

GLENCAL TECHNOLOGY

NIHON CANPACK Co.,Ltd , in partnership with Glencal Technology Installed two RedoxMaster units at the company's Gumma Plant in 2020 to dry and process waste GREEN TEA and COFFEE residues into a high-performance premium animal feed supplement.

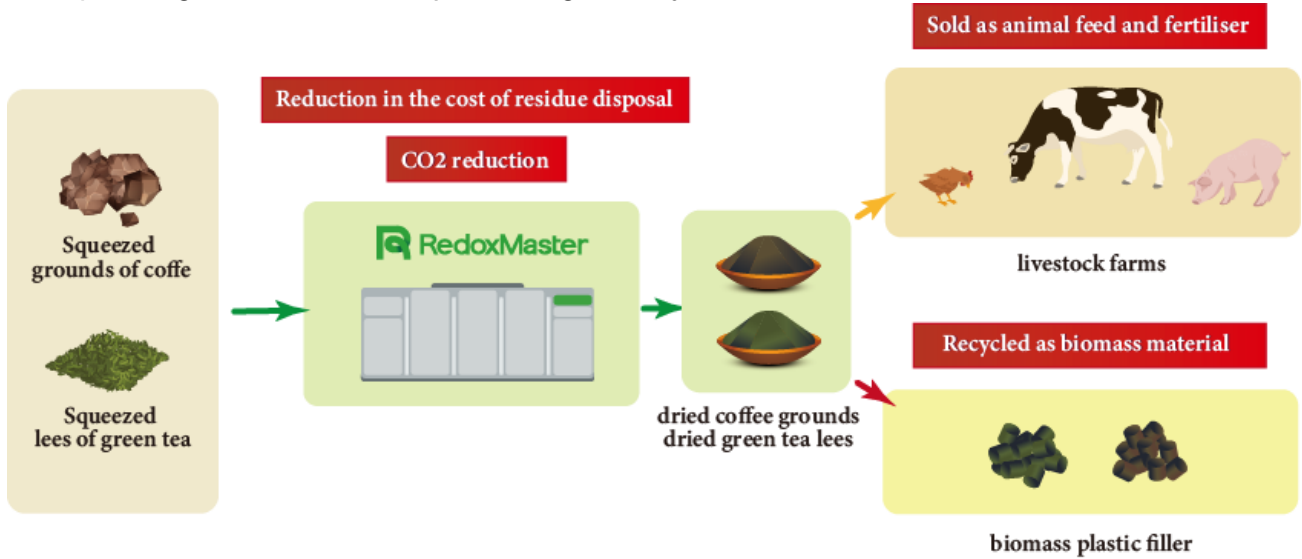
NIHON CANPACK is one of the biggest beverage-making companies operating the largest packing plant in Japan. It has fastest aseptic filling line in the world, which can fill 1,050 cans per minute and 1200 bottles per minute, producing 29 billion bottles per year.

HOKKAN Holdings Limited (the Parent Company) has implemented several initiatives to assist in achieving the Group target of decreasing 30% of the Scope 1&2 emissions, and 20% of the Scope 3 emissions by 2030 (each compared to 2019). The installation of the two RedoxMaster units makes a valuable contribution to the final target of neutralizing greenhouse gas emissions by 2050.



The innovative and patented design of RedoxMaster® uses the Mixed Ion Reactive Approach (MIRA). The MIRA engine incorporates advanced ionization technology to generate reactive oxygen species and ultra-low energy plasma ions. This scientific approach facilitates the unprecedented rapid drying of wet materials by disrupting the hydrogen bonds in the water molecule to form smaller clusters, enabling swift drying at remarkably low temperatures, thereby delivering significant energy cost savings, reduced CO2 emissions, and, most importantly, RedoxMaster dries without carbonization or oxidization, therefore preserving the original properties of organic materials.

RedoxMaster® ultra-low temperature ionisation drying method prevents oil oxidation and protein denaturation while significantly reducing carbon dioxide. Using RedoxMaster® to dry the GREEN TEA and COFFEE lees, which was previously disposed of at high costs, or composted with limited results is now generating substantial revenue, as the dried material is rich in Polyphenol, Catechin, Antioxidants, Fibre and other essential nutrients, making it an ideal and high-value premium animal feed supplement. The dried material has a moisture content of less than 12.5%, which allows for easy transportation and long-term storage without risk of spoilage. Further promoting sustainability in Japan's agricultural and food processing industry.



