COTECA
„Coffee - a sensory pleasure with high quality standards“

Nora Ohnesorge – M.Sc. Food Science

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According to "Duden", QUALITY means all characteristics of a product:

- **Quality includes:**
  - Physical,
  - Chemical,
  - Microbiological,
  - Sensorial,
  - Nutritional aspects

- **Defined in:**
  - Legislations/laws
  - Guiding principles (ISO/EN/DIN-Standards)
  - Specifications of the manufactures
Sensory is the use of human senses (appearance, smell, taste, touch and hearing) to measure, analyse and interpret product characteristics.
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**Application areas**

- **Research and Development**
  - Improvements
  - Innovations
  - Cost savings

- **Marketing**
  - Define consumer needs
  - Product placement
  - Benchmark study

- **Quality control**
  - Marketability check
  - Shelf Life Study
  - Batch release
  - Comparison of suppliers

**Comparison of prototypes or optimised products**
- **Select**
  - products with the highest acceptance

**Monitor**
- Market share for existing products
- **Evaluate**
  - product cycle in the market

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Application areas

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Sensory Evaluations for:
- **Characterisation** of sensory product properties
- Establish sensory quality standards
- Define drivers for preferences and purchasing behavior
- Relationship between consumer expectations and product properties

Assure market shares and reduce flop rates
Methodology

Sensory Analysis
- Organoleptic Perception
- Performances in competitive environment
- Product optimisation

✓ Discriminative Analysis
  - Triangle Test
  - Duo-Trio-Test
  - Pairwise Comparison Test
  - A not A Test
  - Ranking

✓ Descriptive Analysis
  - Simple Descriptive Test
  - Expert report
  - Sensory evaluation with Scale
  - Profiling
  - In/ Out Test

Consumer Insight
- Acceptance/ Preference Tests
- Performances of packaging
- Purchase behavior, pricing, usage of products

✓ Quantitative Studies (CLT and HUT)
  - Packaging Test
  - Concept Test
  - Acceptance Tests
  - Trade off & TURF
  - Kano analysis

✓ Qualitative Studies (e.g. Focus groups)
  - Packaging Test
  - Concept Test
  - Insights Tests

Combination of Sensory and Consumer Insights
A structure able to answer many problematics

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Coffee
“a sensory pleasure with high quality standards“
Flavour influencing factors

- **Modalities**
  - Appearance
  - Smell
  - Taste
  - Mouth feel/ Texture/ Body

- **Roasting process:**
  - Individual vs. mixes: adopted on type of coffee bean or all together
  - Sharp/ strong roasting (burned flavour notes) vs. careful/ slowly roasting (developed flavour profile)
  - Less roasting due to acrylamide reduction: less developed/ weak/ flat flavour and higher acidity
  - The stronger the roast, the less fine/ complex aroma, more bitter notes and more sour

Flavour influencing factors

- **Type of coffee:**
  - Robusta: stable cream, intense flavour, more earthy
  - Arabica: complex flavour/ wide range of flavours

- **Coffee making**
  - Type of machine, degree of grinding etc. → mutual influence of the individual factors
  - Coffee preparation e.g. add milk or sugar

Sensory Coffee Evaluation

- **Controlled sample preparation**
  - According to coffee type and preparation recommendations
    - Adjust the pressure
    - Temperature treatment (e.g. 94 ± 2 °C) & sample temperature for tasting
    - Preparation e.g. filter machine, French-press-method
    - Infusion time (e.g. 4 Minutes)
    - Coffee concentration (amount of coffee powder)
    - Water quality
    - Degree of grinding (partly influenced by coffee machine)

- **Suitable and standardised tableware/ cups**
  - Preheated cups
  - Cover glasses
Sensory Coffee Evaluation

Methods:
- Cupping
- Profiling
- Coffee estimation due to Sweetmarias
- Specification check
  - Simple descriptive test
  - In/ Out Test
  - Degree from Control
- Degree of roast with Agtron (direct correlation between the degree of roasting and the flavour) - SCAA colour kit (standardised colour evaluation)

Competitions
- Cup of Excellence® (world's most prestigious coffee competition)
- DLG 5-point Scheme® (International DLG quality test)
Methods

- **Tasting technique**
  - Evaluate smell during breaking the crust
  - Taste: the coffee must be sucked into the mouth as vigorously as possible → flavour distribution throughout the mouth

<table>
<thead>
<tr>
<th>Cupping</th>
<th>Profiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of 2 cups (up to 5 cups) per sample</td>
<td>1 cup and maybe one repetition per sample</td>
</tr>
<tr>
<td>Direct comparison of different coffees</td>
<td>Sequential monadic test design</td>
</tr>
<tr>
<td>Qualitative evaluation with defined attributes</td>
<td></td>
</tr>
<tr>
<td>Typical attributes to define coffee quality</td>
<td>All attributes that can be used to differentiate samples</td>
</tr>
<tr>
<td>Quantification by assessing intensities (scale)</td>
<td></td>
</tr>
<tr>
<td>Typical scale 0 (unacceptable) – 8 (great)</td>
<td>Typical scale 0 (not perceivable) – 10 or 15 (very intense)</td>
</tr>
<tr>
<td>Uniformity between the cups of one coffee</td>
<td>Uniformity or differences between different coffees</td>
</tr>
<tr>
<td>Category overall can become subjective</td>
<td>No subjective evaluation</td>
</tr>
<tr>
<td>Award points in individual categories</td>
<td>Statistical treatment and comparison of the intensity values → graphical result treatment (spider web)</td>
</tr>
<tr>
<td>→ a total of points can be calculated at the end</td>
<td></td>
</tr>
</tbody>
</table>
Methods

