In-house gas production from recycled kitchen and garden waste with high yield and purity

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Producing gas in your own backyard has become a real alternative to dependence on imported gas thanks to innovative processes. Essential

for this are technologies to enhance the fermentation processes as well as methods for gas purification developed for the automotive industry. The Austrian company Krajete GmbH is a global leader in the optimal combination of these processes. Specializing in the biological production of methane and the purification of gases, the company has been a partner for the industry for years. Now it is using its patents and experience to develop in-house fermentation plants that can produce high-quality gas in attractive quantities.

Composting kitchen and garden waste is resource-saving and sustainable—and, thanks to the latest developments, also capable of making a significant contribution to private, independent gas supplies. Key to this are recent developments from Krajete GmbH, which is now putting its years of experience in biological gas production and purification to work in the service of in-house gas production.

Bio-booster brings benefits

One of the cornerstones of the company's development is an innovative bio-booster technology. This uses sustainably produced hydrogen (H_2), which is fed into the fermenter and stimulates special fermentation processes. Here, Krajete GmbH benefits from its world-leading expertise with so-called Achaea—microbes that can produce pure methane from CO_2 and H_2. This is an ability that other bacteria in conventional fermentation plants do not possess. These bacteria produce so-called biogas, which consists of half methane and half CO_2. Usually, the CO_2 is removed in complex purification processes and then released into the ambient air. Dr. Krajete, founder and CEO of Krajete GmbH, comments: "This is an expensive and climate-damaging waste. Our Achaea, on the other hand, act efficiently and in a climate-friendly way. They convert the CO_2 to methane, increasing the gas yield to almost double."

The bio-booster process not only offers the advantage of increased gas production, but also allows existing photovoltaic systems to store the often surplus electricity produced in the form of high-quality hydrogen –instead of feeding it into the power grid for little money. Says Dr. Krajete: "Our technologies allow excess electricity to be used to electrolyse water into H_2 and oxygen, and the hydrogen can then be used later to boost gas production by Achaea. This, after all, increases the methane yield enormously and thus turns the cheap surplus electricity into a supplier of valuable energy."

Advanced adsorption

In fact, biological gas production from green waste is a long-established method in agriculture. There, biogas with a high CO_2 content is produced in large fermenters and used in specially designed power plants to generate electricity and heat. However, due to the high CO_2 content and other impurities, it cannot be used directly in the same way as natural gas in the infrastructure provided for this purpose.

This is precisely where further know-how from Krajete GmbH comes in: "We have developed technologies for purifying exhaust gases in many years of cooperation with major European car manufacturers," explains Dr. Alexander Krajete. "We can remove nitrogen oxides and other impurities with a specially developed adsorption technology—this advanced adsorption technology is extremely versatile." This includes purifying gas from our fermentation system and thus producing the purity and quality needed for use as natural gas.

The company is now developing a fermenter designed for a normal family household. Measuring approximately 2x1x1 m, the system can ferment up to 1,000 kg of kitchen and garden waste per year, producing up to 1,000 kWh of top-quality gas—thanks to bio-boosting and advanced adsorption. Enough to significantly reduce the gas bill of a

single-family household.

Provided by Forschung & Bildung GmbH

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