

# Impact of Food Consistency in Dynamic Perception of Simple Model Systems

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## Background and aims

Taste perception is an important factor in consumers' choice. To get a better understanding of the oral cavity taste release, this study explores the influence of matrix consistency on the sweetness perception. As a secondary objective, the influence of flavour addition was studied. Simple model systems were initially made to explore dominance across retro nasal smell, taste and texture attributes. The systems used were sucrose and four different bulk sweeteners, all evaluated in four different forms: plain water, flavoured water, plain gel and flavoured gel.

Control of flavours perception and oral transit time was done using Temporal Dominance of Sensation with 14 trained panellists from Leatherhead. All assessments were done in triplicate.

## Samples

Sweetener	Sweetness (SEV)	g/L
Sucrose	1.00	100.00
Fructose	1.20	83.33
Maltitol	0.85-0.95	111 .11
Mannitol	0.50	200.00
Sorbitol	0.5-0.6	181.82

Table 1: Sweetness concentration used

	Samples			
	Liquid Form 1	Liquid Form 2	Gel Form 1	Gel Form 2
Water	✓	✓	✓	✓
Sweetener	✓	✓	✓	✓
K-Carrageenan (1%)			✓	✓
Mango Flavour (1000µL/L)		✓		✓
Citric Acid (0.6 g/L)		✓		✓

