Food Science @ HAW Hamburg
Mission
Strategic Thrusts and Framework
Study Cours and Graduation
Food Science Competence Team
Company Projects
Scientific Conferences
Quality Assurance Projects
Packaging Research and Sustainability Projects
Scientific Research Projects
Publications
Contact
mission

to deliver comprehensive state-of-the-art, science-based expertise to our students enabling interdisciplinary, problem-based learning enriched by shared activities together with our multi-institutional partners.

better food

better life
strategic thrusts

food science – better food, better life

- product & process optimization
- packaging & new technologies
- quality management & sustainability
- food safety nutrition & health

food science @ haw hamburg
framework

Food science

better food

food safety, nutrition & health
quality management, sustainability
packaging, new technologies

product process optimization

better life
people

profit
planet

better

sustainability
profit

product process optimization

packaging, new technologies

quality management, sustainability

food safety, nutrition & health

better food

framework

Food Science (MSc)
Life Sciences
HAW Hamburg
tasks

knowledge generation

company projects

research studies
tasks

- **knowledge generation**
  - Food technology and industrial processing, product and packaging development, sensory and consumer science, food innovation marketing
  - Quality management, food law and regulations, food sustainability, food safety

- **company projects**
  - Product development, process value analysis along the entire food chain (life cycle assessment)
  - Consulting companies during implementation of International Food Quality Standards (IFS, ISO 22000)

- **research studies**
  - Scientific studies on the food product and process optimization (nutritional quality, safety, sustainability, consumer acceptance, packaging)
study course & graduation

4 semester | 120 ECTS credit points | master of science (MSc)

unique selling point: problem based learning

<table>
<thead>
<tr>
<th>Semester (1)</th>
<th>Semester (2)</th>
<th>Semester (3)</th>
<th>Semester (4)</th>
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<td>• logistics &amp; packaging</td>
<td>• food analysis</td>
<td>master thesis</td>
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<tr>
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<td>• food innovation marketing</td>
<td>• food microbiology/toxikology</td>
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<td>• food functionality</td>
<td>• product development</td>
<td>• nutrition science</td>
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<td>• industrial food processing</td>
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<td>• scientific projects</td>
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<td></td>
<td>• quality assurance</td>
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© food science @ HAW Hamburg
Company Projects

- Meierei-Genossenschaft Godow-Schwarzenbek eG
- Lipid Nutrition (Loders Croklaan)
- National Starch
- H.J. Heinz
- Beiersdorf
Setting of company projects

- **Food Innovation Marketing**
  - Prof. C. Wegmann

- **Innovative product development**
  - Prof. J. Fritsche

- **Sensory perception and consumer acceptance**
  - Prof. M. Busch-Stockfisch

- **Project team**
  - 25 food science students, HAW Profs, company representatives

- **Project start**
  - each 2ND semester (approx. 160 h)
Company Project (2007)

- Cooperation with Meierei-Genossenschaft Godow-Schwarzenbek eG

- **Skim milk concentrates** – innovative product ideas, marketing concepts and product prototypes
Company Project (2008)

- Cooperation with Lipid Nutrition (NL): **Functional Food**

Contains 3.5 g Clarinol™ Powder (2.2 g CLA isomers)
Company Project (2009)

- Cooperation with National Starch (Hamburg)

1.) Functional Drink mit Ballaststoffen
2.) Functional Drink mit Probiotics
3.) Exotischer Drink
4.) Energy Drink
Company Project (2010)

- Cooperation with Uelzena „FIT with 50+“

![Image of food products and preference card]

- Präferenzenkarte
  - F1: Fruchtig/sauer
  - F2: Nicht bananig/Molke

- Food Science (MSc)
  - Life Sciences
  - HAW Hamburg
Company Project (2011)

- Cooperation with H.J. Heinz GmbH

- Cremige Spargelsuppe verfeinert mit Schnittlauch und Vollkorn-Croutons
- Cremige Tomatensuppe verfeinert mit Basilikum und Grissini-Talern
- Cremige Kürbissuppe verfeinert mit Zitronenmelisse und Wurzelgemüsechips
- Cremige Linsensuppe verfeinert mit Petersilie und Balsamico-Schwarzwurzelchips
Company Project (2012)

- Cooperation with Beiersdorf AG
external interfaces

Food Science study course accreditation since 2009

Packaging Research and Testing since 1954, Accredited and certified Test laboratories
Scientific Conferences

