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Small UV chip replaces mercury lamps

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Translated from German



The new UV chip may be small and inconspicuous, but it is extremely effective (Source: ntu.edu.sg)

Thanks to a new chip developed by researchers at Nanyang Technological University in Singapore, food can now be stored and transported for longer. The device emits intense ultraviolet light, which has a germicidal effect. It also emits hardly any heat, making it suitable for use in non-refrigerated rooms and containers.

Until now, traditional UV lamps have been used for this purpose. These emit heat, which sensitive foods do not react well to, and often contain toxic mercury. The researchers' environmentally friendly solution, which also consumes hardly any electricity, was developed in collaboration with the Swedish company PureFize.

No more high toxicity

The most effective is short-wave UV light, known as UVC, because it damages DNA and thus reliably kills microorganisms. Mercury lamps that emit UVC are often used to disinfect water and air. However, due to the high toxicity of mercury, they are being phased out and replaced with safer and more environmentally friendly disinfection technologies.

Instead of evaporating mercury to generate UVC light, the chip produces UV light through a process called cathodoluminescence. The chip contains two electrodes: a cathode made of zinc oxide nanostructures and an anode coated with a material. When an electrical voltage is applied, the cathode emits electrons that strike the anode. These electrons stimulate the coating on the anode to emit UV light.

All germicidal spectra

The emitted light contains all UV spectra (UVA, UVB, and UVC). This has a multifaceted effect against all types of germs. UVC destroys DNA, while UVB and UVA penetrate and destroy difficult-to-eliminate microorganisms, so-called biofilms, and cellular components such as proteins and lipids.

The new chip operates at ambient temperatures ranging from minus 20 to plus 100 degrees Celsius and can be switched on and off instantly, which is crucial for applications requiring immediate disinfection. Mercury lamps, on the other hand, require a certain amount of time before they emit light.

PureFize subsidiary EcoLoc has integrated the chip into the lid of a one-liter transport container, which the furniture retailer IKEA sells under the name "365+." The lid, including the UV unit, is available from EcoLoc for the equivalent of around €80. This is said to extend the shelf life of food by about a week.

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