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Mozzarella production

Hygiene and safety with proper air management

At Goldsteig, the mozzarella is produced in a huge hall.

Controlled air flow

At Goldsteig, circulation fans ensure the effective removal of loaded air

In the past, the mozzarella production in the Goldsteig dairy was impeded by high humidity, precipitation of condensate and high environmental temperatures. These factors are a risk for the hygiene as well as for the construction of the building. With simple and targeted measures, which base on integrated air management, the problems can be mastered. Now circulation fans ensure proper air flow including the quick removal of heat and humidity. LT discussed this topic with Uwe Grünemeyer, technical plant manager at Goldsteig, and hygiene planner Ralf Ohlmann.

LT: Mr. Grünemeyer, what were the hygiene-climatic improvements you implement in your plant recently?
Grünemeyer: Because we successively expanded our machinery in our mozzarella production, our ventilation equipment was no longer able to remove the occurring heat and humidity sufficiently. Therefore we decided to install circulation fans.

Now we can also master the problems with the formation of condensate. **Ohlmann:** The first step was an analysis of operational data our planning company Just in Air conducted at Goldsteig. The objective of this analysis was to develop optimization alternatives that took the available processing technology and of course the products into consideration.

About Uwe Grünemeyer

Uwe Grünemeyer (42) is a food technologist. Following his studies at the Humboldt University in Berlin, he worked for three years as assistant plant manager at Milchhof Magdeburg GmbH, a 100% subsidiary of Nordmilch. Then he changed to the Alois Müller dairy in Aretsried and returned, after one year, to Milchhof Magdeburg where he first took over the product management, followed by the maintenance department. Finally he was appointed manager of production and technology. By correspondence course of the University of Applied Sciences in Magdeburg he completed his studies in economical engineering. Since the end of 2007, he is working in his current position as technical plant manager at Goldsteig in Cham.

LT: Why did you contact a specialist company in Northern Germany which is located far away from your Bavarian company?
Grünemeyer: We had already cooperated successfully with the hygiene specialists from Bremen in the past. We are using an fogging system for the degermination of air really successfully for some years now.
LT: Let's talk about the ventilation system. What problems did you have?
Grünemeyer: We continuously tried to optimize our present ventilation equipment for quite some time now. But it simply did not deliver the performance we needed for the size of our plant. We are operating in an extremely wet environment. In particular during the cleaning process, we generate a lot of steam and heat. The existing ventilation was not able to remove the humidity from the area. I had to react and talked to Mr. Ohlmann about this problem.

Ohlmann: Main task was to stop the damage to the building caused by the condensate and to improve the microbial stability. Both should be done with the least possible effort and with as low energy consumption as possible. One solution were for example special circulation fans.
Grünemeyer: Our goal was an integrated air management. Because in the long run this will be beneficial for the quality and safety of our products. They are already of high quality but they will improve even more once the scheduled optimization of the air management has been completed. We intend to implement the concept proposed by Just in Air step by step.
LT: The objective is to withdraw the humid, warm air as quickly as possible?
Ohlmann: Yes, that is correct. In the mozzarella production at Goldsteig we have to distinguish two processing stages: production and cleaning. The high humidity and the high temperatures originate during the cleaning of the numerous cooling and brine baths and the other processing equipment. These internal loads must be removed by the ventilation equipment as quickly as possible using air flow technology. Then a new production cycle can quickly start again after the cleaning process.
Grünemeyer: In the past this time span was much too long. We could not utilize our capacities as much as we wanted. This resulted in production losses including detrimental economical effects. Added to that there was some inconsiderate behavior by our employees.
LT: What did your employees do?
Grünemeyer: Needless to say that working in a room with extremely high humidity is not optimal, in particular in the summer. Even though is it not allowed, the spontaneous opening of a window or a door is a very human reaction. However, this way contaminated air can enter the production and jeopardize our defined hygiene status.

Goldsteig in brief

Company: Goldsteig Käsereien Bayerwald GmbH

Founded: in 1992

Locations: Cham (headquarters), Plattling, Tittling

Management: Andreas Kraus

Annual sales volume: 386m EUR (Export share: 40 %)

Employees: approximately 600

Production quantity: About 80,000 tons of cheese are produced annually from 720m kg raw milk.

Market significance: Goldsteig is considered to be the largest mozzarella producer in Germany and the second-largest in Europe after Galbani (Lactalis).

About Ralf Ohlmann

Ralf Ohlmann (46) is a trained baker and chef. During his professional career he improved his skills in the field of food technology and technical engineering. The next steps included working in industrial bakeries as plant manager and production manager. Ohlmann then changed into the project management for mechanical engineering and plant construction. In 2000, he founded a company, in Bremen, Germany. The company specializes in providing solutions for air and surface degermination. Later, the Just in Air GmbH was added as a consultation and planning company for hygiene optimization.

One of the circulation fans used to optimize the air flow.