9th Pangborn Sensory Science Symposium
4-8 September 2011
The Sheraton Centre Toronto Hotel, Toronto, Canada

5th European Conference on Sensory and Consumer Research
Bern, Switzerland, 9-12 September 2012

2008 LChG
2009 LChG
2010 LChG
2011 LChG
2012 LChG
2013 LChG

6th Euro Fed Lipid Congress
7-10 September 2008 • Athens • Greece

7th Euro Fed Lipid Congress
18-21 October 2009 • Graz • Austria

8th Euro Fed Lipid Congress
21-24 November 2010 • Munich • Germany

9th Euro Fed Lipid Congress
18-21 September 2011 • Rotterdam • The Netherlands
Effect of fat content on long-term acceptability of dairy products: a comparison between plain stirred yoghurt and vanilla custard

INTRODUCTION

Product failures are often caused by false prediction of long-term acceptance of a product. When consumed repeatedly the acceptance of food changes, at which it may increase or decrease. It is unknown why some products are liked and consumed regularly over a long time and others never will.

The fat content of a product could be an influencing factor concerning the long-term acceptance of food. It is known that fat-reduced products mostly are not accepted by the consumer, but their consumption is important due to the continuously increasing number of overweight and obese people. However, it is interesting to know if the consumer could get used to fat-reduced food when consuming them regularly. Referring to this, it is interesting to evaluate the influence of variation in fat content on long-term acceptance.

The aim of this study was to evaluate the effect of fat on long-term acceptability in two different food categories (starch-based vanilla custard and plain stirred yoghurt) during repeated consumption.

MATERIALS AND METHODS

Samples

Four samples per food category, varying in fat, were analyzed using consumer tests.

Table 1: Evolved sensory description and fat content

<table>
<thead>
<tr>
<th>Description</th>
<th>Fat content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepared with UHT milk</td>
<td>0.1%</td>
</tr>
<tr>
<td>Prepared with UHT milk</td>
<td>1.5%</td>
</tr>
<tr>
<td>Prepared with UHT milk and vegetable fat cream</td>
<td>2.9%</td>
</tr>
<tr>
<td>Prepared with UHT milk and cream</td>
<td>8.6%</td>
</tr>
<tr>
<td>Plain stirred yoghurt</td>
<td>0.1%</td>
</tr>
<tr>
<td>Plosterilized milk was adjusted in fat content using cream from the separation process</td>
<td>1.5%</td>
</tr>
<tr>
<td>Plosterilized milk was adjusted in fat content using cream from the separation process</td>
<td>3.0%</td>
</tr>
<tr>
<td>Plosterilized milk was adjusted in fat content using cream from the separation process</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

Sensory Evaluation

Two independent consumer tests were carried out:

| Subjects (n:custard=71, n:yoghurt=79) consumed and evaluated each of the four samples every weekday for three weeks. |
| Additionally the desire to eat the samples was requested at the beginning of each session. |

Desire to eat

• Custard: ↓
• Yoghurt: Slightly ↓

Appearance

• Custard: ↓ for 0.1% and 1.5%, slightly ↑ for 2.9% and 8.6%.
• Yoghurt: ↓ for 0.1%, slightly ↓ for 1.5% constant for 3.0%, ↑ for 8.5%.

Table 2: Determined clusters (custard)

Custard and yoghurt:

• 0.1% Most negative correlations, least positive correlations.
• 8.5% / 8.6%: Most positive correlations.

Custard

• 1.5% Most negative correlations in appearance.
• 2.9%: Least negative correlations in appearance.
• 8.6%: Least negative correlations in taste, texture and overall-liking.

Correlations

• Significant decrease (m=51) / increase (m=11) of desire to eat custard.
• Significant decrease (m=3) / increase (m=0) of desire to eat yoghurt.

ANOVA

• “Time” as a covariate had a significant effect concerning overall-liking (both products), appearance (only custard), taste (both products) and texture (only yoghurt).

Significant differences concerning overall-liking between each sample in descending order:

• Custard: 2.9%, 8.0%, 1.5% and 0.1%.
• Yoghurt: 8.5%, 3.0%, 1.5%, 0.1%.

The higher the fat content, the higher the liking of a product by tetr.

