Steinhagen,

**Disinfection and sterilization with plasma technology:**

New processes from Plasmatreat can simplify future sanitization of food, packaging and more

**Plasmatreat GmbH, a leading developer and manufacturer of plasma systems for atmospheric plasma processes (Openair-Plasma), has developed processes for disinfection and sterilization in various partnerships that use plasma-activated water (PAW) and plasma-activated water vapor (PAWV) to simplify processes and save costs. Scientific tests confirmed the effectiveness. Approval for use in industry is currently pending.**

Plasma technology is based on a simple physical principle: the addition of energy causes states of aggregation to change. If further energy is added to a gas, it is ionized and enters the high-energy plasma state as the fourth state of aggregation. When plasma with its high energy level comes into contact with materials, the surface properties change, e.g. from hydrophobic to hydrophilic. Plasmatreat systems are mainly used in surface treatment for ultra-fine cleaning, activation and coating in industrial production processes. However, the reactive species in atmospheric pressure plasma also have an antibacterial effect, which can be used as an interesting alternative to conventional disinfection and sterilization processes, e.g. in the food industry.

**Atmospheric pressure plasma has an antibacterial effect**

The reactive nitrogen and oxygen species of atmospheric plasma can be transferred to water or water vapor. Plasma-activated water (PAW) or plasma-activated water vapor (PAWV) is then obtained. Highly efficient mixing of plasma into water is achieved with the aid of reactors that enable the efficient production of PAW. The reactive plasma species dissolve in water and can react further. PAW can be poured, sprayed or nebulized and will sterilize a directly treated surface in seconds. Washing objects in PAW is also possible. To obtain plasma activated water vapor (PAWV), plasma sterilization nozzles are used for highly efficient activation: Water is evaporated in an evaporator and the vapor is mixed into the reactive gas stream. This reactive mixture can be used, for example, to sterilize surfaces of food production and packaging equipment in a short time. In addition to direct surface sterilization, this process can also be used to disinfect (smaller) production rooms. In trials, a single plasma sterilizer was used to sterilize an entire ambulance quickly and gently.

**Chemical-free, efficient and cost-effective options for sterilization**

Plasmatreat has developed the technology for generating PAW and PAWV in cooperation with the Fraunhofer IVV (Freising), the WFK Institute (Krefeld) and other partners. The effectiveness of PAW and PAWV against a wide variety of germs has been demonstrated. The only components of the two odorless and tasteless sterilization processes are water and plasma generated under atmospheric pressure. To date, PAW and PAWV have not yet been approved as biocides or disinfectants. In the future, however, these processes could open up completely new possibilities for the gentle sterilization of a wide variety of materials, equipment and textiles in areas such as the disinfection and sterilization of people in protective suits, production equipment, packaging, transport containers and even direct hygienization of food.

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For more information, please visit: [www.plasmatreat.com](http://www.plasmatreat.com)

***Info box:***

**How plasma technology optimizes industrial processes**

When plasma with its high energy level comes into contact with materials, it changes the surface properties, e.g. from hydrophobic to hydrophilic. Fine cleaning of metal and glass, for example, with Openair-Plasma from Plasmatreat gently and safely removes dust, grease, release agents and additives from surfaces. In the case of plastics, in addition to cleaning, an increase in surface energy is brought about by so-called activation through the introduction of hydroxyl groups into the plastic surface. In both cases, an optimized wettability of the substrate surface can be achieved and the adhesion ability significantly increased. In this way, long-term stable adhesion of adhesives and coatings is achieved. With Plasmatreat's PlasmaPlus technology, the application (deposition) of nanocoatings can additionally produce specifically functionalized surfaces with defined properties, e.g. an adhesion promoter layer.

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**About Plasmatreat**

Plasmatreat is an international leader in the development and manufacture of atmospheric plasma systems for the pretreatment of substrate surfaces. Whether plastic, metal, glass or paper - the industrial use of plasma technology modifies the properties of the surface in favor of the process requirements.

Openair-Plasma® technology is used in automated and continuous manufacturing processes in almost every industrial sector. Examples include the automotive, electronics, transportation, packaging, consumer goods and textile industry, but the technology, cost and environmental advantages of the plasma technology are used in medical technology and in the renewable energy sector as well.

The Plasmatreat Group has technology centers in Germany, USA, Canada, China, and Japan. With its worldwide sales and service network, the company is represented in more than 30 countries by subsidiaries and sales partners.

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**Image:**



Apples can be sterilized quickly and easily by treating them with plasma-activated water vapor. (Copyright: Plasmatreat)