

TECH OFFER

Capitalising On Spent Coffee Grounds (SCG)



KEY INFORMATION

TECHNOLOGY CATEGORY:

Foods - Processes

Foods - Ingredients

Waste Management & Recycling - Food & Agriculture

Waste Management

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **SINGAPORE**

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OVERVIEW

Only 20% of actual coffee is extracted from beans to produce coffee in its beverage form, leaving the remaining 80% (six million tons annually) deemed as spent coffee grounds (SCG) to be disposed or used in landfills or as non-food product components to make fertilisers, furniture, deodorisers or skin care products. A technology was created to counteract SCG wastage and valorise it for human consumption. This particular invention comprises of methodologies to create two types of ingredients using leftover SCG - oil-grind and water-grind processed SCG. A simple, reproducible method of conching is employed to convert leftover SCG into smooth pastes, where specific conching parameters help refine the SCG to an acceptable particle size, eliminating grittiness in numerous valorised products similar to SCG.

The product utilises common ingredients like oil and water to conche SCG with improved taste and textural properties. The shelf stability and nutritional composition (including caffeine) of the ingredients were also validated to ensure the food possessed good

sensorial properties and are scale up ready. This technology increases SCG's potential use as a versatile ingredient in different food applications. The technology provider is seeking off-takers from food manufacturers, food services industry, companies interested to valorise side streams to turn SCG into edible compounds.

TECHNOLOGY FEATURES & SPECIFICATIONS

Technology Features:

- Uses reproducible method of conching into a functional ingredient with high insoluble dietary fibre (13g/100g) content.
- Fibre content is higher than instant coffee powder (<1g/100g) and coffee flavourings (0g/100g) and
- Lower caffeine levels (133mg/100g) compared to regular coffee (3600mg/100g) and is similar to decaffeinated beverages
- Sodium (<3mg/100g) and sugar free (<0.1g/100g)
- Additive free (clean label)

Specifications:

1. SCG with particle size ranging between 4.82µm D(v,0.1) to 39.3 µm D[4,3]
2. Moisture content 58.6%

The technology was validated by incorporating SCG ingredients into a range of common food products such as beverages and ice cream (water-grind SCG), spreads and chocolate (oil-grind SCG) to help relevant food industries gain a deeper understanding of SCG valorisation, for a greater adoption among food manufacturers to create products using SCG.

POTENTIAL APPLICATIONS

- Can be developed into Ready-to-Drink (RTD) beverages, coffee ice cream, coffee spreads and confectionary (e.g. chocolates and cakes)
- Companies specialising in upcycling sidestreams and sustainability can explore this technology

MARKET TRENDS & OPPORTUNITIES

Coffee consumption in Singapore increased by 4.8% in the last seven years with 105000, 60kg bags of coffee consumed in 2023 and the market is growing. There is a global push to reduce food side streams and Singapore's Zero Waste Masterplan on the treatment of such side streams by commercial and industrial generators, which aligns with the proposition of this technology. Similar technologies such as these may not be as cost effective.

UNIQUE VALUE PROPOSITION

The technology uses basic ingredients such as water and oil and is easily reproducible. It does not involve high CAPEX investment or vigorous training processes that disrupts production process. Conching machines are commercially available, and the licensee can choose to purchase the equipment based on their production scale requirements. The conching process is easy to pick up.

In addition, replacing coffee flavouring agents with SCG, customers can benefit from the natural and functional coffee flavour and caffeine SCG imparts into all the food applications. The product is rich in insoluble fibre which can help to regulate blood cholesterol and glucose levels. Caffeine is known to stimulate the Central Nervous System (CNS) in the body, which can improve cognitive abilities (e.g. alertness, reaction time).