

TechConnect Ventures
Sprint Challenge Brief:

Technologies For Measurement Of Volatiles in Chocolate

BACKGROUND

When you eat, your perceptions of that food are determined by a complex interplay between sense receptors and the multitudes of compounds in the food itself. In particular, aroma-active volatiles in food directly impact your enjoyment of that item and provide valuable clues to a variety of factors about it, including age, ingredients and quality.

The client, Mondelez International, is a global confectionary and snack company that uses chocolate in many forms across numerous brands. To provide a new avenue for quality control efforts as well as insights for the development of new products, Mondelez wants innovative technologies for the measurement of volatile, aroma-active chemicals from milk chocolate.

Currently, Mondelez utilizes gas chromatographic mass spectrometry (GC/MS) systems to analyze chocolate samples. The GC/MS is used to quantify a wide range of target compounds, approximately fifty in all, including pyrazines, lactones, short chain aldehydes, esters and acids, and small phenolics. This approach, while effective, is highly time consuming, taking approximately 6 hours to complete a single evaluation from start to finish.

The goal of this project is to identify alternative technologies to conventional GC/MS approaches. Mondelez is interested in approaches that can deliver the following performance:

- Detection and accurate quantification of various aroma-active volatiles present in milk chocolate
- Increased evaluation throughput:
 - Minimum 10 samples per day (duplicate analysis)
 - Ideally ~30 samples per day (duplicate analysis)
- High repeatability of quantification results: low (<20%) relative standard deviation
- Suitable for usage with:
 - Molecular masses between 50 and 200 Da
 - Concentrations between ~1µg/kg and ~200mg/kg

Ideally, proposed approaches will meet or exceed all the performance described above, however technologies which provide incremental or partial improvements will also be considered. Approaches which reduce sample preparation or processing time are of interest as are innovations which improve analysis of detected compounds.

Mondelez intends to deploy new systems globally beginning in early 2024. Consequently, technologies closer to commercial viability are strongly preferred. Early stage technologies, including ones originating from academic labs, will still be considered, provided a viable pathway to commercial implementation exists.

The goal of this sprint is to facilitate contact and interactions between the Sprint sponsor and commercial entities (including Start-ups) or technology developers or research organization/university in this space. Submissions from all viable subject matter experts are of interest including those from academia and commercial entities.

REQUIREMENTS

Solvers submitting an Entry are encouraged to highlight capabilities in their Submission that meet criteria including:

- Ability to detect and quantify compounds such as:
 - Pyrazines
 - Lactones
 - Short chain aldehydes
 - Short chain esters
 - Short chain acids
 - Small phenolics
- Anticipated performance including:
 - Detection and quantification threshold
 - Daily throughput
 - Repeatability
 - Suitable molecular mass range
 - Suitable concentration range
- Timeline to deployment
- Technical maturity

BUSINESS OPPORTUNITY FOR SOLVERS

All complete and eligible Entries will be included in an exclusive Innovation Opportunity Report that will be presented to our client. Solvers with well-matched capabilities may be contacted directly by either TechConnect Ventures or the client to discuss potential partnership opportunities, including – but not limited to – demonstrations, consulting, contract research, licensing, and more. Top-rated Entries may also be invited to register or participate in an upcoming TechConnect Ventures event or pitch program.

PARTICIPATION RULES & GUIDELINES

Solvers are encouraged to review the [Rules](#) and [Guidelines](#) provided on the Sprint page for details about participation, including submission criteria, eligibility information, and more.

QUESTIONS? Contact challenge@techconnectventures.com