NEW technology

3 May 2025

Translated from Hungarian

A new UV chip helps keep food fresh and kill bacteria

Scientists at the LUMINOUS! Centre of Excellence at Nanyang Technological University (NTU) in Singapore and PureFize Technologies in Sweden have jointly developed a UV chip that kills microorganisms, including bacteria, fungi and viruses. The chip has already been incorporated into a commercially available product that helps preserve the freshness of food in containers.

“Our chip represents a major breakthrough in the field of health and safety, as it has the potential to kill harmful food spoilage microorganisms and reduce the spread of infectious diseases such as COVID-19,” said Dr. Vijay Kumar Sharma, a senior researcher at NTU’s School of Electrical and Electronic Engineering and the LUMINOUS! Centre, according to The Engineer.

Unlike traditional UV lamps, the new chip does not require mercury, is a few centimetres in size, and operates at full intensity without cooling even in small, enclosed spaces.

According to NTU, short-wavelength UV light (UVC) has been shown to be the most effective in inactivating microorganisms by damaging their DNA, thereby killing pathogens. Mercury lamps, which emit UVC radiation, are still widely used in water and air disinfection applications, but their mercury content has raised sustainability concerns, leading to initiatives to phase them out. The solution from NTU and PureFize could provide an environmentally friendly alternative.

The new chip generates UVC radiation through a process called cathodoluminescence. Its cathode is made of zinc oxide (ZnO) nanostructures, while its anode is covered with a material. This emits mainly UVC light when struck by electrons, which directly damages DNA, while UVB and UVA light can destroy biofilms or cellular components such as proteins and lipids. The chip operates in a temperature range of -20 to +100 degrees Celsius.

Laboratory tests showed that after a few minutes of irradiation, the UV chip effectively reduced the amount of pathogenic bacteria spread in water, including *Pseudomonas aeruginosa*, *Escherichia coli* and *Legionella pneumophila*, but also destroyed the SARS-CoV-2 virus, which caused COVID-19.

“Our chip has the same disinfection efficiency as traditional mercury lamps, so we are excited about its potential applications in consumer products such as food storage containers, refrigerators and medical technology applications,” said Professor Hilmi Volkan Demir, Director of LUMINOUS!.

The chip has also been integrated into a handheld device called EcoLoc, which works in conjunction with a specially designed food storage lid. This lid is compatible with IKEA 365+ containers and immediately allows consumers to safely store food such as bread, fruit, vegetables and meat, the study says.

https://newtechnology.hu/egy-uj-uv-chip-segit-frissen-tartani-az-elelmiszert-es-elpusztitani-a-bakteriumokat/