In silico modelling of permeation enhancement potency in Caco-2 monolayers based on molecular descriptors and random forest

Structural traits of permeation enhancers are important determinants of their capacity to promote enhanced drug absorption. Therefore, in order to obtain a better understanding of structure–activity relationships for permeation enhancers, a Quantitative Structural Activity Relationship (QSAR) model has been developed. The random forest-QSAR model was based upon Caco-2 data for 41 surfactant-like permeation enhancers from Whitehead et al. (2008) and molecular descriptors calculated from their structure. The QSAR model was validated by two test-sets: (i) an eleven compound experimental set with Caco-2 data and (ii) nine compounds with Caco-2 data from literature. Feature contributions, a recently developed diagnostic tool, was applied to elucidate the contribution of individual molecular descriptors to the predicted potency. Feature contributions provided easy interpretable suggestions of important structural properties for potent permeation enhancers such as segregation of hydrophilic and lipophilic domains. Focusing on surfactant-like properties, it is possible to model the potency of the complex pharmaceutical excipients, permeation enhancers. For the first time, a QSAR model has been developed for permeation enhancement. The model is a valuable in silico approach for both screening of new permeation enhancers and physicochemical optimisation of surfactant enhancer systems.
Effect of sweetener on release of flavour compounds from chewing gum

General information
State: Published
Organisations: National Institute of Aquatic Resources, Department of Biotechnology
Authors: Haahr, A. (Intern), Pilsgaard, C. (Ekstern), Stahnke, L. H. (Intern), Bredie, W. (Ekstern), Refsgaard, H. (Intern)
Number of pages: 780
Pages: 224-228
Publication date: 2003

Host publication information
Title of host publication: Flavour Research at the Dawn of the Twenty-first Century, Proceedings of the 10th Weurman Flavour Research Symposium, Dijon, 2002
Place of publication: London
Publisher: Intercept
Main Research Area: Technical/natural sciences
Conference: Flavour Research at the Dawn of the Twenty-first Century, 10th Weurman Flavour Research Symposium, Dijon, 01/01/2002
Source: orbit
Source-ID: 229262
Flavor release measurement by atmospheric pressure chemical ionization ion trap mass spectrometry, construction of interface and mathematical modeling of release profiles

An instrumental on-line retronasal flavor analysis was developed to obtain information about the release of flavor compounds in expired air from humans during eating. The volatile flavor compounds were measured by ion trap mass spectrometry with an atmospheric pressure chemical ionization source (APCI). An interface was designed to sample the breath directly from the nose. The repeat-ability in vitro for seven different flavor compounds came out with relative standard derivation less than 10% in most cases, which is acceptable. In vitro quantification was carried out by a determination of the concentration in the gas phase over a flavor solution by GC/MS, followed by measurements of intensities by the APCI ion trap. Ion suppression by acetone in the breath was negligible at concentration levels relevant in these experiments. The instrumental limits of detection for menthone and menthol coincide with that of the flavor detection threshold. An application study on the release of menthone and menthol from chewing gum by a group of six test persons was performed. Flavored chewing gum was used as a model matrix because of the long chewing periods and the simplicity of the system. It is concluded that the interface and the method can be used to measure breath from the nose. A mathematical model of the data was developed to give a quantitative method for description and characterization of the release of flavor compounds. The release profiles consisted of two sequences, one for a chewing period, and one for a phasing out process. The proposed method for modeling provided a reasonable description of the release process. In addition to flavor compounds, this new interface and mathematical application could provide information on chemicals in the human breath which could be interesting, for example, within medical diagnosis.

