The effect of three different ad libitum diets for weight loss maintenance: a randomized 18-month trial

Purpose: To test the effect of three diets in their ability to sustain weight loss and improve type 2 diabetes (T2D) and cardiovascular disease (CVD) risk markers after 18-month intervention. Methods: Following a ≥8% weight loss, 131 healthy, overweight/obese (BMI ± SD 31.5 ± 2.6 kg/m²) men (n = 55) and women (n = 76) aged 28.2 ± 4.8 years were randomized to either 1. Moderate fat (40 E%) with 20 E% MUFA and low in glycemic index (GI) (MUFA, n = 54), 2. Low fat (25 E%) and medium in GI (LF, n = 51) or 3. Control (35 E% fat) and high in GI (CTR, n = 26) all with similar protein content, and all provided ad libitum. First 6-month intervention with 100% food provision (previously reported) following 12 months of moderately intensive intervention with 20% food provision now reported. Results: Attrition rate was higher in MUFA (63%) than in LF (37%, P = 0.019) and CTR (42%, P = 0.09) group. Weight regain in completers was not different between groups (mean ± SEM), MUFA 7.1 ± 2.1% versus LF 5.6 ± 1.3% versus CTR 7.2 ± 1.5%, nor was body fat regain, MUFA 4.8 ± 1.0% versus LF 4.7 ± 0.8% versus CTR 5.7 ± 0.6%. The MUFA group reduced LDL/HDL ratio by −0.47 ± 0.09 compared with −0.23 ± 0.11 in LF (P < 0.05) and 0.06 ± 0.14 (P < 0.005) in CTR groups. Conclusions: Weight regain or body composition did not differ between diets over 18 months. No effects on risk markers for T2D or CVD were found, with the exception of an improvement in the LDL/HDL ratio by the MUFA diet compared to the CTR diet. The LF diet was generally more satisfactory and the MUFA diet seemed more difficult to follow.
Absorption difference between diacylglycerol oil and butter blend containing diacylglycerol oil

This study aims at investigating whether the intake of butter blends containing diacylglycerol (DAG) oil may result in reduced fat accumulation, in similarity to DAG oil, and the potential metabolic differences between butter blends and DAG oil. Four experimental diets containing either 10 wt% DAG butter blend (BDAG), triacylglycerol (TAG) butter blend (BTAG), DAG oil (ODAG) or TAG oil (OTAG) were prepared, and each was fed to a group of 8 male Wistar rats. The design of the experiment was a combined balance and feeding experiment. The rats fed the BTAG and ODAG-diets had a significantly higher protein content than rats fed the BDAG and OTAG-diets, and the fat content was significantly lower in rats fed the ODAG-diet as compared to rats fed the OTAG and BDAG-diets. A significantly higher content of ash was observed in rats fed the two TAG diets. The ratio of abdominal fat weight/body weight was significantly higher for rats fed the BDAG-diet than for rats fed the BTAG and ODAG-diets. To conclude, the beneficial effects of DAG oil in reducing body fat accumulation cannot be observed in DAG oil containing butter blends, and the effect of DAG on bone health requires further investigation.
New human milk fat substitutes from butterfat to improve fat absorption

A new human milk fat substitute (HMFS) was produced from butterfat. A 2-week's feeding experiment was performed using three groups of rats with 10 wt.% fat in their feed; the fat was either (1) butterfat-based HMFS + long-chain polyunsaturated fatty acids (LCPUFA), (2) the reference oil + LCPUFA, or (3) the reference oil without LCPUFA. The apparent fat absorption after intake of butterfat-based HMFS (95.9% +/- 1.8%) was significantly higher than the other two groups, indicating that much less calcium soap was formed after feeding butterfat-based HMFS. Calcium contents in urines and faeces from the two groups fed LCPUFA in their diet were lower than those without supplementation of LCPUFA, suggesting that LCPUFA could improve calcium absorption by reducing the calcium excretion. It can thus be concluded that the butterfat-based HMFS improves fat absorption, and supplementation of LCPUFA in the formula improves calcium absorption.

General information
State: Published
Organisations: Department of Systems Biology, Center for Biological Sequence Analysis, Analytical Chemistry, Department of Chemistry, Division of Toxicology and Risk Assessment, National Food Institute
Authors: Li, Y. (Ekstern), Mu, H. (Intern), Andersen, J. E. T. (Intern), Xu, X. (Ekstern), Meyer, O. A. (Intern), Orngreen, A. (Ekstern)
Pages: 739-744
Publication date: 2010
Main Research Area: Technical/natural sciences

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Journal: Food Research International
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BFI (2018): BFI-level 1
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Web of Science (2017): Indexed Yes
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Scopus rating (2016): CiteScore 3.87 SJR 1.589 SNIP 1.682
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.518 SNIP 1.641 CiteScore 3.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.496 SNIP 1.761 CiteScore 3.52
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.522 SNIP 1.818 CiteScore 3.68
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Human milk fat substitute (HMFS), Butterfat, Absorption, Minerals, Long-chain polyunsaturated fatty acids (LCPUFA)

Protein and energy metabolism of young male Wistar rats fed conjugated linoleic acid as structured triacylglycerol

Twelve 4-week-old male Wistar rats weighing 100 g were fed diets semi-ad libitum for 22 d containing either 1.5% conjugated linoleic acid (CLA-diet) or high oleic sunflower oil (Control-diet). The CLA was structured triacylglycerol with predominantly cis-9, trans-11 and trans-10, cis-12 fatty acid isomers in the inner position and oleic acid in the other positions of the glycerol molecule. The rats were kept individually in metabolic cages. From days 8-16 energy, nitrogen (N) and carbon

General information
State: Published
Organisations: Center for Biological Sequence Analysis, Department of Systems Biology
Authors: Jørgensen, H. (Ekstern), Hansen, C. H. (Ekstern), Mu, H. (Intern), Jakobsen, K. (Ekstern)
Pages: 322-336
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: Archives of Animal Nutrition
Volume: 64
Issue number: 4
ISSN (Print): 1745-039X
Ratings:
**The protease inhibitors ritonavir and saquinavir influence lipid metabolism: a pig model for the rapid evaluation of new drugs**

Background: Studies of the effects of antiretroviral drugs on lipid metabolism are limited by the availability of suitable models. We have thus developed an animal model utilising Gottingen mini-pigs. The normal lipid metabolism of mini-pigs closely reflects that of humans and they are expected to have similar reactions to antiretroviral drugs. Methods: The pigs were treated orally with high doses of the protease inhibitors ritonavir and saquinavir for 4 weeks. The model allows repeated concomitant biopsies from liver, muscle, adipose tissue and plasma samples. Results: The study showed a general decrease in polyunsaturated fatty acids; changes in both saturated and monounsaturated fatty acids were also apparent after antiretroviral treatment. The changes were observed after 4 weeks of treatment. At 4 weeks post-treatment, the levels of all fatty acids were lower compared with pretreatment levels, suggesting a prolonged effect of the antiretroviral drug treatment lasting beyond the 4 week post-treatment observation period. Conclusions: The Gottingen mini-pig model is a promising animal model for rapid screening of the metabolic effects induced by antiretroviral drugs.
Intramyo cellular triglyceride content in man, influence of sex, obesity and glycaemic control

It remains unknown whether sex impacts on intramyocellular triglyceride (IMTG) in obesity, as has been shown in non-obese subjects, and if so, whether this may have implications on the association between IMTG and insulin sensitivity.

Subject and methods: A Muscle biopsy from vastus lateralis was obtained in 27 obese women (body mass index (BMI) = 35.5 +/- 0.8 kg/m(2) ; mean +/- S.E.M., percentage of body fat (PBF) = 44 +/- 1, n = 7 impaired fasting glucose. n = 7 type 2 diabetes), 20 obese men (BMI = 35.8 +/- 0.8 kg/m(2); PBF = 33 +/- 1, n = 4 impaired-fasting-glucose; n = 6 type 2 diabetes) and 12 lean sedentary healthy individuals (controls: n = 7 women, BMI = 21.8 +/- 0.7 kg/m(2), PBF = 20 +/- 2; n = 5 men, BMI = 23.6 +/- 0.5 kg/m(2), PBF = 13 +/- 2). IMTG was determined by chromatography. Results: IMTG wits increased twofold in obese women compared to obese men, lean men and lean women respectively (21.9 +/- 2.4 mg/g wet weight, 10.9 +/- 1.5. 9.8 +/- 2.1 and 10.9 +/- 2.4 mg/g. P
Bioavailability of omega-3 long-chain polyunsaturated fatty acids from foods

Increasing recognition of the importance of the omega-3 long chain polyunsaturated fatty acids (LCPUFA) has caused greater attention about dietary intake of these fatty acids. Fatty fish is the major dietary source of these fatty acids. Because of the low intake of fish at many places, foods enriched with omega-3 LCPUFA can be good alternatives to improve the intake of these fatty acids. Effects of lipid structures and food matrices on bioavailability of omega-3 LCPUFA have been investigated. Short term studies showed that both lipid structure and food matrix affect the bioavailability of these fatty acids, whereas diverse results have been reported from long-term studies. Therefore more studies are encouraged to clarify the long-term effects.

General information
State: Published
Organisations: Center for Biological Sequence Analysis, Department of Systems Biology
Authors: Mu, H. (Intern)
Pages: 24-26
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Agro Food Industry Hi-Tech
Volume: 19
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ISSN (Print): 1722-6996
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
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Web of Science (2017): Indexed Yes
Comparison of 3 ad libitum diets for weight-loss maintenance, risk of cardiovascular disease, and diabetes: A 6-mo randomized, controlled trial

BACKGROUND: The optimal dietary content and type of fat and carbohydrate for weight management has been debated for decades. OBJECTIVE: The objective was to compare the effects of 3 ad libitum diets on the maintenance of an initial weight loss of ≥8% and risk factors for CVD and diabetes during a 6-mo controlled dietary intervention. DESIGN: Nondiabetic overweight or obese [mean ± SD body mass index (in kg/m²): 31.5 ± 2.6] men (n = 55) and women (n = 76) aged 28.2 ± 4.8 y were randomly assigned to a diet providing a moderate amount of fat (35-45% of energy) and >20% of fat as monounsaturated fatty acids (MUFA diet; n = 54), to a low-fat (20-30% of energy) diet (LF diet; n = 51), or to a control diet (35% of energy as fat; n = 26). Protein constituted 10-20% of energy in all 3 diets. All foods were provided free of charge from a purpose-built supermarket. RESULTS: More subjects dropped out of the MUFA (28%) group than out of the LF group (16%) and control group (8%) (MUFA compared with control: P <0.05). All groups regained weight (MUFA: 2.5 ± 0.7 kg; LF: 2.2 ± 0.7 kg; and control: 3.8 ± 0.8 kg; NS). Body fat regain was lower in the LF (0.6 ± 0.8%) and MUFA (1.6 ± 0.8%) groups than in the control group (2.6 ± 0.8%) (P <0.05). In the MUFA group, fasting insulin decreased by 2.6 ± 3.5 pmol/L, the homeostasis model assessment of insulin resistance by 0.17 ± 0.13, and the ratio of LDL to HDL by 0.33 ± 0.13; in the LF group, these variables increased by 4.3 ± 3.0 pmol/L (P <0.08) and 0.17 ± 0.10 (P <0.05) and decreased by 0.02 ± 0.09 (P = 0.005), respectively; and in the control group, increased by 14.0 ± 0.14 pmol/L.
4.3 pmol/L (P <0.001), 0.57 +/- 0.17 (P <0.001), and 0.05 +/- 0.14 (P = 0.036), respectively. Dietary adherence was high on the basis of fatty acid changes in adipose tissue. CONCLUSIONS: Diet composition had no major effect on preventing weight regain. However, both the LF and MUFA diets produced less body fat regain than did the control diet, and the dropout rate was lowest in the LF diet group, whereas fasting insulin decreased and the homeostasis model assessment of insulin resistance and ratio of LDL to HDL improved with the MUFA diet. This trial was registered at clinicaltrials.gov as NCT00274729.
Intramyocellular triglyceride fatty acid composition implicates on muscle triglyceride turnover, insulin action and glycaemic control in man

