Changes in volatile compounds from sliced Havarti cheese during storage analyzed by dynamic headspace GC/MS

Sliced Havarti cheese in retail packages with modified atmosphere were stored at 5 degreesC for up to 21 days exposed to light or protected against light. The changes in the volatile profile of the cheese was determined by dynamic headspace GC/MS. Fifty-seven compounds (aldehydes, alcohols, ketones, esters, lactones, and hydrocarbons) were identified and their relative abundance was followed during storage. The complete data set of volatiles of all Havarti cheeses was subjected to partial least squares regression (PLSR) analyses. During storage an increase in the content of some of the volatiles was observed. For Havarti cheeses exposed to light increasing levels of octane, 1-pentanol, nonanal, and tridecane were observed.
The purpose of this work was to study the impact of storage conditions, such as light and temperature, on the development of volatile compounds in processed cheese. Cheese in glass containers was stored at 5, 20 or 37 degreesC in light or darkness for up to 1 yr. Dynamic headspace and gas chromatography/mass spectrometry were used for quantifying 28 volatile organic compounds at eight stages during the storage period. Through principal component analysis, three important storage parameters could be identified. Principal components 1, 2 and 3 reflected storage time, conditions of light/darkness and storage temperature, respectively, and described 81, 8 and 4% of the total variance. All compound developments were shown to correlate positively with storage time. Storage in light resulted in a sharp rise not only in the concentration of especially octane, but also hexanal, heptanal, octanal and nonanal, compared to storage in the darkness. Rising temperature especially increased the concentrations of 2-propyl-1-pentanol, 2-hexanone, 2-octanone, 2-decanone, 2-tridecanone, octanal, nonanal and decanal.

### General information

State: Published
Organisations: Food Biotechnology and Engineering Group, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Sunesen, L. O. (Intern), Lund, P. (Intern), Sørensen, J. (Ekstern), Hølmer, G. K. (Intern)
Pages: 128-134
Publication date: 2002
Main Research Area: Technical/natural sciences

### Publication information

Journal: Lebensmittel-Wissenschaft Und-Technologie-Food Science and Technology
Volume: 35
Issue number: 2
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
Effect of 6 dietary fatty acids on the postprandial lipid profile, plasma fatty acids, lipoprotein lipase, and cholesterol ester transfer activities in healthy young men

Background: There is increasing evidence that postprandial triacylglycerol-rich lipoproteins may be related to atherogenic risk. Objective: The objective was to investigate the effect of individual fatty acid intakes on postprandial plasma lipoprotein triacylglycerol and cholesterol concentrations, plasma fatty acids, and preheparin lipoprotein lipase and cholesterol ester transfer protein (CETP) activities. Design: Six test fats high (approximate to 43% by wt) in stearic acid, palmitic acid, palmitic + myristic acid, oleic acid, elaidic acid (trans 18:1), and linoleic acid were produced by interesterification. After having fasted for 12 h, 16 healthy young men were served the individual test fats incorporated into meals (1 g fat/kg body wt) in random order on different days separated by washout periods. Blood samples were drawn before and 2, 4, 6, and 8 h after the meals. Results: Different responses to the test-fat meals were observed for plasma lipoprotein triacylglycerol and cholesterol concentrations, plasma fatty acid concentrations, and lipoprotein lipase and CETP activities (diet x time interaction: 0.001 <P <0.05). Intake of the long-chain saturated fatty acids stearic and palmitic acids resulted in a relatively lower lipemic response than did intake of the unsaturated fatty acids, probably because the saturated fatty acids were absorbed less and at a lower rate; therefore, the lipemic response took longer to return to postabsorptive values. Conclusions: Fatty acid chain length and degree of saturation appear to affect the extent and duration of lipemia and affect hepatic output indirectly. These effects may not be mediated via effects on lipoprotein lipase and CETP activities.

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Tholstrup, T. (Ekstern), Sandstrom, B. (Ekstern), Bysted, A. (Intern), Holmer, G. K. (Intern)
Pages: 198-208
Publication date: Feb 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: American Journal of Clinical Nutrition
Volume: 73
Issue number: 2
ISSN (Print): 0002-9165
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
Characterization of volatiles from cultured dairy spreads during storage by dynamic headspace GC/MS

The effect of storage time and storage temperature on the formation of volatile compounds in dairy spreads was investigated. Dairy spreads were stored for 10 weeks at -18, 5 and 20 degreesC, respectively, and analyzed after 0, 38,
54 and 67 days of storage. By means of a dynamic headspace GC/MS method using Tenax traps the dairy spreads were analyzed for volatile aromatic compounds. 61 components were identified and their relative content was followed during the storage period. Among these were four alcohols, 17 aldehydes, four esters, ten alkanes, 11 ketones and six lactones. A general increase in the concentration of most of the volatile compounds during storage was found. The content of volatile compounds in dairy spreads stored at -18 OC was nearly constant or showed a rather low increase in the content during the storage period. Storage at higher temperatures (5 and 20 degreesC) resulted in an increase in the content of most of the volatiles after 40 days of storage. The profiles obtained were subjected to multivariate data analysis to determine the volatiles potentially responsible for oxidized off-flavors in dairy spread. The volatiles were divided into three groups: one correlated with storage temperature and 5 OC, one with storage time and 20 degreesC and the last with storage time alone. Most of the volatiles were found in the highest concentration after storage at 20 OC, but the content of some volatiles was highest after storage at 5 degreesC.

**General information**

State: Published  
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology  
Authors: Lund, P. (Intern), Hølmer, G. K. (Intern)  
Pages: 636-642  
Publication date: 2001  
Main Research Area: Technical/natural sciences

**Publication information**

Journal: European Food Research and Technology  
Volume: 212  
Issue number: 6  
ISSN (Print): 1438-2377  
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  
Web of Science (2016): Indexed yes  
BFI (2015): BFI-level 1  
Scopus rating (2015): SJR 0.732 SNIP 0.822 CiteScore 1.55  
BFI (2014): BFI-level 1  
Scopus rating (2014): SJR 0.828 SNIP 0.908 CiteScore 1.71  
BFI (2013): BFI-level 1  
Scopus rating (2013): SJR 0.791 SNIP 0.901 CiteScore 1.71  
ISI indexed (2013): ISI indexed yes  
BFI (2012): BFI-level 1  
Scopus rating (2012): SJR 0.872 SNIP 1.038 CiteScore 1.68  
ISI indexed (2012): ISI indexed yes  
Web of Science (2012): Indexed yes  
BFI (2011): BFI-level 1  
Scopus rating (2011): SJR 1.009 SNIP 1.097 CiteScore 1.87  
ISI indexed (2011): ISI indexed yes  
Web of Science (2011): Indexed yes  
BFI (2010): BFI-level 1  
Scopus rating (2010): SJR 0.931 SNIP 0.901  
Web of Science (2010): Indexed yes  
BFI (2009): BFI-level 1  
Scopus rating (2009): SJR 0.917 SNIP 0.845  
Web of Science (2009): Indexed yes  
BFI (2008): BFI-level 1  
Scopus rating (2008): SJR 0.852 SNIP 0.849  
Web of Science (2008): Indexed yes  
Scopus rating (2007): SJR 0.707 SNIP 0.842
Effect of randomization of mixtures of butter oil and vegetable oil on absorption and lipid metabolism in rats