Table 2: Samples composition

## Results – TDS: Sensory Trajectories Curves

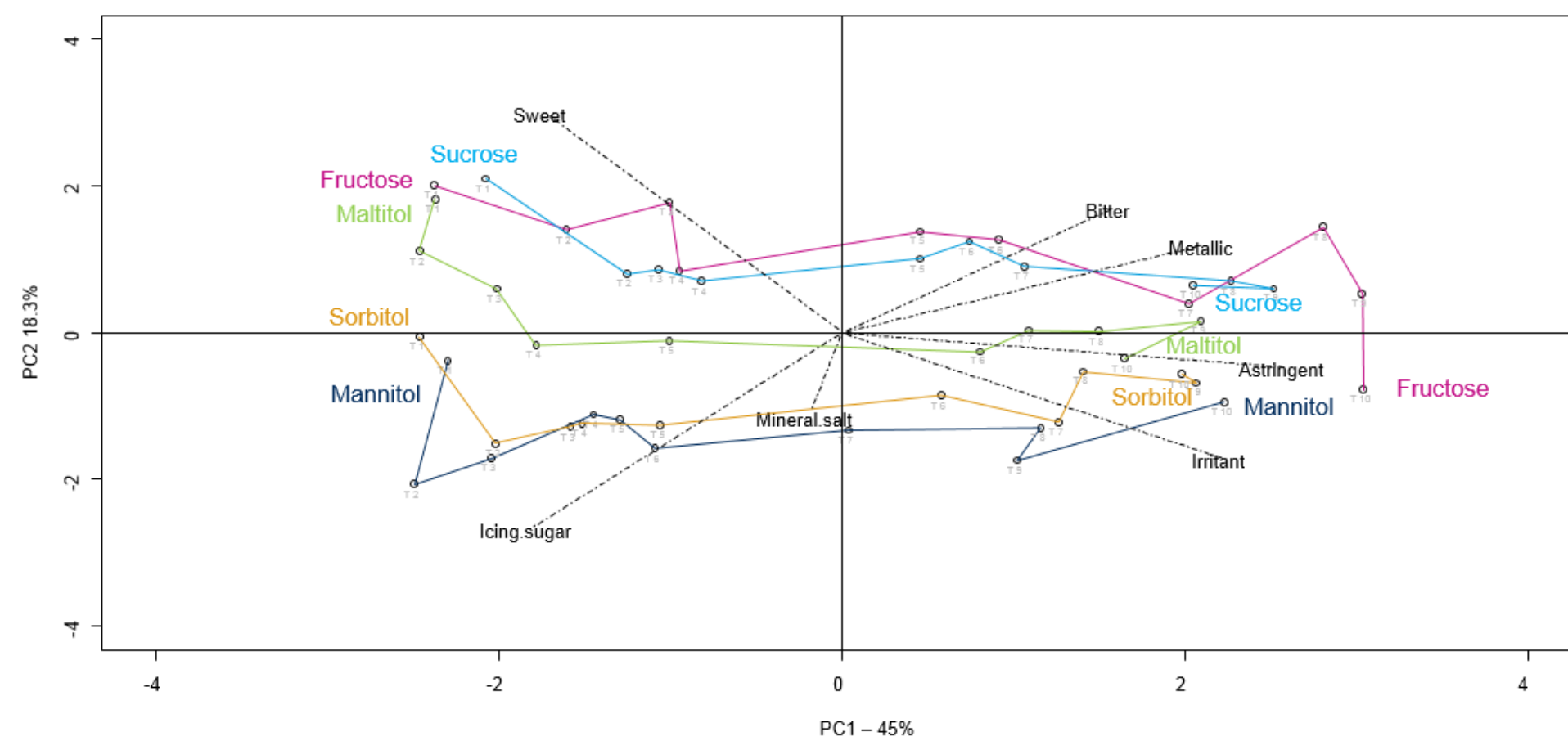


Figure 1: Sensory Trajectory of the sweeteners in Liquid Form 1

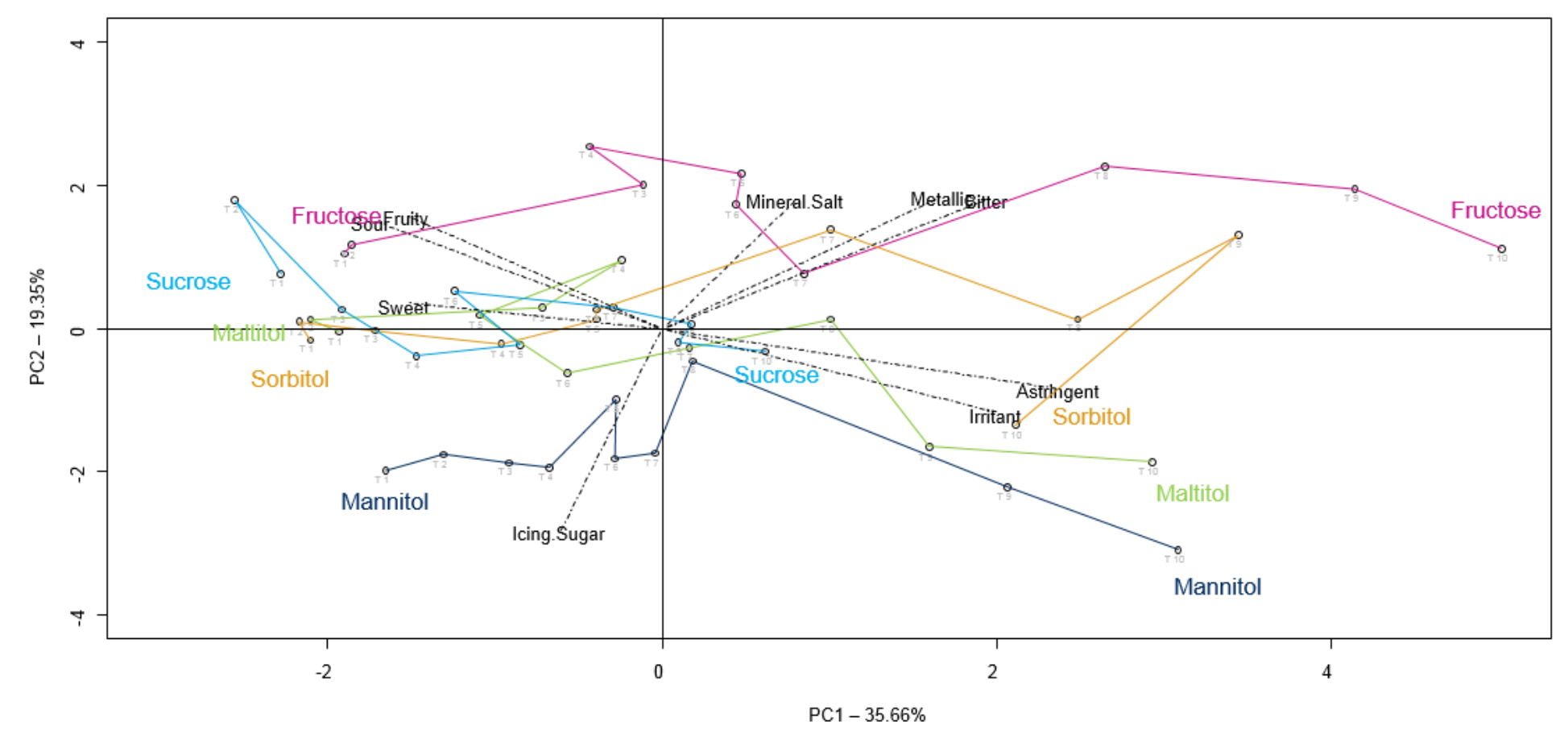


Figure 2: Sensory Trajectory of the sweeteners in Liquid Form 2

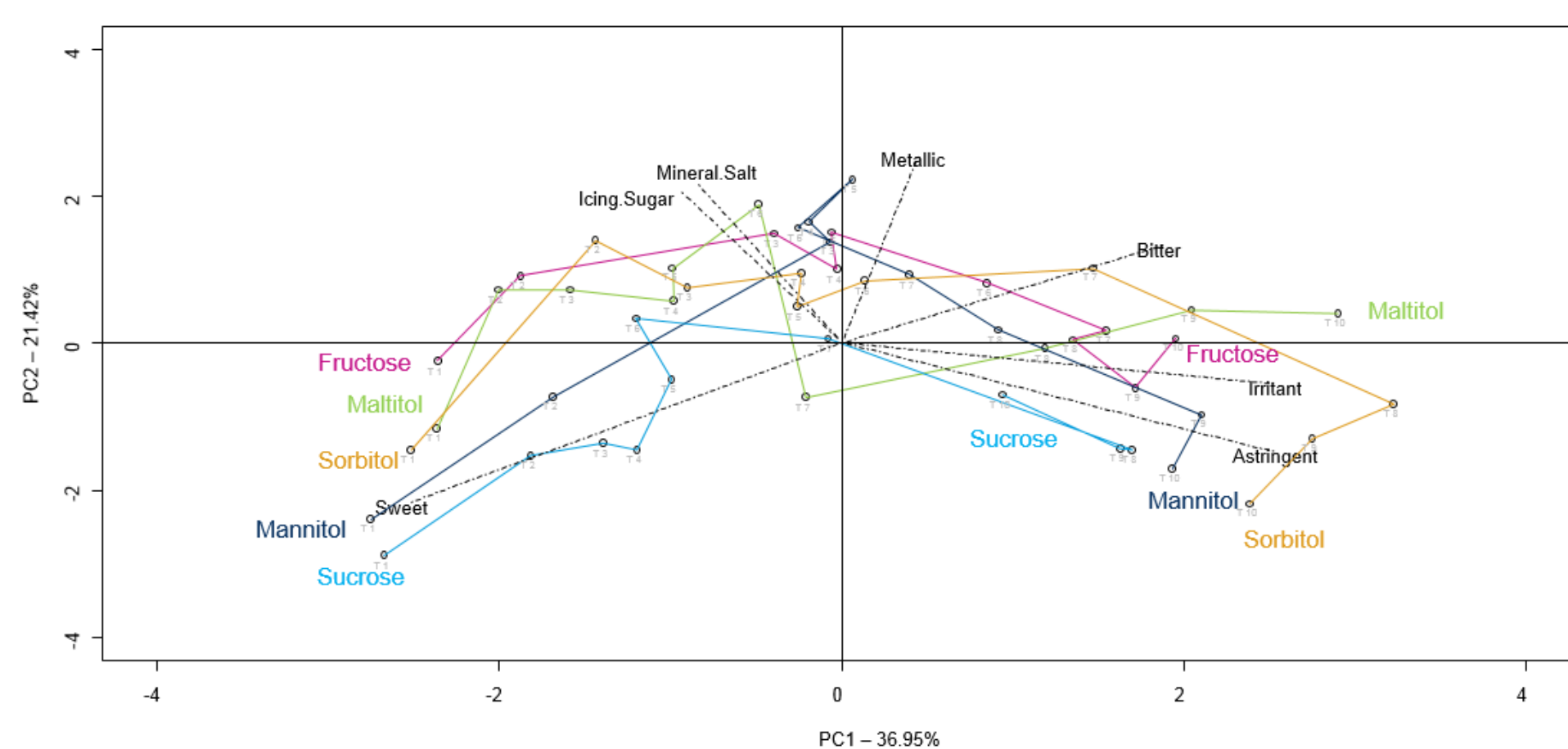


Figure 3: Sensory Trajectory of the sweeteners in Gel Form 1

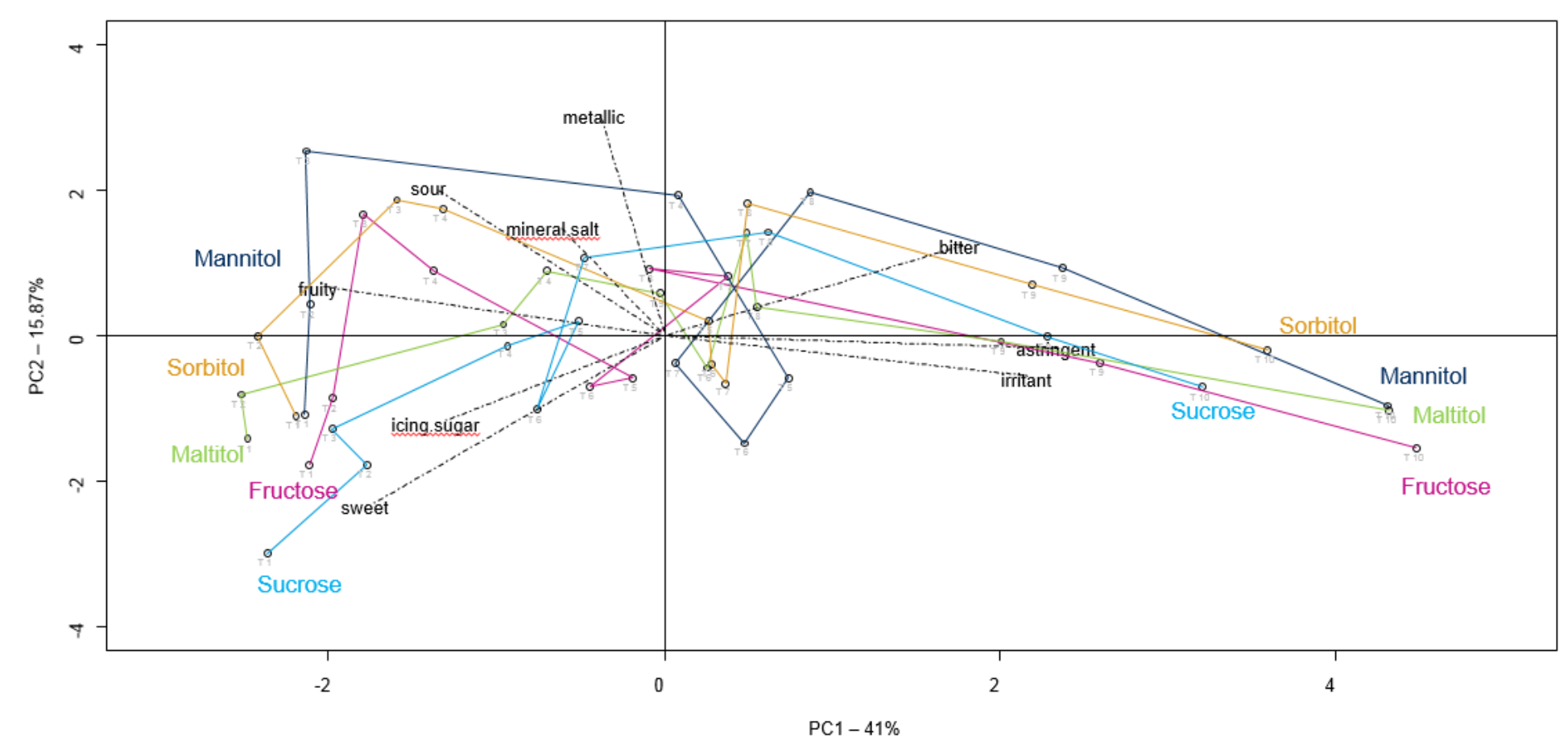


Figure 4: Sensory Trajectory of the sweeteners in Gel Form 2

## Results

**Liquid Form1 (Figure 1):** Sucrose and Fructose followed the same trajectory (Fructose being slightly more irritant toward the end). Sorbitol and Mannitol followed the same trajectory (Icing Sugar, Mineral Salt and Irritant)

**Liquid Form 2 (Figure 2):** Mannitol is perceived with a strong icing sugar