Cluster Analysis

Results revealed 3 clusters for each of the 4 variables:

1. no change in rating
2. positive correlations (positive change in rating)
3. negative correlations (product boredom)
Comparison of bitter masking agents for improving sweetness perception with different sweeteners

Cai Brandenstein¹, C. Gerlach¹, L. Stelzer¹, Mechthild Busch-Stockfisch¹
¹Hamburg University of Applied Sciences

Introduction
Bitter masking agents for improving the perception of sweetness are of interest. A large number of bitter masking agents have been described in the literature. Some are naturally occurring, such as caffeine, while others are synthetic derivatives. It is known that bitter masking agents are not only effective in food products, but also in pharmaceuticals. However, the effectiveness of bitter masking agents varies depending on the concentration and the type of sweetener.

Method
The effectiveness of bitter masking agents was determined using a bitter masking index (BMI). The BMI was calculated as the ratio of the sweetness intensity of the sample with and without the masking agent, with a value of 1 indicating complete masking.

Stimuli
Sodium Glucinate: a natural bitter masking agent

Masking agents
1. Sodium Glucinate (50 ppm - 500 ppm)
2. Bitter masking agents (50 ppm - 500 ppm)

Results – Aqueous Solutions

Sodium Glucinate

Fig. 1: Influence of sodium glucinate on the bitterness of model drinks
- 5% Significant suppression of bitterness with concentration C
- Contents F: bitter off-flavor
- 6% High significant suppression of bitterness with concentration F

Model drink “apple”

Fig. 2: Influence of sodium glucinate on the bitterness of model drinks: “green tea”
- 5% Significant increasing bitter masking effect

Bitter masking aroma

Fig. 3: Influence of aroma on the bitterness of model drinks
- 3% Significant suppression of bitterness in aroma A
- 6% Significant suppression of bitterness with concentration 0.61 %
- Mixtures (3, 6 %) No significant suppression (results not shown)

Conclusions
- Clear differences in suppressive effect
- Sodium glucinate suppresses bitterness of rebaudioside A
- Existing, but limited effect in effray-eriose-Stevia solutions
- Saffl off-flavors with increasing amount of sodium glucinate
- Aroma less effective than sodium glucinate
- Sodium glucinate more effective in bitter drinks than in sour drinks

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Substitution of sugar in sugar-free fine bakery products
- a sensory and technological challenge to exceed consumer expectation

Cai Brandenstein¹, K. Baudewig², V. Gilmer³, Eskrak Köhler³, Z. Lampe³, S. Mete³, Mechthild Busch-Stockfisch¹
¹Hamburg University of Applied Sciences
²Braunschweig University of Technology
³Hamburg University of Applied Sciences

Introduction
Sugar is the key ingredient in most bakery products. However, the increasing demand for sugar-free products has led to the development of new technologies and formulations to improve the sensory and technological properties of these products.

Method
Sensory evaluation
- 70 volunteers were involved in the sensory evaluation
- A 9-point hedonic scale was used

Statistical analysis
- Data were analyzed using analysis of variance (ANOVA)
- Duncan’s multiple range test was used for post hoc comparisons

Results – Model drinks

Combination of sweetener used in study

<table>
<thead>
<tr>
<th>Sweetener</th>
<th>%</th>
<th>Sensory Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Xylitol</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Stevia</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Xylitol 30 Stevia 3</td>
<td>30</td>
<td>3</td>
</tr>
</tbody>
</table>

Significant differences in taste
- Xylitol significantly improves the sensory quality of the model drinks

Results – Sponge cakes

No significant differences in reference: No sweeteners, for further testing

Significant positive impact of alternative sweeteners:
- Xylitol significantly improves the sensory quality of the sponge cakes

Significant differences in reference: samples with maltitol and polydextrose more bitter

Polydextrose significantly influences the sensory quality

Note: Further testing of alternative sweeteners
- 30% of consumers prefer sugar-free cakes, containing polydextrose
- Majority prefers sugar-free cakes

Conclusions
- Alternative sweeteners improve texture of sponge cakes and adversely influence texture of shortbread biscuits
- Consumers divided into two groups: one likes samples with alternative sweeteners, the other prefers sugar-containing samples
- Combinations of erythritol and maltitol are well suited to replace sugar in the formulations
- Polydextrose is able to improve texture of sponge cake biscuits

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Einfluss auf qualitative und quantitative Abbauprodukte

**Introduction**

The demand for high-quality fermented products grows, calling for the development of fermentation processes that can ensure the desired quality and safety. It is essential for consumers to perceive the fermented products as healthy and natural. The current study investigated the influence of different fermentation conditions on the composition of the products.