Background The nutritional effect of the regiospecific distribution of fatty acids in edible fats is currently discussed due to an increased use of interesterification of fats for human consumption. However, disagreeing results have been reported which may be due to the varying composition of the dietary fats compared. Data on the fate of such lipids beyond the bloodstream is rather scarce and animal model studies are needed. Aim of the study To compare the metabolism of butter oil and mixtures of butter and rapeseed oil, native or randomized, in a model. The regiospecific fatty acid distribution present in dietary fats was followed through absorption, chylomicron formation, and deposition in adipose tissue and in different liver lipids (triacylglycerols, phospholipids, and cholesterol esters). Methods Rats were fed for 6 weeks from weaning either butter oil (BO), a butteroil- rapeseed oil mixture 65:35 w/w (BR) or a randomized mixture of BR (tBR). Half of the animals were used for organ analysis, the rest for a postprandial study with the same fats and isolation of chylomicrons. The regiospecific distribution of the fatty acids present in the dietary fats was followed during metabolism by analyses of chylomicrons, depot fat and liver lipids, using regiospecific cleavage followed by TLC separation and quantification by GC. Results Randomization of edible fat mixtures leading to equal distribution of fatty acids between TG positions is directly reflected in the composition of chylomicrons. During clearing by lipoprotein lipase this positional distribution is abolished and the regiospecific composition of triacylglycerols in adipose tissue is completely identical for BR and tBR. Chylomicron remnants, which are taken up by the liver, are correspondingly fully degraded to free fatty acids by hepatic lipase, and distribution of fatty acids in liver triacylglycerols, phospholipids and cholesterol esters are identical for the groups fed either BR or tBR. The group fed BO with a low content of linoleic acid is on the borderline of essential fatty acid-deficiency. Conclusion Randomization (interesterification) of butter oil with rapeseed oil (65:35 w/w) for use as edible fat did not have any impact on the fatty acid composition beyond the chylomicron step when compared to the native mixture.

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Becker, C. (Ekstern), Lund, P. (Intern), Hølmer, G. K. (Intern)
Pages: 1-9
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Nutrition
Volume: 40
Issue number: 1
ISSN (Print): 1436-6207
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Lack of effect of fish oil supplementation on coagulation and transcapillary escape rate of albumin in insulin-dependent diabetic patients with diabetic nephropathy

Objective: We studied the effect of a diet supplementation with fish oil in insulin-dependent diabetic patients with nephropathy in order to evaluate whether abnormal transcapillary escape rate of albumin and procoagulant activity in these patients could be modified. Methods: A double-blind, randomized, controlled study was carried out at a tertiary referral centre. The subjects were 29 insulin-dependent diabetic patients with nephropathy. One year of fish oil supplementation (4.6 g n-3 fatty acids/day) was compared with placebo (olive oil). The main outcome measures were N-3 fatty acid proportions of platelet lipids, transcapillary escape rate of albumin, prothrombin fragment 1+2, thrombin-antithrombin complexes, markers of fibrinolysis, fibrinogen, factor VII antigen and activity, thrombomodulin, von Willebrand factor, platelet factor 4 and beta-thromboglobulin. These were measured every 6 months. Results: Neither transcapillary escape rate of albumin (7.4 (median) (5.0-9.8) (range) % vs. 7.0 (4.6-10.6) %) nor prothrombin fragment 1+2 (0.97 (0.72-2.40)nmol/L vs. 1.01 (0.59-3.11)nmol/L) changed after 12 months of fish oil supplementation. Conclusion: Increased
transcapillary escape rate of albumin and activity could not be modified during diet supplementation with fish oil in insulin-dependent diabetic patients with nephropathy.

**General information**

State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Myrup, B. (Ekstern), Rossing, P. (Ekstern), Jensen, T. (Ekstern), Parving, H. (Ekstern), Hølmer, G. K. (Intern), Gram, J. (Ekstern), Kluft, C. (Ekstern), Jespersen, J. (Ekstern)
Pages: 349-356
Publication date: 2001
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Scandinavian Journal of Clinical & Laboratory Investigation
Volume: 61
Issue number: 5
ISSN (Print): 0036-5513

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): SJR 0.584 SNIP 0.69 CiteScore 1.4
- BFI (2015): BFI-level 1
- Scopus rating (2015): SJR 0.729 SNIP 0.741 CiteScore 1.79
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 1
- Scopus rating (2014): SJR 0.746 SNIP 0.897 CiteScore 1.9
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 1
- Scopus rating (2013): SJR 0.632 SNIP 0.676 CiteScore 1.84
- ISI indexed (2013): ISI indexed yes
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): SJR 0.482 SNIP 0.67 CiteScore 1.43
- ISI indexed (2012): ISI indexed yes
- BFI (2011): BFI-level 1
- Scopus rating (2011): SJR 0.545 SNIP 0.769 CiteScore 1.54
- ISI indexed (2011): ISI indexed yes
- Web of Science (2011): Indexed yes
- BFI (2010): BFI-level 1
- Scopus rating (2010): SJR 0.54 SNIP 0.703
- BFI (2009): BFI-level 1
- Scopus rating (2009): SJR 0.453 SNIP 0.607
- Web of Science (2009): Indexed yes
- BFI (2008): BFI-level 1
- Scopus rating (2008): SJR 0.487 SNIP 0.588
- Web of Science (2008): Indexed yes
- Scopus rating (2007): SJR 0.49 SNIP 0.598
- Scopus rating (2006): SJR 0.49 SNIP 0.622
- Scopus rating (2005): SJR 0.416 SNIP 0.636
- Scopus rating (2004): SJR 0.415 SNIP 0.672
- Scopus rating (2003): SJR 0.486 SNIP 0.66
- Scopus rating (2002): SJR 0.43 SNIP 0.704
- Scopus rating (2001): SJR 0.456 SNIP 0.721
- Web of Science (2001): Indexed yes
Lipid oxidation in fish oil enriched mayonnaise: Calcium disodium ethylenediaminetetraacetate, but not gallic acid, strongly inhibited oxidative deterioration

