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[\[Plasma Medicine\] NCKU Innovates Sterilizing Plasma Pen](#)[Plasma Medicine] NCKU Innovates Sterilizing Plasma Pen ([Chinese Version](#))

NCKU Realtime News (2010/08/23) National Cheng Kung University (NCKU) has made a new establishment in atmospheric plasma technology. Professor Jiunn-Der LIAO, Department of Materials Science and Engineering, NCKU, and his team have succeeded in innovating a new sterilizing equipment, a new type of hollow-electrode microplasma jet system, which has been proved to be effective in killing colon bacillus, staphylococcus aureus, bacillus thermophilus, etc. The equipment will be used in cosmetology, wound healing, sterilizing the medical equipment, etc. According to NCKU Realtime News, plasma medicine began to develop in the U.S. and Germany in 2009, and, with the new invention, NCKU has showed its keeping pace with the international development.

The new type of hollow-electrode microplasma jet system uses the design of separating supply of the reactive gas and plasma excitation gas to reduce the power consumption for maintaining the plasma. Besides, by adjusting the portion of reactive gas, a better sterilization effect can be found.

The team investigates the effect of the plasma treatment on several common bacteria, such as colon bacillus, staphylococcus aureus, bacillus thermophilus, etc., and finds the obvious changes of them after the treatment, proving the effect of sterilization. Besides, the team also finds that with various portion of oxygen supply, the total sterilization can be made from 90 to 120 seconds; among these bacteria, bacillus thermophilus has the shortest reaction time to the plasma treatment. The experiments show that the equipment can indeed kill the bacteria, not just inhibit their mobility or reproduction.

In order to find the best sterilization parameter, the team shrinks the equipment into a micro-size of a pen, which could be more potential to be applied to micro-operations on skin or in bio-medical applications. According to Professor LIAO, the innovated equipment can be used to treat the wound in the corners or bended area. The plasma sterilization can be applied to the dental hygiene, equipment clearing, wound treatment, etc., replacing the expensive laser treatment (whose cost is ten times than the plasma treatment). Now the clinical cooperation with NCKU Hospital has begun.

Specially, plasma treatment does not produce toxic substances and pollution, so the equipment is very suitable to bio-medical treatments. Besides, the side products of the plasma treatment, hydrocarbons and water vapour, are environmental friendly. The equipment is hence believed to meet the green demand of current world.

Plasma is the fourth form of matter beside of solid, liquid and gaseous, consisting of cations, electrons, atoms, molecules, etc. Such a technology has been developing for a century. Its applications cover the field of semiconductor, optical coating, fiber modification, green energy and medicine. Present development focuses on "micro-plasma system," which is a type of clean system of low power consumption in atmospheric pressure operation.

Further Information:

[NCKU Realtime News 2010/08/23](#) (Chinese)

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[National Science Council International Cooperation Sci-Tech Newsbrief](#)

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