Overview

• Satiety

• Texture

• Mouth coating / tooth-packing, astringency

• Different proteins
**Increased Satiety**

- High protein meals & foods accelerate satiety
- Different sources?
  - Whey and fish proteins more satiating than others? *(Gilbert et al. 2010)*
  - Composition of the whole meal / product!!

- Elderly market: reduce portion sizes?
  - Meal size reduction *(Ziylan et al. 2016)*
  - Product size reduction *(Beelen et al. 2017)*

**Texture**

- High protein products are firmer / more dense / less creamy
  - Firmer products need more oral processing

- Especially problematic for elderly people
  - Satiating effect
  - Denture issues

- Challenge to make high protein products for dysphagia suffers
Texture

- Example
- Enriched with plant based protein
  - Chocolate brownies
  - Apfelstrudels
  - Cakes with fruit filling
    - Different proteins used for cake and for filling
- Softer texture
  - Veal

“Almost broke my dentures”
“Hard as a brick”
“Like wall paper glue”
“Very cohesive filling”
“Extremely bland”

Mouth coating granules, astringency

- “Astringency is a tactile sensation described as dryness, tightening, and puckering sensations perceived in the oral cavity” (Fermented Foods in Health and Disease Prevention, 2017)
- Result of binding with salivary proteins
- Astringency more pronounced in beverages with >3% whey protein and low pH (Beecher et al. 2008, doi:10.3168/jds.2008-1083)

“I get this dry feeling in my mouth”
“It feels a little like sandpaper on my teeth”
Different proteins

- Meal replacement bars made with:
  - Whey protein: sweet aromatic and vanilla, adhesive and cohesive texture
  - Soy protein: nutty, tooth-packing and dense

- Meal replacement beverages made with:
  - Whey protein: sweet aromatic and vanilla flavour
  - Soy protein: cereal / grainy flavour
  - Consumer acceptance scores were higher for prototypes containing whey protein or a mixture of whey/soy protein than with soy protein alone

- Yogurt with soy protein: darker, more chalky texture, less sweet

Yogurt different casein:whey ratios

Control = 80:20, Y30 = 70:30, Y40 = 60:40, Y50 = 50:50
Sensory descriptive analysis by trained panel
Expectations for a burger

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<th>Blind</th>
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<td>Plant-based</td>
<td>Insect-based</td>
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<td>Aftertaste</td>
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<td>33&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>Juicy</td>
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<td>15&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>10&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Meat flavour</td>
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<td>20&lt;sup&gt;BA&lt;/sup&gt;</td>
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<td>Nutty flavour</td>
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<td>5&lt;sup&gt;b&lt;/sup&gt;</td>
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(Schouteten et al. 2016, doi: 10.1016/j.foodqual.2016.03.011)

Take home messages

• Firmer, more dense, harder textures

• Different sources of protein alter flavour and texture differently

• pH influences astringency perception

• Different target consumers, different needs
Thank you

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