The antioxidative effects of gallic acid, EDTA, and extra emulsifier Panodan DATEM TR in mayonnaise enriched with 16% fish oil were investigated. EDTA reduced the formation of free radicals, lipid hydroperoxides, volatiles, and fishy and rancid off-flavors. The antioxidative effect of EDTA was attributed to its ability to chelate free metal ions and iron from egg yolk located at the oil-water interface. Gallic acid reduced the levels of both free radicals and lipid hydroperoxides but promoted slightly the oxidative flavor deterioration in mayonnaise and influenced the profile of volatiles. Gallic acid may therefore promote the decomposition of lipid hydroperoxides to volatile oxidation products. Addition of extra emulsifier reduced the lipid hydroperoxide levels but did not influence the level of free radicals or the oxidative flavor deterioration in mayonnaise; however, it appeared to alter the profile of volatiles. The effect of the emulsifier on the physical structure and rheological properties depended on the presence of antioxidants.
Lipophilic antioxidants and polyunsaturated fatty acids in lipoprotein classes: distribution and interaction

General information
State: Published
Organisations: Department of Systems Biology
Authors: Sunesen, V. (Ekstern), Weber, C. (Intern), Hølmer, G. K. (Intern)
Pages: 115-123
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Clinical Nutrition
Volume: 55
Issue number: 2
ISSN (Print): 0954-3007
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
Oxidation in fish oil-enriched mayonnaise 4 : Effect of tocopherol concentration on oxidative deterioration
Regiospecific analysis of neutral ether lipids by liquid chromatography/electrospray ionization/single quadrupole mass spectrometry: validation with synthetic compounds

A reversed-phase high-performance liquid chromatography (HPLC) method with on-line electrospray ionization/collision-induced dissociation/mass spectrometry (ESI/CID/MS) is presented for the regiospecific analysis of synthetic reference compounds of neutral ether lipids. The reference compounds were characterized by chromatographic retention times, full mass spectra, and fragmentation patterns as an aid to clarify the regiospecificity of ether lipids from natural sources. The results clearly show that single quadrupole mass spectrometric analysis may elucidate the regiospecific structure of neutral ether lipids. Ether lipid reference compounds were characterized by five to six major ions in the positive ion mode. The 1-O-alkyl-sn-glycerols were analyzed as the diacetoyl derivative, and showed the [M - acetoyl](+) ion as an important diagnostic ion. The diagnostic ions of directly analyzed 1-O-alkyl-2-acyl-sn-glycerols and 1-O-alkyl-3-acyl-sn-glycerols were the [M - alkyl](+), [M + H - H2O](+) and [M + H](+) ions. Regiospecific characterization of the fatty acid position was evident from the relative ion intensities, as the sn-2 species had relatively high [M + H](+) ion intensities compared with [M + H - H2O](+), whereas the reverse situation characterized the sn-3 species. Furthermore, corresponding sn-2 and sn-3 species were separated by the chromatographic system. However, loss of water was promoted as fatty acid unsaturation was raised, which may complicate interpretation of the mass spectra. The diagnostic ions of directly analyzed 1-O-alkyl-2,3-diacyl-sn-glycerols were the [M - alkyl](+), [M - sn-2-acyl](+) and [M - sn-3-acyl](+) ions. Regiospecific characterization of the fatty acid identity and position was evident from the relative ion intensities, as fragmentation of the sn-2 fatty acids was preferred to the sn-3 fatty acids; however, loss of fatty acids was also promoted by higher degrees of unsaturation. Therefore, both structural and positional effects of the fatty acids affect the spectra of the neutral ether lipids. Fragmentation patterns and optimal capillary exit voltages are suggested for each neutral ether lipid class. The present study demonstrates that reversed-phase HPLC and positive ion ESI/CID/MS provide direct and unambiguous information about the configuration and identity of molecular species in neutral 1-O-alkyl-sn-glycerol classes.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Hartvigsen, K. (Intern), Ravandi, A. (Ekstern), Bukhave, K. (Intern), Hølmer, G. K. (Intern), Kuksis, A. (Ekstern)
Pages: 1116-1124
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Mass Spectrometry
Volume: 36
Issue number: 10
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 2.41 SJR 0.899 SNIP 0.885
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.925 SNIP 0.855 CiteScore 2.42
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.956 SNIP 0.911 CiteScore 2.46
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.165 SNIP 1.004 CiteScore 2.87
Determination of neutral lipid hydroperoxides by size exclusion HPLC with fluorometric detection. Application to fish oil enriched mayonnaises during storage

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hartvigsen, K. (Ekstern), Hansen, L. F. (Intern), Lund, P. (Intern), Bukhave, K. (Intern), Hølmer, G. K. (Intern)
Pages: 5842-5849
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 48
Issue number: 12
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
Dynamic headspace gas chromatography/mass spectrometry characterization of volatiles produced in fish oil enriched mayonnaise during storage

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hartvigsen, K. (Ekstern), Lund, P. (Intern), Hansen, L. F. (Intern), Hølmer, G. K. (Intern)
Pages: 4858-4867
Publication date: 2000
Main Research Area: Technical/natural sciences
Oxidative protection of mayonnaises with 16% fish oil was studied during cold storage (5 degrees C) after supplementation with different tocopherol systems: the ternary antioxidant system ascorbic acid, lecithin and tocopherol (A/L/T), and two commercial mixtures, an oil-soluble (Toco 70) preparation and a water-soluble (Grindox 1032) preparation. The physical structure of the fish-oil-enriched mayonnaise was manipulated by adding extra emulsifier (Panodan TR) with the purpose of investigating whether or not this affected the antioxidative activity of the tocopherol mixtures. A number of different analytical techniques HPLC (high-performance liquid chromatography), gas chromatography mass spectrometry (GC-MS), sensory analysis, confocal laser scanning microscopy and rheological measurements were employed to elucidate the chemical, sensory, structural and rheological aspects of the oxidation process. Discriminant partial least squares regression was used to analyse the data obtained. The three tocopherol preparations not only affected the oxidative stability of the mayonnaises differently they also influenced the rheological and structural properties of the mayonnaises in different ways. The rheological and structural properties of the mayonnaise were also affected by the addition of extra emulsifier, but this did not influence the formation of fishy and rancid off-flavours. Addition of the A system caused the immediate formation of distinct fish and rancid off-flavours in the fresh mayonnaises. The volatile compounds trans-2-heptenal, 3-octen-3-one, 1-octen-3-ol, trans,cis-2,4-heptadienal, trans,trans-2,4-heptadienal, trans-2-octenal, nonanal and trans,cis-3,6-nonadienal were thought to contribute to the fishy and rancid flavours. Addition of Toco 70 did not affect the sensory perception of mayonnaise nor the development of volatile flavour compounds as evaluated by GC-MS, but the peroxide values were slightly increased in mayonnaise containing Toco 70 as compared to the other mayonnaises. Mayonnaise with Grindox 1032 seemed to have fewer fishy and rancid off-flavours than mayonnaises without antioxidant. This flavour-protective effect of Grindox 1032 was correlated to an increase in the size of the droplet diameter of mayonnaises supplemented with Grindox 1032.
Oxidation in fish oil-enriched mayonnaise 3: Assessment of the influence of the emulsion structure on oxidation by discriminant partial least squares regression analysis