General information
State: Published
Organisations: Center for Biological Sequence Analysis, Department of Systems Biology
Authors: Haugaard, S. (Ekstern), Madsbad, S. (Ekstern), Mu, H. (Intern), Vaag, A. (Ekstern)
Pages: 755 PG 1
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Diabetologia
Volume: 51
ISSN (Print): 0012-186X
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 5.23 SJR 3.158 SNIP 1.732
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 3.609 SNIP 1.923 CiteScore 5.57
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 3.215 SNIP 1.97 CiteScore 5.57
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 3.216 SNIP 2.029 CiteScore 6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 3.144 SNIP 1.916 CiteScore 5.76
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Postprandial lipid responses of butter blend containing fish oil in a single-meal study in humans

The postprandial effects of a butter product containing fish oil were investigated in a single-meal, randomized crossover study with a commercial butter product as the control. Twelve healthy males consumed two test meals with (13)C-labelled cholesterol (45 mg) and either an interesterified butter blend with fish oil (352 mg n-3 long-chain PUFA (LCPUFA)) or the commercial butter blend. Blood samples were collected after the meals and in the fasting condition on the test day and the following morning, and were analysed for cholesterol absorption, plasma lipid profile and fatty acid composition. No significant difference in the postprandial plasma fatty acid composition was observed between the groups, neither difference in cholesterol absorption, plasma cholesterol or the cholesterol contents of plasma lipoproteins. The incorporation of fish oil in the butter resulted in a significant lower concentration of triacylglycerols in the plasma 2 h after the meal in comparison with the commercial butter blend (p = 0.02); there was, however, no significant difference 24 h after the meal. In conclusion, fish oil-enriched butter blend provides a source to increase the intake of n-3 LCPUFA in the population, but has no acute effect on cholesterol absorption and plasma cholesterol concentration in human.
Butter blend containing fish oil improves the level of n-3 fatty acids in biological tissues of hamster

Many studies have shown beneficial effects of long chain n-3 polyunsaturated fatty acids (PUFA) on human health. Regardless of the positive effects of n-3 PUFA, the intake of these fatty acids remains low. An approach to increase the intake of n-3 PUFA in the population is to incorporate fish oil into food. In the present study, fish oil was incorporated into butter blends by enzymatic interesterification. The aim of the study was to investigate the effects of this butter product in comparison with a commercial butter blend and a product produced by interesterification but without fish oil. Golden Syrian hamsters received hamster feed blended with one of the three butter products. After 6 weeks of feeding, the fatty acid compositions of plasma, erythrocytes, liver, brain, and visceral fat were determined. The intake of butter product with fish oil resulted in a higher level of n-3 PUFA in plasma, erythrocytes, and liver. The incorporation of n-3 PUFA was significantly higher in phospholipids than in triacylglycerols. The results suggest that enriching butter blends with small amounts of fish oil can be used as an alternative method for improving the level of n-3 PUFA in biological tissues.

General information
State: Published
Organisations: Department of Systems Biology, Department of Environmental Engineering, National Food Institute, Infotek, Food Production Engineering
The aim of this study was to investigate the role of the food matrix on bioavailability of (n - 3) PUFA and oxidative stress in plasma. The study was a randomized, cross-over study and included 12 healthy male participants. The participants ingested a test meal, which consisted of a fitness bar, a yoghurt drink, eight oil capsules, bread and butter; 4 g of fish oil was incorporated into one of the matrices. Blood samples were collected and fatty acid composition of chylomicrons was determined together with plasma levels of conjugated dienes and alpha-tocopherol. Fish oil incorporated into food products were absorbed differently from those simply administered as supplements alongside of food products, and yoghurt was the best matrix for providing fast absorption of lipids in general, including (n - 3) fatty acids. No significant difference was observed in the level of plasma alpha-tocopherol after ingestion of test meals. (c) 2007 Elsevier Ltd. All rights reserved.

**General information**

State: Published
Organisations: Risø National Laboratory for Sustainable Energy, Department of Systems Biology, Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources, Center for Biological Sequence Analysis, Technical University of Denmark
Authors: Schram, L. B. (Ekstern), Nielsen, C. J. (Ekstern), Porsgaard, T. (Intern), Nielsen, N. S. (Intern), Holm, R. (Ekstern), Mu, H. (Intern)
Pages: 1062-1068
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Main Research Area: Technical/natural sciences

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BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.87 SJR 1.589 SNIP 1.682
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.518 SNIP 1.641 CiteScore 3.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.496 SNIP 1.761 CiteScore 3.52
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.522 SNIP 1.818 CiteScore 3.68
Increased lipids in non-lipogenic tissues are indicators of the severity of type 2 diabetes in mice

We hypothesised that the molecular changes triggered in type 2 diabetes might cause phenotypic changes in the lipid fraction of tissues. We compared tissue lipid profiles of inbred lean B6-Bom with those of the obese B6-ob/ob and diabetic BKS-db/db mice and found that genetically diabetic mice significantly accumulate fat (especially monounsaturated fatty acids, MUFA) in non-lipogenic tissues such as the eye (MUFA, 2-fold), skeletal muscle (MUFA, 13-fold) and pancreas (MUFA, 16-fold). In contrast, the B6-ob/ob mice which manifest a milder form of type 2 diabetes use the liver as their predominant lipid depot (MUFA 91-fold increase, as compared to lean mice values). The lipids in the BKS-db/db skeletal muscle and pancreas were also significantly enriched with linoleic acid (LA, 9-fold and 6-fold, respectively); and alpha-linolenic acid (ALA, 8.5-fold and 8-fold, respectively). MUFA, LA and ALA accumulation in the non-lipogenic tissues of BKS-db/db mice was associated with reduced liver stearoyl-CoA desaturase-1 expression.
Oxidative stability of DHA-containing liposomes during cold storage

General information
State: Published
Organisations: Department of Systems Biology, Food Production Engineering
Authors: Vikbjerg, A. F. (Intern), Andersen, T. L. (Ekstern), Jørgensen, K. (Ekstern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 631-637
Oxidative stability of liposomes composed of docosahexaenoic acid-containing phospholipids

Oxidative stability of liposomes made of (Docosahexaenoic acid) DHA-containing phosphatidylcholine (PC) was examined during preparation and storage. After preparation of the liposomes, the concentration of primary (conjugated dienes) and secondary oxidation products (Thiobarbituric acid-reactive substances, TBARS) were significantly higher compared to the initial value. During cold storage, formation of conjugated dienes and TBARS remained more or less constant in large unilamellar vesicles (LUV), whereas in multilamellar vesicles (MLV) they were seen to increase over a period of 21 days. Evaporation of solvent traces from a lipid film should preferably be done under nitrogen as vacuum evaporation was found to increase oxidation of the phospholipid.

General information

State: Published
Organisations: Department of Chemistry, Polymers for Biological and Medical Technology, Polymer Department, Risø National Laboratory for Sustainable Energy, Center for Biological Sequence Analysis, Department of Systems Biology, National Food Institute
Authors: Vikbjerg, A. F. (Intern), Andresen, T. L. (Intern), Jørgensen, K. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 631-637
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information

Journal: J A O C S
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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 1.64 SJR 0.696 SNIP 0.905
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.682 SNIP 0.997 CiteScore 1.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.767 SNIP 1.043 CiteScore 1.68
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.809 SNIP 1.074 CiteScore 1.71
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.871 SNIP 1.236 CiteScore 1.81
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.833 SNIP 1.292 CiteScore 1.98
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Enzyme catalyzed production of phospholipids with modified fatty acid profile

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Organisations: Department of Systems Biology, Food Production Engineering, Department of Chemical and Biochemical Engineering
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Anders Falk Vikbjerg PhD.pdf
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Diacylglycerol oil does not affect portal vein transport of nonesterified fatty acids but decreases the postprandial plasma lipid response in catheterized Pigs

Studies have shown several beneficial effects of dietary diacylglycerol oil (DAG oil), but the mechanism behind these effects is still not clear. One hypothesis is that an increase in portal vein transport of nonesterified fatty acids (NEFA) with subsequent oxidation in the liver might be responsible for the positive effects. We examined the portal vein transport of NEFA and other lipid related variables, in response to DAG and triacylglycerol (TAG) bolus feeding and a bolus of standard pig feed in 4 portal vein and mesenteric artery catheterized pigs. Also, the effect of the boluses on postprandial
lipid variables was examined. Portal vein transport of NEFA did not differ when pigs were administered the 2 oil bolus diets, consistent with the similar portal plasma concentrations of oleic and linolenic acids during h 1 after feeding. Glycerol, on the contrary, was transported by the portal vein to a much higher degree after intake of DAG oil (P <0.001; 20, 40, and 60 min). The postprandial arterial TAG response at 5 and 6 h postprandially was significantly lower after the DAG bolus intake. Analysis of Delta AUC for the 6-h postprandial period of selected and total fatty acids showed a lower concentration of vaccenic acid (P = 0.002) after the DAG bolus diet. In conclusion, DAG bolus feeding did not increase the portal transport of NEFA, but it did increase the portal transport of glycerol and lower the postprandial lipid concentration in arterial plasma.

General information
State: Published
Organisations: Department of Systems Biology, Danish Institute of Agricultural Sciences
Authors: Kristensen, J. B. (Intern), Jørgensen, H. (Ekstern), Mu, H. (Intern)
Pages: 1800-1805
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Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.93 SJR 1.956 SNIP 1.335
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.271 SNIP 1.505 CiteScore 4.08
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.089 SNIP 1.596 CiteScore 4.13
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.172 SNIP 1.614 CiteScore 4.6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.919 SNIP 1.671 CiteScore 4.45
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.838 SNIP 1.603 CiteScore 4.32
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.7 SNIP 1.575
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.559 SNIP 1.545
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.575 SNIP 1.42
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.579 SNIP 1.484
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.706 SNIP 1.562
Production and Nutritional Aspects of Butter Enriched with Diacylglycerols

General information
State: Published
Organisations: Department of Systems Biology, Center for Biological Sequence Analysis
Authors: Kristensen, J. B. (Intern), Xu, X. (Intern), Mu, H. (Intern), Jacobsen, C. (Intern)
Publication date: Mar 2006

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Publication: Research › Ph.D. thesis – Annual report year: 2006

Absorption of structured lipids and their applications in the diet

General information
State: Published
Organisations: Department of Systems Biology
Authors: Mu, H. (Intern)
Pages: 271-274
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipid Technology
Volume: 18
Issue number: 12
ISSN (Print): 0956-666X
Ratings:
Scopus rating (2016): SJR 0.224 SNIP 0.29 CiteScore 0.53
Scopus rating (2015): SJR 0.227 SNIP 0.278 CiteScore 0.64
Scopus rating (2014): SJR 0.287 SNIP 0.353 CiteScore 0.66
Scopus rating (2013): SJR 0.264 SNIP 0.311 CiteScore 0.43
ISI indexed (2013): ISI indexed no
Scopus rating (2012): SJR 0.323 SNIP 0.499 CiteScore 0.4
ISI indexed (2012): ISI indexed no
Scopus rating (2011): SJR 0.323 SNIP 0.368 CiteScore 0.39
Application of ultrafiltration membranes for purification of structured phospholipids produced by lipase-catalyzed acidolysis

