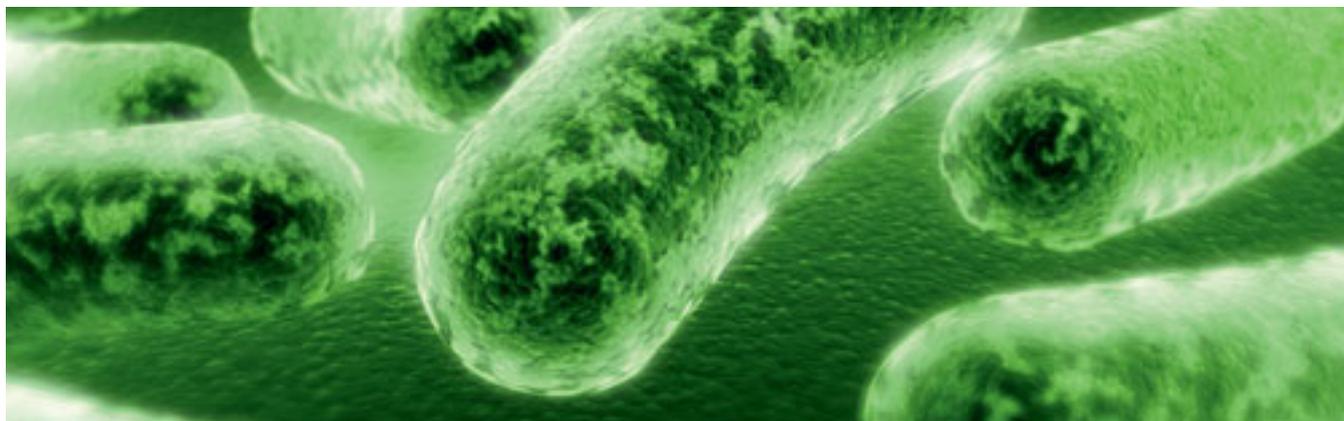


New approaches to hygiene

THE AUSTRIAN BAKERY MACHINE MANUFACTURER KÖNIG AND THE PLASTICS SPECIALIST COMPANY FAIGLE ARE COOPERATING ON A DEVELOPMENT PROJECT ON NEW MATERIALS FOR SWING TRAYS IN PROOFERS AND FOR DOUGH BELTS



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++ figure 1
Swing tray with film made from antibacterial faigle material

++ figure 2
Plastics film made by faigle

+ The environment in a proofer is perfect for dough; it can develop in a calm, humid and warm atmosphere. Unfortunately, this climate is also appreciated by numerous microorganisms that are considered to pose hygiene and health risks. Proofing cloths and swing trays with clearly visible black mould are an obvious indicator of such undesired visitors. However, they are not the only ones, species such as *Penicillium*, *Sporothrix*, *Cladosporium herbarum*, *Rhizopus nigricans* and *Thrychothecium roseum* are also present. To fight these microorganisms simple aeration and drying of the swing trays is not sufficient as the air-borne spores will settle down on the next batch of dough and start multiplying again. Microorganisms not only grow in proofers; they are also present in the pressing cups of roll plants that are lined with felt because of the favorable conditions there (flour residues, humidity, temperature).

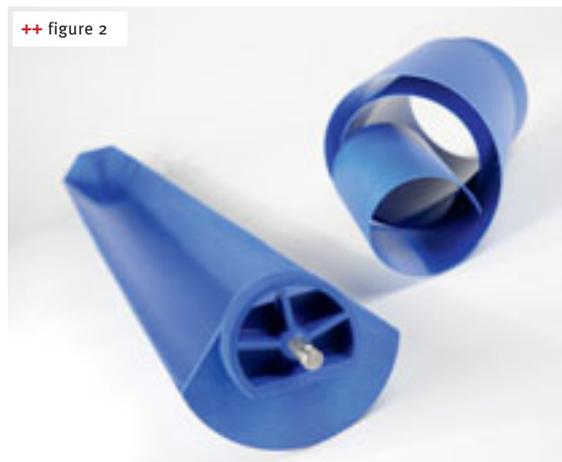
Previous strategies

The bakeries have taken different approaches to fight the microorganisms but an optimal solution has not yet been found. The drying of all materials needs time and also has only a limited effect as the spores will be present in the air.

There are brushing plants available for swing trays where the flour adhering to the trays is removed by rotating brushes. This is helpful but not sufficient.

Radiation with UV-C light from cold cathode tubes has a limited sterilizing effect. In this case the proper arrangement is important to avoid shady areas that are only insufficiently irradiated. Added to that, time plays a large role and with that the intensity of the irradiation.

A thermal sterilization method that operates with a surface temperature of 130 °C and an





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exposure time of less than 30 seconds is infrared radiation. Up to now it has been one of the most effective methods in this field. However, the costs for investment and operation are high. Metal or aluminum swing trays made with cloth lining are, in general, not suitable for permanent IR sterilization because the metal picks up the heat.

Another process whose effectiveness is viewed in contradictory terms is the spraying in the air of flavor substances, in particular cinnamon, dissolved in alcohol.

It is also possible to use microwaves for sterilization. Microwaves heat the water present in the materials. The lower the moisture, the more intense the microwave application must be in order to reduce the germ count.

New approaches

The Austrian bakery machine manufacturer König, world market leader for roll plants, has been involved with the fight against undesired microorganisms for many years now. Together with its supplier, the Austrian plastics specialist company faigle from Hard near Bregenz, König has developed special swing trays that have a similar sturdiness to that of metal trays. Added to that there is a fabric lining with a nanotechnology silver ion coating or a film coated with larger molecules, so called sterions.

The swing trays are pultrusion shaped troughs, closed with formed parts on both ends to ensure proper stability. The trays are equipped with a carrier and a cam. The trays are connected to the conveying chains via the carrier that allow the trays to swivel horizon-

tally. During their transportation through the proofer, the cams of the trays rest on the transport chains thus keeping the proofing troughs in a horizontal position.

The trays for the pre-proofer and the final proofer are lined with different materials for targeted elimination of undesired microorganisms. The lining developed for the proofing trays in the final proofer has a newly developed antimicrobial coating with silver ions. The trays for the pre-proofer are equipped with a lining film made from faigle plastic material PAS-PE with added sterions. Sterions are organometallic substances with ionizing effect. They offer protection from a large range of unhealthy microorganisms including mould, bacteria and viruses. As the molecules are integrated into the plastic materials, they cannot be removed by cleaning or washing. If, for example, the material is scratched and microorganisms settle on the surface, the sterions in the material interfere with the energy metabolisms of the microorganisms massively so that they die. The microorganisms are not able to develop a resistance against the sterions. The surface of the film and the surfaces of the trays underneath the films are fluted so that the dough pieces can be removed easily.

The addition of sterions is a successful method that has been used in medicine applications and hospitals for quite some time now. According to the strict rules of the FDA, they have the GRAS status (generally recognized as safe).

Currently, these developments have been tested for their use in practical applications. +++

++ figure 3
Highly efficient infrared
sterilization method

++ figure 4
Sterilization with UV rays

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STEP 2:

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