Targeted flavor

PRECISE WORK, RAPID COOLING AND STORING ABOVE 0°C – WP AND MIWE BOTH PRESENTED A NEW WAY OF LONG-TERM PROOFING AT IBA. THE TECHNOLOGY BEHIND: "SUCTION COOLING"

++ WP Aroma+Cooler

++ Miwe smartproof

Small baked goods used to be a breakfast business only. Whatever was not sold by 10 in the morning, just stayed on the shelves. But this time has long gone. Even though most people still eat rolls for breakfast, they are popular at other times of the day. Rolls are also eaten for lunch and – at least in Germany – for dinner. The reasons for this are numerous. It is much easier to vary the baked goods with different types of rolls than with a loaf of bread. The sector of out-of-home consumption which is ever increasing also contributed to the prolonged availability of rolls until late at night. Buying rolls in the afternoon has become common place now and the in-store baking ovens and the bakeries produce tempting baked goods all day long.

This service is backed up increasingly by refrigeration technology: Retarder proofers, proofing interrupters, PATT® system (programmed cooling of par-proofed dough pieces), shock freezers and all other types of freezers – they all became important because of the decoupling of production processes and baking time, no matter whether using unproofed, par-proofed, fully proofed or par-baked goods.

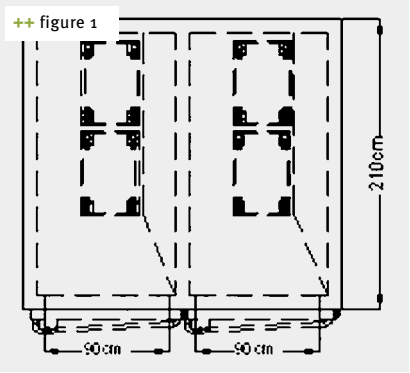
The classical "prolonged dough processing method" using reduced amounts of yeast does not need to be supported by technical equipment. Here the dough pieces are kept for two to eight hours, depending on the time of year and room temperature. They are stored in a condition which is suitable to bake the rolls without over-proofing them. Incidentally, the retarded proofing process enhances the flavor development. The disadvantage: environmental parameters and therefore the process cannot be controlled precisely, and the result is always a little hit and miss. Furthermore, the dough pieces are susceptible to sudden temperature changes, for example during transportation. Not only is a trained eye necessary to assess the ripeness of the dough, but also time must be available for optimum utilization. Both are rarely available in the sales outlets.

The so-called PATT system, predominantly used in Switzerland and Austria, is used for the stabilization of the dough pieces. The decisive factor is that there is no significant difference between the surface and the core temperatures to prevent water migration. Therefore, after a long proofing time at low temperatures and high humidity, a slow cooling process takes place which can reach freezing temperatures but also be used as a controlled prolonged proofing process so that the products are readily available for bake-off.

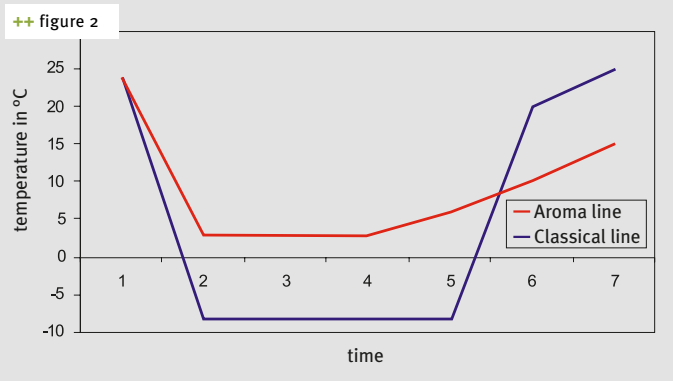
The two new systems by Miwe (smartproof) and WP (Aroma+Cooler WP System Dieckmann) promise controlled long-time processing. However, both rely on quick cooling of the dough pieces to a temperature around +5°C, storage at temperatures just above 0°C and subsequent gentle temperature rise. The conditions are the same as for the PATT process: Precise compliance with the recipe and processing parameters and reduction of the yeast quantity used to a max. of 3%

