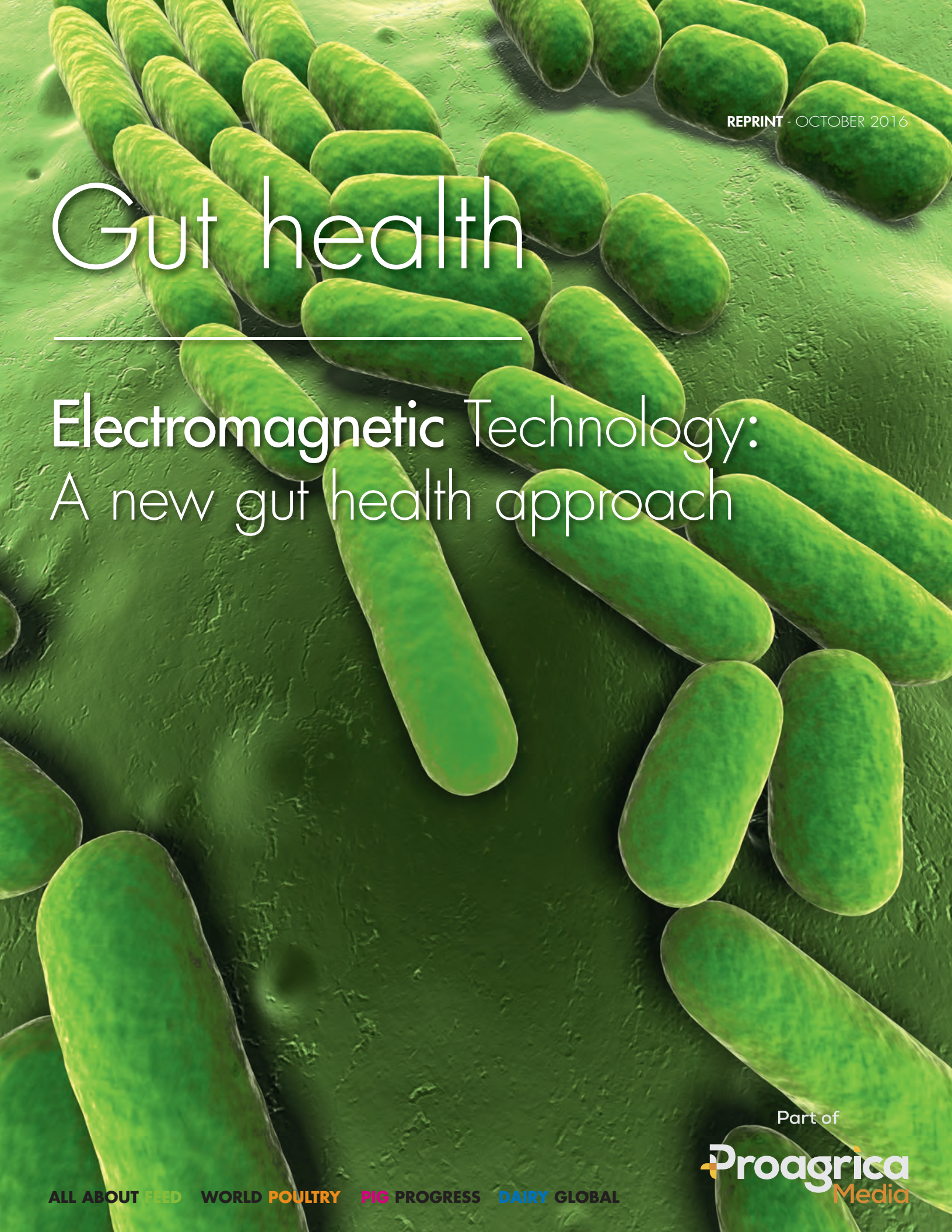

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Gut health

Electromagnetic Technology: A new gut health approach

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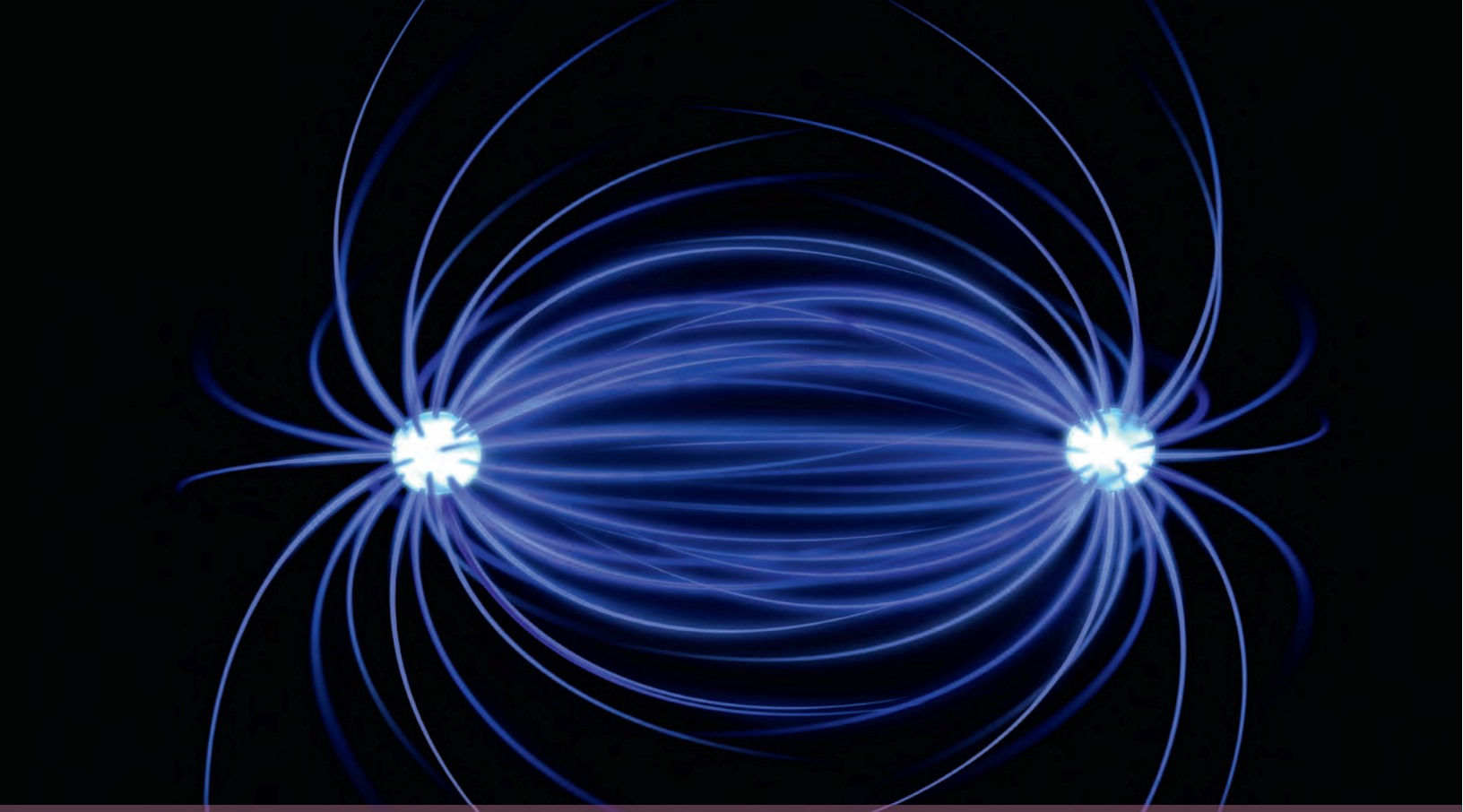


Electromagnetic Technology: A new gut health approach

A Canadian research company has spent the last five years studying the impact of electromagnetic waves on animal health and performance. Studies reveal that electromagnetic frequencies can impact gut health by acting on several functions simultaneously.

The therapeutic effects of EMF have been applied to livestock production by modifying the water properties of the aqueous solution inside the gut.

