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Translated from Japanese

Singapore develops eco-friendly, small chip that uses UV light to keep food fresh

On April 28, Nanyang Technological University (NTU) in Singapore announced that it has developed a small, environmentally friendly UV chip in collaboration with Swedish technology company PureFize Technologies that uses cathodoluminescence technology to generate ultraviolet (UV) light for disinfection, without using traditional mercury lamps.



Credit: PureFize Technologies (Source: NTU)

Conventional mercury lamps require the evaporation of harmful mercury to generate UV light, which has been criticised for its environmental and health risks. In contrast, the newly developed UV chip uses cathodoluminescence technology to emit electrons from zinc oxide (ZnO) nanostructures, and the accelerated electrons collide with the anode to generate UV light, so it does not use any mercury.

This chip emits UV light over a wide range of wavelengths, mainly short-wavelength UV light, and can effectively inactivate a wide range of microorganisms, including bacteria, viruses, and fungi. In addition, since it does not require cooling and can be used in small spaces, it can be used in situations where it is difficult to install conventional UV lamps.

The developed UV chip is installed in EcoLoc, a handheld food freshness preservation device. EcoLoc is used in combination with the lids for IKEA's 365+ food storage containers, and has been confirmed to extend the freshness of food by approximately

one week by UV-treating the surface of food. In experiments, the storage period of a variety of foods, including bread, fruits, vegetables, and meat, was extended with almost no loss in flavour or aroma.

"The disinfection efficiency of this chip is equivalent to that of conventional mercury lamps, and we expect it to be applied to a wide range of fields, including food containers, refrigerators, and medical technology applications," said Professor Hilmi Volkan Demir, director of NTU's LUMINOUS! Semiconductor Lighting and Display Research Centre. "Our unique technology is a groundbreaking solution that complements existing UV technology. Its small size and lack of cooling make it suitable for a wide range of applications," said Rune Torbjørnsen, CEO of PureFize Technologies. In the future, the research team aims to apply this technology not only to extend the shelf life and improve the safety of food, but also to other fields such as disinfecting medical equipment, household hygiene, and packaging.

https://spap.jst.go.jp/asean/news/250505/topic_na_02.html