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| ISSUE 10/2026

| D58282

| EUR 6.00

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# Physics against shoe odour

*Go Fresh 24/7 uses biocide-free Mundex technology*



Dr Klaus Schepers (left) and Thomas Oesterwinter presented the technology behind Go Fresh 24/7 to SHOEZ.

*Go Fresh 24/7 is designed not simply to mask unpleasant odours in shoes, but to tackle them at their source. Behind the new product from T. Oesterwinter GmbH & Co. KG lies a patented, biocide-free technology from Munditech that works 100 per cent physically. It activates the surface, a process that goes unnoticed by the user – and could also open up new possibilities for manufacturers.*

The moment is as commonplace as it is unpleasant: trainers after a workout, work boots after a long shift or trainers that have been worn for days on end – when you take them off, you see what has developed inside the warm, damp interior

Airing them out helps only to a limited extent, fragrance sprays often merely mask the problem, and not every shoe can be washed regularly.

During a discussion at the SHOEZ editorial office in Wetztenberg, Dr Klaus Schepers from the Giessen-based technology company Munditech and Thomas Oesterwinter, managing director of Bielefeld-based T. Oesterwinter GmbH & Co. KG, presented a different approach. With Go Fresh 24/7, the two partners aim not to mask the odour with perfume, but to prevent the proliferation of the

microorganisms that cause it. It quickly became clear that this is not just about a new shoe deodorant, but a technology that also opens up interesting, long-term prospects for industrial manufacturing, offering a significant competitive advantage.

Thomas Oesterwinter sees this as far more than just a new shoe deodorant. "To be honest, there hasn't been any real innovation in the shoe care sector for a long time," says the entrepreneur. Whilst packaging, applicators and formulations have been changed time and again, the fundamental principle behind many products has hardly changed at all. "I'm convinced that once people have experienced this technology for themselves and understood how it works, it will eclipse much of what's currently available."

## NOT MASKING, BUT PREVENTING

Behind Go Fresh 24/7 lies the Mundex technology developed by Munditech. Its approach differs fundamentally from traditional odour-neutralising products, which often rely on fragrances, biocidal agents or silver compounds. After spraying, the water evaporates first. What remains on the material is an ultra-thin three-dimensional polymer structure

measuring up to five micrometres (0.000005 metres). Only once this has fully cured does it take effect. Odour molecules are also trapped within this three-dimensional polymer structure (see diagram), meaning that odour elimination can be attributed to two mechanisms of action.

According to Munditech, when bacteria or enveloped viruses come into contact with the treated surface, purely physical interactions occur with their cell membrane or envelope. This is destabilised and loses its integrity. This inactivates the microorganism. Consequently, no chemical or ionic reaction takes place; nor are any antimicrobial agents continuously released into the environment. Potential fungal growth is also prevented.

"The material consists predominantly of renewable raw materials and, once dry, has an antimicrobial effect – through purely physical means," explains Dr Klaus Schepers, Managing Director of Munditech. Conventional solutions, by contrast, often rely on organic biocides, silver compounds or other chemically active substances. "We offer an alternative that works purely physically via polarity or surface tension."

Put simply, the structure of the treated surface resembles the membrane of bacteria in certain physical properties. When the two come into contact, the membrane is destabilised. "The integrity of the cell membrane is disrupted, resulting in an antibacterial effect," says Schepers, describing the mechanism.

## A DISCOVERY MADE BY A DETOUR

The technology did not arise from a targeted search for a new shoe deodorant. Schepers has been working on antimicrobial technologies since around 2010. During a long-running development project involving paint formulations, so-called 'blind samples' suddenly also exhibited an antimicrobial effect – even though they lacked the active ingredient that was actually intended.

"At first, we thought it was a measurement error," recalls Schepers. The tests were repeated, re-checked and then evaluated in collaboration with molecular biologists. Yet the effect persisted. This led to a scientific investigation into the mechanism of action. Patent proceedings, expert reports and legal classification by the relevant authorities followed – a process that spanned several years.

Today, Mundex forms a technological platform from which Munditech develops different formulations for various materials. This is because leather, textiles, plastics, wood and ceramic surfaces each place different demands on adhesion, dosage and processing. The principle remains the same, but the formulation is tailored to the specific application.

#### FROM SNEAKER CLEANER TO GO FRESH 24/7

Thomas Oesterwinter has been working on physically active cleaning and care products for many years. As early as 2019, his company launched a novel sneaker cleaner onto the market. The search for a further innovation for the footwear industry led him to Munditech and Dr Klaus Schepers.

Oesterwinter recognised early on the potential of a technology that not only disinfects in the short term but also remains on the surface once dry. Following a hiatus, the collaboration was resumed and the product was further developed for use in shoes and on textiles. Under the name Go Fresh 24/7, it is now set to be specifically positioned for the footwear market, amongst others.