General information
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Organisations: Food Production Engineering, Department of Systems Biology, Membrane Technology group, Department of Chemical and Biochemical Engineering, Enzyme and Protein Chemistry
Pages: 184-191
Publication date: 2006
Main Research Area: Technical/natural sciences

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Journal: Separation and Purification Technology
Volume: 50
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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 3.78 SJR 1.023 SNIP 1.394
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.078 SNIP 1.504 CiteScore 3.75
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.257 SNIP 1.54 CiteScore 3.5
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.325 SNIP 1.678 CiteScore 3.62
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.409 SNIP 1.732 CiteScore 3.2
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.35 SNIP 1.64 CiteScore 3.48
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.376 SNIP 1.586
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.388 SNIP 1.542
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.109 SNIP 1.433
Comparative Evaluation of the Emulsifying Properties of Phosphatidylcholine after Enzymatic Acyl Modification

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Membrane Technology group, Department of Chemical and Biochemical Engineering, Enzyme and Protein Chemistry, Technical University of Denmark
Pages: 3310-3316
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 54
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
Different kinetic in incorporation and depletion of n-3 fatty acids in erythrocytes and leukocytes of mice

n-3 PUFA are well known for their anti-inflammatory effects. However, there has been only limited study on the kinetics of incorporation and depletion of n-3 PUFA in immune cells. In the present study we investigated the incorporation and depletion of n-3 PUFA in erythrocytes and leukocytes in mice during a 6-wk feeding period. Over the first 3-wk period (the incorporation period) the mice were fed a special diet with a high n-3/n-6 PUFA ratio. In the following 3-wk period (the depletion period) the mice were fed a standard chow diet. A linear increase of the concentration of EPA and DHA in erythrocyte membranes was observed during the incorporation period, whereas a stagnation was observed after the second week for leukocytes. The level of EPA did not fall to the background level after the depletion period, and the level of DHA was kept almost constant during the depletion period in the erythrocyte membranes. In leukocytes the concentration of both EPA and DHA decreased during the depletion period, but did not reach the background level after the 3-wk depletion. In conclusion, the kinetics of EPA and DHA in the different cells are different. The rate of incorporation is faster than that of depletion for n-3 PUFA. More n-3 PUFA can be incorporated into leukocytes in comparison with erythrocytes. The ratio of n-3/n-6 PUFA is more important than the amount of n-3 FA in changing the FA compositions of membrane lipids.

General information
State: Published
Organisations: Center for Biological Sequence Analysis, Department of Systems Biology, Technical University of Denmark
Pages: 749-752
Effects of dietary triacylglycerol structure on plasma and liver lipid levels in rats fed low-fat diets containing n-3 polyunsaturated fatty acids of marine origin

General information
State: Published
Organisations: Department of Systems Biology, Food Production Engineering
Authors: Porsgaard, T. (Intern), Xu, X. (Intern), Mu, H. (Intern)
Pages: 456-464
Publication date: 2006

Host publication information
Title of host publication: Seafood research from fish to dish: Quality, safety and processing of wild and farmed fish
Place of publication: Wageningen, The Netherlands
Publisher: Academic Publishers
Editors: Luten, J., Jacobsen, C., Bakaert, K., Sæbø, A., Oehlenschläger, J.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 197291
Publication: Research - peer-review › Book chapter – Annual report year: 2006

Elucidation of Acyl Migration During Lipase-Catalyzed Production of Structured Phospholipids

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Vikbjerg, A. F. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 609-614
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of American Oil Chemists’ Society
Volume: 83
Issue number: 7
Original language: English
Source: orbit
Source-ID: 189817
Publication: Research - peer-review › Journal article – Annual report year: 2006

Fish oil in various doses or flax oil in pregnancy and timing of spontaneous delivery: a randomised controlled trial

General information
State: Published
Organisations: Department of Systems Biology, Statens Serum Institut, University of Copenhagen
Authors: Knudsen, V. (Ekstern), Hansen, H. (Ekstern), Østerdal, M. (Ekstern), Mikkelsen, T. (Ekstern), Mu, H. (Intern), Olsen, S. (Ekstern)
Pages: 536-543
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Volume: 113
Issue number: 5
ISSN (Print): 1470-0328
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
Lymphatic recovery of exogenous oleic acid in rats on long chain or specific structured triacylglycerol diets
Specific structured triacylglycerols, MLM (M = medium-chain fatty acid, L = long-chain fatty acid), rapidly deliver energy and long-chain fatty acids to the body and are used for longer periods in human enteral feeding. In the present study rats were fed diets of 10 wt% MLM or LLL (L = oleic acid [18:1 n-9], M = caprylic acid [8:0]) for 2 wk. Then lymph was collected 24 h following administration of a single bolus of C-13-labeled MLM or LLL. The total lymphatic recovery of exogenous 18:1 n-9 24 h after administration of a single bolus of MLM or LLL was similar in rats on the LLL diet (43% and 45%, respectively). However, the recovery of exogenous 18:1 n-9 was higher after a single bolus of MLM compared with a bolus of LLL in rats on the MLM diet (40% and 24%, respectively, P = 0.009). The recovery of lymphatic 18:1 n-9 of the LLL bolus tended to depend on the diet triacylglycerol structure and composition (P = 0.07). This study demonstrated that with a diet containing specific structured triacylglycerol, the lymphatic recovery of 18:1 n-9 after a single bolus of fat was dependent on the triacylglycerol structure of the bolus. This indicates that the lymphatic recovery of long-chain fatty acids from a single meal depends on the overall long-chain fatty acid composition of the habitual diet. This could have implications for enteral feeding for longer periods.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Vistisen, B. (Intern), Mu, H. (Intern), Høy, C. (Intern)
Pages: 827-834
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Monitoring lipase-catalyzed butterfat interesterification with rapeseed oil by Fourier transform near-infrared spectroscopy

This work demonstrates the application of FT-NIR spectroscopy to monitor the enzymatic interesterification process for butterfat modification. The reactions were catalyzed by Lipozyme TL IM at 70°C for the blend of butterfat/rapeseed oil (70/30, w/w) in a packed-bed reactor. The blend and interesterified fat samples were measured in liquid form at 70°C by transmission mode based FT-NIR at spectra region of 12000-4000 cm⁻¹. Calibrations of FT-NIR for conversion degrees
(evaluated by triglyceride profile, which represented by triglyceride peak ratio), and solid fat contents (SFC) of interesterified products were carried out by using partial least squares (PLS) regression. Good correlations were observed between NIR spectra and Ln(Peak ratio), and between NIR spectra and SFC at 5 C with spectra range of 5269-4513 cm\(^{-1}\). Overall, FT-NIR spectroscopy coupled with transmission mode measured at 70 C had the closest conditions for the interesterification process, implying the potentiality to be implemented as online control for the enzymatic interesterification process.

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology
Authors: Zhang, H. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 1889-1897
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Analytical and Bioanalytical Chemistry
Volume: 386
Issue number: 6
ISSN (Print): 1618-2642
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 3.03 SJR 0.943 SNIP 1.039
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.064 SNIP 1.083 CiteScore 3.07
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.126 SNIP 1.222 CiteScore 3.26
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.229 SNIP 1.282 CiteScore 3.55
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.347 SNIP 1.282 CiteScore 3.51
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.363 SNIP 1.275 CiteScore 3.47
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.354 SNIP 1.236
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.272 SNIP 1.237
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.144 SNIP 1.076
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.08 SNIP 1.096
Web of Science (2007): Indexed yes
Oxidative stability of diacylglycerol oil and butter blends containing diacylglycerols

Diacylglycerol (DAG) oils produced from sunflower oil and traditional sunflower oil were stored for 20 wk at 38 degrees C, and their oxidative stability was measured. Moreover, two butter blends were produced containing 40 wt-% DAG oil made from sunflower oil or rapeseed oil, respectively, as well as two control butter blends with sunflower oil or rapeseed oil. Their oxidative stability during storage at 5 degrees C for up to 12 wk was examined by similar means as for the pure oils. The storage study of the oils indicated that the DAG oil was oxidatively less stable as compared to sunflower oil, but that they had similar sensory quality. Storage of the butter blends revealed that blends with the two types of rapeseed oil (triacylglycerol (TAG) or DAG oil) were oxidatively more stable than the blends containing oils from sunflower. There was no unambiguous indication of DAG butter blends having a different stability than their respective control TAG blends. However, they had a significantly less salty and buttery flavour, which was ascribed to a much smaller water droplet size causing a delayed sensory perception in the mouth. The butter blend with DAG oil from rapeseed had a very neutral flavour. On the contrary, the butter blend with DAG oil from sunflower had a more rancid aroma and flavour than its control blend with sunflower oil.
Strategies for lipase-catalyzed production and purification of structured phospholipids

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Membrane Technology group, Department of Chemical and Biochemical Engineering, Enzyme and Protein Chemistry, Technical University of Denmark
Pages: 802-811
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Lipid Science and Technology
Volume: 108
ISSN (Print): 1438-7697
Ratings:
BFI (2018): BFI-level 1
The Form of Dietary Conjugated Linoleic Acid Does Not Influence Plasma and Liver Triacylglycerol Concentrations in Syrian Golden Hamsters

General information
State: Published
Organisations: Department of Systems Biology
Authors: Porsgaard, T. (Intern), Xu, X. (Intern), Mu, H. (Intern)
Pages: 2201-2206
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Nutrition
Volume: 136
ISSN (Print): 0022-3166
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 3.93 SJR 1.956 SNIP 1.335
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.271 SNIP 1.505 CiteScore 4.08
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.089 SNIP 1.596 CiteScore 4.13
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.172 SNIP 1.614 CiteScore 4.6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.919 SNIP 1.671 CiteScore 4.45
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.838 SNIP 1.603 CiteScore 4.32
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.7 SNIP 1.575
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.559 SNIP 1.545
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.575 SNIP 1.42
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.579 SNIP 1.484
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.706 SNIP 1.562
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.51 SNIP 1.403
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.399 SNIP 1.45
The recovery of C-13-labeled oleic acid in rat lymph after administration of long chain triacylglycerols or specific structured triacylglycerols

General information
State: Published
Organisations: Department of Systems Biology
Authors: Vistisen, B. (Intern), Mu, H. (Intern), Høy, C. (Intern)
Pages: 363-368
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Nutrition
Volume: 45
Issue number: 6
ISSN (Print): 1436-6207
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 3.22 SJR 1.267 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.319 SNIP 1.169 CiteScore 3.13
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.273 SNIP 1.227 CiteScore 3.28
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.021 SNIP 1.135 CiteScore 3.2
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.961 SNIP 1.022 CiteScore 2.91
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.13 SNIP 1.107 CiteScore 3.02
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.207 SNIP 1.217
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.043 SNIP 1.171
BFI (2008): BFI-level 2
Analysis of lipids by new hyphenated techniques

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Mu, H. (Intern)
Pages: 78-98
Publication date: 2005

Continuous Production of Structured Phospholipids in a Packed Red Reactor with Lipase from Thermomyces lanuginosa
The possibilities of producing structured phospholipids by lipase-catalyzed acidolysis between soybean phospholipids and caprylic acid were examined in continuous packed bed enzyme reactors. Acidolysis reactions were performed in both a solvent system and a solvent-free system with the commercially immobilized lipase from Thermomyces lanuginosa (Lipozyme TL IM) as catalyst. In the packed bed reactors, different parameters for the lipase-catalyzed acidolysis were elucidated such as solvent ratio (solvent system), temperature, substrate ratio, residence time, water content, and operation stability. The water content was observed to be very crucial for the acidolysis reaction in packed bed reactors. If no water was added to the substrate during reactions under the solvent-free system, very low incorporation of caprylic acid was observed. In both solvent and solvent-free systems, the acyl incorporation was favored by high substrate ratio between acyl donor and phospholipids, longer residence time, and higher reaction temperature. Under certain conditions, an incorporation of around 30% caprylic acid can be obtained in continuous operation with hexane as the solvent.

