the cross-section of the cheese. As consumers are becoming increasingly health-conscious, the demand for 'clean label' products and ingredients has grown too. Pack-Age® allows manufacturers to address this demand for 'clean label' natural ripening without changing any of the key cheese qualities.

Insight:
More profit
for cheese producers
- 225,000 US$ can be saved by using Pack-Age®, while achieving the same amount of edible cheese for the consumer: 87 million US$ can be saved in the production of Gouda and 138 million US$ in the production of Parmesan.

Pack-Age® is a natural cheese ripening solution that enables processors to maintain good product quality. It eliminates the strong dry rind and allows for homogenous drying throughout the cheese, helping to make significant savings on production. Being completely natural, Pack-Age® helps cheesemakers gain green credentials and offer consumers clean label products. It increases output and profit, and contributes to reducing food waste and CO_2 emissions. Using less milk to produce the same amount of cheese is key to a profitable and sustainable business that satisfies customers' needs.

The data presented is based on calculations made by Denkstatt, a consultancy company in the field of sustainability and environmental management. It compares using the cheese ripening membrane Pack-Age® versus conventional cheese ripening methods in Parmesan and Gouda. This report quantifies the benefits for people, planet and producers.

[10] *PwC, From sun to glass (2015)*
[11] *http://www.independent.co.uk/news/business/news/milk-quota-scrapped-good-for-breakfast-not-so-good-for-farmers-10149014.html*
[12] *European Comission, 2015, Milk Market Situation*

If all natural ripened

Gouda & Parmesan cheeses

were ripened in Pack-Age®

7.6 BILLION POUNDS LESS MILK IS NEEDED

to produce the same amount of cheese

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1 GLASS
of milk daily for* ***48 MILLION*** *kids aged 1–11 years*

** 1 glass of milk is 8 ounce*

220,000 TONS LESS CHEESE IS BEING WASTED

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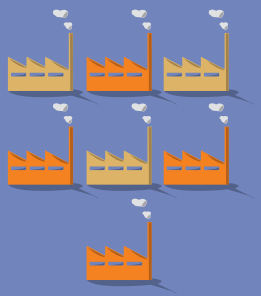

The annual output of around ***7*** *European cheese factories*

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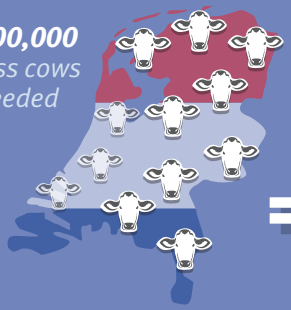

400,000 *less cows needed*

which equates to ***25%*** *of the cow population in the Netherlands*

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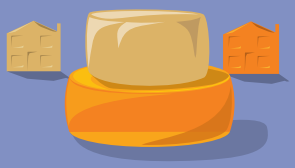
6.2 MILLION *tons less CO2*



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OF CHEESE BOUGHT 110,000 TONS MORE CAN BE EATEN

the annual cheese consumption of

5 MILLION *Italians*

225,000 US$ PROFIT IMPROVEMENT

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For more information:
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