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# HiSorb Centri-GCMS/Olfactometry analysis of aroma compounds in raw bovine milk

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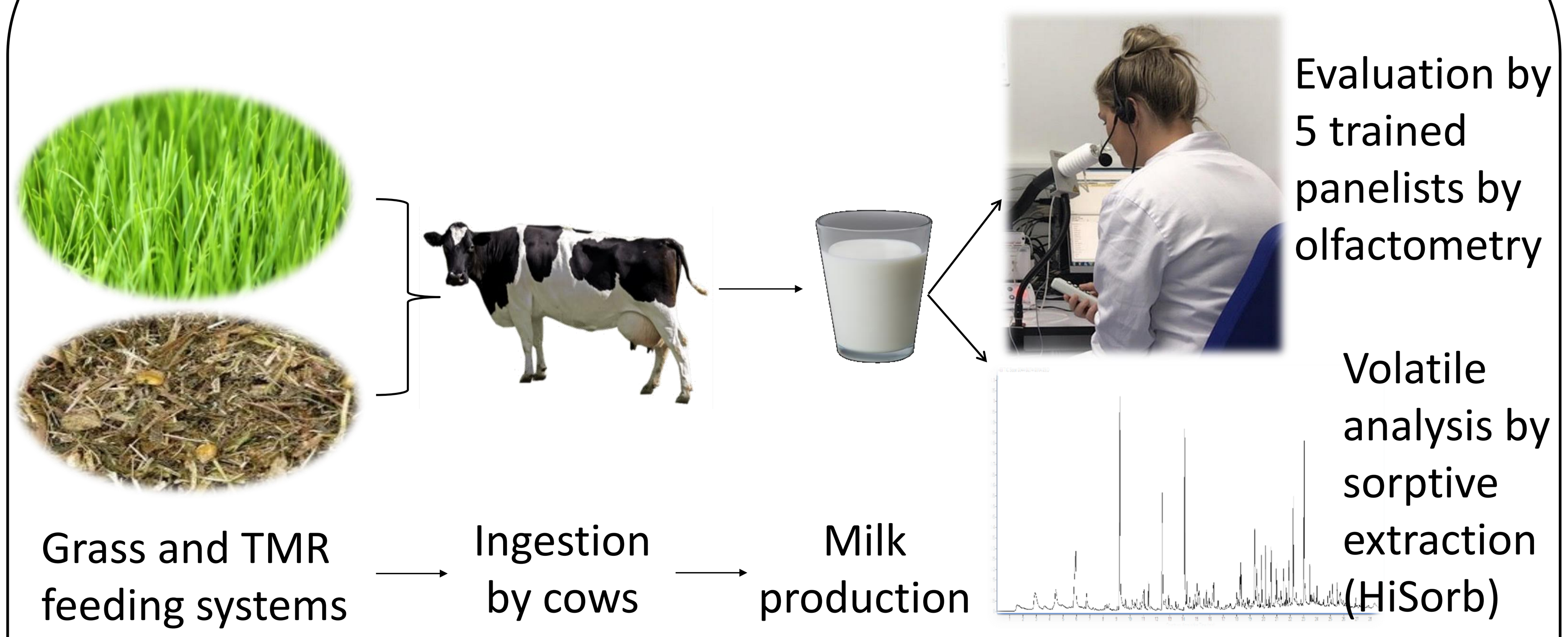
## 1. Background

- As well as being important for aroma perception of raw bovine milk, volatile organic compounds (VOC) are important for the authentication of pasture-based dairy products.
- Information on the aroma perceptions and intensities of individual VOC in raw milk could prove important when selecting raw milk for further processing.
- Compounds that are present in raw milk can be altered and/or exacerbated in subsequent commodity products such as dairy powders and cheese.
- Immersive HiSorb was employed to extract compounds in higher concentrations compared to Solid-phase microextraction (SPME).
- **Objective: To evaluate the effect of feeding system (pasture vs. non-pasture) on the sensory properties of raw bovine milk via gas-chromatography olfactometry (GC-O) and determine the main odour active compounds.**