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Vikbjerg, A. F. (Intern), Peng, L. (Ekstern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 237-242
Publication date: 2005
Main Research Area: Technical/natural sciences
Diacylglycerol synthesis by enzymatic glycerolysis: Screening of commercially available lipases

Seven lipases were screened for their ability to synthesize DAG in the glycerolysis of rapeseed oil. In batch reactions with free glycerol, the lipase carrier was of great importance for catalysis. Catalysis did not take place in reactions with lipases having hydrophilic carriers. The best DAG yield (approx. 60 wt%) was achieved with Novozym 435 and Lipase PS-D after 7 h, and an equilibrium was obtained. Stepwise addition of glycerol allowed catalysis with Novozym CALB L (immobilized) to take place in spite of the hydrophilic carrier; however, the DAG yield was only 19 wt%. This result suggests that glycerol forms a layer around the hydrophilic lipase particles, limiting contact between the lipases and the hydrophobic oil phase. With glycerol absorbed on silica gel, all lipases catalyzed the glycerolysis reaction. Faster conversion of TAG was obtained with Lipase PS-D, Lipase AK, and Lipase F-AP15 than in reactions with free glycerol, but the DAG yield remained approximately 60-65 wt%. Nonspecific lipases yielded more 1,3-DAG early in the reaction.
Diacylglycerol synthesis by lipase-catalyzed glycerolysis

General information
State: Published
Organisations: Department of Systems Biology, Food Production Engineering
Authors: Kristensen, J. B. (Intern), Xu, X. (Intern), Mu, H. (Intern)
Pages: 329-334
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Volume: 82
Original language: English
Source: orbit
Source-ID: 196286
Publication: Research - peer-review › Journal article – Annual report year: 2005

Differences in the intramolecular structure of structured oils do not affect pancreatic lipase activity in vitro or the absorption by rats of (n-3) fatty acids

General information
State: Published
Organisations: Department of Systems Biology, Food Production Engineering, Enzyme and Protein Chemistry
Authors: Porsgaard, T. (Intern), Xu, X. (Intern), Gøttsche, J. (Intern), Mu, H. (Intern)
Pages: 1705-1711
Publication date: 2005
Main Research Area: Technical/natural sciences
The aim of the study was to investigate whether it was possible a) to increase the relative incorporation of n-3 very long chain polyunsaturated fatty acids (VLCPUFA) in a low VLCPUFA diet by feeding trout structured triacylglycerols and b) to reduce fat accumulation by feeding trout a diet containing DAG. A feeding experiment where groups of rainbow trout were fed six diets containing different types of oils for 61 days was performed. The lipid fraction of the six diets was as follows: 1) Fish oil and rapeseed oil (FO diet), 2) Specific structured lipid and rapeseed oil (SL diet), 3) Randomised structured lipids and rapeseed oil (RL diet), 4) Medium chain triglyceride and fish oil (MCT diet), 5) Diacylglycerol and fish oil (DAG diet), 6) Fish oil (FOmax diet). Five of the diets (1-5) contained mixed oils blended to contain the same amount of EPA and DHA. Three of these diets (2,3 and 4) contained medium chain fatty acids incorporated in TAG to be positioned either intentionally as specific (SL), by chance as randomised (RL) or added as medium chain TAG (MCT). Diet 1 contained fish oil (FO) in order to investigate the effect of MCFA and diet 4 contained diacylglycerol (DAG). Diet 6 was a reference diet containing pure fish oil (FOmax). After the feeding period, FO and FOmax fed fish were significantly larger than SL fed fish. Digestibility, measured by adding yttrium oxide as inert marker was significantly lowest for the MCT diet. Fish on the RL and MCT diets had significantly higher protein contents than fish fed FO and FOmax diets. The total fatty acid compositions of the fillet, liver, carcass and viscera were similar and reflected closely that of the diet, also in the sn-2 position. In conclusion, addition of MCT to the diet increased protein content of the fish. There was no additional effect of incorporating the medium chain fatty acids in specific positions and no weight reducing effect of adding DAG to the diets.

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Enzymatic interesterification of butterfat with rapeseed oil in a continuous packed bed reactor

Lipase-catalyzed interesterification of butterfat blended with rapeseed oil (70/30, w/w) was investigated both in batch and in continuous reactions. Six commercially available immobilized lipases were screened in batch experiments, and the lipases, Lipozyme TL IM and Lipozyme RM IM, were chosen for further studies in a continuous packed bed reactor. TL IM gave a fast reaction and had almost reached equilibrium with a residence time of 30 min, whereas RM IM required 60 min. The effect of reaction temperature was more pronounced for RM IM. TL IM showed little effect on the interesterification degree when the temperature was raised from 60 degrees C to 90 degrees C, whereas RM IM had a positive effect when the temperature was increased from 40 degrees C to 80 degrees C. Even though TL IM is an sn-1,3 specific lipase, small changes in the sn-2 position of the triacylglycerol could be seen. The tendency was toward a reduction of the saturated fatty acid C14:0 and C16:0 and an increase of the long-chain saturated and unsaturated fatty acids (C18:0 and C18:1), especially at longer residence times (90 min). In prolonged continuous operation the activity of TL IM was high for the first 5 days, whereafter it dramatically decreased over the next 10 days to an activity level of 40%. In general, the study shows no significant difference for butterfat interesterification in terms of enzyme behavior from normal vegetable oils and fats even though it contains short-chain fatty acids and cholesterol. However, the release of short-chain fatty acids from enzymatic reactions makes the sensory quality unacceptable for direct edible applications.

General information

State: Published
Organisations: Department of Systems Biology, Center for Biological Sequence Analysis, Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources
Authors: Rønne, T. H. (Intern), Yang, T. (Intern), Mu, H. (Intern), Jacobsen, C. (Intern), Xu, X. (Intern)
Pages: 5617-5624
Influence of dietary conjugated linoleic acid (CLA) and age at slaughtering on performance, slaughter- and meat quality, and lipoproteins in barrows

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Lauridsen, C. (Ekstern), Mu, H. (Intern), Henckel, P. (Ekstern)
Pages: 393-399
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Meat Science
Volume: 69
ISSN (Print): 0309-1740
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): SJR 1.734 SNIP 1.945 CiteScore 3.33
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.92 SNIP 1.85 CiteScore 3.04
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.488 SNIP 1.878 CiteScore 2.94
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.506 SNIP 1.848 CiteScore 2.9
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.655 SNIP 1.884 CiteScore 2.84
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.761 SNIP 1.797 CiteScore 2.75
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.547 SNIP 1.621
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.34 SNIP 1.511
Web of Science (2009): Indexed yes
**Lipase-catalyzed acyl exchange of soybean phosphatidylcholine in n-hexane: a critical evaluation of both acyl incorporation and product recovery**

Lipase-catalyzed acidolysis were examined for the production of structured phospholipids in a hexane system. In a practical operation of the reaction system, the formation of lyso-phospholipids from hydrolysis is often a serious problem as demonstrated from previous studies. A clear elucidation of the issue and optimization of the system is essential for the practical applications in reality. The effects of enzyme dosage, reaction temperature, solvent amount, reaction time, and substrate ratio were optimized in terms of the acyl incorporation, which led to the products, and lyso-phospholipids formed by hydrolysis, which led to the low yields. The biocatalyst used was the commercial immobilized lipase Lipozyme TL IM and substrates used were phosphatidylcholine (PC) from soybean and caprylic acid. A response surface design was used to evaluate the influence of selected parameters and their relationships on the incorporation of caprylic acid and the corresponding recovery of PC. Incorporation of fatty acids increased with increasing enzyme dosage, reaction temperature, solvent amount, reaction time and substrate ratio. Enzyme dosage had the most significant effect on the incorporation followed by reaction time, reaction temperature, solvent amount and substrate ratio. However the parameters had also a negative influence on the PC recovery. Solvent amount had the most negative effect on recovery followed by enzyme dosage, temperature, and reaction time. Individually substrate ratio had no significant effect on the PC recovery. Interactions were observed between different parameters. Based on the models, the reaction was optimized for the maximum incorporation and maximum PC recovery. With all the considerations, the optimal conditions are recommended as 29% enzyme dosage, 50 h reaction time, temperature 54°C, substrate ratio 15 mol/mol caprylic acid/PC, and 5 ml hexane per 3 g substrate. No additional water is necessary. Under these conditions, an incorporation of caprylic acid up to 46% and recovery of PC up to 60% can be obtained from the prediction. The prediction was confirmed from the verification experiments.

**General information**

State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Vikbjerg, A. F. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 397-404
Publication date: 2005
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Biotechnology Progress
Volume: 21
ISSN (Print): 8756-7938
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
Lipolysis of Different Oils using Crude Enzyme Isolate from the Intestinal Tract of Rainbow Trout, Oncorhynchus mykiss

General information
Monitoring of monooctanoyl phosphatidylcholine synthesis by enzymatic acidolysis between soybean phosphatidylcholine and caprylic acid by thin-layer chromatography with a flame ionization detector

Thin-layer chromatography with flame ionization detector (TLC-FID) method was used for monitoring the production of structured phospholipids (ML-type: L-long chain fatty acids; M-medium chain fatty acids) by enzyme-catalyzed acidolysis between soybean phosphatidylcholine (PC) and caprylic acid. It was found that the structured PC fractionated into 2-3 distinct bands on both plate thin layer chromatography (TLC) and Chromarod TLC. These 3 bands represented PC of LL-type, ML-type, and MM-type, respectively. The TLC-FID method was applied in the present study to examine the influence of enzyme dosage, reaction temperature, solvent amount, reaction time, and substrate ratio (mol/mol caprylic acid/PC) on formation of ML-type PC in batch reactor with Thermomyces lanuginosa lipase as the catalyst. The formation of ML-type PC was dependent on all parameters examined except for substrate ratio. ML-type PC content increased with increasing enzyme dosage, reaction temperature, solvent amount, and reaction time. Substrate ratio had no significant effect on the formation of ML-type PC within the tested range (3-15 mol/mol). The formation of MM-type PC was observed in some experiments, indicating that acyl migration is taking place during reaction since the lipase is claimed to be 1,3-specific. The TLC-FID method offers a simple and cheap technique for elucidation of product and by-product formation during enzyme-catalyzed reactions for production of phospholipids containing mixtures of long- and medium-chain fatty acids.

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Vikbjerg, A. F. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 3937-3942
Publication date: 2005
Main Research Area: Technical/natural sciences

Lymphatic transport in rats of structured oils containing conjugated linoleic acids

General information
State: Published
Organisations: Department of Systems Biology
Pages: 677-684
Publication date: 2005
Main Research Area: Technical/natural sciences

Lymphatic transport in rats of structured oils containing conjugated linoleic acids

Monitoring of monooctanoyl phosphatidylcholine synthesis by enzymatic acidolysis between soybean phosphatidylcholine and caprylic acid by thin-layer chromatography with a flame ionization detector
Parameters affecting incorporation and by-product formation during the production of structured phospholipids by lipase-catalyzed acidolysis in solvent free system

By-product formation is a serious problem in the lipase-catalyzed acyl exchange of phospholipids (PL). By-products are formed due to parallel hydrolysis reactions and acyl migration in the reaction system. A clear elucidation of these side reactions is important for practical operation in order to minimize by-products during reaction. In the present study we examined the Lipozyme RM IM-catalyzed acidolysis for the production of structured phospholipids between phosphatidylcholine (PC) and caprylic acid in the solvent free system. A five-factor response surface design was used to evaluate the influence of major factors and their relationships on a number of responses reflecting the turnover of main reactions as well as side reactions. The five factors, including enzyme dosage, reaction time, reaction temperature, substrate ratio (mol/mol caprylic acid/PC) and water addition, were varied at three levels with two star points. All parameters besides water addition had an effect on the incorporation of caprylic acid into PC and lysophosphatidylcholine (LPC). Reaction time and enzyme dosage showed increased effect on incorporation into PC, while substrate ratio and reaction temperature showed opposite effect. The PC content decreased with increase of all parameters except for substrate ratio. Optimal conditions are recommended as enzyme dosage 40%, reaction temperature 55°C, water addition 1%, reaction time 70h, and substrate ratio 6 mol/mol caprylic acid/PC. Under these conditions an incorporation of 46% with PC accounting for 53% of the PL fraction. Regiospecific analysis of the product revealed that the caprylic acid was mainly incorporated into the sn-1 position accounting for 80% of the fatty acids incorporated.