The addition of '24/7' reflects the aim of ensuring the product remains effective beyond the moment it is sprayed on. Whilst a traditional disinfectant evaporates after application, allowing a surface to become colonised again, the treatment remains on the treated material. Oesterwinter therefore describes this as a completely new approach: "A long-lasting antimicrobial treatment of this kind has never before existed in the footwear care sector."

#### CLEANLINESS IS ESSENTIAL

However, Go Fresh 24/7 is not a cleaner. Existing dirt and strong odours must first be removed. Washable shoes or insoles should be cleaned and left to dry completely before application. The product is then applied generously to the inside of the shoe and onto the insole.

After spraying, the formulation needs time to dry. The initial effect sets in after a few hours, whilst the fully formed polymer structure develops overnight at the latest. "The product must dry through completely. Only then is the network established," explains Schepers.

The treatment is designed to prevent odour-causing bacteria from multiplying rapidly again. At the same time, the three-dimensional network structure can trap odour molecules already present in the material. Schepers compares this additional effect to a cage-like structure in which molecules are trapped. Go Fresh 24/7 thus combines two approaches: the antimicrobial treatment of the surface and the reduction of perceptible odours.

#### APPLICATIONS FROM SPORT TO OCCUPATIONAL SAFETY

The obvious applications are wherever footwear is subjected to heavy wear and tear: in sport, in work boots, in outdoor activities, in safety footwear, as well as in leisure and children's shoes. Insoles, orthotics, helmets, gloves, bags and other textiles worn close to the body are also potential areas of application.

Particularly with work and safety footwear, it is not just about odour. Moisture, minor skin injuries and high microbial loads can also cause hygiene issues. According to the developers' assessment, a shoe lining with permanent antimicrobial properties could therefore be of particular interest in occupational safety, the care sector and medical aids.

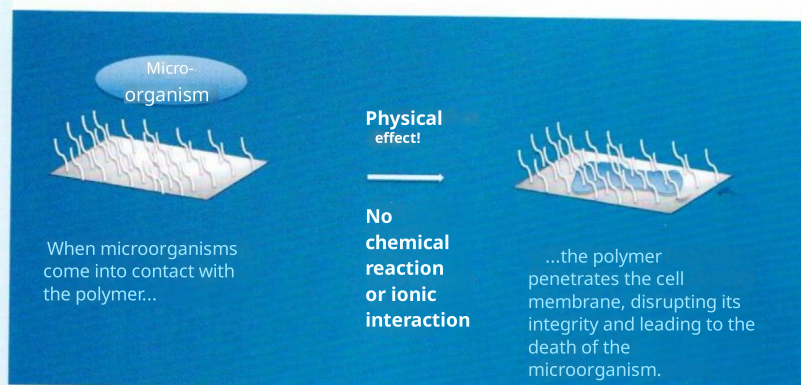
#### MUNDITECH: TECHNOLOGY FROM GIESSEN

Munditia Technologies GmbH, or Munditech for short, was founded in 2015 and is based in Gießen. The company specialises in the development of biocide-free hygiene technologies. It develops functional additives, coating and finishing systems designed to impart antimicrobial, antiviral and odour-neutralising properties to surfaces and products.

At the heart of its portfolio is Mundex technology. It is based on a physical mechanism of action and inactivates microorganisms upon contact with the treated surface. The formulations are predominantly bio-based and can be incorporated into, amongst other things, textiles, non-woven fabrics, varnishes, paints, plastics, paper, wood coatings, and air and water filter systems.

Munditech sees itself both as a technology partner to industry and as a supplier to retail companies. The company supports its customers from the development of an application-specific formulation right through to market launch.

#### Technology: Purely physical mechanism of action



*Mundex technology relies on a purely physical mechanism of action – without any chemical or ionic reaction.*

Initial practical experience in the sports sector has been positive. 'tennis MAGAZIN' and the magazine 'Yacht' reported on its use in tennis shoes, boat shoes, functional clothing, caps and racket bags. An accompanying self-test using heavily worn sports shoes concluded in both magazines that the previously clearly noticeable odours were no longer present after treatment.

#### OF INTEREST FOR INDUSTRIAL MANUFACTURING

For footwear manufacturers, the real potential may lie even before the product reaches the consumer. Mundex technology can not only be sprayed on retrospectively but can also be incorporated into materials during the production process. Possible applications include treated linings, insoles, leather, non-woven fabrics, plastics, etc.

In the case of roll goods, the formulation can, for example, be sprayed on or applied using the foulard process. It is also possible to integrate it with existing dyeing or finishing processes. Schepers emphasises that it is crucial that established manufacturing processes do not need to be altered if at all possible: "For the industry, it must be a drop-in solution." Even after approximately 50 household washes, the product still exhibits

Due to the small quantities used, the appearance, feel and technical properties of the materials are said to remain unchanged. According to Mundtech, the function of breathable membranes is also unaffected. Experience with treated filter systems has also shown that air permeability remains unchanged. A sole or an innovative fastening system

abrasion, high temperatures and frequent washing can impair the cured structure over time. However, the effect does not cease abruptly, but gradually diminishes.