## 2. Methodology




## 2.1 HiSorb extraction protocol


## 3.2 SPME vs. HiSorb extractions for GC-O

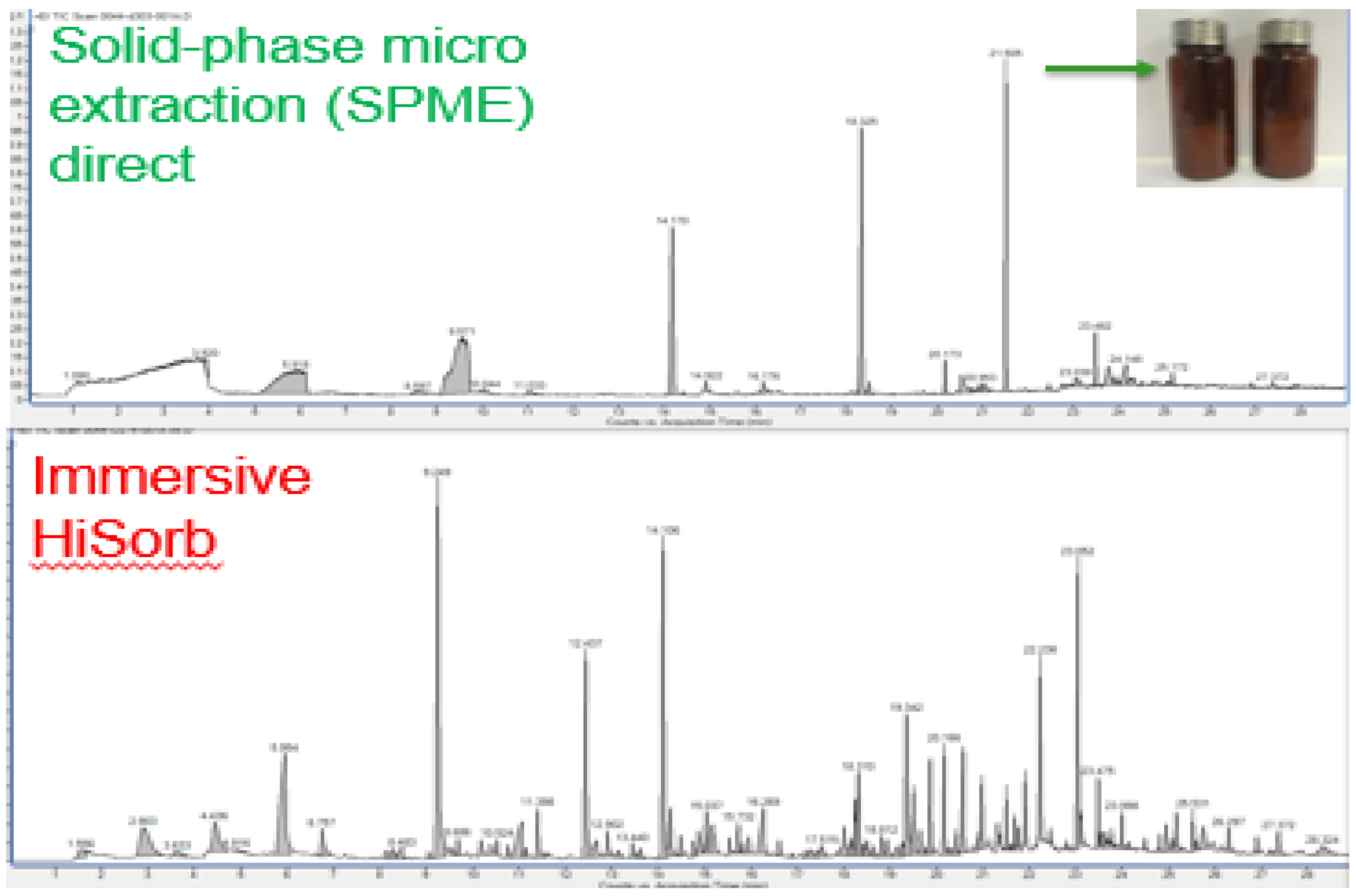



**Figure 2:** Chromatograms of raw milk extracts using SPME and HiSorb methodology.

## 3. Results

### 3.1 Important odour descriptors for raw milk produced from pasture (green) and TMR based feeding system (blue).

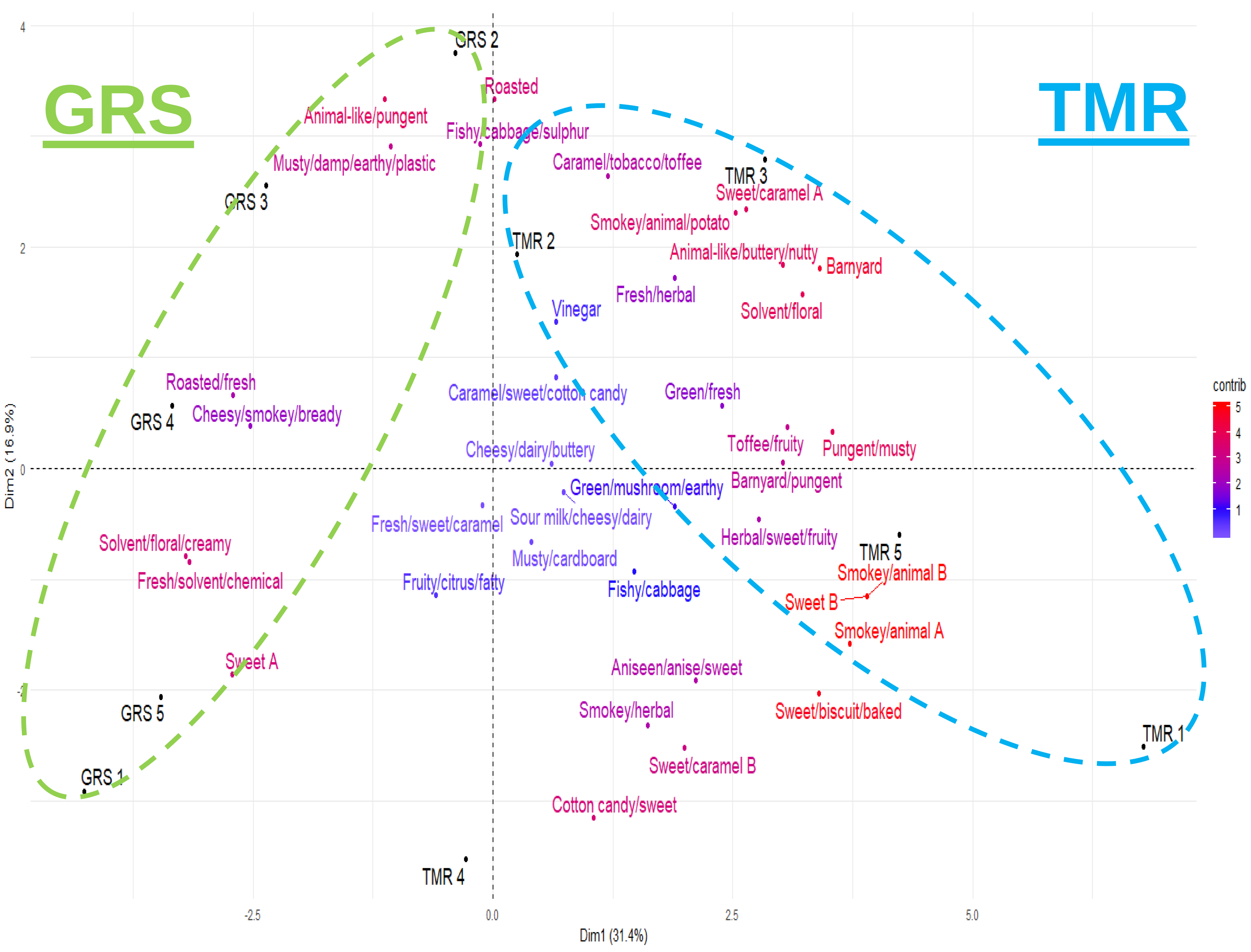



**Figure 1:** Principle component Biplot analysis of the odour descriptors perceived by the panelists (n=5) for raw GRS and TMR milk. Colour gradient: low = white, mid = blue, high = red, midpoint set at 1.0.

## 4. Key findings

- 108 VOC were identified in raw milk
- Using GC-O, 34 VOC were found to be aroma active in raw GRS milk and 36 in raw TMR milk, therefore ~30% of the VOC in raw milk influence sensory perception.
- While the intensities varied, numerous compounds contributed to the aroma profile of both raw GRS and TMR milk.

The odour profile of **raw GRS milk** was dominated 'cheesy', 'nutty', 'sweet', and 'green' aromas which have been attributed to **methanethiol, furfural, benzaldehyde, 1-octen-3-ol, phenylethyl alcohol** and **maltol.**

The odour profile of **raw TMR milk** was dominated by 'roasted', 'smokey', 'animal', and 'pungent' aromas which have been attributed to **furfural, 2,5-dimethylpyrazine/2,3-dimethylpyrazine, 2-pentylfuran, benzaldehyde, 1-octen-3-ol, p-cresol/2-pyrrolidinone** and **3/4-ethylphenol.**

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