General information
State: Published
Organisations: Food Production Engineering, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Vikbjerg, A. F. (Intern), Mu, H. (Intern), Xu, X. (Intern)
Pages: 14-21
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Molecular Catalysis B: Enzymatic
Volume: 36
ISSN (Print): 1381-1177
Ratings:
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.39 SJR 0.63 SNIP 0.855
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.66 SNIP 0.802 CiteScore 2.12
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.744 SNIP 1.044 CiteScore 2.5
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.038 SNIP 1.38 CiteScore 3.09
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.12 SNIP 1.347 CiteScore 2.98
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.026 SNIP 1.126 CiteScore 2.74
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.797 SNIP 1.032
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.898 SNIP 1.136
Process optimization using response surface design and pilot plant production of dietary diacylglycerols by lipase-catalyzed glycerolysis

General information
State: Published
Organisations: Department of Systems Biology, Food Production Engineering, Enzyme and Protein Chemistry
Authors: Kristensen, J. B. (Intern), Xu, X. (Intern), Mu, H. (Intern)
Pages: 7059-7066
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 53
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
Size and number of lymph particles measured by a particle sizer during absorption of structured oils in rats

General information
State: Published
Organisations: Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Porsgaard, T. (Intern), Kansky, J. (Ekstern), Mason, S. L. (Intern), Mu, H. (Intern)
Pages: 273-279
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 40
Original language: English
Source: orbit
Source-ID: 184502
Publication: Research - peer-review › Journal article – Annual report year: 2005

The metabolism of structured triacylglycerols

General information
Diacylglycerols from butterfat: Production by glycerolysis and short-path distillation and analysis of physical properties

The aim of this paper was to develop a process for the production of DAG from butterfat through glycerolysis and short-path distillation and to evaluate the physical properties of the DAG in comparison with the original butterfat. Chemical glycerolysis produced a mixture of acylglycerols containing DAG together with MAG and TAG. From the mixture of glycerolysis products, MAG were removed through three consecutive distillations (vacuum <0.001 mbar) at 150°C. TAG were separated from DAG by distillation at 210°C, which gave a product with more than 80% DAG in the distillates. Distillation temperatures had significant effects on acyl migration. The formation of desirable 1,3-DAG was favored at higher temperatures. Under 210°C distillation, the equilibrium ratio of 6:4 was obtained between 1,3-DAG and 1,2(2,3)-DAG. The FA profile of the DAG product was relatively similar to the original butterfat. The total DAG recovery was around 77% in the pilot-scale production. The different patterns of m.p. were observed between butterfat and the DAG fraction produced as well as the MAG fraction collected. Solid fat content profiles of the DAG fraction and its mixtures with rapeseed oil possessed trends similar to those of the corresponding butterfat and its mixtures with rapeseed oil. Compared with butterfat, the DAG fraction behaved differently in its thermal profiles, crystallization patterns, and rheological properties; for example, the dropping point was 13°C higher for the latter than for the former, and the crystal pattern was mostly beta form for the latter, whereas the former was the beta’ form.

General information

State: Published
Organisations: Food Biotechnology and Engineering Group, Department of Systems Biology, Enzyme and Protein Chemistry
Authors: Yang, T. (Intern), Zhang, H. (Intern), Mu, H. (Intern), Sinclair, A. (Ekstern), Xu, X. (Intern)
Pages: 979-987
Publication date: 2004
Main Research Area: Technical/natural sciences

Publication information

Journal: Journal of the American Oil Chemists Society
Volume: 81
Issue number: 10
ISSN (Print): 0003-021X
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 1.64 SJR 0.696 SNIP 0.905
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.682 SNIP 0.997 CiteScore 1.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.767 SNIP 1.043 CiteScore 1.68
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.809 SNIP 1.074 CiteScore 1.71
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
To investigate whether biotransport constitutes an entry route into pristine ecosystems for nonpersistent, nonvolatile xenobiotic compounds, extractable organically bound halogen in sockeye salmon (Oncorhynchus nerka) from Alaska was determined before and after spawning migration. The major organohalogen compounds in the salmon were halogenated fatty acids, predominantly chlorinated species that accounted for up to 35% of the extractable, organically bound chlorine (EOCl) in the fish tissues. The amount of chlorinated fatty acids in the salmon muscle decreased as a result of spawning migration. The decrease was correlated with that of triacylglycerols in the salmon muscle, indicating the chlorinated fatty acids to be mobilized and metabolized to approximately the same extent as the other fatty acids. Chlorinated fatty acids were also transferred to the maturing roe in a manner similar to that of the unchlorinated fatty acids. Lipids of the Arctic grayling (Thymallus arcticus), a fish resident to the spawning lake of the salmon, contained higher concentrations of chlorinated fatty acids than grayling in a lake without migratory salmon. This may reflect a food-chain transfer of the chlorinated fatty acids originating from the salmon, demonstrating a long-range transport route for this type of pollutants to pristine areas.

Fate of chlorinated fatty acids in migrating sockeye salmon and their transfer to arctic grayling
To investigate whether biotransport constitutes an entry route into pristine ecosystems for nonpersistent, nonvolatile xenobiotic compounds, extractable organically bound halogen in sockeye salmon (Oncorhynchus nerka) from Alaska was determined before and after spawning migration. The major organohalogen compounds in the salmon were halogenated fatty acids, predominantly chlorinated species that accounted for up to 35% of the extractable, organically bound chlorine (EOCl) in the fish tissues. The amount of chlorinated fatty acids in the salmon muscle decreased as a result of spawning migration. The decrease was correlated with that of triacylglycerols in the salmon muscle, indicating the chlorinated fatty acids to be mobilized and metabolized to approximately the same extent as the other fatty acids. Chlorinated fatty acids were also transferred to the maturing roe in a manner similar to that of the unchlorinated fatty acids. Lipids of the Arctic grayling (Thymallus arcticus), a fish resident to the spawning lake of the salmon, contained higher concentrations of chlorinated fatty acids than grayling in a lake without migratory salmon. This may reflect a food-chain transfer of the chlorinated fatty acids originating from the salmon, demonstrating a long-range transport route for this type of pollutants to pristine areas.
Influence of dietary triacylglycerol structure and level of n-3 fatty acids administered during development on brain phospholipids and memory and learning ability of rats

The objective of this study was to examine the effects of triacylglycerol (TAG) structure and level of n-3 fatty acids on fatty acid profile of brain phospholipids (PL) of dams and offspring, and the memory and learning ability of the offspring, when administered during initial development of the nervous system. Methods: Pregnant rats were fed experimental diets from the 8th day of pregnancy throughout lactation. After weaning and until 13 weeks of age, the pups were fed the same diet as their dams. The experimental diets contained either a structured oil, a linseed oil, or a fish oil. In the structured oil, alpha-linolenic acid (18:3n-3) was predominantly located in the sn-2 position of the triacylglycerols and the level of 18:3n-3 was 2 mol or 10 mol%. In the linseed oil diets the level of 18:3n-3 was 2 mol or 10 mol% as well. Finally, the fish oil diet contained 18:3n-3 as well as 20:5n-3 and 22:6n-3 adding up to a total of 2 mol% n-3 fatty acids. The effects of the experimental diets were compared to the effect of a chow diet. Results: The amount of 22:6n-3 in brain phosphatidyl ethanolamine (PE) and phosphatidyl serine (PS) of dams and offspring (3 and 13 weeks of age) was not affected by the six different diets. 18:2n-6, but not 18:3n-3, was detected in brain PL, suggesting a specificity of the tissues in the metabolism of n-3 and n-6 fatty acids. The level of monounsaturated fatty acids (MUFA) increased with increasing age of the pups, indicating an enhanced myelinization. No considerable differences between groups were found when memory or learning was tested in the Morris water maze. Conclusion: The results suggest that extreme diet modifications are needed in order to observe significant effects on the memory and learning ability in rats.
Positional distribution of decanoic acid: Effect on chylomicron and VLDL TAG structures and postprandial lipemia

Although medium-chain FA (MCFA) are mainly absorbed via the portal venous system, they are also incorporated into chylomicron TAG; therefore, the positional distribution of MCFA in TAG is likely to affect their metabolic fate. We studied chylomicron and VLDL TAG structures, as well as the magnitude of postprandial lipemia, after two oral fat loads containing decanoic acid (10:0) predominantly at the sn-1 (3),2 (MML) or at the sn-1,3 positions (MLM) of TAG in a randomized, double-blind, crossover clinical trial with 10 healthy, normal-weight volunteers. An MS-MS method was used to analyze TAG regioisomers. The position of decanoic acid in chylomicron TAG reflected its position in the TAG ingested, and TAG with none, one, two, or three decanoic acid residues were detected after ingestion of both fats. More (P < 0.05) 30:0 and 38:1 TAG (acyl carbons:double bonds) and fewer 46:5, 54:5, and 54:4 TAG were found in chylomicrons after ingestion of MML than after MLM. The VLDL TAG composition did not differ between the fat loads but did change (P < 0.05) 2 to 6 h after ingestion of both fats. No statistical differences were seen between the fat loads in areas under the plasma, chylomicron, or VLDL TAG response curves or in FFA concentrations. Thus, the positional distribution of MCFA in TAG
affects their metabolic fate, but the magnitude of postprandial lipemia does not seem to be dependent on the positional
distribution of MCFA in the ingested fat.

**General information**
State: Published
Organisations: Food Biotechnology and Engineering Group, Department of Systems Biology, Enzyme and Protein
Chemistry
Authors: Yli-Jokipii, K. (Ekstern), Schwab, U. (Ekstern), Tarvonen, R. (Ekstern), Xu, X. (Intern), Mu, H. (Intern), Kallio, H.
(Ekstern)
Pages: 373-381
Publication date: 2004
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Lipids
Volume: 39
Original language: English
Source: orbit
Source-ID: 155210
Publication: Research - peer-review › Journal article – Annual report year: 2004

**The digestion of dietary triacylglycerols**
Dietary triacylglycerols (TAGs) are the major lipid components in the human diet and they are carriers of energy as well as
important fatty acids. Many factors affect the digestion and absorption of TAGs. Evidence is accumulating that, in addition
to the overall fatty acid profile, the TAG structure and the species composition are of importance when considering the
nutritional effects of a dietary fat. There is good evidence that in addition to its short-term effects in the intestine on
absorption of fatty acids the TAG structure also has long-term effects resulting from differences in the profile of absorbed
fatty acids. Observations on the different atherogenic potential of dietary fats have given us a clear indication of the
importance of the TAG structure for absorption of saturated fatty acids. In this context, one may focus on the effects of the
structure of dietary fats as such, or one may speculate additionally on the possibilities of modifying the structure of fats to
affect their absorption and the distribution of the fatty acids in the body after digestion and uptake. In this review we will
summarize diverse aspects of TAG digestion and absorption, as well as the influences of the fatty acid composition and
the intramolecular structure of dietary TAGs on their digestion and absorption.