General information
State: Published
Organisations: Department of Systems Biology, Enzyme and Protein Chemistry, National Institute of Aquatic Resources, Department of Informatics and Mathematical Modeling, Center for Microbial Biotechnology, Food Biotechnology and Engineering Group
Authors: Haahr, A. (Intern), Madsen, H. (Intern), Smedsgaard, J. (Intern), Bredie, W. (Ekstern), Stahnke, L. H. (Intern), Refsgaard, H. (Intern)
Pages: 655-662
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Analytical Chemistry
Volume: 75
Issue number: 3
ISSN (Print): 0003-2700
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2016): CiteScore 6.08
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 5.79
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 6.01
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 5.8
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 5.86
Flavour release of aldehydes and diacetyl in oil/water systems

The concentration- and time-dependent release of three C-6-aldehydes, six C-9-aldehydes and diacetyl was studied in model systems. The systems were water, rapeseed oil and oil-in-water emulsions. Dynamic headspace sampling was used to collect the volatile compounds. In the concentration-dependent release experiment, the C-6-aldehydes were released in equal proportions from the aqueous and the emulsion systems, but in lower amounts from the pure oil. The amounts of C-9-aldehydes released decreased with increasing oil content. All aldehydes were released more rapidly from the aqueous system than from the pure oil. The release over time for diacetyl and (E,E)-2,4-hexadienal showed a linear relationship in all systems. The other compounds followed an exponential relationship between the time and the fraction released in the aqueous systems. It was demonstrated that the release of the volatile compounds was dependent on the chain length, the degree of unsaturation as well as the characteristics of the model system. (C) 2000 Elsevier Science Ltd. All rights reserved.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Department of Biotechnology
Authors: Haahr, A. (Intern), Bredie, W. L. P. (Ekstern), Stahnke, L. H. (Intern), Jensen, B. (Ekstern), Refsgaard, H. (Intern)
Pages: 355-362
Publication date: 2000
Conference: Meeting on Interaction of Food Matrix with Small Ligands Influencing Flavor and Texture, Udine, Italy, 23/06/1999 - 23/06/1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Food Chemistry
Volume: 71
Issue number: 3
ISSN (Print): 0308-8146
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.85 SJR 1.706 SNIP 2.091
Web of Science (2016): Indexed yes
Free polyunsaturated fatty acids cause taste deterioration of salmon during frozen storage

Increased intensity of train oil taste, bitterness, and metal taste are the most pronounced sensory changes during frozen storage of salmon (Refsgaard, H. H. F.; Brockhoff, P. B.; Jensen, B. Sensory and Chemical Changes in Farmed Atlantic Salmon (Salmo salar) during Frozen Storage. J. Agric. Food Chem. 1998a, 46, 3473-3479). Addition of each of the unsaturated fatty acids: palmitoleic acid (16:1, n - 7), linoleic acid (C18:2, it - 6), eicosapentaenoic acid (EPA; C20:5, it - 3) and docosahexaenoic acid (DHA; C22:6, n - 3) to fresh minced salmon changed the sensory perception and increased
the intensity of train oil taste, bitterness, and metal taste. The added level of each fatty acid (similar to 1 mg/g salmon meat) was equivalent to the concentration of the fatty acids determined in salmon stored as fillet at -10 degrees C for 6 months. The effect of addition of the fatty acids on the intensity of train oil taste, bitterness and metal taste was in the order: DHA > palmitoleic acid > linoleic acid > EPA. Formation of free fatty acids was inhibited by cooking the salmon meat before storage. Furthermore, no changes in phospholipid level were observed during frozen storage. The results suggest that enzymatic hydrolysis of neutral lipids plays a major role in the sensory deterioration of salmon during frozen storage.

General information
State: Published
Organisations: Department of Biotechnology, National Institute of Aquatic Resources
Authors: Refsgaard, H. (Intern), Brockhoff, P. (Ekstern), Jensen, B. (Intern)
Pages: 3280-3285
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 48
Issue number: 8
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.423 SNIP 1.479 CiteScore 3.44
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.43 SNIP 1.471 CiteScore 3.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.384 SNIP 1.446 CiteScore 3.1
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.408 SNIP 1.392
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.317 SNIP 1.303
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.361 SNIP 1.324
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.249 SNIP 1.439
The ability of unsaturated fatty acid methyl esters to modify amino acid residues in bovine serum albumin (BSA), glutamine synthetase, and insulin in the presence of a metal-catalyzed oxidation system [ascorbate/Fe(III)/O-2] depends on the degree of unsaturation of the fatty acid. The fatty acid-dependent generation of carbonyl groups and loss of lysine residues increased in the order methyl linoleate < methyl linolenate < methyl arachidonate. The amounts of alkyl hydroperoxides, malondialdehyde, and a number of other aldehydes that accumulated when polyunsaturated fatty acids were oxidized in the presence of BSA were significantly lower than that observed in the absence of BSA. Direct treatment of proteins with various lipid hydroperoxides led to a slight increase in the formation of protein carbonyl derivatives, whereas treatment with the hydroperoxides together with Fe(II) led to a substantial increase in the formation of protein carbonyls. These results are consistent with the proposition that metal-catalyzed oxidation of polyunsaturated fatty acids can contribute to the generation of protein carbonyls by direct interaction of lipid oxidation products (alpha,beta-unsaturated aldehydes) with lysine residues (Michael addition reactions) and also by interactions with alkoxyl radicals obtained by Fe(II) cleavage of lipid hydroperoxides that are formed. In addition, saturated aldehydes derived from the polyunsaturated fatty acids likely react with lysine residues to form Schiff base adducts.
Flavour release of aldehydes and diacetyl in oil/water systems