**Methods**

The samples were analyzed for their proximate composition, flavor liking, and overall liking. The analysis was conducted under different fermentation conditions, and the results were compared to determine the optimal conditions.

**Results**

The analysis showed that the fermentation conditions had a significant impact on the proximate composition and the sensory attributes of the products. The best results were obtained under conditions that favored a high level of acidity and a low pH.

**Conclusions**

The study demonstrates the importance of controlling the fermentation conditions to achieve desired sensory and nutritional properties in fermented products.
Methodenoptimierung zur Bestimmung polarer und unpolarer Anteile in Frittierfetten mittels Säulenchromatographie

ZIEL
Modifizierung des Fraktionierungsverfahrens zur Bestimmung von polaren (und unpolaren) Anteilen in Frittierfett (ISO 8420:2002).

METHODEN
- Referenzmethode „Bestimmung polarer Anteile in Frittierfett“ ISO 8420:2002 (§ 64 LFGB 13.07.12)
- Chromatographische Bedingungen: Kieselgel 60 (Korngröße 0,063-0,2 mm; Wasseraaktivität 5%);
  Elutionsmittel: Petroleumbenzин/Diethylether (87:13 (v:v))
- Modifiziertes Verfahren: Elutionsmittel Petroleumbenzin-Butyl-Methyl ether (t-BME)
- Ermittlung des optimalen t-BME-Anteils im Elutionsmittel mittels statistischer Versuchsplanung
  (Statistica, Version 7.1 (StatSoft, Tulsa, USA); Vollständiger faktorielles Versuchsplan auf drei Stufen
  für zwei Faktoren (t-BME Anteile: 5, 10, 15%; polarer Anteil in der Probe (bestimmt mit
  Referenzmethode): 15,2%, 23,2%, 36,2%); Zielgröße: Polare Anteile Δ% Referenzmethode
- Modifiziertes Fraktionierungsverfahren anhand von Frittierfettproben validiert
- Reinheit der Fraktionen dunnschichtchromatographisch überprüft (ISO 8420:2002, Anhang A)
- Ergebnisse der Referenzmethode wurden im Referenzlabor (Institut für Umwelt und Hygiene
  Hamburg) bestätigt

ERGEBNIS

<table>
<thead>
<tr>
<th>Anzahl Einzeluntersuchungsergebnisse pro Probe</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mittelwert % (ISO 8420:2002)</td>
<td>16,4</td>
<td>24,6</td>
<td>34,3</td>
<td>39,5</td>
</tr>
<tr>
<td>Standardabweichung (ISO 8420:2002)</td>
<td>0,59</td>
<td>0,74</td>
<td>1,33</td>
<td>1,43</td>
</tr>
<tr>
<td>Mittelwert % (t-BME)</td>
<td>16,3</td>
<td>23,2</td>
<td>31,2</td>
<td>39,1</td>
</tr>
<tr>
<td>Standardabweichung (t-BME)</td>
<td>0,61</td>
<td>0,96</td>
<td>1,33</td>
<td>0,72</td>
</tr>
<tr>
<td>T-Test (überprüfte Varianzhomogenität)</td>
<td>0,92</td>
<td>0,059</td>
<td>0,018</td>
<td>0,011</td>
</tr>
</tbody>
</table>

Tab.: Ergebnisse der Elutionsmittelvalidierung Petroleumbenzin-BME (89:11 (v:v))

ZUSAMMENFASSUNG
- Die Auswertung des Versuchsplans ergibt eine optimale Elutionsmittelzusammensetzung
  Petroleumbenzin/BME (69:11 (v:v)) (s. Abb. 1).
- Die Reinheit der polaren Fraktion wurde mittels Dunnschichtchromatographie bestätigt.
- Die Validierung zeigt, dass mit beiden Methoden vergleichbare Ergebnisse erzielt werden (s. Tabelle).
Analysis of cis/trans Octadecenoic Fatty Acid Isomers in Foods by Ag⁺-SPE/GC-FID

I. Background

- Trans fatty acids (TFA) occur in many kinds of foods in varying quantities with trans octadecenoic acid isomers being the predominant TFA.
- In principle there are two distinct dietary sources of TFA: partly hydrogenated vegetable oils (PHVOs) and rumen derived feeds (methanogenic bacteria) such as rancid, butter, cheese, yogurt, bread, etc.
- Therefore, the health aspects of high intakes of TFA are considered a drawback (increased risk of coronary heart diseases).
- Generally, a few European countries are planning to implement regulatory measures, eg. maximum limit for TFA in processed foods in Germany 2% of total fat.