**General information**
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Mu, H. (Intern), Høy, C. (Intern)
Pages: 105-133
Publication date: 2004
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Progress in Lipid Research
Volume: 43
ISSN (Print): 0163-7827
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): SJR 4.59 SNIP 3.359 CiteScore 11.67
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 5.217 SNIP 3.229 CiteScore 11.6
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 5.061 SNIP 3.813 CiteScore 11.6
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 4.996 SNIP 3.645 CiteScore 12.62
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Effect of orlistat on fat absorption in rats: A comparison of normal rats and rats with diverted bile and pancreatic juice

Orlistat is a specific inhibitor of pancreatic and gastric lipases leading to decreased absorption of fat. In the present study, we measured the effect of orlistat on lymphatic fat transport in rats following intake of oils very different in FA composition and TAG structure, and compared this with the transport in normal rats and rats with fat malabsorption. Rats were subjected to cannulation of the main mesenteric lymph duct, and a feeding catheter was inserted into the stomach. In addition, malabsorbing rats were cannulated in the common bile and pancreatic duct. Emulsified safflower, fish, and randomized oils were administered, and lymph was collected for 24 h and analyzed for FA composition. Administration of 25 mg orlistat together with the dietary oils resulted in very small changes from baseline lymphatic transport, indicating that inhibition of the fat absorption was almost complete and furthermore that the source of fat had no influence on the inhibitory effect of orlistat. Orlistat did not interfere with the absorption of the hydrolysis products, since high absorption of sn-2 MAG and FFA (oleic acid) mixed with orlistat was observed. The baseline lymphatic transport in the orlistat group was higher than in the malabsorbing group, but this was the result of generally lower transport of endogenous FA in the malabsorbing group, presumably caused by the absence of bile FA. The transport of FA in normal rats was several-fold higher than the transport after orlistat addition and in malabsorbing rats. Thus, this study showed that orlistat inhibited fat hydrolysis, and thereby lymphatic absorption, almost completely independently of the fat administered.
Fremstilling af et nyt smørprodukt med forbedrede ernæringsmæssige egenskaber

General information
State: Published
Organisations: Center for Biological Sequence Analysis, Department of Systems Biology, Section for Aquatic Lipids and Oxidation, National Institute of Aquatic Resources
Pages: 206-208
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Influence of maternal dietary n-3 fatty acids on breast milk and liver lipids of rat dams and offspring - a preliminary study

The impact of triacylglycerol (TAG) structure and level of n-3 fatty acids on the fatty acid profile of total breast milk lipids and total liver phospholipids (PL) of dams and offspring (1, 3 and 13 weeks of age), when administered during development, was examined. Pregnant rats were fed experimental diets from the 8(th) day of pregnancy throughout lactation. After weaning and until 13 weeks of age, the offspring were fed the same diet as their dams. The experimental diets contained either a specific structured oil, linseed oil or fish oil. In the specific structured oil, a-linolenic acid (18:3n-3) was predominantly located in the sn-2 position of the TAG and the level of 18:3n-3 was 2 mol% or 10 mol%. In the linseed oil diets the level of 18:3n-3 was 2 mol% or 10 mol% as well. Finally, the fish oil diet contained 18:3n-3 as well as 20:5n-3 and 22:6n-3 adding up to a total of 2 mol% n-3 fatty acids. Samples from three animals in each group were analyzed. The highest level of 22:6n-3 in the breast milk was obtained with diets containing this fatty acid itself. The fatty acid profile of rat dam liver PL was very different from the milk lipids indicating that the maternal dietary fats and the fatty acid synthesis in the mammary gland are the major determinants of the fatty acid profile of breast milk, whereas the liver does not significantly add to this. The 20:4n-6 was decreased in breast milk lipids and liver PL of dams and offspring when 18:3n-3 was increased in the diet. When the diet was based on 10 mol% 18:3n-3 from structured lipid trace levels of 22:6n-3 occurred in breast milk. The 22:6n-3 in liver PL of 1 week old offspring was significantly higher when the diet was based on the specific structured oil (2 mol%) compared to linseed oil. The metabolism of fatty acids may therefore be related to their positions in the dietary TAG. In liver PL of 1 week old offspring 22:6n-3 was highest in the groups, in which the breast milk contained pre-formed 22:6n-3. This demonstrates that the milk fatty acids influence the fatty acid composition of liver PL in young offspring. The results showed, furthermore, that dietary 22:6n-3 is a more effective precursor of tissue 22:6n-3 than an equivalent amount of dietary 18:3n-3.

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Hartvigsen, M. (Ekstern), Mu, H. (Intern), Høy, C. (Intern)
Pages: 747-760
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Nutrition Research
Volume: 23
Issue number: 6
ISSN (Print): 0271-5317
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 1.095 SNIP 1.002 CiteScore 3.03
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.208 SNIP 1.062 CiteScore 3.12
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.081 SNIP 1.074 CiteScore 2.95
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.998 SNIP 1.175 CiteScore 3.05
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Recoveries of rat lymph FA after administration of specific structured C-13-TAG

The potential of the specific structured TAG MLM [where M = caprylic acid (8:0) and L = linoleic acid (18:2n-6)] is the simultaneous delivery of energy and EFA. Compared with long-chain TAG (LLL), they may be more rapidly hydrolyzed and absorbed. This study examined the lymphatic recoveries of intragastrically administered L*L*L*, M*M*M*, ML*M, and ML*L* (where * = C-13-labeled FA) in rats. Lymph lipids were separated into lipid classes and analyzed by GC combustion isotope ratio MS. The recoveries of lymph TAG 18:2n-6 8 h after administration of L*L*L*, ML*M, and ML*L* were 38.6, 48.4, and 49.1%, respectively, whereas after 24 h the recoveries were approximately 50% in all experimental groups. The exogenous contribution to lymph TAG 18:2n-6 was approximately 80 and 60% at maximum absorption of the specific structured TAG and L*L*L*, respectively, 3-6 h after administration. The tendency toward more rapid recovery of exogenous long-chain FA following administration of specific structured TAG compared with long-chain TAG was probably due to fast hydrolysis. The lymphatic recovery of 8:0 was 2.2% 24 h after administration of M*M*M*. This minor lymphatic recovery of exogenous 8:0 was probably due to low stimulation of chylomicron formation. These results demonstrate tendencies toward faster lymphatic recovery of long-chain FA after administration of specific structured TAG compared with long-chain TAG.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Vistisen, B. (Intern), Mu, H. (Intern), Høy, C. (Intern)
Pages: 903-911
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 38
Absorption and metabolism of structured lipids

**General information**

**State:** Published

**Organisations:** Enzyme and Protein Chemistry, Department of Systems Biology, Food Biotechnology and Engineering Group
A packed-bed enzyme mini-reactor for the production of structured lipids using nonimmobilized lipases

General information
State: Published
Organisations: Food Biotechnology and Engineering Group, Department of Systems Biology, Enzyme and Protein Chemistry
Pages: 205-206
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of the American Oil Chemists Society
Volume: 79
Issue number: 2
ISSN (Print): 0003-021X
Ratings:
BFI (2018): BFI-level 1
Distribution of medium-chain FA in different lipid classes after administration of specific structured TAG in rats

Structured TAG (STAG) containing medium-chain FA (MCFA) in the sn-1,3 positions and essential FA in the sn-2 position were synthesized by lipase-catalyzed acidolysis. In our previous studies we found that part of the MCFA from STAG could be absorbed in the small intestine; however, it was unclear how they were absorbed. In order to get a better understanding of the metabolism of STAG to improve future design and application of STAG, in the present study lymph lipids collected after feeding STAG were fractionated into different classes and the FA composition of each lipid class was studied by GC after methylation to FAME. Caprylic acid was detected in the fraction of TAG only after administration of 1,3-dioctanoyl-2-linoleyl-sn-glycerol (8:0/18:2/8:0), whereas lauric acid was detected in TAG, DAG, and FFA as well as phospholipids, after administration of 1,3-didodecanoyl-2-linoleyl-sn-glycerol (12:0/18:2/12:0). We conclude that the enterocyte has the ability to reacylate the MCFA into TAG and that the intestinal absorption of MCFA from STAG mainly occurs by resynthesis of TAG. Caprylic acid from STAG is not incorporated into phospholipids, whereas lauric acid from STAG can be incorporated into phospholipids.

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Mu, H. (Intern), Høy, C. (Intern)
Pages: 329-331
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 37
Issue number: 3
ISSN (Print): 0024-4201
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 0.693 SNIP 0.77 CiteScore 1.94
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.782 SNIP 0.744 CiteScore 1.96
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.792 SNIP 0.876 CiteScore 2.07
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.903 SNIP 0.976 CiteScore 2.59
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.888 SNIP 1.048 CiteScore 2.5
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.765 SNIP 0.931 CiteScore 2.3
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.798 SNIP 0.898
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.694 SNIP 0.892
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.707 SNIP 0.841
Scopus rating (2007): SJR 0.741 SNIP 0.904
Scopus rating (2006): SJR 0.83 SNIP 0.788
Web of Science (2006): Indexed yes
Effect of 3 modified fats and a conventional fat on appetite, energy intake, energy expenditure, and substrate oxidation in healthy men

Background: Different dietary fats are metabolized differently in humans and may influence energy expenditure, substrate oxidation, appetite regulation, and body weight regulation.

Objective: We examined the short-term effects of 4 triacylglycerols (test fats) on subjective appetite, ad libitum energy intake, meal-induced thermogenesis, and postprandial substrate oxidation.

Design: Eleven healthy, normal-weight men (mean age: 25.1 +/- 0.5 y) consumed 4 different test fats [conventional fat (rapeseed oil) and 3 modified fats (lipase-structured fat, chemically structured fat, and physically mixed fat)] in a randomized, double-blind, crossover design.

Results: No significant differences in appetite sensations or ad libitum energy intakes were observed between the 4 test fats. Overall, the 4 fats exerted different effects on energy expenditure (meal effect: P
Production of structured phospholipids by lipase-catalyzed acidolysis: optimization using response surface methodology

General information
State: Published
Organisations: Department of Systems Biology
Authors: Peng, L. (Ekstern), Xu, X. (Intern), Mu, H. (Intern), Høy, C. (Intern), Adler-Nissen, J. (Intern)
Pages: 523-532
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Enzyme and Microbial Technology
Volume: 31
Issue number: 4
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Absorption of structured lipids
Intestinal absorption of specific structured triacylglycerols

To clarify the intestinal absorption pathway of medium-chain fatty acids from MMM-type structured triacylglycerols containing both medium- and long-chain fatty acids, we studied the lymphatic transport of 1,3-dioctanoyl-2-linoleoyl-sn-glycerol (8:0/18:2/8:0), 1,3-didecanoyl-2-linoleoyl-sn-glycerol (10:0/18:2/10:0), and 1,3-didodecanoyl-2-linoleoyl-sn-glycerol (12:0/18:2/12:0) in a rat model. Safflower oil was used in the absorption study in order to compare the absorption of medium-chain fatty acids and long-chain fatty acids. The triacylglycerol species of lymph Lipids were separated on a reversed-phase high performance liquid chromatograph (RP-HPLC) and identified by atmospheric pressure chemical ionization mass spectrometry. The composition of triacylglycerols was quantified by RP-HPLC with evaporative Light scattering detection. The intact MLM-type triacylglycerols were detected in the lymph lipids after administration of the specific structured triacylglycerols (STAG), and the recoveries of 8:0/18:2/8:0, 10:0/18:2/10:0, and 12:0/18:2/12:0 were 0.6%, 12%, and 5%, respectively. Several new triacylglycerol species were detected in the lymph lipids, including MLL-, LLL-, and MMM-type triacylglycerols. From the present study we conclude that the medium-chain fatty acids from STAG, in addition to absorption into the portal blood as free fatty acids, are absorbed by the same pathway as the conventional long-chain triacylglycerols, that is, they are hydrolyzed into free fatty acids, absorbed and activated into CoA, and reacylated into triacylglycerols in the enterocyte. The hydrolysis of MLM-type STAG is predominantly partial hydrolysis, whereas part of the STAG can also be hydrolyzed to free glycerol and free fatty acids. - Mu, H., and CE. Hoy. Intestinal absorption of specific structured triacylglycerols.
Production of margarine fats by enzymatic interesterification with silica-granulated Thermomyces lanuginosa lipase in a large-scale study

Interesterification of a blend of palm stearin and coconut oil (75:25, w/w), catalyzed by an immobilized Thermomyces lanuginosa lipase by silica granulation, Lipozyme TL IM, was studied for production of margarine fats in a 1- or 300-kg pilot-scale batch-stirred tank reactor. Parameters and reusability were investigated. The comparison was carried out between enzymatic and chemical interesterified products. Experimentally, Lipozyme TL IM had similar activity to Lipozyme IM for the interesterification of the blend. Within the range of 55-80 degreesC, temperature had little influence on the degree of interesterification for 6-h reaction, but it had slight impact on the content of free fatty acids (FFA). Drying of Lipozyme TF IM from water content 6 to 3% did not affect its activity, whereas it greatly reduced FFA and diacylglycerol contents in the products. Lipozyme TL IM was stable in the 1-kg scale reactor at least for 11 batches and the 300-kg pilot-scale reactor at least for nine batches. Due to regiospecificity of the lipase (sn-1,3 specific), enzymatically interesterified products had different Fatty acid distribution at sn-2 position from the chemically randomized products, implying the potential nutritional benefits of the new technology.