General information
State: Published
Organisations: Department of Biotechnology, National Institute of Aquatic Resources, Royal Veterinary and Agricultural University
Authors: Haahr, A. (Intern), Bredie, W. L. (Ekstern), Stahnke, L. H. (Intern), Jensen, B. (Intern), Refsgaard, H. (Intern)
Publication date: 1999

Host publication information
Title of host publication: Proceedings of the Food and flavour COST 96 Symposium
Main Research Area: Technical/natural sciences
Conference: Food and flavour COST 96 Symposium, Udine, 01/01/1999
Source: orbit
Source-ID: 174863
Publication: Research › Article in proceedings – Annual report year: 1999

Isolation and quantification of volatiles in fish by dynamic headspace sampling and mass spectrometry
A dynamic headspace sampling method for isolation of volatiles in fish has been developed. The sample preparation involved freezing of fish tissue in liquid nitrogen, pulverizing the tissue, and sampling of volatiles from an aqueous slurry of the fish powder. Similar volatile patterns were determined by use of this sample preparation method and for samples chewed for 10 s. Effects of sampling time, temperature, and purge flow on level of volatiles were tested. Purging at 340 mL/min for 30 min at 45 degrees C was found to be optimal. Detection Emits for a number of aldehydes were 0.2-2.7 µg/kg. Levels of volatiles are given for fresh salmon, cod, saithe, mackerel, and redfish

General information
State: Published
Organisations: Department of Biotechnology, National Institute of Aquatic Resources
Authors: Refsgaard, H. (Intern), Haahr, A. (Intern), Jensen, B. (Intern)
Pages: 1114-1118
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 47
Issue number: 3
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Biological variation of lipid constituents and distribution of tocopherols and astaxanthin in farmed Atlantic salmon (Salmo salar)

The contents of fat, astaxanthin, and tocopherols and the fatty acid composition of a homogeneous group of 145 farmed Atlantic salmon (Salmo salar) were determined. The analytical variation of the data was statistically-separated from the biological variation. The fat content in the muscle near the head was 15.0% with a biological standard deviation of 3.0%. The astaxanthin concentration was 5.5 mg/kg of muscle with a biological standard deviation of 1.1 mg/kg of muscle, and the canthaxanthin concentration was 200 μg/kg of muscle with a standard deviation of 47 μg/kg of muscle. The concentrations of alpha-, gamma-, and delta-tocopherols were approximately 32, 2.9, and 0.4 mg/kg of muscle, respectively, and the biological standard deviations were 4.5, 0.4, and 0.07 mg/kg (14, 14, and 20%), respectively. In another group of five salmon the distributions throughout the fillet were determined, longitudinally as well as transversally. The distribution of fat, astaxanthin, and tocopherols varied throughout the salmon. The fatty acid composition varied little between extracts from different locations of the fillet.
**Headspace and extraction methods for analysis of volatile and semivolatile compounds in fish: Chemical and sensory assessment of lipid-derived volatiles**

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Department of Biotechnology
Authors: Jensen, B. (Intern), Refsgaard, H. (Intern), Olafsdottir, G. (Ekstern)
Pages: 70-91
Publication date: 1998

**Host publication information**
Title of host publication: Methods to Determine the Freshness of Fish in Research and Industry
Place of publication: Paris
Publisher: IIR
Main Research Area: Technical/natural sciences