Ohlmann: This is what I call uncontrolled air management. It should not be practiced at all in a food production plant. A controlled air flow is key. The air inside the room must be distributed as effectively as possible to carry the internal loads to the places where they are discharged. To achieve this we installed three circulation fans which transport the air into the right direction. This improves the air flow conditions significantly with low effort.
Grünemeyer: The next step is to add three more fans of this type. With them our ventilation equipment is optimized as much as possible and we will be able to increase our production performance significantly. Our employees also feel better in the new climate. They sweat less which also reduces the bacteriological risk. Another advantage is that the humidity does not precipitate at the ceiling which resulted in the paint chipping off.
Ohlmann: The interior of the building had to be renovated frequently resulting in production losses and detrimental economical effects. The control authorities also consider chipped off paint as a fault that must be remedied immediately. The use of a reasonable air management will increase the intervals between the required renovation work.
LT: Does this mean that the removal of air at one side and the introduction of air at the other side of the production area is in general not sufficient?
Ohlmann: It all depends on the size and the geometry of the respective room. At Goldsteig, the production takes place in a huge hall. There will be many pockets of still air if the air is not forced to move. Our circulation fans do this job. The internal loads are transported to the exhaust fan. We could already achieve a 30% improvement with the existing three fans.
Grünemeyer: When all six circulation fans have been finally installed, we will obtain ▶

the desired flow conditions. This will stabilize the hygiene level and increase the productivity. We plan to complete the implementation by this summer.

Ohlmann: With our work we are always striving for an integral solution that can be implemented step by step. Our premise is to keep as much of the existing technology as possible, to integrate it in a concept and to optimize it.

Grünemeyer: After the production has reached the requested level in terms of hygienic climate, we will successively approach all other areas including the secondary packaging. The planning is already done. Now it is up to us how fast we go on with the implementation.

LT: How elaborate is the compilation of operational data which are the basis for the concept?

Ohlmann: Our specialists were on site for two days to conduct microbiological tests and to collect samples for the determination of air-borne counts and surface counts. The production and cleaning times were also recorded. The visualization of the air flow conditions is the most important work. Based on all these data, we prepared the proposals for the optimization.

Uwe Grünemeyer (left) and Ralf Ohlmann frequently discuss hygiene-relevant topics on site.

Grünemeyer: The approach Just in Air takes suits me. I have already cooperated with many planners and I feel that the approach to tackle the problems from the food technology point of view and then explore the possible solutions with ventilation engineers and microbiologists is the better way.

Ohlmann: Consulting engineers specialized in ventilation technology often focus only on the ventilation side of the problem. They try to adjust the food product to the technology. In my opinion it should be vice versa. The food product and its requirements are the focus. In particular, when it comes to such a susceptible product as mozzarella.

LT: Would clean room technology be an alternative?

Grünemeyer: I know companies where this technology is under consideration. But it is also a matter of cost. Clean rooms even request specific work clothes. I cannot exclude that we will get there one day. But currently, this is not discussed in our company.

Ohlmann: It is completely sufficient to create conditions similar to the ones in a clean room. This is our philosophy. We always have the profitability in mind; for the benefit of our customers.

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www.goldsteig.de
www.justinair.com

Circulation fans

Appropriately generated air flow

The circulation fans use an appropriate air flow with defined velocity to improve the turbulences of the room air. This way areas of still air are set in motion. The units are equipped with a fan and a short air channel. The air flow ensures a uniform temperature level; air-borne processing media (e.g. water vapor) are quickly removed. This counteracts a possible accumulation of air-borne microorganisms in a natural way. The air discharge opening of the ventilation unit is tapered for increased flow speed and optimum air flushing with highest possible penetration level inside the room.

Belt degermination

Also effective against salmonellae and listeria

Another interesting development is the belt spraying degermination. This unit will keep the surface of the transport belts free from germs for a prolonged period of time without wetting the surfaces too much. Apart from the well-known spoilage organisms (moulds, yeast, lactobacilli and others) potentially present pathogens (salmonella, listeria) must be reliably combated.

The new belt sprayer will meet these requirements. A mixture of water and active agent is pumped from a reservoir into a dosing pump that operates with compressed air. The liquid is then distributed in extremely fine droplets through a specific single medium nozzle over the entire belt surface. The amount applied is very low and most of the degermination agent is returned via drain path into the reservoir where the liquid is filtered and fed again into the spraying cycle. The economical effort in terms of use of materials is very low while providing a high hygienic safety. Added to this, the necessary cleaning times can be minimized due to the reduced contamination of the surfaces. This increases the productivity. The new belt spraying unit ensures permanent hygienic stability for e.g. product conveying belts or packaging belts. The unit may be used in the presence of open food products and personnel. The active agent is registered at the Federal Office of Occupational Health in Germany.

The degermination agent is distributed by a dosing pump that operates with compressed air via a specific spraying nozzle in an extremely fine droplet pattern onto the belt surface.

The degermination agent was recently successfully tested by the Laboratory Iben, Bremerhaven, Germany, for its effectiveness against salmonellae and listeria in air and water applications.

PICTURES: GOLDSTEIG, A ST.