General information
State: Published
Organisations: Department of Systems Biology
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Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of the American Oil Chemists Society
Volume: 78
Issue number: 1
ISSN (Print): 0003-021X
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 1.64 SJR 0.696 SNIP 0.905
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.682 SNIP 0.997 CiteScore 1.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.767 SNIP 1.043 CiteScore 1.68
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.809 SNIP 1.074 CiteScore 1.71
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.871 SNIP 1.236 CiteScore 1.81
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.833 SNIP 1.292 CiteScore 1.98
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Quantitation of acyl migration during lipase-catalyzed acidolysis, and of the regioisomers of structured triacylglycerols formed

Various MLM-type (M, medium-chain fatty acids; L, long-chain fatty acids) structured triacylglycerols were produced in pilot- or small-scale packed-bed reactors by lipase-catalyzed acidolysis. The incorporation and acyl migration of octanoic acid were measured by gas chromatography and Grignard degradation, and ranged from 39.0 to 48.7% and 0.6 to 9.3%, respectively. Quantitation of triacylglycerol molecular species was performed by ammonia negative ion chemical ionization (NICI) mass spectrometry (MS). The proportion of ACN (acyl carbon number) 34 species that contained one C-18 fatty acid and two C-8:0, in samples analyzed, varied from 12.5 to 23.2%. The selected regioisomers MLM and MML within the ACN 34 species group were quantified by NICI tandem MS (MS/MS) and were in the range of 97.1 to 98.4% and 1.6 to 2.9%, respectively. There was no correlation between the level of acyl migration during lipase-catalyzed esterification and the level of regioisomers of the selected MLM-type triacylglycerols in the structured lipid samples.
Regioisomers of octanoic acid-containing structured triacylglycerols analyzed by tandem mass spectrometry using ammonia negative ion chemical ionization

Tandem mass spectrometry based on ammonia negative ion chemical ionization and sample introduction via direct exposure probe was applied to analysis of regioisomeric structures of octanoic acid containing structured triacylglycerols (TAG) of type MML, MLM, MLL, and LML (M, medium-chain fatty acid; L, long-chain fatty acid). Collision-induced dissociation of deprotonated parent TAG with argon was used to produce daughter ion spectra with appropriate fragmentation patterns for structure determination. Fatty acids constituting the TAG molecule were identified according to \([\text{RCO}_2\text{]}(-)\) ions in the daughter ion spectra. With the standard curve for ratios of \([\text{M} - \text{H} - \text{RCO}_2\text{H} - 100](-)\) ions corresponding to each \([\text{RCO}_2\text{]}(-)\) ion, determined with known mixtures of sn-1/3 and sn-2 regioisomers of structured TAG, it was possible to determine the proportions of different regioisomers in unknown samples. The method enabled quantification of MML- and MLM-type structured TAG. In the case of MLL- and LML-type TAG, it was possible to determine the most abundant regioisomer in the unknown mixture and estimate the proportions of regioisomers when there were more than 50% MLL-type isomers in the mixture.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Kurvinen, J. (Ekstern), Mu, H. (Intern), Kallio, H. (Ekstern), Xu, X. (Intern), Høy, C. (Intern)
Pages: 1377-1382
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication Information
Journal: Lipids
Volume: 36
Issue number: 12
Original language: English
Source: orbit
Source-ID: 45855
Publication: Research - peer-review » Journal article – Annual report year: 2001

Synthesis of structured triacylglycerols containing caproic acid by lipase-catalyzed acidolysis: Optimization by response surface methodology

Production in a batch reactor with a solvent-free system of structured triacylglycerols containing short-chain fatty acids by Lipozyme RM IM-catalyzed acidolysis between rapeseed oil and caproic acid was optimized using response surface methodology (RSM). Reaction time (t(r)), substrate ratio (S-r), enzyme load (E-1, based on substrate), water content (W-c, based on enzyme), and reaction temperature (T-e), the five most important parameters for the reaction, were chosen for the optimization. The range of each parameter was selected as follows: t(r) = 5-17 h; E-1 = 6-14 wt %; T-e = 45-65 degreesC; S-r = 2-6 mol/mol; and W-c = 2-12 wt %. The biocatalyst was Lipozyme RM IM, in which Rhizomucor miehei lipase is immobilized on a resin. The incorporation of caproic acid into rapeseed oil was the main monitoring response. In addition, the contents of mono-incorporated structured triacylglycerols and di-incorporated structured triacylglycerols were also evaluated. The optimal reaction conditions for the incorporation of caproic acid and the content of di-incorporated structured triacylglycerols were as follows: t(r) = 17 h; S-r = 5; E-1 = 14 wt %; W-c = 10 wt %; T-e = 65 degreesC. At these conditions, products with 55 mol % incorporation of caproic acid and 55 mol % di-incorporated structured triacylglycerols were obtained.

General information
State: Published
Organisations: Department of Systems Biology
Pages: 5771-5777
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication Information
Journal: Journal of agricultural and food chemistry
Volume: 49
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
Application of atmospheric pressure chemical ionization liquid chromatography-mass spectrometry in identification of lymph triacylglycerols
Chromatographic methods in the monitoring of lipase-catalyzed interesterification

General Information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Mu, H. (Intern), Kalo, P. (Ekstern), Xu, X. (Ekstern), Høy, C. (Intern)
Pages: 202-211
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication Information
Journal: European Journal of Lipid Science and Technology
Volume: 102
Issue number: 3
ISSN (Print): 1438-7697
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 2.06 SJR 0.71 SNIP 1.024
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.642 SNIP 0.881 CiteScore 1.85
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.737 SNIP 1.051 CiteScore 1.98
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.852 SNIP 1.124 CiteScore 2.16
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.873 SNIP 1.207 CiteScore 2.06
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.732 SNIP 0.945 CiteScore 1.75
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.791 SNIP 1.049
Effects of different medium-chain fatty acids on intestinal absorption of structured triacylglycerols

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Mu, H. (Intern), Høy, C. (Intern)
Pages: 83-89
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 35
Issue number: 1
Original language: English
Source: orbit
Source-ID: 177476
Publication: Research - peer-review › Journal article – Annual report year: 2000

Effects of triacylglycerol structure on fat absorption

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Høy, C. (Intern), Mu, H. (Intern)
Pages: 218-235
Publication date: 2000

Host publication information
Title of host publication: Fat digestion and absorption (Eds.: S. de Vries)
Place of publication: Champaign
Publisher: AOCS Press
Identification of diacylglycerols and triacylglycerols in a structured lipid sample by atmospheric pressure chemical ionization liquid chromatography/mass spectrometry

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Mu, H. (Intern), Sillen, H. (Ekstern), Høy, C. (Intern)
Pages: 1049-1059
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of the American Oil Chemists Society
Volume: 77
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ISSN (Print): 0003-021X
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 1.64 SJR 0.696 SNIP 0.905
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.682 SNIP 0.997 CiteScore 1.66
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.767 SNIP 1.043 CiteScore 1.68
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.809 SNIP 1.074 CiteScore 1.71
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.871 SNIP 1.236 CiteScore 1.81
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.833 SNIP 1.292 CiteScore 1.98
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.763 SNIP 1.056
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.863 SNIP 1.183
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.667 SNIP 1.037
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.663 SNIP 0.891
Web of Science (2007): Indexed yes
**Intestinal metabolism of interestified fats**

**General information**
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Høy, C. (Intern), Mu, H. (Intern)
Pages: 383-401
Publication date: 2000

**Host publication information**
Title of host publication: Intestinal lipid metabolism (Eds.: C. Mansbach)
Place of publication: New York
Publisher: Plenum Publishing Co., N.Y.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 177490
Publication: Research - peer-review › Article in proceedings – Annual report year: 2000

**Lipase-catalyzed production of structured lipids via acidolysis of fish oil with caprylic acid**

**General information**
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Pages: 263-274
Publication date: 2000
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Journal of Food Lipids
Volume: 7
Issue number: 4
Ratings:
Scopus rating (2012): SJR 0.43 SNIP 0.918
Scopus rating (2011): SJR 0.609 SNIP 1.029
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.45 SNIP 0.812
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.715 SNIP 0.722
Lipozyme IM-catalyzed interesterification for the production of margarine fats in a 1 kg scale stirred tank reactor

Lipozyme IM-catalyzed interesterification of the oil blend between palm stearin and coconut oil (75/25 w/w) was studied for the production of margarine fats in a 1 kg scale batch stirred tank reactor. Parameters such as lipase load, water content, temperature, and reaction time were investigated. The reusability of Lipozyme IM was also studied under optimized conditions. The interesterification products were monitored by analysis of triacylglycerol profiles, the contents of diacylglycerols, free fatty acids (FFA), and solid fat contents. The contents of some triacylglycerol species, which were categorized by equivalent carbon number (ECN), namely ECN34, 36, 48, and 50, decreased by 6.0, 5.9, 5.8, and 13.7%, respectively, after enzymatic interesterification, similar to the reduction of those species after chemical interesterification, 6.6, 6.0, 7.1, and 12.9%, respectively. On the other hand, those of ECN38, 40, 42, 44, and 46 increased by 1.1, 1.6, 6.8, 16.7, and 6.5%, respectively, in comparison with the increase of those species after chemical interesterification, 0.2, 1.5, 6.5, 17.0, and 9.2%, respectively. Lipase load and reaction time had great influence on the degree of interesterification. A Lipozyme IM load of 6% was required for a reaction of 6 h and at 60 °C, to reach a stable degree of interesterification. Temperature variation in the range of 50–75 °C did not affect the reaction degree as well as the contents of diacylglycerols, but the content of FFA slightly increased with higher temperature. Addition of water to the enzyme increased the contents of diacylglycerols and FFA in the products linearly. However, it had no effect on the degree of interesterification for the first batch when the enzyme was reused. Lipozyme IM was stable in the 10-batch test after adjusting the water content in the system. The relationship between the content of water in the system and that of FFAs in the products was evaluated and discussed.
Lipozyme IM-catalyzed interesterification for the production of margarine fats in a 1 kg scale stirred tank reactor

Lipozyme IM-catalyzed interesterification of the oil blend between palm stearin and coconut oil (75/25 w/w) was studied for the production of margarine fats in a 1 kg scale batch stirred tank reactor. Parameters such as lipase load, water content, temperature, and reaction time were investigated. The reusability of Lipozyme IM was also studied under optimized conditions. The interesterification products were monitored by analysis of triacylglycerol profiles, the contents of diacylglycerols, free fatty acids (FFA), and solid fat contents. The contents of some triacylglycerol species, which were categorized by equivalent carbon number (ECN), namely ECN34, 36, 48, and 50, decreased by 6.0, 5.9, 5.8, and 13.7%, respectively.
respectively, after enzymatic interesterification, similar to the reduction of those species after chemical interesterification, 6.6, 6.0, 7.1, and 12.9%, respectively. On the other hand, those of ECN38, 40, 42, 44, and 46 increased by 1.1, 1.6, 6.8, 16.7, and 6.5%, respectively, in comparison with the increase of those species after chemical interesterification, 0.2, 1.5, 6.5, 17.0, and 9.2%, respectively. Lipase load and reaction time had great influence on the degree of interesterification. A Lipzyme IM load of 6% was required for a reaction of 6 h and at 60 degrees C, to reach a stable degree of interesterification. Temperature variation in the range of 50-75 degrees C did not affect the reaction degree as well as the contents of diacylglycerols, but the content of FFA slightly increased with higher temperature. Addition of water to the enzyme increased the contents of diacylglycerols and FFA in the products linearly. However, it had no effect on the degree of interesterification for the first batch when the enzyme was reused. Lipzyme IM was stable in the 10-batch test after adjusting the water content in the system. The relationship between the content of water in the system and that of FFAs in the products was evaluated and discussed.