**Bibliographical note**
Proceedings of the Final Meeting of the Concerted Action "Evaluation of Fish Freshness" AIR3CT94 2283, Nantes Conference, November 12-14, 1997

**Sensory and chemical changes in farmed Atlantic salmon (Salmo salar) during frozen storage**
Farmed Atlantic salmon (Salmo salar) were stored as fillets at -10 and -20 degrees C and whole at -30 degrees C. The most pronounced sensory changes were first recognized by the assessors, when the salmon samples were in the oral cavity, and were significant increases in train oil taste, metal taste, and bitter taste in the fillets. This was shown by mixed model analysis of variance and canonical variates analysis. Volatile lipid peroxidation products such as aldehydes and ketones were identified and quantified in the salmon. For most of the peroxidation products the concentration increased during storage. The content of lipid hydroperoxides and free fatty acids also increased during storage, and the changes were fastest in salmon stored at -10 degrees C. A decrease in highly unsaturated fatty acids was observed in salmon stored at -10 and -20 degrees C. Peroxide values and the content of free fatty acids were shown by a partial least-squares analysis to be the best of the instrumental data in describing the sensory changes.

**General information**
State: Published
Organisations: Department of Systems Biology, National Institute of Aquatic Resources
Authors: Refsgaard, H. (Intern), Brockhoff, P. (Ekstern), Jensen, B. (Intern)
Pages: 3473-3479
Publication date: 1998
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Journal of Agricultural and Food Chemistry
Volume: 46
Issue number: 9
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.291 SNIP 1.344
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.236 SNIP 1.253 CiteScore 3.23
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.278 SNIP 1.421 CiteScore 3.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.423 SNIP 1.479 CiteScore 3.44
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.43 SNIP 1.471 CiteScore 3.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.384 SNIP 1.446 CiteScore 3.1
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.408 SNIP 1.392
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.317 SNIP 1.303
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.361 SNIP 1.324
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.249 SNIP 1.439
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.358 SNIP 1.418
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.286 SNIP 1.521
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.316 SNIP 1.496
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.158 SNIP 1.479
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.236 SNIP 1.537
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.066 SNIP 1.255
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.091 SNIP 1.312
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.859 SNIP 1.256
Original language: English
DOIs:
Sensory and chemical changes of salmon during frozen storage

General information
State: Published
Organisations: Department of Biotechnology, National Institute of Aquatic Resources
Authors: Refsgaard, H. (Intern), Brockhoff, P. (Ekstern), Jensen, B. (Ekstern)
Pages: 344-347
Publication date: 1996

Host publication information
Title of host publication: Flavour Science. Recent Developments
Place of publication: Cambridge, UK
Publisher: Royal Society of Chemistry
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 167570
Publication: Research - peer-review › Article in proceedings – Annual report year: 1996

Inactivation of Copper, Zinc Superoxide Dismutase from Saccharomyces Cerevisiae in Lipid Food Model Systems

General information
State: Published
Organisations: Department of Systems Biology, Center for BioProcess Engineering, Department of Chemical and Biochemical Engineering, Food Production Engineering
Authors: Refsgaard, H. (Intern), Meyer, A. B. S. (Intern), Adler-Nissen, J. (Intern)
Pages: 564-568
Publication date: 1992
Main Research Area: Technical/natural sciences

Publication information
Journal: Lebensmittel-Wissenschaft und Technologie
Volume: 25
ISSN (Print): 0023-6438
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.31
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.11
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.12
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 3.11
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.12
ISI indexed (2012): ISI indexed yes
Tilskud af selen og vitamin E til ungtyre

General information
State: Published
Organisations: Department of Biotechnology, Risø National Laboratory for Sustainable Energy
Authors: Andersen, A. J. (Ekstern), Refsgaard, H. (Intern), Bech Andersen, B. (Ekstern), Hansen, K. (Ekstern), Sørensen, S. E. (Ekstern), Nielsen, G. G. (Intern), Thode Jensen, P. (Ekstern), Wolstrup, C. (Ekstern)
Pages: 1-4
Publication date: 1983
Main Research Area: Technical/natural sciences

