Sensory perception of double emulsions

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Primary ObjectiveTo investigate the sensory perception (taste and mouthfeel) of various double emulsions differing in fat reduction level and/or original oil content, in comparison to non-reformulated oil-in-water emulsions by means of two sensory...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON40632

Source
ToetsingOnline

Brief title
Sensory perception of double emulsions

Condition

- Other condition

Synonym
mouthfeel, sensory properties, taste

Health condition

geen.

Research involving
Human

Sponsors and support

Primary sponsor: Humane Voeding
Source(s) of monetary or material Support: EU FP7 Project TeRiFiQ;Grant agreeement 289397

Intervention

Keyword: Double emulsion, Fat reduction, Sensory study

Outcome measures

Primary outcome

CanYouFeelIt study: The intensity ratings of taste, mouthfeel and aftertaste of various emulsions differing in original oil content and oil reduction.

WOW! study: The chosen attributes to describe each emulsion, and consequently their intensity ratings.

Secondary outcome

CanYouFeelIt study: The performance of the participants including discriminatory power, agreement within the group and repeatability will be measured every two sensory sessions during the training phase II and the sensory evaluation phase III.

WOW! study: For classification purposes participants* age, gender, and frequency of consumption of food products similar to our test products will be recorded.

Study description

Background summary

The food industry, seen as a major contributor for providing processed foods which overconsumption is linked to an increase in obesity, aims to tackle this problem by reducing the energy density of high caloric food. Especially fat delivers high caloric value per gram of food (9kcal/g), compared to

carbohydrates and proteins (4 kcal/g).
The use of water-in-oil-in-water (w1/o/w2) double emulsions offers a potential approach for the reduction of oil content in food products (Muschiolik, 2007). In literature, it is assumed that sensory perception (fattiness, creaminess, thickness, etc.) of double emulsions is the same as of normal oil-in-water (o/w) emulsions (Jiménez-Colmenero, 2013). Two studies have been reported so far (Malone, Appelqvist, & Norton, 2003) (Lad, Hewson, & Wolf, 2012). However, their research hypotheses were different from ours and therefore their experimental setups did not match the requirements for the hypothesis we aim to test. Additionally, results about achieved fat reductions, as far as reported, are questionable, since accurate methods and appropriate stabilization mechanisms only recently developed. We can conclude that until this moment, no research has yet been published to prove that the sensory perception of fat-reduced double emulsions is comparable of that of non-reformulated full-fat emulsions.
We want to perform the present research with model emulsions that are similar to real food products by having similar oil contents to prove the principle that stable fat-reduced double emulsions are indeed able to provide the same taste and mouthfeel as full-fat emulsions.
With these two non-invasive sensory studies, we therefore aim to test the hypothesis that various double emulsions have similar sensorial properties than their full-fat counterparts. The effect of different fat reduction levels will also be explored. The results of the presented studies will therefore be a milestone in the implementation of double emulsions as potential fat replacers in several food product categories. Reducing oil content in food products while maintaining sensory perception is a challenge for the food industry, and has great potential for social and health impact.

Study objective

Primary Objective
To investigate the sensory perception (taste and mouthfeel) of various double emulsions differing in fat reduction level and/or original oil content, in comparison to non-reformulated oil-in-water emulsions by means of two sensory methods differing in the level of training of the participants and duration of the research.

Secondary Objective
To validate the recently developed sensory method RATA (rate-all-that-apply), characterized by its short duration and use of untrained panellists, on its applicability to be used for food products with very similar taste and mouthfeel properties, in comparison to the classical descriptive analysis for which a trained sensory panel is required.

Study design

Study 1:
The CanYouFeelIt study is an observational study on taste and mouthfeel of various double emulsions differing in fat reduction and original oil content, with three phases, i.e. screening, training and sensory evaluation. The study will be performed in the Axis building 118 at Wageningen University, and at the Restaurant of the Future at Wageningen University.
After the recruitment and prior to the training and sensory evaluation sessions, there will be a 2-hour screening session (Phase I) during which we will select participants based on their performance in a sensory test and group discussion.
During the training session (Phase II) participants need to commit and involve in two 60-minutes training sessions a week for approximately eight weeks (until sufficiently trained). The usual panel performance of the panellists is also discussed with the panellists and monitored throughout the training phase.
At the sensory evaluation sessions (Phase III), trained panelists also need to involve in two sessions a week for three weeks. Each session will approximately take 60 minutes. During these sessions, various double emulsions differing in fat reduction level and/or original oil content will be evaluated on their taste and mouthfeel in comparison to non-reformulated oil-in-water emulsions.