By Caroline Decaux, R&D Manager, Ceresco Nutrition, Canada

What is the link between electromagnetic frequencies (EMF) and living organisms? Not many know that scientists from various disciplines strived for over 100 years to understand the effect of EMF on living systems. The famous electricity pioneer Nikola Tesla, following his invention of the Tesla coil, carried out several experiments demonstrating the harmlessness of alternate currents on the human body. Tesla further experimented on the therapeutic nature of the warming effect known today as diathermy. George Lakhovsky further documented the effect of electromagnetic fields on plants, animals and human cells. Additional significant research continued by Moore *et al*. (1979) and F.-A. Popp (1981) discovered that the growth of all microorganisms can be altered by magnetic fields and that the DNA and any biological system for that matter emitted photons (biophotons). Finally, in 2014 Luc Montagnier demonstrated that DNA of bacteria emitted electromagnetic fields when exposed to ambient electromagnetic background and that water, being a highly conductive substance, reacted to the signals emitted by living organisms. Because water is involved in all biochemical reactions and regulation systems, it seems to be possible to act on biological functions by acting on water properties.

Can EMF offer solutions to animal nutrition?

Based on the above studies, Ceresco Nutrition found a way to apply the therapeutic effects of EMF to livestock production by modifying the water properties of the aqueous solution inside the gut. Company researchers developed a new technology product named SILICA+, by sending a certain frequency to a finely micronised crystalline silicon dioxide powder and adding the activated

supplement to feed. By applying a certain quantum of electromagnetic energy inside the gut, it is possible to increase electronegativity of water and thus accelerate the exchange of ions. In the last year, two peer-reviewed publications (*Poultry Science* and *Journal Animal Science*) demonstrated that such a feed supplement is responsible for higher growth performance, better digestion of nutrients, higher minerals assimilation and also better litter/manure quality.

In short, by taking action on the scale of ions, it is possible to unlock a large array of possibilities for enhancing the digestive process. One such possibility is to improve the efficiency of feed additives currently used to control gut flora.

EMF enhances antibiotics, acidifiers, copper and zinc

Today, common supplements that are used to decrease the proliferation of pathogen bacteria such as antibiotics, copper and zinc are causing resistance and/or environmental problems; hence they need to be reduced or eliminated. Gut acidifiers, which represent another alternative to control pathogen bacteria, also represent a risk for animal health and the environment. Additionally, the action of some organic acidifiers on pH is reduced by the buffer effect of zinc oxide, leading to higher dosages of the former. For these and various other reasons, nutritionists have no choice but to reduce the use of these common supplements and find new ways to control gut flora.

A recent publication in the *Journal of Animal Science* revealed that the use of antibiotics, copper and zinc as growth promoters can be potentiated by a certain quantum of EMF imparted by the new silica-based feed supplement. In combination with antibiotics (0.5 kg/MT) and relatively high levels of copper (250 ppm) and zinc (2500 ppm) the product allows a significantly higher ADWG of piglets compared to control groups fed only with growth promoters (*Figure 1*). In addition, another trial conducted by the Schothorst Research Centre (the Netherlands) on piglets, showed an improvement of the ADWG of the animal when benzoic acid is used in combination with the EMF activated silicon dioxide as opposed to without the EMF supplement (*Figure 2*). These results are part of a series of more than seven scientific trials done on piglets, showing improved ADWG and feed intake of piglets, which is one of the indicators of a healthy gut. These results can be explained by higher ionic exchanges due to electromagnetic stimulation between water, supplements and gut flora.

Maintaining gut health by increasing bacterial activity

It has been recently discovered, that the product also acts directly on the intestine microflora. In an *in vitro* study conducted by TransBIOTech laboratory in Quebec, it was observed that the product increased the volume of gas produced by the bacterial fermentation of piglet faeces in anaerobic conditions. For this trial, samples of faeces were collected from two piglet groups; one received a regular antibiotic-free diet and the treatment group was fed with EMF treated silica supplement at 200 ppm of the same regular diet for three weeks. Faeces were collected per rectum from 10 pigs of each group, before the supplementation and three weeks after the treatment. Samples were pooled and immediately placed in an anaerobic jar containing a gas pack system (Oxoid AnaeroGen, Oxoid). Samples were kept at 4°C until their use. The volume of gas produced by the equal quantity of faeces inoculum was measured using fermentation glass syringes after 24, 48, 72 and 144 hours. The supplementation of the EMF treated silica significantly increased the production of gas coming from the fermentation activity of bacteria by up to 38%.