General information
State: Published
Organisations: Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Department of Biotechnology, Department of Systems Biology, Department of Biochemistry and Nutrition, Center for BioProcess Engineering, Department of Chemical and Biochemical Engineering
Authors: Jacobsen, C. (Intern), Hartvigsen, K. (Intern), Lund, P. (Intern), Thomsen, M. (Ekstern), Skibsted, L. (Ekstern), Adler-Nissen, J. (Intern), Hølmer, G. K. (Intern), Meyer, A. S. (Intern)
Pages: 86-98
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: European Food Research and Technology
Volume: 211
ISSN (Print): 1438-2377
An optimized method for fatty acid analysis, including quantification of trans fatty acids, in human adipose tissue by gas-liquid chromatography

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Odense University Hospital
Authors: Bysted, A. (Intern), Cold, S. (Ekstern), Hølmer, G. K. (Intern)
Pages: 205-214
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Scandinavian Journal of Clinical Laboratory Investigation
Volume: 59
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): SJR 0.584 SNIP 0.69 CiteScore 1.4
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.729 SNIP 0.741 CiteScore 1.79
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.746 SNIP 0.897 CiteScore 1.9
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.632 SNIP 0.676 CiteScore 1.84
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.482 SNIP 0.67 CiteScore 1.43
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.545 SNIP 0.769 CiteScore 1.54
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.54 SNIP 0.703
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.453 SNIP 0.607
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.487 SNIP 0.588
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.49 SNIP 0.598
Scopus rating (2006): SJR 0.49 SNIP 0.622
Scopus rating (2005): SJR 0.416 SNIP 0.636
Scopus rating (2004): SJR 0.415 SNIP 0.672
Scopus rating (2003): SJR 0.486 SNIP 0.66
Scopus rating (2002): SJR 0.43 SNIP 0.704
Scopus rating (2001): SJR 0.456 SNIP 0.721
Web of Science (2001): Indexed yes
Coenzyme Q10 in health and disease

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Danish Nutrition Council
Authors: Overvad, K. (Ekstern), Diamant, B. (Ekstern), Holm, L. (Ekstern), Hølmer, G. K. (Intern), Mortensen, S. (Ekstern), Stender, S. (Ekstern)
Pages: 764-770
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Clinical Nutrition
Volume: 53
ISSN (Print): 0954-3007
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 2.8 SJR 1.347 SNIP 1.179
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.586 SNIP 1.192 CiteScore 2.86
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.516 SNIP 1.183 CiteScore 2.78
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.422 SNIP 1.329 CiteScore 3.15
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.413 SNIP 1.22 CiteScore 3
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.215 SNIP 1.14 CiteScore 2.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.311 SNIP 1.28
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.229 SNIP 1.371
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.198 SNIP 1.215
Effect of modified dairy fat on fasting and postprandial haemostatic variables in healthy young men

It has been suggested that milk fat, due to its content of saturated fatty acids, may have a thrombogenic effect. In the present study the fatty acid profile of milk fat was modified by changing the feeding regimens of cows and the effect on haemostatic variables of a diet containing the modified milk fat (M) was compared with that of a diet containing milk fat of typical Danish composition (D). In the modified fat 16 % of the saturated fatty acid (C-12-C-16) content was replaced mainly by oleic acid. Eighteen subjects were fed on two strictly controlled isoenergetic diets containing 40 % energy from retail fat (30 % energy from the test fats) for periods of 4 weeks in a study with a crossover design. Fasting samples were taken in the last week of each study period. Postprandial samples were taken on day 21, 3 h after lunch (n 18), and on the last day of the study 2, 4, 6 and 8 h after a fat load containing 1.2 g of one of the milk fats/kg body weight (n 8). After 4 weeks' dietary intervention fasting plasma factor VII coagulant (FVIIc) activity, tissue-type plasminogen activator (t-PA) activity, plasminogen activator inhibitor (PAI-1) antigen and P-thromboglobulin did not differ between diets M and D. Postprandially FVIIc and t-PA activities increased (P < 0.001) and PAI-1 antigen and PAI-1 activity decreased (P < 0.001) as compared with fasting values, regardless of diet. After the fat load, the postprandial increase in FVIIc was marginally lower after diet M than diet D (diet effect, P < 0.05). In conclusion, the modified milk fat obtained by the applied feeding strategy had virtually the same effects on haemostatic variables as conventional milk fat.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Royal Veterinary and Agricultural University, Danish Institute of Animal Science
Authors: Tine, T. (Ekstern), Peter, M. (Ekstern), John, H. (Ekstern), Hølmer, G. K. (Intern), Sandström, B. (Ekstern)
Pages: 105-113
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: British Journal of Nutrition
Volume: 82
Issue number: 2
ISSN (Print): 0007-1145
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
Effects of butter oil blends with increased concentrations of stearic, oleic and linolenic acid on blood lipids in young adults

General information
Oxidation in fish-oil-enriched mayonnaise 1: Assessment of propyl gallate as an antioxidant by discriminant partial least squares regression analysis

General information
State: Published
Organisations: Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Department of Biotechnology, Department of Systems Biology, Department of Biochemistry and Nutrition
Authors: Jacobsen, C. (Intern), Hartvigsen, K. (Intern), Lund, P. (Intern), Meyer, A. S. (Intern), Adler-Nissen, J. (Intern), Holstborg, J. (Ekstern), Hølmer, G. K. (Intern)
Pages: 13-20
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: European Food Research and Technology
Volume: 210
ISSN (Print): 1438-2377
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): SJR 0.742 SNIP 0.882 CiteScore 1.81
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.732 SNIP 0.822 CiteScore 1.55
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.828 SNIP 0.908 CiteScore 1.71
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.791 SNIP 0.901 CiteScore 1.71
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.872 SNIP 1.038 CiteScore 1.68
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.009 SNIP 1.097 CiteScore 1.87
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.931 SNIP 0.901
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
The effect of palm oil, lard, and puff-pastry margarine on postprandial lipid and hormone responses in normal-weight and obese young women