II. Scope

- We recently reported an improved Ag⁺-SPE/GC-FID method for the determination of trans octadecenoic acid isomers in various foods [1].
- Here, we are reporting the results of a TFA survey with a special focus on bakery products.
- In particular, we were interested in the investigation of TFA contents in two distinct groups of bakery products: firstly, industrially produced bakery products (piedmontese goods), and secondly, locally produced bakery products (e.g. Berliner-type doughnuts, croissants, cookies) purchased from bakeries.

III. Material and Methods

- Prescribed bakery products such as cookies, biscuits, waffles (all containing sources of vegetable oil and/or butter according to their ingredients list) were purchased from local food retail stores (September 2006-March 2006).
- Locally produced bakery products (Berlin-type doughnuts) and other food bakery products, croissants, biscuits were sampled from bakery shops in Hamburg.
- In total, 51 bakery products were analyzed gas chromatographically with regard to their C18:1 trans contents [1] and their total fat contents [2].
- Samples containing 1% TFA of total fat were subsequently fractionated by Ag⁺-SPE and again analyzed by gas chromatography [1].

IV. Results

- The prescribed bakery products showed similar C18:1 trans contents (all less than 3% TFA of total fat) as well as comparable trans octadecenoic acid content profiles (Figure 1 and 2) supporting butter fat as predominant TFA source. Only 3 out of 27 samples contained <2% of total fat.
- However, some of the locally produced bakery products (particularly the Berliner-type doughnuts) showed a significant difference in TFA magnitude (Figure 3).
- Of the analyzed Berliner-type doughnuts, 50 percent of the samples had a C18:1 trans content of more than 20% of the total fat (max. value 27% TFA).
- The trans octadecenoic acid isomer profiles of all analyzed Berliner-type doughnuts were similar (Figure 4), suggesting PHVOs as predominant TFA source.

V. Implications

- Further research is needed to investigate the intake of TFA from different dietary sources to evaluate the risk for coronary heart disease.

---

**Contents of Trans Fatty Acid Isomers (C18:1) in Bakery Products**

**Figure 2: C18:1 trans fatty acid contents of prescribed bakery products (n=27)**

**Figure 3: C18:1 trans fatty acid contents of locally produced bakery products (n=25)**
Spectrophotometric quantification of polyphenols in refined and non-refined rapeseed oils

1. INTRODUCTION

Polyphenols have a significant effect on the stability, sensory perception, as well as the nutritional characteristics of edible oils. The content of polyphenols in vegetable oils varies depending on plant species, processing techniques and storage conditions. The polyphenol concentration of olive oils were markedly reduced (85%). However, only limited information on the polyphenol content of rapeseed oil is available.

The aim of the present study was to adapt and validate a spectrophotometric assay (Folin-Ciocalteu assay) in order to quantify the polyphenol content of rapeseed oil samples. Moreover, a new spectrophotometric device (FOODLAB@) was applied for comparison. This device does require a time-consuming sample preparation.

2. RESULTS AND CONCLUSION

- The total polyphenol content of refined and non-refined rapeseed oil was measured with the Folin-Ciocalteu method and the FOODLAB System.

- Polyphenol content of refined rapeseed oil samples showed consistent data for both methods (Figure 2).

- Sample preparation and overall analysis time was significantly lower for the FOODLAB system due to its quick sample preparation.

- Further research is necessary with special focus on non-refined rapeseed oil. Finally, further methods validation work is included.

Rapid Determination of the Total Polar Compound Content in Frying Oils – A Method Comparison

2 Materials and Methods

- Five edible oils were tested, including sunflower oil (SF), rapeseed oil (RO), palm (PO), high-oleic sunflower oil (HOSF), and high-oleic rapeseed oil (HORO), at 13 times between 0 s and 30 hours at 170°C.

- The DGF Standard Method C 188 36 (D) was performed by micro silica gel column chromatography.
Method Optimization of the Analysis of Volatile Compounds derived from Edible Oils by HS-SPME-GC

1 Aim
The aim of this study was to evaluate four commercially available fiber materials (PA, DVF/PAK, CAR/PDMS and DVF/CPDMS) with respect to their effectiveness to extract various volatile compounds derived from vegetable oils.

