

# From Coffee Waste to Cow Feed

The Saikai Project by Sanyu Plant Service Group is recycling used coffee grounds in quite an innovative way – by converting them to dairy cow feed, thereby reducing food loss and waste.



The Saikai Project by Sanyu's mixing (front) and storing used coffee grounds for anaerobic fermentation (back).

All images courtesy of Yumi Nakatsugawa

A recycling effort converting used coffee grounds to dairy cow feed or agricultural fertilizer, named the 'Saikai (meeting again) Project', is drawing attention in today's recycling-oriented society. The Saikai Project was implemented by Sagami-hara, Kanagawa-based Sanyu Plant Service Group in 2014, after a research and experimental period started in 2007 when the Food Recycling Law in Japan, which aims to reduce food loss and waste, was amended.

The basic goal of the Saikai Project is to create a recyclable loop from food waste to another food stuff. Converting used coffee grounds to cow feed is unique to Sanyu, in

which high quality milk from healthy cows is produced. Processing coffee waste to agricultural manure is more commonly practiced in several countries in the world, including Ryokusan Co Ltd in Shizuoka, a fertilizer manufacturer within the Sanyu Group.

Sanyu Group is a leading firm in processing and recycling industrial waste, covering all 47 prefectures over the country. As the pilot case, the Saikai Project is conducted under the approval of the Food Recycle Loop Project of used coffee grounds, which was granted in March 2014. The project must abide by regulations, guidance and permission of the Ministry

of the Environment, Ministry of Agriculture, Forestry and Fisheries, and Ministry of Health, Labour and Welfare. Furthermore, the project is conducted in collaboration with both public and private sectors as well as research, medical and educational institutions.

The main used coffee grounds suppliers are Starbucks Coffee Japan, Denny's Restaurants and ready-to-drink coffee manufacturers. Experiments and trials have been executed with the cooperation of dairy farms and their scientific findings and effects are analysed by researchers at Azabu University.

The Japan Agricultural Standard registers usable food wastes for

The used coffee grounds are packed in plastic bags in coffee shops and delivered to Sanyu's Yokohama Factory.



livestock feed, which includes beer, tofu, soya sauce wastes and beet pulp, as well as used coffee grounds. Sanyu made further studies about the merits and difficulties of coffee waste when it is processed to cattle feed. The company found that nutritious components of used coffee are quite similar to those of beet pulp. However, cows can digest nearly 100 percent of the nutrients in beet pulp, but only 50 percent of those in coffee waste. Sanyu also noticed coffee waste still contains considerable polyphenols – nearly one-third of the amount found in red wine.

On the other hand, dairy farmers know that cows don't eat used coffee grounds because of their roasted smell, which they instinctively avoid as the sign of an unsafe foodstuff. In addition, wet used coffee becomes moldy within a few days. Therefore, Sanyu had several initial challenges; namely, how to keep and process used coffee grounds without spoiling them, how to get cows to eat coffee waste-based feed with appetite, and then prove the health benefits for cattle when they consume coffee waste.

Yasutaka Kusumoto, deputy manager of Yokohama Office, Sanyu Plant Service Co, explained that they were deadlocked since the company started with drying used coffee for preservation. "However, the drying process requires additional costs

and processes, including installing new facilities, added energy to run the machines, and operations of shop staff, which were not intended in the Saikai Project," he said. "Through various trial and error, we introduced fermentation technology, which doesn't require a drying process, then we began to manufacture lactic acid-fermented cattle feed from used coffee grounds." Following several years of demonstrative experiments, Sanyu has established a certain method to produce cow feed with consistent quality.

### Eco- and Cow-Friendly

Presently, coffee shop staff pack used coffee grounds into plastic bags, spray vinegar on the surface, then tie up the bags so they are airtight to prevent mold. The coffee waste is delivered to Sanyu's Yokohama factory twice a week. There, the used coffee is blended with tofu and soy sauce waste (about 10 percent, which helps cows eat better), then lactic acid bacteria is added, and the mix is kept in closed bags for two weeks to enhance anaerobic fermentation.

Sanyu requested dairy farmers give the coffee-based feed to their cows and then studied its health benefits by analysing the blood of cows and the quality of milk. Consequently, the health benefit results in cows derived from the polyphenols in coffee waste have been scientifically proved. Firstly, the coffee-based feed can help

prevent mastitis in cows, which is a serious infectious disease that affects milking cows.

It is also expected that coffee-based feed decreases cows' belches since its polyphenols promote digestion. From an environmental point of view, cattle farms are the second largest methane gas emitter next to paddy fields in the agricultural sector. So, if cows have less gas, it can curb methane gas emissions, known as one of the greenhouse gasses.

However, since used coffee-based feed is not quite digestible for cattle, it cannot totally replace compound feed or hay. Therefore, Sanyu recommends using coffee waste feed for about five percent of the total foodstuff. Even with such a small portion, coffee polyphenols can work effectively for cows. Sanyu also found that the remaining caffeine in the feed does not harm the cattle if kept to the five percent.

Mitsuhiro Masuda, executive officer, Sanyu Comprehensive Environmental Research Institute Co, shared that thanks to the polyphenols in used coffee, "our coffee-based cow feed can work as a supplement that improves dairy cows' health. We hope our Saikai Project will expand further in the future, not only used coffee but also in other food waste or anything reusable for the creation of a recycling society." ☕

Yumi Nakatsugawa



The processing facility for the Saikai Project used coffee grounds project was built on the premises of Sanyu's Yokohama Factory.