Study 2:
The WOW! study is an observational study on taste and mouthfeel of various double emulsions differing in fat reduction and original oil content, with two phases, i.e. training and sensory evaluation sessions. The study will be held in the sensory testing rooms at the Restaurant of the Future (WUR).
After the recruitment there will be a 90-minutes training session (Phase I) during which participants will be made familiar to our test products, the sensory attributes to be used in this study, and the use of a scale.
At the sensory evaluation sessions (Phase II), panelists need to involve in two sessions a week for one and a half weeks. Each session will approximately take 60 minutes. During the first two sensory evaluation sessions, various double emulsions differing in fat reduction level and/or original oil content will be evaluated on their taste and mouthfeel in comparison to non-reformulated oil-in-water emulsions by using the Rate-All-That-Apply method (RATA). During the third sensory evaluation session, samples will be evaluated in pairs on a selection of sensory attributes with regard to which of the two samples is perceived higher in these selected attributes.
Due to logistical and organizational reasons, participants will be split up in two groups (Group A and group B) depending on their availability. That means that not all participants will start on the same day with the research. The order of sessions will be the same for each participant.

Study burden and risks

The food sensory descriptive test is non-therapeutic to the participants. In addition, all test products only contain food grade ingredients, and the daily intake of emulsifier E476 per session per subject does not exceed the

acceptable daily intake for participants with a body weight of >55kg. All test products are prepared in a food grade environment, and their storage conditions will follow food safety rules, strictly complying to HACCP. We do not foresee any risks of participating in this research.
Regarding time investment, participants of the WOW! study will come, apart from the information session (30 minutes), to one training session (60 minutes) and three sensory evaluation sessions (60 minutes each). These four sessions will be held within two weeks.
Participants of the CanYouFeelIt study will come, apart from the information session (30 minutes), to 16 training sessions (60 minutes each) and six sensory evaluation sessions (60 minutes each). These 22 sessions will be held from November 2014 until February 2015 with two sessions per week, including a Christmas break.

Both studies are non-therapeutic to the participants. The risk associated with participation is negligible and compared to other studies the burden of the WOW! study can be considered low. The burden of the CanYouFeelIt study can be considered moderate, since participants have to come two times per week over 12 weeks, and have to work in a team.

Contacts

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Selecteer

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Scientific
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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- Dutch as her/his native language
- On the first test day between 18 and 65 years old
- A normal taste and smell function (elicited by the questionnaire)
- A stable weight (no weight gain/loss of more than 5 kg in the past two months)
- Used to oil-containing liquid food products (for example salad dressings, mayonnaise, milk, crème soup, vla, or oil products)
- Having a good general health (elicited by the questionnaire)
- Willing to taste test products with ingredients sourced from animals, such as gelatine and whey protein
- For CanYouFeelIt study (expert panel) only: Passing the different sensory tests during the screening session

Exclusion criteria

- Not meeting all inclusion criteria
- Reported to have difficulties in chewing or swallowing
- Body weight < 55kg
- Smoking (> 2 units per week and those stopped smoking <3 months ago)
- Use of medication that might affect the taste perception. This will be checked in the inclusion questionnaire by asking if any (and if yes, which) medication is regularly taken.
- Not being able or willing to consume gelatine and whey protein, unless the person voluntarily wants to make an exception for the duration of the study.
- Wheat allergy
- Currently being pregnant, breastfeeding or having the intention of getting pregnant
- For WOW! (consumer panel) study: Participation in the CanYouFeelit study

Study design

Design

Study type: Observational non invasive
Masking: Open (masking not used)

Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	17-11-2014
Enrollment:	120
Type:	Actual

Ethics review

Approved WMO

Date:	10-11-2014
Application type:	First submission
Review commission:	METC Wageningen Universiteit (Wageningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL50244.081.14