The most suitable fiber material was applied to determine the optimal extraction conditions for the analysis of volatile compounds in sunflower oil (SF) using a central composite design (DoE).

2 Material and Methods
HS-SPME-GC:
- Fiber: PA (Polar, 85 μm coating), DVF/PAK (DVB/PDMS/Polar, 85 μm coating), CAR/PDMS (50 μm coating), DVF/CPDMS (DVB/Carbowax/Carbowax, 85 μm coating).
- Nucleus size: 24 μm

A) Full factorial design:
- Amount of SF: 6, 12, 24, 48, 96 g
- Extraction temperature: 25, 35, 45 °C
- Extraction time: 30 min
- Oven temperature: 200 °C

B) Central composite design:
- Amount of SF: 100 g
- Extraction temperature: 25, 35, 45 °C
- Extraction time: 30 min
- Oven temperature: 200 °C

3 Results
A) Fiber Material:
- DVF/CPDMS > CAR/PDMS > DVF/PAK > PA

4 Conclusion / Outlook
- DVF/CPDMS showed the most suitable fiber material in extending the range of various volatile compounds by HS-SPME-GC.
- Other investigated fiber materials may also be suitable, but not for a comprehensive range of volatile compounds.
- Further development of the extraction of volatile compounds using fiber materials would be desirable.

Tab. 1: Identification of volatile compounds derived from sunflower oil

1 Einleitung & Problemstellung
Ziel der Arbeit: Gewinnung der Stabilität des verpackten Lebensmittels durch die Analyse der getrockneten Lebensmittelproben mittels der Optimierung der Verpackungsmaterialien und der Verpackungsmittelspezifikation.

Material & Method
- Probenaufarbeitung:
  - Probenaufarbeitung: 10 g Probenmaterial aufgeteilt in 10 g Probenmaterial
  - Probenaufarbeitung: 10 g Probenmaterial aufgeteilt in 10 g Probenmaterial
- Probenaufarbeitung:
  - Probenaufarbeitung: 10 g Probenmaterial aufgeteilt in 10 g Probenmaterial

Ergebnis
- Optimierte Verpackungsmaterialien: 1.0 g Probenmaterial, DDW(99%): 10 g Probenmaterial, 10 g Probenmaterial
- Mol. Gew. (g/mol): 1.0 g Probenmaterial, DDW(99%): 10 g Probenmaterial, 10 g Probenmaterial

Schlussfolgerung
Eine optimierte Probenaufarbeitung ist notwendig, um eine höhere Genauigkeit der Ergebnisse zu erreichen.
Regionalverbandstagung
Lebensmittelchemische Gesellschaft Nord 2013

Ansätze zur Minimierung von fischigen off-flavor Komponenten beim Frittieren von Pommes frites in raffinierten Rapsölen

1 Ziel & Hintergrund
Das Ernten eines fischigen off-flavors beim Erhitzen von Pommes frites kann durch Veränderungen in der warmen Phase eintritt [1]. In der Studie werden raffinierte Rapsöle mit einer Temperatur von 150 °C benutzt, wobei die Erhitzungstemperatur des fischigen off-flavors während des Frittierens von Pommes frites in Rapsöl untersucht wurde.

2 Material und Methoden

2.1 Probenmaterial
- Raffiniertes Rapsöl (RO) und raffiniertes high-oleic Rapsöl (HRO) als Referenz.
- 1% Inhibit (MgCl₂) als Inhibit (MRO) [7].

2.2 Erhitzungstemperatur
- 6h bei 150 °C
- Probenahme: 1h, 2h, 3h, 4h, 5h, 6h

2.3 Probenahme
- 1x Pommes frites für 3,5 min Frittieren (100 °C) und Probenahme (60 °C) mit einem Probensammelvorrat.

2.4 Sensorische Einstufung
- Inh. Panel (n = 7)
- Bewertung der Rapsöle auf fischigen off-flavor mit einer Skala von 0 bis 10.

2.5 Analytische Einstufung
- Inh. Panel (n = 7)
- Bewertung der Rapsöle auf fischigen off-flavor mit einer Skala von 0 bis 10.

3 Ergebnisse
- Die Ergebnisse zeigen, dass die Gehalt von off-flavor Indikatoren in den Rapsölen während des Frittierens überwacht durch eine Probenahme im Frittieröl für eine Sensitivitätsprüfung

4 Schlussfolgerung
- Die Ergebnisse legen nahe, dass die Gehalt von off-flavor Indikatoren in den Rapsölen während des Frittierens durch eine Probenahme im Frittieröl liegt.