Only a few studies have been published on the postprandial effects of different fatty acids in obese subjects. Therefore, the present study investigated the effects of three test meals containing palm oil (PO), lard (LD), or puff-pastry margarine (PPM), all normal dietary ingredients, on postprandial lipid and hormone responses in normal-weight and obese young women. The study was performed as a randomized, crossover design. The fats differed in the content of palmitic acid, stearic acid, and traits monounsaturated fatty acids allowing a dietary comparison of different 'solid' fatty acids. The obese women had significantly higher fasting concentrations and postprandial responses of plasma total triacylglycerol (TAG), chylomicron-TAG, and insulin compared with the normal-weight women but there was no significant difference in the postprandial responses between the three test meals. The obese women had fasting concentrations of leptin four times greater than the normal-weight women. There were no postprandial changes in the concentrations of leptin. The fasting concentrations of HDL-cholesterol were significantly lower in the obese women than in the normal-weight women, whereas there was no significant difference between the two groups in the concentrations of total cholesterol or LDL-cholesterol. These results provide evidence that obese women have exaggerated lipid and hormone responses compared with normal-weight women but the different contents of saturated and trans monounsaturated fatty acids provided by PO, LD, and PPM have no effect in either group.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Århus Amtskommune, Copenhagen University Hospital
Authors: Jensen, J. J. D. (Intern), Bysted, A. (Intern), Dawids, S. (Ekstern), Hermansen, K. (Ekstern), Hølmer, G. K. (Intern)
Pages: 469-479
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: British Journal of Nutrition
Volume: 82
Issue number: 6
ISSN (Print): 0007-1145
Ratings:
BFI (2018): BFI-level 1
Biochemistry of trans-monoenoic fatty acids.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hølmer, G. K. (Intern)
Pages: 163-189
Publication date: 1998

Host publication information
Title of host publication: Trans Fatty Acids in Human Nutrition
Place of publication: Dundee
Publisher: The Oily Press
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 171658
Publication: Research - peer-review › Book chapter – Annual report year: 1998

Effect of Formula Supplemented with Docosahexaenoic Acid and gamma-Linolenic Acid on Fatty Acid Status and Visual Acuity in Term Infants

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Royal Veterinary and Agricultural University, Umeå University
Authors: Jørgensen, M. H. (Ekstern), Hølmer, G. K. (Intern), Lund, P. (Intern), Hernell, O. (Ekstern), Michaelsen, K. F. (Ekstern)
Pages: 412-421
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Pediatric Gastroenterology and Nutrition
Volume: 26
Original language: English
Source: orbit
Source-ID: 171659
Publication: Research - peer-review › Journal article – Annual report year: 1998

Effect of modified dairy fat on postprandial and fasting plasma lipids and lipoproteins in healthy young men

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Royal Veterinary and Agricultural University, Danish Institute of Animal Science
Authors: Tholstrup, T. (Ekstern), Sandström, B. (Ekstern), Hermansen, J. (Ekstern), Hølmer, G. K. (Intern)
Pages: 11-21
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 33
Issue number: 1
Original language: English
Source: orbit
Source-ID: 170014
Publication: Research - peer-review › Journal article – Annual report year: 1998

Influence of moderate amounts of trans fatty acids on the formation of polyunsaturated fatty acids

General information
State: Published
Absorption and metabolism of the primary oxidation product: hydroperoxy-linoleic acid.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Bertelsen, L. S. (Intern), Hartvigsen, K. (Intern), Weber, C. (Intern), Hølmer, G. K. (Intern), Bukhave, K. (Intern)
Pages: 27-30
Publication date: 1997

Host publication information
Title of host publication: Proceedings of the 19th Nordic Lipid Symposium
Place of publication: Bergen
Publisher: LipidForum
Main Research Area: Technical/natural sciences
Conference: 19th Nordic Lipid Symposium, Ronneby, Sweden, 15/06/1997 - 15/06/1997
Source: orbit
Source-ID: 168041
Publication: Research › Article in proceedings – Annual report year: 1997

Coenzyme Q10 in the diet - daily intake and relative bioavailability

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Weber, C. (Intern), Bysted, A. (Intern), Hølmer, G. K. (Intern)
Publication date: 1997

Host publication information
Title of host publication: Molecular Aspects of Medicine
Publisher: Pergamon
Main Research Area: Technical/natural sciences
Conference: 9th International Symposium on Biomedical and Clinical Aspects of Coenzyme Q, Ancona, 01/01/1996
Source: orbit
Source-ID: 168770
Publication: Research - peer-review › Article in proceedings – Annual report year: 1997

Effekt og sikkerhed af kosttilskud indeholdende Q10: Efficacy and safety of dietary supplementation containing Q10].

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Overvad, O. (Ekstern), Diamant, B. (Ekstern), Holm, L. (Ekstern), Hølmer, G. K. (Intern), Mortensen, S. (Ekstern), Stender, S. (Ekstern)
Pages: 7309-7315
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Ugeskrift for Laeger
Volume: 159
Intestinal absorption of coenzyme Q(10) administered in a meal or as capsules to healthy subjects

A randomized cross-over study by supplementation with single doses of coenzyme Q(10) (30 mg/person), administered either as a meal consisting of cooked pork heart or as 30 mg coenzyme Q(10) capsules was performed to investigate the bioavailability of dietary coenzyme Q(10) in humans. The increase in serum coenzyme Q(10) concentration was used as an index of the absorption, and reached a maximum six hours after the ingestion of either meal or capsules. Following intake of coenzyme Q(10) capsules, the serum coenzyme Q(10) concentrations increased significantly (p

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Division of Food Chemistry
Authors: Weber, C. (Intern), Bysted, A. (Intern), Helmer, G. K. (Intern)
Pages: 941-945
Smørfedt og smørfedtbtandlers ernæringsmæssige betydning

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Technical University of Denmark, Royal Veterinary and Agricultural University
Authors: Lund, P. (Intern), Becker, C. C. (Ekstern), Hølmer, G. K. (Intern), Sandström, B. (Ekstern)
Pages: 155-158
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Mælkeritidende
Volume: 6
Original language: Danish
Source: orbit
Source-ID: 167229
Publication: Research › Journal article – Annual report year: 1997

Antioxidanter kan modvirke lipidoxidation

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hølmer, G. K. (Intern)
Pages: 2-9
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Margasinet
Volume: 1
Original language: Danish
Source: orbit
Source-ID: 165508
Publication: Research - peer-review › Journal article – Annual report year: 1996