The amount of gas produced during fermentation is directly proportional to the amount of fermented substrate, as well as the amount of short chain fatty acid (SCFA) products. Fatty acids play an important role in improving intestinal heath and controlling microflora composition by regulating pH and limiting intestinal inflammation in pigs. They are also involved in other regulation functions such as pancreatic secretion, glucogenesis, or appetite regulation. In the same study, gas chromatography analysis of SCFA production from piglet faeces inoculum revealed that the sample containing EMF treated silica produced more acetate and propionate than the control sample. After 48 hours of *in vitro* fermentation, increase in acetate (+11%) and propionate (+7%) production was observed in the supernatants of the inoculum from piglets fed with the silica-based product. No difference was observed in butyrate production.

With high levels of copper and zinc being reduced greatly in Europe and with antibiotics now banned, electromagnetic technology can offer a surprising alternative for reducing pathogen bacteria. In addition, its positive effect on SCFA production offers new possibilities for maintaining gut integrity. Ceresco Nutrition is committed to investing in new research projects to better understand the intimate interaction between microbiota, gut health and EMF's as well as their potential synergy effect with probiotics, enzymes and yeast.

PHOTO: ANDREY PROKHOROV

Figure 1 - Effect of SILICA+ on piglet average daily weight gain (kg/day).

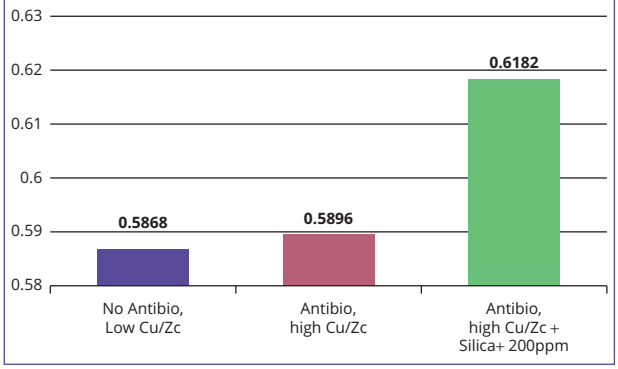
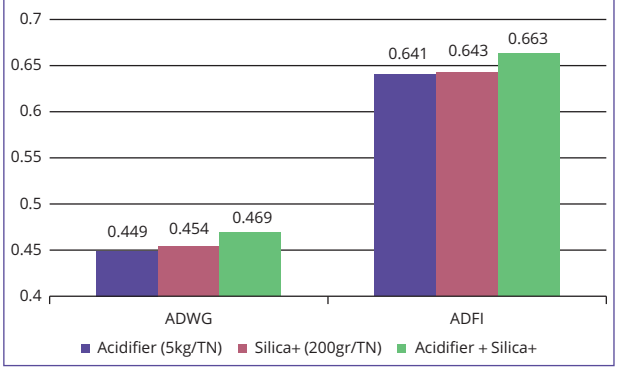


Figure 2 - Comparison of benzoic acid and SILICA+ effect on piglet growth performance.



A New Sustainable **Solution**

Do you know why SILICA+ is completely different from any other product you have used before?

Most of the silicates previously used in animal nutrition are amorphous materials capable of various functions such as absorbents of moisture and odor, flow agents and mycotoxin binders. Our silica however, is different from the conventional and commonly used silicates owing to its pure composition of silicon dioxide, crystalline structure and ability to retain and transfer electromagnetic energy.
SILICA+ is a biological resonance technology that delivers specific information to water that modifies its structure to resonate with all forms of life in the gut. Biological resonance is an innovative strategy, identified and developed by Ceresco Nutrition to exploit the unique property of water to transfer low-intensity electromagnetic signals to the life system of the animal.Result data in several different countries has proven SILICA+ should be used as a base product in livestock feed since it affects not just a specific function of the animal but rather helps improve overall utilization of feed and potentiates the effectiveness of other additives.

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