5 Dankes
- Die Autoren danken der Firma Eurofins Analytik für die Unterstützung und der Teilnahme an den Panels für ihre Unterstützung.

Literatur:
Methodenentwicklung und -validierung zum Nachweis von PCDD/F und PCB in Fischölen mittels HRGC/HRMS unter Anwendung der Good Manufacturing Practice

1. Methodenentwicklung und -erprobung

- Strategie: Entwicklung einer Methode zur Bestimmung von PCDD/F und PCB
- Ziel: Musteranalyse
- HRGC/HRMS (High-Resolution Gas Chromatography/Mass Spectrometry)

2. Aufgabenbereiche

- Validierung der Methode: Einhaltung der Lieferzüge
- Einführung der Methode in die Routineanalytik
- Qualitätsmanagement: Einhaltung der Lieferzüge
- Qualitätsmanagement: Einhaltung der Lieferzüge

3. Material und Methoden

3.1 Vorbereitung der Proben
- Fischöle (z.B. Schlesiische Sprotten)

3.2 Extraktion
- Extraktionsmittel: Dichlormethan

3.3 Ölsäure (methyl-tert-butyl-ether)

3.4 Fraktionierung in ionen austauschern

3.5 Flammenionisationsdetektor

3.6 Massenspektrometrie

3.7 Quantifizierung

4. Methode

4.1 Bestimmung der Fraktionen (PCDD/F und PCB)

4.2 Bestimmung der Konzentrationen

4.3 Bestimmung der Qualität

5. Ergebnisse

5.1 Bestimmung der Fraktionen

5.2 Bestimmung der Konzentrationen

5.3 Bestimmung der Qualität

6. Schlussfolgerung

- Die entwickelte Methode ermöglicht die effiziente und präzise Bestimmung von PCDD/F und PCB in Fischölen.

7. Literatur


8. Anhang


9. Anzeigepunkt

- Die Methode wurde im Rahmen einer interlaboratorischen Vergleichsstudie erfolgreich evaluiert.

10. Referenzen

Strategies to control the virtual food marketplace

Prof. Dr. Jan Fritsche

University of Applied Sciences Hamburg (Germany)
Food Science

2nd meeting e-commerce working group
Berlin (BVL), July 14/15 2011
Food Science Summer School 2012

Programm

**Mittwoch, 20.06.**

10:00 **Begrüßung / Moderation**
Claus Wacker, Jan Fritzsche, HAW-Hamburg

10:15 **e-commerce für Lebensmittel – eine Einführung**
Christoph Wegmann, HAW-Hamburg

11:00 **e-commerce: Holt Deutschland auf?**
Stephanie Siechert, Unilever Deutschland GmbH, Hamburg

11:45 **e-commerce in EDEKA Märkten**
Ingolf Schubert, EDEKA, Rostock

12:30 **Mittagessen**

13:30 **social commerce bei einem Lebensmittelhersteller: Der Nestlé Marktplatz**
Alexander Decker, Nestlé Deutschland AG, Frankfurt

14:15 **on-line Kauf von Schankheitsmitteln aus Verbrauchersicht**
Wolfgang Fesser, Verbraucherzentrale Rheinland-Pfalz e.V., Mainz

15:00 **Sicherer on-line Handel mit Lebensmitteln**
Thorsten Scharmach, EHI Retail Institute GmbH, Köln

15:45 **Kaffeepause**

18:00 **Abendessen**

**Donnerstag, 21.06.**

10:00 **Amtliche Lebensmittelkontrolle goes virtual**
Georg Schreiber, Bundesamt für Verbraucherschutz und Lebensmittelsicherheit (BVL), Berlin

10:45 **Entwicklung IT-basierter Suchstrategien zur Kontrolle des virtuellen Lebensmittelmarkts**
Alexandra Krewinkel, Bundesamt für Verbraucherschutz und Lebensmittelsicherheit (BVL), Berlin

11:30 **Sichere Lebensmittel im www – neue Perspektiven für die Food Science Forschung**
Jan Fritzsche, Dirk Lewandowski, Boris Tolg, HAW-Hamburg

12:15 **Mittagessen**

13:15 **Lebensmittelüberwachung 2.0**
Sigrid Löbell-Behrens, CVUA Karlsruhe

14:00 **Zusammenfassung / Ende**
Jan Fritzsche, HAW Hamburg

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**E-Commerce – Chancen und Risiken für die Lebensmittelbranche im 21. Jahrhundert**

Summer School 2012

Food Science Summer School 2012

Prof. Dr. Dirk Lewandowski
HAW (DMI)

Prof. Dr. Jan Fritsche
HAW (LS)

Prof. Dr. Boris Töle
HAW (LS)

Alexandra Krewinkel
BVL

Klarer Kurs in Richtung Zukunft!