- **Specification check**
  - **Simple descriptive test:**
    - Description of sensory characteristics with freely selected attributes
    - Exactly descriptive, factual words
    - No hedonic terms (e.g. nice, good)
    - No intensity describing words (e.g. light, strong, something)

- **In/Out Test**
  - Evaluation of the conformity of a product in comparison to a sensory standard
  - IN = conform / OUT = not conform
  - Graduated and descriptive IN/OUT evaluation possible
  - Description of the difference, if the sample does not conform the standard

- **Degree from Control**
  - Evaluation of the difference of a product in comparison to a sensory standard
  - Determine the size of the difference by a scale
  - Define the difference by using attributes
Challenges

Result Comparison

- Differences between countries
- Guarantee controlled/ always the same conditions
- Different usage of scales for profiling
  - Spectrum™ Descriptive Analysis Method
  - References from World Coffee™ Sensory Lexicon to train/ harmonise sensory tasters
  - Samples with defined values as reference for each test
- Influence of single persons
  - 10 to 14 panellists per evaluation to cover personalities
  - Analyse means instead of consensus or single assessments
  - References with defined values as orientation
Sensory tests for quality control at every point of the Supply Chain

- Why?
- How?
- Who?
Sensory tests for quality control at every point of the Supply Chain

WHY?
- Detect off flavour or determine changes from sensory specification and evaluate sensory product quality to
  - Adopt processing
  - Decline raw products
  - Assign a price

HOW?
- Evaluation of appearance and smell e.g. with In/Out Testing (random sample check)
- Sample roasting and small Cupping

WHO?
- Sensory trained persons working in raw material reception and quality control
- Coffee buyers
Sensory tests for quality control at every point of the Supply Chain

WHY?
- Production control: Marketability check and batch release for a possible adjustment of production/ mix/ roasting
- Shelf Life Study

HOW?
- Discrimination or descriptive tests to evaluate appearance, smell, taste and body to assess sensory specification
- E.g. Cupping

WHO?
- Sensory trained persons working in quality control, production, product development . .
- Roaster
- Consumers during coffee tastings
Sensory tests for quality control at every point of the Supply Chain

**WHY?**
- Product optimisation
- Satisfy consumer needs
- Evaluate product placement/marketing
- Comparison with competitors/benchmark tests

**HOW?**
- Analytical or hedonic sensory tests to evaluate product characterisation and acceptance

**WHO?**
- Sensory trained persons working in quality control, production, product development . .
- Consumers for hedonic testing
According to Duden (Standard reference for the German language) the word quality summarises all characteristics of a product.

- **Quality includes:**
  - Physical,
  - Chemical,
  - Microbiological,
  - Sensorial and
  - Nutritionally aspects

- **Defined in:**
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Subjective Quality

Consumers usually do not know legal aspects or technological backgrounds → they decide subjective about product quality

- Simple criteria like:
  - Taste
  - Price
  - Convenience

- Complex factors like:
  - Sustainability
  - Trends
  - Quality labels
  - Brands
  - Emotional aspects
Subjective Quality

Taste and sensory pleasure are the most deciding factors for market success of food products.

“Stagnation means regression.”

Coffee is a food category that is always improving and innovating.

- Always new trend products
- Coffee as flavour for many food categories
- Coffee as a life style product
- Coffee as an elixir of life
Subjective Quality

Taste and sensory pleasure are the most deciding factors for market success of food products.

“Stagnation means regression.”

Coffee is a food category that is always improving and innovating.

- Always new trend products
  - Cold brewed coffee
  - Lemonades or tea from coffee cherries
  - Coffee in Coke
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“Stagnation means regression.”

Coffee is a food category that is always improving and innovating.

- Always new trend products
- Coffee as flavour for many food categories
  - Nutritional products/ sport supplements
  - Ice cream/ dessert/ cake
  - Coffee-roasted carrots
Subjective Quality

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- Coffee as flavour for many food categories
- Coffee as a life style product
  - Coffee to go (with flavours)
  - Trend locations/ products for social media
Subjective Quality

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Coffee is a food category that is always improving and innovating.

- Always new trend products
- Coffee as flavour for many food categories
- Coffee as a life style product
- Coffee as an elixir of life
  - Every morning to start the day
  - At work to refresh or relax for a moment
In Germany, 56% of the consumers use a **filter coffee machine** → **most frequently used preparation method for coffee**

Source: Deutscher Kaffeeverband e.V., Coffe consumption study: „So trinkt Deutschland Kaffee“/ final report, January 2018, Hamburg

Some aspects that are important for coffee taste, are generally NOT considered from consumers that use a filter coffee machine

- Adjust the pressure, temperature and infusion time
- Water quality
- Degree of grinding

**High standards for sensory testing**
- Controlled conditions
- Precise methods
- Comparability

**Consumers product preparation**
- No influence on factors like temperature and pressure
- Add milk and/or sugar
- Estimated amount of coffee

**Different expectations**
Very important to differentiate between sensory quality analysis and sensory consumer insights for marketing or product development.
Coffee consumption – WHY?

Main reasons:

- Taste and pleasure
- Physiological effects: stimulating, keeps awake, increases concentration
- Ritual: coffee in the morning, at the end of a meal
- Conscious breaks or to have a feel-good-moment
- As a bounty or for stress reduction

Coffee is a product with many emotional aspects and individual preferences
Many factors influence the success of coffee products.
Summary

But finally, an accepted taste is always the basis for market success of coffee products.