CHARACTERIZATION OF THE TEXTURE IN READY MEALS

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Consumer Problems Associated with Ready Meals

Many elderly people turn to ready meals, but can they compete with a proper dinner?

“What if the food isn't good enough?”

“The portions were too small and I'm still hungry, Is it worth of buying for that price?”

“Are ready meals healthy?”

“When I tasted the ready meal, It doesn’t feel like fresh cooked”

“beef was not that tender as fresh cooked.”

The taste was disgusting and after a mouthful, it was consigned to the bin. A most unpleasant experience.

"Actually had some flavour. Had the most flavour out of all of them."

“I am always concerned about the MSG in some of these meals. Did these meals have MSG (flavour enhancer 621)?”
Why Ready Meals?

“Convenient, tasty and nutritious alternative to takeaway food”

PROJET – 3 Phases

Phase 1 – Product development
  • Recipe formulation
  • Recipe trials
  • Sensory evaluation and confirmation with the final recipe

Phase 2 – Analysis of Textural changes over the storage
  • Texture Profile Analysis
    - Texture analyser
    - Trained sensory panel

Phase 3 – Nutritional Analysis
  • Compositional analysis
  • Digestibility assay
  • Storage trials (oxidative changes)
Texture Profile Analysis (TPA)

- First Bite
- Second Bite
- Probe Movement
- Down
- Up
- Hardness
- Gumminess = \( \frac{A2}{A1} \) * Hardness
- Springiness = \( \frac{L2}{L1} \)
- Chewiness = Gumminess * \( \frac{L2}{L1} \)

- Area 1 (A1)
- Area 3 (A3)
- Area 2 (A2)
- Length 1 (L1)
- Length 2 (L2)
- Adhesiveness
- Time
## Treatment Design and Measurements

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Main Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beef</td>
</tr>
<tr>
<td>Fresh Cooked</td>
<td>10</td>
</tr>
<tr>
<td>Refrigerated (24h)</td>
<td>10</td>
</tr>
<tr>
<td>Refrigerated (24h) &amp; Microwaved (1000W 2min high)</td>
<td>10</td>
</tr>
<tr>
<td>Frozen (7 days) &amp; Microwaved (1000W 5min high)</td>
<td>10</td>
</tr>
<tr>
<td>Frozen (7 days) &amp; Oven-heated (180°C 30min)</td>
<td>10</td>
</tr>
</tbody>
</table>

Main texture measurements are,
- Hardness
- Adhesiveness
- Chewiness
- Gumminess
- Springiness
Texture Profile Analysis Results - Whole Meal

**Figure 1 - Comparison of hardness measurement among storage treatments**

- Frozen & Oven-heated
- Frozen & Microwaved
- Refrigerated & Microwaved
- Refrigerated
- Fresh Cooked

Hardness *10^3 (g)

**Figure 1 - Comparison of chewiness measurement among storage treatments**

- Frozen & Oven-heated
- Frozen & Microwaved
- Refrigerated & Microwaved
- Refrigerated
- Fresh Cooked

Chewiness
Texture Profile Analysis Results - Whole Meal cont.

Figure 3- Comparison of Adhesiveness measurement among storage treatments

Figure 4- Comparison of Cohesiveness measurement among storage treatments
Texture Profile Analysis Results - Whole Meal cont.

Figure 5 - Comparison of Gumminess measurement among storage treatments

Figure 6 - Comparison of Springiness measurement among storage treatments
Texture Profile Analysis Results - Whole Meal cont....

![Figure 7- Comparison of Resilience measurement among storage treatments](image)

**Summery**

- Hardness and the tenderness is the key sensory attributes in ready meal
- Frozen storage and thawing affect on hardness, gumminess, adhesiveness and chewiness
- Desirability of this reduction need to measure through a sensory panel

**Future Focus - Sensory Analysis with trained sensory panel**
Importance of this Project to Industry

• To unlock value from the whole carcass – add value for meat
• To provide information on quality changes (texture, aroma, flavor) happening during storage of ready meals
• To provide suggestions and recommendation on storage conditions (time, temperature), thawing & heating information of ready meals for chefs, manufacturers to preserve and serve in its best quality
• To find solutions for current food industry issues related with ready meal quality
• To understand the single ingredient behavior when it is in combine meal
• To setting up collaboration and commercialization of developed ready meal
Thank you...
Texture Profile Analysis Results - HARDNESS

Figure 1 - Comparison of hardness measurement among storage treatments

- Beef
- Mushrooms
- Broccoli
- Potato
- Carrot

Figure 1: Comparison of hardness measurement among storage treatments.
Texture Profile Analysis Results - CHEWINESS

Figure 2- Comparison of Chewiness measurement among storage treatments

- Fresh Cooked
- Refrigerated
- Refrigerated & Microwaved
- Frozen & Oven-heated
- Frozen & Microwaved

Ingredients:
- Beef
- Mushroom
- Broccoli
- Potato
- Carrot
Texture Profile Analysis Results- ADHESIVENESS

Figure 3- Comparison of adhesiveness measurement among storage treatments
Texture Profile Analysis Results - COHESIVENESS

Figure 4- Comparison of cohesiveness measurement among storage treatments.
Texture Profile Analysis Results - GUMMININESS

Figure 5- Comparison of gumminess measurement among storage treatments
Texture Profile Analysis Results - SPRINGINESS

Figure 6- Comparison of springiness measurement among storage treatments
Texture Profile Analysis Results - RESILIENCE

Figure 7 - Comparison of resilience measurement among storage treatments

- Frozen & Oven-heated
- Frozen & Microwaved
- Refrigerated & Microwaved
- Refrigerated
- Fresh Cooked

- Beef
- Mushroom
- Broccoli
- Potato
- Carrot