Fish Oil in Diabetic Nephropathy

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Steno Diabetes Centre
Authors: Rossing, P. (Ekstern), Hansen, B. V. (Ekstern), Nielsen, F. S. (Ekstern), Myrup, B. (Ekstern), Hølmer, G. K. (Intern), Parving, H. (Ekstern)
Pages: 1214-1219
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Diabetes Care
Volume: 19
Issue number: 11
Original language: English
Source: orbit
Source-ID: 167018
Publication: Research - peer-review › Journal article – Annual report year: 1996

GC/MS analysis of volatile aroma components in butter during storage in different catering packaging

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Technical University of Denmark
Authors: Christensen, T. C. (Ekstern), Hølmer, G. K. (Intern)
Pages: 134-139
Isomere fedtstyrers omsætning og metaboliske effekter på cellulært niveau

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hølmer, G. K. (Intern)
Pages: 37-43
Publication date: 1996

Host publication information
Title of host publication: Transfettsyrer og helse
Place of publication: Göteborg
Publisher: TenaNord
Main Research Area: Technical/natural sciences
Conference: Møde vedrørende Trans-Fedtsyrer, Göteborg, 01/01/1996
Source: orbit
Source-ID: 167196
Publication: Research › Article in proceedings – Annual report year: 1996

Karakterisering af lipid oxidation i mejeriprodukter

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Technical University of Denmark
Authors: Hølmer, G. K. (Intern), Christensen, T. C. (Ekstern)
Pages: 498-499
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Mælkeritidende
Volume: 20
Original language: Danish
Source: orbit
Source-ID: 167015
Publication: Research › Journal article – Annual report year: 1996

Lipidoxidation, determination in butter and dairy spreads by HPLC

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Technical University of Denmark
Authors: Hølmer, G. K. (Intern), Christensen, T. C. (Ekstern)
Pages: 486-489
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Food Science
Volume: 61
Ratings:
BFI (2018): BFI-level 1
Nutritional value of micro-encapsulated fish oils in rats

General information
State: Published
The coenzyme Q10 content of the average Danish diet

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Weber, C. (Intern), Bysted, A. (Intern), Hølmer, G. K. (Intern)
Pages: 123-127
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: International Journal for Vitamin and Nutrition Research
Volume: 67
ISSN (Print): 0300-9831
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 0.99 SJR 0.339 SNIP 0.561
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.672 SNIP 0.478 CiteScore 1.35
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.467 SNIP 0.555 CiteScore 1.36
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.548 SNIP 0.627 CiteScore 1.49
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.523 SNIP 0.523 CiteScore 1.27
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.441 SNIP 0.364 CiteScore 1.12
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.397 SNIP 0.423
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.412 SNIP 0.401
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.471 SNIP 0.651
Scopus rating (2007): SJR 0.481 SNIP 0.562
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.5 SNIP 0.525
Scopus rating (2005): SJR 0.474 SNIP 0.596
Trans-Fedtsyrer og fosterudvikling

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Hølmer, G. K. (Intern), Hølmer, G. K. (Intern)
Pages: 63-67
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Tema Nord
Volume: 555
Original language: Danish
Source: orbit
Source-ID: 165518
Publication: Research › Journal article – Annual report year: 1996

Visual acuity and erythrocyte docosahexaenoic acid status in breast-fed and formula-fed term infants during the first four months of life

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Royal Veterinary and Agricultural University, Umeå University
Authors: Jørgensen, M. H. (Ekstern), Hernell, O. (Ekstern), Lund, P. (Intern), Hølmer, G. K. (Intern), Michaelsen, K. F. (Ekstern)
Pages: 99-105
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 31
Issue number: 1
Original language: English
Source: orbit
Source-ID: 165322
Publication: Research - peer-review › Journal article – Annual report year: 1996

Influence of (n-3) polyunsaturated fatty acids on pig platelets and erythrocytes

General information
State: Published
Organisations: Risø National Laboratory for Sustainable Energy, Division of Toxicology and Risk Assessment, National Food Institute, Department of Electrical Engineering, Department of Biochemistry and Nutrition, Department of Biotechnology
Authors: Høj, C. (Intern), Meyer, O. A. (Intern), Ibsen, P. (Intern), Mortensen, A. (Ekstern), Hølmer, G. K. (Intern), Schmidtsdorff, W. (Intern)
Publication date: 1992
Event: Abstract from The 33rd International Conference on the Bioscience of Lipids, Lyon-Villeurbanne, France.
Main Research Area: Technical/natural sciences
Source: orbit
Projects:

**Studies on EFA deficiency in rats**
Co-operation with Løvens Kemiske Fabrik A/S, Ballerup and Dr. Harald Hansen, Danish School of Pharmacy.
Copenhagen.

Department of Biochemistry and Nutrition
Department of Systems Biology
Period: 15/09/1998 → 01/01/1999
Number of participants: 4
Project participant:
Jensen, Monika (Ekstern)
Tetens, Vilhelm (Ekstern)
Hansen, Harald (Ekstern)
Project Manager, organisational:
Helmer, Gunhild Kofoed (Intern)

**Studies on the correlation between antioxidants and PUFA-oxidation in vivo, possible relations to LDL-oxidation and platelet activation**
Dietary fat is believed to play a role in development of atherosclerosis and cancer. The composition and distribution of the lipoproteins transporting the dietary fat to the tissues is a factor in determining the potential atherogenicity of the diet. Much interest has been focused on the protection against atherosclerosis of antioxidants present in the low-density lipoproteins (LDL). However, high-density lipoprotein (HDL) and very low-density lipoprotein (VLDL) may also play important roles in protection against coronary artery disease. Dietary supplements of antioxidants are popular among the population, as well as supplements of fish oil containing high amounts of polyunsaturated fatty acids (PUFAs). The PUFAs are, in addition to their beneficial effects of total plasma lipid levels, vulnerable to oxidation when transported in the lipoproteins, and increase the demand for antioxidative protection. The importance of classical antioxidants as vitamin E and C is well recognized, but recent studies have questioned whether the recommended intake is sufficient to match present dietary intakes of PUFA. Other redox-active components, such as various carotenoids and coenzyme Q10 must be included in such a validation. The issues to be studied include: Basic examinations of the co-operative effect of antioxidants present in LDL and HDL Formation of oxidation products which can be used as biochemical markers, such as lipid hydroperoxides, the redox status of coenzyme Q or formation of so-called "core aldehydes". Supplemented coenzyme Q and vitamin E are absorbed but distributed differently within lipoprotein classes. Vitamin E follows PUFA thus providing optimal protection against oxidation.