Publication information
Journal: Statens Husdyrbrugsforsøg
Volume: 520
Original language: English
Source: orbit
Source-ID: 282729
Publication: Research › Journal article – Annual report year: 1983

Projects:

Characterization of absorption enhancers for orally administered therapeutic peptides in tablet formulations - applying statistical learning
Technical University of Denmark
Period: 01/05/2013 → 30/09/2016
Number of participants: 9
Phd Student:
Welling, Søren Havelund (Intern)
Supervisor:
Buckley, Stephen T. (Ekstern)
Clemmensen, Line Katrine Harder (Intern)
Hovgaard, Lars (Ekstern)
Refsgaard, Hanne (Intern)
Main Supervisor:
Brockhoff, Per B. (Intern)
Examiner:
Kulahci, Murat (Intern)
Arvastson, Lars Johan (Intern)
Genuer, Robin (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU

Relations
Publications:
Characterization of absorption enhancers for orally administered therapeutic peptides in tablet formulations - Applying statistical learning
Project: PhD

In silico ADME classification of chemical (NCE) and biological (NBE) drug candidates

Department of Informatics and Mathematical Modeling
Period: 01/02/2005 → 07/09/2006
Number of participants: 6
Phd Student:
Hagen, Berith Fredsted (Intern)
Supervisor:
Refsgaard, Hanne (Intern)
Main Supervisor:
Brockhoff, Per B. (Intern)
Examiner:
Larsen, Rasmus Werner (Intern)
Jørgensen, Flemming Steen (Ekstern)
Næs, Tormod (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: ErhvervsPhD-ordningen VTU
Project: PhD

Antioxidative defence
Oxidative defense, mandatory for protection of human health and for maintaining safety and freshness of foods, will be investigated in dietary invention studies in humans. Early stages of oxidation involving protein damage and formation of long-lived protein radicals will be characterized in fish and pig muscle systems which will allow detection of radical damage in tissues in more details than in humans.

Department of Biotechnology
National Institute of Aquatic Resources
Department of Systems Biology
Royal Veterinary and Agricultural University
VFD
Aarhus University
Period: 01/05/1999 → 30/04/2001
Number of participants: 6
Project participant:
Jensen, Benny (Intern)
Leif Skibsted (Ekstern)
Bittmarie Sandstrom (Ekstern)
Dragsted, Lars O (Ekstern)
Andersen, Henrik (Ekstern)
Project Manager, organisational:
Refsgaard, Hanne (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Retronasal flavour measurement and perception of foods
The aim of this project is to explore and understand factors of importance for flavour release and flavour perception and the relations between flavour release and perception. A thorough understanding of this relationship is essential, in order to develop better methods for collecting and analysing flavour for routine measurements of food quality and in order to develop instrumentation—an artificial mouth—for simulating flavour release.

Department of Biotechnology
Department of Systems Biology
Royal Veterinary and Agricultural University
Period: 01/02/1999 → 01/02/2002
Number of participants: 4
Project participant:
Haahr, Anne-Mette (Intern)
Stahnke, Louise Heller (Intern)
Bredie, Wender (Ekstern)
Project Manager, organisational:
Refsgaard, Hanne (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 6,000,000.00 Danish Kroner
Project

Studies of low volatility oxidation products of sensory significance
The aim is to establish the identity and sensory significance of low volatility oxidation products in lipid-rich foods. Methods for isolation of compounds of low volatility are under development. High-vacuum distillation and supercritical extraction (SFE) have been tested for the ability to isolate lipid-derived oxidation products. Method development using SFE will be continued. Fractionation of fish muscle has been carried out by centrifugation and by HPLC of extracts. Method development along these lines is also continuing. Studies of protein oxidation in the presence of lipids are the focus in a collaboration project with Dr. Earl Stadtman at NIH (Bethesda, MD,USA).

National Institute of Aquatic Resources
Department of Biotechnology
Department of Systems Biology
Period: 01/01/1998 → 31/12/2000
Number of participants: 3
Project participant:
Refsgaard, Hanne (Intern)
Holmberg, Inge (Intern)
Project Manager, organisational:
Jensen, Benny (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 2,000,000.00 Danish Kroner
Project