Food Science Studierende
HAW Hamburg

Food Science (MSc)
Life Sciences
HAW Hamburg
Quality Assurance Projects

- Langnese
- Schafft (Unilever)
- Cartoflex
- Greenfox
Company training and **IFS audit guidance** (food safety assessment)
Quality Assurance Projects (2010-2012)

- Company training and **ISO 22000 audit guidance** (food safety assessment)
Quality Assurance Project (2012)

- Company training and **ISO 50001 audit guidance** (energy management)

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**Energiemanagementsysteme in der Praxis**

**DIN EN 16001: Leitfaden für Unternehmen und Organisationen**
Packaging Research @ HAW Hamburg

- Mould prevention in logistics
- Biodegradable packaging
Packaging Research @ HAW Hamburg
Mould prevention in logistics

Global cargo transport

Climatic stresses during transport

Mould avoidance strategy tool

Risk analysis
e.g. practical tests
(mold growth in logistic processes)

Risk assessment – FMEA

Risk avoidance - HACCP
(Hazard Analysis and Critical Control Points)
Verification by composting experiments

- Market analysis on biodegradable packaging
- Selection of test samples
- Conduction of composting experiments
- Evaluation of the test samples
- Evaluation of the compost quality
Full disintegration in a hot composter is possible

Garden composting does not work efficiently in a reasonable time frame.
Scientific Research Projects

- **Project OPTIFRY (Fritsche)**
  - Strategien zur oxidativen Stabilisierung von neuartigen Speiseölen während des Frittierprozesses sowie deren sensorisch-analytische Charakterisierung
  - 3 Jahre (2009-2012); Fördersumme: 69.500 EUR
  - Stifterverband für die Deutsche Wissenschaft

- **Project FOOD CONTROL 2.0 (Fritsche, Tolg, Lewandowski)**
  - Entwicklung von automatisierten Analyseverfahren zur Identifizierung und Bewertung von nicht verkehrsfähigen Produkten des virtuellen Lebensmittelmarktes
  - 3 Jahre (2013-2016); Fördersumme: 484.000 EUR
  - Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz

- ...
Publications

2013

- Relating Creamy Perception of Whey Protein Enriched Yogurt Systems to Instrumental Data by Means of Multivariate Data Analysis, *Journal of Food Science, 78, 314-319 (2013)*

2012

- Comparison of analytical and sensory lipid oxidation parameters in conventional and high-oleic rapeseed oil, *European Journal of Lipid Science and Technology 114, 1193-1203 (2012)*
Publications

2011

2010
- Sustainability as a new paradigm regarding food consumption, *British Food Journal*, 112, 476-488, 2010
- Trans octadecenoic fatty acid (TFA) isomers in German foods and bakery goods, *European Journal of Lipid Science and Technology* 112, 1363-1368 (2010)
- Content of Trans Fatty Acid Isomers (C18:1) in Bakery Products: *Lebensmittelchemie* 64, 96-96 (2010)
- Untersuchungen zur Frittiereignung von High Oleic Sonnenblumenölen: *Lebensmittelchemie* 64, 96-97 (2010)
- Sensory preferences and discrimination ability of children before and after an obesity intervention, *Int. Journal Pediatric Obesity*, 5, 116-119, 2010
- Water quality and taste sensitivity for basic tastes and metallic sensation, *Food Quality and Preference*, 21, 243-249, 2010

2009

2008

2007
- Physiological nutrition evaluation of structured lipids, Schriftenreihe Lebensmittelchemische Gesellschaft 28 (Fettsäuren - Risiken und Nutzen) 19-29 (2007)

2006

For publications (JF) prior 2002 please visit: http://www.chemie.uni-hamburg.de/lc/publikationen/Fritsche.html
Got inspired?

...for more information on **food science @ haw hamburg** please contact:

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