**Intercomparison of methods for the determination of trans fatty acids in edible fats and certification of three materials containing trans.**
The overall objective of this European project is to provide reliable and safe methods and appropriate standards for determination of trans fatty acids in edible oils and fats. The background for the co-operation was the recognition of the fact that results published on trans fatty acid contents were depending on the methods used and varied to a great extent...
between laboratories. Twelve independent laboratories have now been validating their methods and two intercomparison study has been carried out sofar with a number of distributed samples. The final step is to prepare suitable standard materials. After examination by the collaborators, the materials will be certified according to BCR-rules. Then they will be released as EU-standard materials.

Department of Biochemistry and Nutrition
Department of Systems Biology
Period: 01/09/1997 → 01/09/2000
Number of participants: 14
Project participant:
Christensen, Nulle Kromann (Intern)
Bysted, Anette (Intern)
Dobson, G. (Ekstern)
Bauer-Plank, C. (Ekstern)
Greut, W. de (Ekstern)
Farmer, M. (Ekstern)
Lercker, G. (Ekstern)
Lumley, I. (Ekstern)
Boskou, D. (Ekstern)
Juarez Iglesias, M. (Ekstern)
Lawless, F. (Ekstern)
Proot, M. (Ekstern)
Project Manager, organisational:
Hølmer, Gunhild Kofoed (Intern)
Ulberth, F. (Ekstern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 250,000.00 Danish Kroner
Project

Undersøgelser over samspillet mellem polyumættede fedtsyrer og antioxidanter med særligt henblik på værdien af kosttilskud

Department of Systems Biology
Period: 01/09/1997 → 13/03/2002
Number of participants: 6
Phd Student:
Thorn, Mette (Intern)
Supervisor:
Hølmer, Gunhild Kofoed (Intern)
Main Supervisor:
Bukhave, Klaus (Intern)
Examiner:
Søndergaard, Ib (Intern)
Hansen, Harald S. (Ekstern)
Poulsen, Lars Kærgaard (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-Su Stipendium, Eksperiment
Project: PhD

Oxidationsmekanismer i fiskeolieholdige

Technical University of Denmark
Period: 01/06/1996 → 18/09/2000
Number of participants: 3
Phd Student:
Lipid oxidation in dairy products
An important factor for the shelf life and aroma formation in dairy products is lipid oxidation. The aim of this project is to characterize minor amounts of oxidation products by using HPLC (primary oxidation products) and dynamic headspace GC/MS (secondary oxidation products) and to implement the knowledge into the production. The project is established in cooperation with the industry (MD Foods and the Danish Dairy Board). During the first part of the project the methods were optimized for the new applications. Then storage experiments with processed cheese and feta cheese were carried out. The products were stored at 5, 20 and 37 °C for up to one year, half of the processed cheeses were stored in light and the rest in darkness. The changes were followed by determination of secondary volatile products by GC/MS. A general increase in the content of volatile compounds was found during storage of the processed cheeses. The formation of some compounds (e.g. 2-hexanone and 2-heptanone) were mainly dependent of the temperature whereas others (e.g. octane, hexanal and octanal) were mainly dependent of light. These findings were confirmed by multivariate statistic evaluation. In 1999 a storage experiment on sliced Havarti cheese was performed. The influence of light on lipid oxidation was examined by analysing the volatiles produced by dynamic headspace GC/MS. Only small differences due to light exposure were observed. A general increase in the content of volatiles was found. Similar examinations, but for shorter periods and at lower temperatures, were conducted on fish oil/rapeseed oil containing dairy spreads. Another part of this project is carried out at Department of Dairy and Food Science, The Royal Veterinary and Agricultural University, where radical formation is studied.

The use of partially hydrogenated fish oil in the feeding of pigs.
The aim of the project was to examine whether partially hydrogenated fish oil could substitute technical animal fat in the feeding of pigs. The health of the animals was followed until slaughtering. The quality of the meat was assessed both by fatty acid analysis and sensoric evaluation, both immediately after slaughtering and after 3 months of freeze storing. Our part of the examination was the detailed lipid analysis including determination of trans fatty acid distribution. Data are being validated for publication.
Oxidation mechanisms in fish oil enriched emulsions

The purpose of the project is to study the oxidation mechanisms in fish oil enriched emulsions in order to develop combined emulsifier and antioxidant systems which are more efficient in protecting fish oil enriched foods against oxidation than existing antioxidant systems. Results obtained in 1999 have shown that the low pH in mayonnaise is a very important factor for the initiation of the oxidation processes in mayonnaise. This is due to the fact that iron ions are released/loosened from the egg yolk components at the oil/water interface when pH is decreased to 4, which is the normal pH in mayonnaise. The released iron promotes decomposition of peroxides to volatiles, which are responsible for the off-flavour formation in mayonnaise. The metal chelator EDTA was observed to be a very efficient antioxidant in mayonnaise due to its ability to chelate iron. A HPLC method for determination of lipid peroxides has been further optimised and is now fully operational. By the aid of GC-MS a large number of volatiles that correlate to the fishy and rancid off-flavours in oxidised mayonnaise have been identified.

National Institute of Aquatic Resources
Department of Biochemistry and Nutrition
Department of Biotechnology
Danisco Ingredients
Association of Danish Fish Meal and Fish Oil Manufacturers

Royal Veterinary and Agricultural University
Period: 01/05/1996 → 31/12/1999
Number of participants: 11
Project participant:
Vu, Thi Thu Trang (Intern)
Jacobsen, Charlotte (Intern)
Hartvigsen, Karsten (Intern)
Lund, Pia (Intern)
Datta, Suvra (Intern)
Helmer, Gunhild Kofoed (Intern)
Meyer, Anne S. (Intern)
Green, Else (Intern)
Reitz, Suzie (Intern)
Adler-Nissen, Jens (Intern)

Project Manager, organisational:
Børresen, Torger (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 90,000.00 Danish Kroner
Project

Trans fatty acids versus saturated fatty acids in the diet. Relation to PUFA and blood lipids.