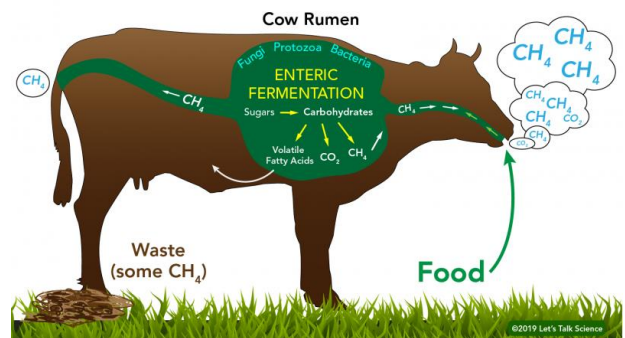
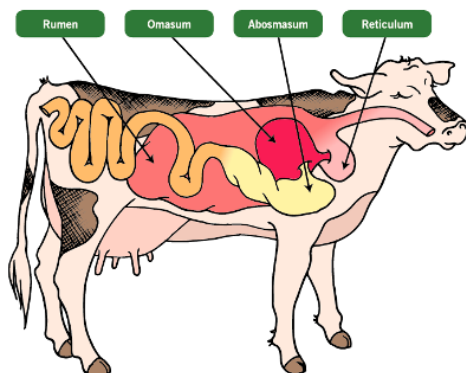
The dried material can be used as Agricultural Material, Bioplastic, Aquafeed, Animal Feed and Fertilizer, and it is currently **sold as a high-value premium Dairy Cow feed supplement.**

Facts regarding Greenhouse gas (methane) production from cattle.

- In cattle, rumen microbes decompose low-nutritious plant fibers into short-chain fatty acids, which are then absorbed through the stomach wall. This reaction occurs under a highly anaerobic condition with methanogens causing hydrogen to react with hydrogen instead of oxygen, therefore releasing methane.
- A single cow belches five liters of methane gas per day. In Japan, if total methane production from ruminants is converted to CO₂, it amounts to 7,095,000 tons of CO₂.
- 1.47 billion cows in the world. **25% of atmospheric methane is derived from cattle belching**

The company research shows

- When Coffee is introduced as part of the feedstock for cattle... the benefits are truly amazing.
- Ammonia level in the rumen drops, reducing the number of methane-producing bacteria in the rumen
- →**50-75% reduction of methane production** tested with artificial rumen solution



Project Benefits and Key Outcomes

When RedoxMaster® is utilised to process coffee for cattle feed, it maximises the sales value of the by-product and enables positive reuse in the circular economy. Plus, if you consider a significant reduction in greenhouse gases, the financial benefits of trading the carbon credits become very lucrative. The project reduced the environmental burden, completed the food recycling loop within the region, and added high value by recycling local resources that can be preserved and utilized throughout Japan's Agricultural Industry

Before Introduction (COFFEE)

4.0 / 5.0 - tonnes per day

After RedoxMaster® (COFFEE)

1.0 / 1.5 - tonnes per day

Before Introduction (GREEN TEA)

4.0 / 5.0 - tonnes - per day

After RedoxMaster® (COFFEE)

0.8 / 1.2 - tonnes per day

NIHON CANPACK

- Reduced their carbon footprint in accordance with the organisations ESG's
- Reduced the OPEX in relation to waste management and disposal fees
- Generated a substantial revenue model from the sale of **700 / 750 tonnes annually** of dried materials
- Achieved an outstanding **Project ROI of less than 3.29 years**, with the major contributing factor from achieving an average of **USD 0.45 / 0.55 per kg sales price** of the dried materials.

Glencal Technology

Glencal Technology is very proud to be involved in a multi-material single-site application with the very prestigious NIHON CANPACK. The project has delivered results beyond the client's expectations, and we look forward to partnering and serving NIHON CANPACK for many years to come.

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