element. Maltitol and Sorbitol were close to the Sucrose response (first half of the trajectory). Maltitol was then perceived Astringent and Irritant whilst sorbitol was perceived with Mineral Salt notes, Metallic and Bitter and finally Astringent and Irritant like Maltitol.

**Gel Form 1 (Figure 3):** All samples were first perceived Sweet with Mannitol being the closest to the Sucrose. Mannitol was perceived at the end of the evaluation relatively close to the Sucrose response although Mannitol was perceived stronger in between for the attributes Icing Sugar, Mineral Salt, Metallic and Bitter. One of the characteristics of Maltitol was to be close to a Sugar response at T7, whilst the samples Sorbitol, Maltitol and Fructose were perceived as being Metallic.

**Gel Form 2 (Figure 4):** All samples were quite strong in Sweetness and Icing Sugar at the beginning of the trajectory. Mannitol, Sorbitol and Maltitol were then perceived quite Fruity and Sour. Mannitol was also perceived Metallic (around T4) in comparison to the other samples. All samples seemed to follow the same finish (Sorbitol and Mannitol being however perceived more Bitter than the other samples.)

**Liquid vs gel:** consistency increment change the oral trajectory being the Sweetness the first attribute perceived in gel form 1 for the different formulations, whilst in liquids Mannitol and Sorbitol tends to be perceived as Icing Sugar. In gel form 2 (in comparison with liquid form 1), seems that this consistency increment allow to perceived more clearly the difference oral sensations.

**Flavour influence:** the addition of a flavour and an acid, increase the complexity of sensory attributes perception

## Conclusions

The Temporal Dominance of Sensation methodology is a useful tool to understand the dynamic perception of sucrose and artificial sweeteners and also provides the pattern by which food consistency influence during oral processing in relation with different flavours perception. The TDS outputs gave descriptive details on how sweeteners compare to each other through time and also which sweeteners give a closer response to sucrose depending on the matrix used: liquid/gel and flavour/no flavour.

Analysis of Variance also showed that the matrix form/composition played a significant role in the perception time of the sweetness and of the flavour itself with a gel matrix significantly delaying the perception at which both attributes Sweet and Fruity were perceived.