

terrapiasma

Development of sustainable solutions as substitute for conventional disinfection approaches
terrapiasma focuses on innovative water treatment with patented cold plasma technology

Garching / Munich, March 21st, 2025 – Tomorrow is World Water Day: The aim of this day of action, launched by UNESCO in 1993, is to draw attention to the importance of (clean) water as the most important basis of life for all of humanity. Water is a limited and increasingly scarce resource. Around 785 million people are already affected by acute water shortages. The availability and quality of water is currently changing dramatically due to population growth and climate change and is constantly becoming the greatest challenge for us humans. These are good reasons for terrapiasma GmbH to focus more on the large field of water treatment and to continue its success story.

Successful from medical technology to cosmetics to disinfection

terrapiasma GmbH is considered a **pioneer** in the development of applications with **cold plasma** and has achieved significant successes regarding the market readiness of this technology since its foundation in 2011. Through close cooperation with partner companies, innovative products have been developed and brought to market that are used in various areas.

- The **medical device plasma care** was developed with **terrapiasma medical GmbH**. This portable device uses cold plasma to promote **wound healing** and reduce germs in acute and chronic wounds. As the first mobile cold plasma device for wound healing, the compact plasma care is an innovative solution for patients and healthcare professionals.
- Together with **hyped about science GmbH**, terrapiasma developed the **compact consumer device Phlas**. This uses cold plasma technology to regenerate acne-prone **skin**, reduce **redness** and care for skin and pimple marks without irritating ingredients. Phlas is gentle thanks to plasma, free of heat or harsh chemicals, making it suitable for all skin types. The development of this consumer device is based on extensive experience in device development in the fields of medicine, household appliance and laboratory equipment and has been integrated into a compact and elegant design.
- In cooperation with **KIMETEC GmbH**, the **PlasmaEgg was created**, a mobile **disinfection device** that uses cold plasma technology to disinfect the surfaces of a wide variety of objects effectively and in an environmentally friendly way. It offers a chemical- and heat-free alternative to conventional disinfection methods and is versatile in the laboratory and medical environment due to its slim design.

These success stories illustrate the wide range of applications of cold plasma technology and terrapiasma GmbH's commitment to developing innovative and sustainable solutions to current challenges. Now the company is focusing on the topic of water treatment with cold plasma to make its contribution to sustainable management and sustainable water management.

Cold plasma as a sustainable technology for water treatment

Cold plasma has the potential **to revolutionize water treatment**, as this technology offers decisive advantages over conventional disinfection methods such as UV, chlorine, ozone or reverse osmosis. Cold plasma works with highly reactive species directly in the water. This efficiently eliminates bacteria, viruses, organic impurities, pollutants and trace substances – **without** the use of **additional chemicals** or **residues**.

- Compared to **chlorine**, there are no harmful by-products or changes in taste
- Cold plasma is effective against UV radiation in the entire water volume, not only on the

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surface. In addition, there is no shadow effect.

- Unlike **ozone**, it requires only a comparatively low energy requirement and eliminates the need for oxygen.
- and unlike **reverse osmosis**, plasma technology works without high pressures or special membranes in the system, and the natural mineral composition of the water is preserved.

In addition, cold plasma works very sustainably and energy-efficiently – current prototypes basically generate **no waste materials** and require **only a fraction of the energy as UV-based solutions, for example**. With this innovative technology, terrapiasma is already setting new standards for environmentally friendly, safe and scalable water treatment.

Successful pilot projects pave the way for cold plasma water treatment

A pilot project for **drinking water treatment** launched two years ago is investigating the use of cold plasma to reduce contamination by **PFAS** (per- and polyfluorinated alkyl substances). After initial tests with lightly contaminated water, further investigations were carried out in a more severely affected region. Initial tests with water samples from this PFAS hotspot showed a reduction of PFAS by up to 30% using cold plasma technology that has not yet been optimized. The results show that each water source has its own unique challenges and that new technologies are needed to sustainably complement existing processes.

In another pilot project with a specialist company for the treatment of **industrial wastewater** from the automotive production sector, the **COD value** (chemical oxygen demand) could be measurably reduced thanks to cold plasma. Here, too, non-optimized cold plasma technology was used – greater efficiency will be achieved by adapting the technology to the specific application.

The knowledge gained from the pilot projects will be incorporated into further research at terrapiasma to develop sustainable and market-ready solutions for water treatment with cold plasma together with partners.

Scaling cold plasma technology for water treatment with greater throughput

The next development goal for terrapiasma is to test an industrial-scale system with a flow rate of about 100 l/min based on the successful small setups with cold plasma. The development team is working with a large demonstrator to achieve this scale: "**Plasma Pure Water**" is the name of this prototype for water treatment on an industrial scale. As a special feature, terrapiasma is also planning **to develop an automated, dynamic adaptation of the plasma power for water treatment in real time to the changing load of the water** under the term "Plasma Aqua Intelligence (PAI)".

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About terrapiasma

terrapiasma GmbH is a deep-tech start-up that was founded in 2011 as a spin-off of the Max Planck Society and is a leader and pioneer in the research, development and application of cold atmospheric plasma (CAP). The company, based in Garching near Munich, offers innovative cold plasma solutions and technologies in areas where bacteria, fungi, viruses, spores, allergens and odor molecules need to be permanently inactivated. Cold plasmas are partially ionized gases that, thanks to their high effectiveness, can replace conventional chemicals or other technologies such as UV, heat or radiation in an increasing number of applications.

The aim of terrapiasma is to further develop and market its environmentally friendly cold plasma solutions in line with demand together with various partners from industry. A young team that works with a lot of creativity and sophistication, extensive know-how in the fields of cold plasma research and technology as well as over 60 patents worldwide support the company on its way to success.

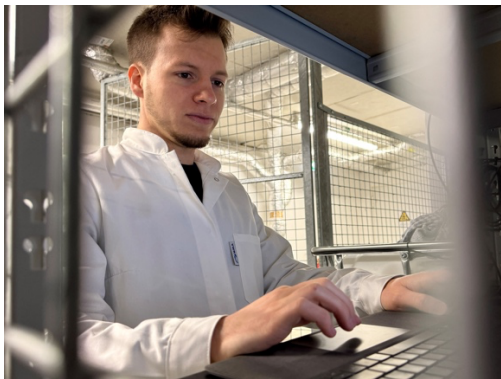
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Press image 1 – Water analysis before treatment with cold plasma



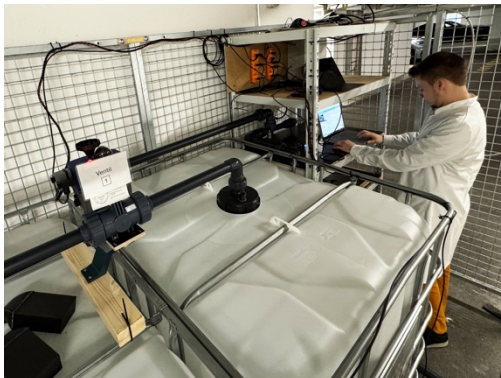
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Press image 2 – Drinking water treatment with cold plasma with "Plasma Pure Water (PPW)" from terrapiasma



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Press image 3 – Drinking water treatment with cold plasma with "Plasma Pure Water (PPW)" from terrapiasma



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