Trans fatty acids have been questioned as safe ingredients of edible fats but the most obvious replacer, saturated fatty acids, may be even more atherogenic. Trans fatty acids are present in partially hydrogenated oils and in ruminant fats.
The aim of the project is to determine the most favourable composition of our dietary fats by examining the effect on blood lipid parameters known to be correlated to the development of coronary heart disease and the influence of moderate amounts of trans fatty acids on the formation of polyunsaturated fatty acids (PUFA). The project includes four different experiments. The effect of trans fatty acids on the conversion of PUFA in organ lipids (liver and heart) was studied in rats. The different trans isomers present in the dietary fats and in rat liver were further investigated at INRA, Dijon, France, by using GC-MS and FTIR-spectroscopy. The two human postprandial experiments were carried out as randomised cross over designs. The absorption of high-fat test meals and the clearing from the blood were followed during 8 hours. In the first human study the effects of five well balanced diets with specific fatty acids were compared with respect to clearing tendency as measured by amount and fatty acid composition of chylomicrons and VLDL triacylglycerols in 16 healthy males. In the second human study the influence of three typical dietary fats on lipid and hormone metabolism was examined in obese and normal weight young women. Furthermore trans fatty acid deposition in humans was studied in samples of depot fat from females. The purpose of this study was to evaluate, whether the recommendation concerning lower ingestion of trans fatty acids put forward by the Danish Nutrition Board in 1995 has been followed. Samples from 1994 and 1997 Have been analyzed and compared. Ph.D. project for Anette Bysted. Maternity leave Nov 11th - May10th 1999. Thesis submitted. To be defended in March 2000.

Department of Biochemistry and Nutrition

Royal Veterinary and Agricultural University

Period: 01/04/1995 → 30/06/1999

Number of participants: 5

Project participant:

Bysted, Anette (Intern)

Rosenberg, Marianne (Intern)

Lund, Pia (Intern)

Jensen, Janne J. Dyrsborg (Intern)

Hølmer, Gunhild Kofoed (Intern)

Financing sources

Source: Unknown

Name of research programme: Uukendt

Amount: 566,000.00 Danish Kroner

Project

Trans-Fedtsyrer Versus mættede fedtsyrer i føden - relationer til metabolismen af polyumættede fedtsyrer og blodlipider

Technical University of Denmark

Period: 01/04/1995 → 31/07/2000

Number of participants: 4

Phd Student:

Bysted, Anette (Intern)

Main Supervisor:

Hølmer, Gunhild Kofoed (Intern)

Examiner:

Høy, Carl-Erik (Intern)

Christensen, Erling (Ekstern)

Financing sources

Source: Internal funding (public)

Name of research programme: Sektorministerium, Stip-SU

Project: PhD

Absorption and antioxidative effects of vitamin E and coenzyme Q

Antioxidants present in the low-density lipoproteins (LDL) are believed to protect against atherosclerosis. The quantitatively most important antioxidant in LDL is vitamin E (a-tocopherol). Another antioxidant, coenzyme Q10 is present to a smaller degree, but may have important influence of the function of vitamin E. This Ph.D. project investigates the absorption and antioxidative effects of vitamin E and coenzyme Q in two different areas - the intestinal absorption and effects in blood, and the percutaneous absorption and protection against UV-irradiation in skin. Maternity leave 1/10 1996 - 30/9 1997. Results published in the thesis: Absorption and antioxidative effects of vitamin E and Coenzyme Q. Thesis defended Dec.12th 1997.

Department of Biochemistry and Nutrition
Nutritionally improved milk fat products

Saturated fatty acids are generally regarded as atherogenic and official recommendations suggest decrease of such fatty acids in edible fats. Milk fat has a high content of a number of saturated fatty acids, therefore a modification with vegetable oils has been introduced. However such mixtures may eventually pose technological problems due to different melting characteristics. The aim of the project was to study the nutritional effects of butter modification, not only with simple blending but also with interesterification, a process which may overcome the above mentioned technological problems. Enrichment with stearic acid, a saturated fatty acid supposed to have less atherogenic effect, was also studied. Young male volunteers ingested different fat mixtures and the influence on blood lipids was followed. In a parallel experiment carried out with rats the effect on vital organs has been validated. It was shown that a modification with vegetable oils improved the nutritional effect of butter, but no special effect of stearic acid was shown for the young volunteers. It might be the case for persons with high cholesterol values. The interesterification process did not influence the fatty acid composition of important organs, nor the blood lipid patterns of the young men. Ph-D project for Claus C. Becker. Results published in the thesis: Butter oil based spreads. Thesis defended Dec. 17th 1997. Results are under publication.

Department of Biochemistry and Nutrition
Royal Veterinary and Agricultural University

Danish Dairy Board
Period: 01/10/1992 → 17/12/1997
Number of participants: 2
Project participant:
Lund, Pia (Intern)
Project Manager, organisational:
Helmer, Gunhild Kofoed (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 4,875,000.00 Danish Kroner

Smarfedtblandingers ernæringsmæssige egenskaber
Technical University of Denmark
Effects of ingestion of n-3 PUFA from fish oils.
The metabolism of n-3 fatty acids from fish oil has been studied for many years in various aspects comprising absorption, tissue deposition and influence on blood lipids. A comparison of the absorption of microencapsulated fish oil with a conventional oil showed the same deposition of fatty acids in rat tissues, indicating a full availability of the microencapsulated product. This is of special importance with respect to the use in infant formulas, as it is known that fish oil fatty acids are beneficial for the development of nervous tissue and hereby the retina. In a collaboration project with Dept. Human Nutrition, RVAU, we have studied the influence of dietary EPA and DHA on visual acuity in infants, taking the deposition of these n-3 fatty acids in red blood cells as a measure of availability. Term infants were given formulas with and without fish oil fatty acids and compared with breast fed babies. The visual acuity was found significantly lower after 4 months, when DHA was omitted from the formula.

Department of Biochemistry and Nutrition
Department of Systems Biology
Period: 18/06/1992 → 31/07/1996
Number of participants: 5
Project participant:

Lund, Pia (Intern)
Christensen, Nulle Kromann (Intern)
Jørgensen, M. Hørby (Ekstern)
Michaelensen, K. Fleischer (Ekstern)
Project Manager, organisational:

Helmer, Gunhild Kofoed (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 220,000.00 Danish Kroner
Project

Karakterisering af lipidoxidation i mejeriprodukter.
Technical University of Denmark
Period: 01/06/1992 → 18/09/1995
Number of participants: 2
Phd Student:

Christensen, Torben Christian (Intern)
Main Supervisor:

Helmer, Gunhild Kofoed (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Program-stipendium
Project: PhD

Oxidation and flavours in fish oil and other fish products
Technical University of Denmark
Period: 01/04/1992 → 10/04/1995
Number of participants: 2
PhD Student: 
Rørbæk, Karen (Intern)
Main Supervisor: 
Hølmer, Gunhild Kofoed (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Program-stipendium
Project: PhD

Absorption og metabolisme af lipid oxidationsprodukter i højere organismer

Technical University of Denmark
Period: 01/04/1991 → 27/09/1994
Number of participants: 2
PhD Student: 
Rosenquist, Annemette (Intern)
Main Supervisor: 
Hølmer, Gunhild Kofoed (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Centerfinansieret
Project: PhD