The differences of these systems compared to the PATT process are mainly in the cooling-down phase. WP as well as Miwe relies on suction cooling. The dough pieces are placed on trays which are then stacked on top of each other and positioned in a chamber similar to the one in a retarder proof-

++ figure 1



++ figure 2



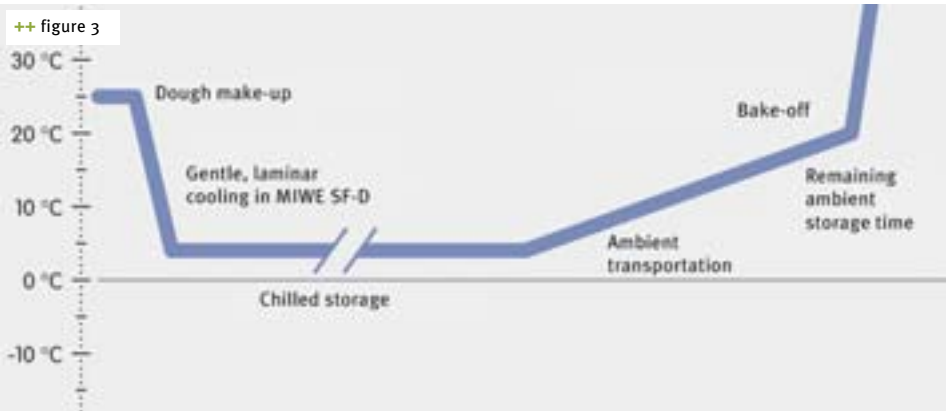
++ figure 1
Aroma+Cooler
general layout

++ figure 2
Aroma profile
WP Aroma+Cooler

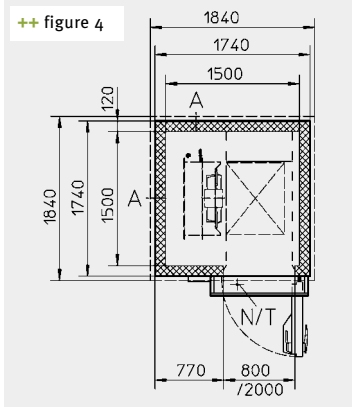
er or shock freezer. No trolley is required. However, fans do not blow air into the chamber, they just suck it out. This is the similarity between the Miwe and WP systems. The differences lie in the details.

WP for example placed a so-called suction chamber, width approximately 10 cm, between the fans and the inside of the cooling cell. The cooling cell has an opening which points to where the stack of trays can be docked. When turning the equipment on or closing the door, the stack of trays is automatically moved to the suction chamber and hermetically sealed. According to WP, this ensures that the fans only suck in the air from the trays and do not suck in environmental air from around the stack(s) of trays. The vaporizer which feeds cold air into the cell is located above the equipment so that the cold air falls from above, into the chamber. The cell's footprint inside is 1,200 x 2,400 mm. If two stacks of trays or two racks are in the chamber at the same time, they must be placed directly next to each other for the best possible efficiency. The suction effect of the fans develops first in the so-called suction chamber and extends from there into the cooling cell while passing through the slots of the trays. The air velocity on the dough pieces reaches 1 – 1.5 m/sec which ensures that the humidity stays inside the dough piece, reports WP. It takes the system almost 10 minutes to cool 40 trays down to +5°C. When compared to this, a shock freezer commonly has an air velocity of 15 m/sec with an energy consumption that is five times higher than that of the Aroma+Cooler's. ▸