According to Schepers, tests on textiles that had been retrofitted showed that even after exposure to a load that significant antimicrobial effect.

#### AN INVISIBLE ADDED BENEFIT

The biggest challenge is likely to lie less in the application itself than in communicating its benefits. "A new colour or a distinctive finish is incredibly

can be recognised immediately. An antimicrobial surface structure, on the other hand, remains invisible.

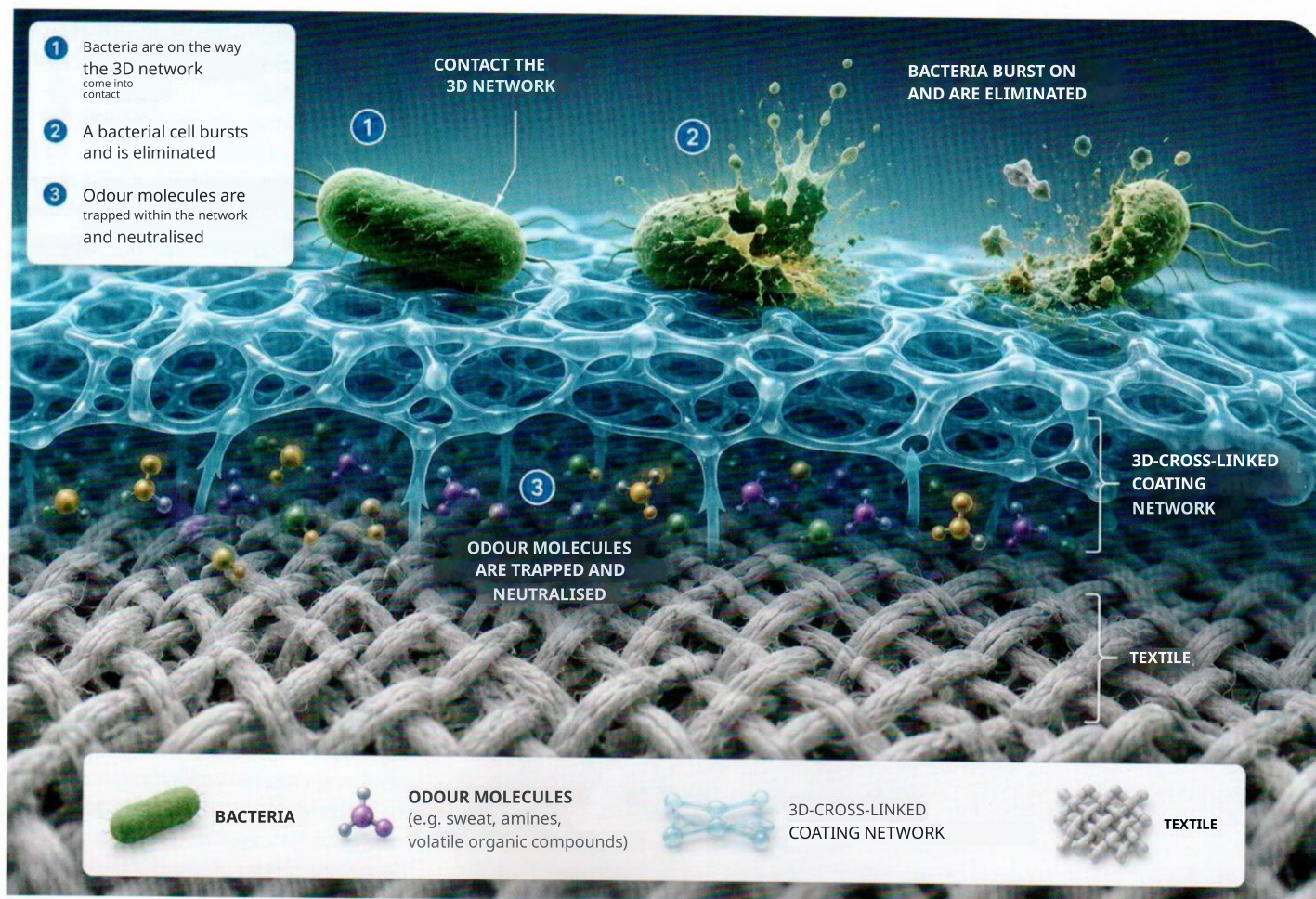
"With shoes, we have the advantage that the consumer can smell the difference," says Schepers. Bacteria are not visible, but unpleasant odours, on the other hand,

are very much noticeable. This is precisely why footwear, amongst other things, is a suitable entry-level segment for the technology.

Oesterwinter sees this as an opportunity for manufacturers to distinguish themselves by offering clear, functional added value. "Over time,

interesting to the footwear industry because the technology can offer a real competitive advantage," he says. A seemingly mundane everyday problem could thus become a relevant product feature: shoes that stay fresher for longer, even with intensive use.

***'I am convinced that once people have experienced this technology for themselves and understood it, it will eclipse much of what is currently available.'***



Mundex technology relies on a purely physical mechanism of action – without any chemical or ionic reactions.