++ figure 3



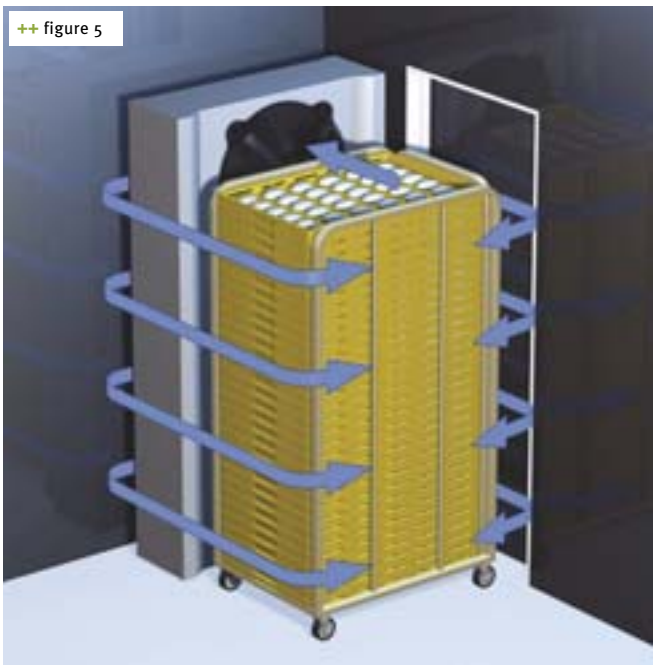
++ figure 4



The smartproof made by Miwe is different. A fan wall is located inside the cell with the vaporizer behind it. This combination is free standing in the room. The stack of trays is placed directly in front of the fan wall. The air is sucked out from between the trays, cooled and fed in again laterally in horizontal layers. According to Miwe the suction principle causes an underpressure in the trays. The air flow through the trays is laminar without any turbulence which significantly reduces the drying-out of the dough pieces. The standard model offers room for two stacks of trays sized 400 x 600 mm or one rack 650 x 800 mm. The cooling time is a matter of minutes, says Miwe.

Finally, the stacks of trays are stored at around +5°C for both systems. In this temperature range, the enzymatic degradation which is important for flavor development can take place but the yeast's activity is suppressed. Naturally, cooling cells as well as retarder proofers can be used for intermediate storage. This is dependent on the individual case, the products and the storage time.
The tray stacks with the dough pieces are transported to the sales outlets and stored there either for a few hours at room temperature or for a prolonged period in the cooling cabinet or cooling room. For transportation within a radius of 120 km, no active cooling is required. In the case of higher ambient temperatures, passive cooling boxes are helpful. The tightly stacked, double-walled trays act like a low temperature reservoir. According to WP, the dough pieces can be left for 3 – 5 hours without refrigeration and according to Miwe for four hours. If the dough pieces in the sales outlets are kept in a refrigerator, they can be left there for 12 hours or longer.
Both companies estimate the energy savings of the new system when compared to the energy consumed by a retarder proofer operating at temperatures below 0°C, to be about 45%.
Both also presume that recipes and dough make-up are uniform, since only uniform preconditions can achieve uniform results. Both systems can handle common recipes, with the yeast being reduced by 1 – 3%. Both companies also emphasize that the processing parameters can be determined individually for each product.
Naturally, each company is finding faults with the competitor's system. Miwe has pointed out irregular air suction by the fans in the WP equipment because the cold air flows in from above and the top fans have the chance to suck in more cold air than the bottom fans. WP disputes this and refers to the broad opening effect of the suction chamber. Vice versa, WP argues that the Miwe plant displays a poorer cooling performance because the air is not just sucked from the trays but also from around the stack as well. Miwe stresses the closeness of the stacked trays to the fans and the horizontal cold air infeed stream.
Both companies recommend the use of special trays, for example the double-walled aroma trays by Ringoplast, with small slots at the sides on the top edges. However, such trays are not mandatory, the process can also be applied with different types of trays, but it must be modified accordingly. The use of a rack trolley for transportation is possible but counter-productive. The effect is that when using a rack trolley only half as many trays will fit into the cooling chamber without reducing the energy costs significantly. +++

++ figure 5



++ **figure 3**
Temperatur curve Miwe smartproof

++ **figure 4**
General layout Miwe smartproof

++ **+figure 5**
Air circulation Miwe smartproof

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