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Pages: 221-228
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Starch - Starke
Volume: 52
Issue number: 6-7
ISSN (Print): 0038-9056
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 0.589 SNIP 0.946 CiteScore 1.68
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.53 SNIP 0.822 CiteScore 1.57
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.644 SNIP 0.909 CiteScore 1.71
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.6 SNIP 0.959 CiteScore 1.6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.512 SNIP 0.887 CiteScore 1.27
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.536 SNIP 0.997 CiteScore 1.5
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.627 SNIP 0.987
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.511 SNIP 0.83
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.566 SNIP 1.006
Scopus rating (2007): SJR 0.669 SNIP 0.994
Scopus rating (2006): SJR 0.583 SNIP 1.163
Scopus rating (2005): SJR 0.512 SNIP 0.815
Web of Science (2005): Indexed yes
Parameters affecting diacylglycerol formation during the production of specific-structured lipids by lipase-catalyzed interesterification

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Mu, H. (Intern), Skands, A. (Ekstern), Høy, C. (Intern), Adler-Nissen, J. (Intern)
Pages: 175-181
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of American Oil Chemists’ Society
Volume: 76
Issue number: 2
Original language: English
Source: orbit
Source-ID: 171936
Publication: Research - peer-review › Journal article – Annual report year: 1999

Production of specifically structured lipids by enzymatic interesterification in a pilot enzyme bed reactor: process optimization by response surface methodology

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Mu, H. (Intern), Høy, C. (Intern), Adler-Nissen, J. (Intern)
Pages: 207-213
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Fett/Lipid
Volume: 101
Issue number: 6
Original language: English
Source: orbit
Source-ID: 171937
Publication: Research - peer-review › Journal article – Annual report year: 1999

Production of structured lipids by lipase-catalyzed interesterification in a packed bed reactor: Effect of reaction parameters on the level of diacylglycerols in the products
Response factors of organochlorine compounds in the electrolytic conductivity detector

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Lund University
Authors: Mu, H. (Intern), Wesén, C. (Ekstern), Odenbrand, I. (Ekstern), Wahlund, K. (Ekstern)
Pages: 285-292
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Chromatography A
Volume: 849
ISSN (Print): 0021-9673
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 3.97 SJR 1.462 SNIP 1.295
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.713 SNIP 1.395 CiteScore 4.03
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.825 SNIP 1.509 CiteScore 4.28
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 2.017 SNIP 1.616 CiteScore 4.6
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 2.31 SNIP 1.703 CiteScore 4.6
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.433 SNIP 1.663 CiteScore 4.47
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.207 SNIP 1.566
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Chlorinated fatty acids in membrane lipids of fish

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Lund University, Stockholm University
Authors: Björn, H. (Ekstern), Sundin, P. (Ekstern), Wesen, C. (Ekstern), Mu, H. (Intern), Odham, G. (Ekstern)
Pages: 229-232
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Naturwissenschaften
Volume: 85
Issue number: 5
ISSN (Print): 0028-1042
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 0.715 SNIP 0.738 CiteScore 1.45
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.027 SNIP 0.858 CiteScore 1.88
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.064 SNIP 0.906 CiteScore 1.91
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.92 SNIP 0.954 CiteScore 2.07
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.084 SNIP 1.207 CiteScore 2.31
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.076 SNIP 1.112 CiteScore 2.22
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.11 SNIP 1.198
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.189 SNIP 1.255
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.182 SNIP 1.052
Scopus rating (2007): SJR 1.199 SNIP 1.258
Scopus rating (2006): SJR 1.06 SNIP 1.097
Scopus rating (2005): SJR 0.958 SNIP 1.156
Scopus rating (2004): SJR 1.027 SNIP 1.309
Scopus rating (2003): SJR 0.957 SNIP 1.026
Scopus rating (2002): SJR 0.875 SNIP 0.933
Scopus rating (2001): SJR 0.794 SNIP 0.886
Scopus rating (2000): SJR 0.621 SNIP 0.89
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.668 SNIP 1.026
Original language: English
DOIs:
10.1007/s001140050488
Source: orbit
Source-ID: 170023
Publication: Research - peer-review › Journal article – Annual report year: 1998

Production of specific-structured lipids by enzymatic interesterification: elucidation of acyl migration by response surface design

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Skands, A. (Ekstern), Høy, C. (Intern), Mu, H. (Intern), Balchen, S. (Intern), Adler-Nissen, J. (Intern)
Pages: 1179-1186
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of American Oil Chemists' Society
Volume: 75
Issue number: 9
Original language: English
Source: orbit
Source-ID: 171202
Publication: Research - peer-review › Journal article – Annual report year: 1998

Production of Specific Structured Triacylglycerols by Lipase-Catalyzed Interesterification in a Laboratory Scale Continuous Reactor

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Department of Biotechnology
Authors: Mu, H. (Intern), Xu, X. (Intern), Høy, C. (Intern)
Pages: 1187-1193
Publication date: 1998
Main Research Area: Technical/natural sciences
Halogenated fatty acids: I. Formation and occurrence in lipids

Chlorinated fatty acids have been found to be major contributors to organohalogen compounds in fish, bivalves, jellyfish, and lobster, and they have been indicated to contribute considerably to organohalogenes in marine mammals. Brominated fatty acids have been found in marine sponges. Also, chlorinated lipids have been found in meat exposed to hypochlorite disinfected water, and in chlorine-treated flour and in products made from such flour. Following exposure to chlorine bleached pulp mill effluents, aquatic organisms may have elevated concentrations of chlorinated fatty acids in their lipids. However, a natural production of halogenated fatty acids is also possible. In this paper we summarize the present knowledge of the occurrence of halogenated fatty acids in lipids and suggested ways of their formation. In Part II (Trends Anal. Chem. 16 (1997) 274) we deal with methods of their determination.
Halogenated fatty acids: II. Methods of determination in lipids

Halogenated fatty acids are the major contributors to organohalogen compounds in lipids of marine mammals, fish, and bivalves. For the initial characterization of these recently noticed compounds, a determination of the halogen concentration has usually been combined with some lipid isolation and separation method. This review covers separation by solid phase chromatography, gel permeation chromatography, and liquid-liquid extraction, followed by halogen determination. All studies performed according to this outline have indicated that the major organohalogen compounds are chlorinated fatty acids bound in different lipids.

For the detection and identification of individual, halogenated fatty acid methyl esters (FAMEs) liberated from the lipids, gas chromatography (GC) has been employed together with detection methods such as electron capture detection, electrolytic conductivity detection (ELCD), atomic emission spectrometry, and mass spectrometry. For most environmental samples, chlorinated FAMEs must be enriched prior to GC. ELCD is a useful detection method for indicating halogenated FAMEs in the chromatograms, and tentative identification of the halogenated species can be obtained by calculation of retention indices. For closer identification of halogenated FAMEs, mass spectrometry (MS) is very useful, in particular when employing the chemical ionisation mode. MS identification, however, is highly facilitated if halogenated species are first indicated by element-selective methods.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Lund University
Authors: Mu, H. (Intern), Sundin, P. (Ekstern), Wesén, C. (Ekstern)
Pages: 274-286
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: TRAC - Trends in Analytical Chemistry
Volume: 16
Issue number: 5
ISSN (Print): 0165-9936
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Synthesis of structured triacylglycerols by lipase in continuous reactor

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Mu, H. (Intern), Høy, C. (Intern)
Projects:

**New human milk fat substitutes (HMFS) from butterfat to improve absorption of calcium and energy in infant**

Administration

Department of Systems Biology
Period: 01/04/2006 → 31/12/2008
Number of participants: 1
Acronym: HMFS
Project ID: 45888
Project Manager, organisational:
Mu, Huiling (Intern)

Financing sources
Source: Forskningsprojekter - Fødevareministeriet
Name of research programme: Forskningsprojekter - Fødevareministeriet
Amount: 3,000,000.00 Danish Kroner
Project

**Enzymatic Production of Ceramide from Sphingomyelin**

Department of Systems Biology
Period: 01/03/2005 → 01/04/2009
Number of participants: 6
Phd Student:
Zhang, Long (Intern)
Supervisor:
Xu, Xuebing (Intern)
Main Supervisor:
Hellgren, Lars (Intern)
Examiner:
Mu, Huiling (Intern)
Adlercreutz, Patrick (Ekstern)
Villeneuve, Pierre (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-lønnet stipendie
Project: PhD

**Foods enriched with fish oil: stability-nutrition-consumer acceptance**

Department of Systems Biology
Period: 01/01/2005 → 01/01/2007
Number of participants: 1
Acronym: Scanomega
Project ID: 45781
Project participant:
Mu, Huiling (Intern)

**Financing sources**
Source: Forskningsrådene - Andre
Name of research programme: Forskningsrådene - Andre
Amount: 3,973,000.00 Danish Kroner

**Fedtstoffer : Teknologi - kvalitet - ernæring**
Enzyme and Protein Chemistry
Department of Systems Biology
Period: 01/01/2004 → 31/12/2006
Number of participants: 1
Project Manager, organisational:
Mu, Huiling (Intern)

**Financing sources**
Source: Forskningsrådene - STVF
Name of research programme: Forskningsrådene - STVF
Amount: 2,500,000.00 Danish Kroner

**Fiskefoder med strukturerede lipider til regnbueørred**
Enzyme and Protein Chemistry
Department of Systems Biology
Period: 01/01/2004 → 31/12/2004
Number of participants: 1
Project Manager, organisational:
Mu, Huiling (Intern)

**Financing sources**
Source: Forskningsprojekter - Fødevareministeriet
Name of research programme: Forskningsprojekter - Fødevareministeriet
Amount: 509,911.00 Danish Kroner

**Den omvendte kostpyramide**
Enzyme and Protein Chemistry
Department of Systems Biology
Period: 01/09/2003 → 30/06/2005
Number of participants: 1
Project Manager, organisational:
Mu, Huiling (Intern)

**Financing sources**
Source: Forskningsprojekter - Andre ministerier og styrelser
Name of research programme: Forskningsprojekter - Andre ministerier og styrelser
Amount: 58,800.00 Danish Kroner

**Enzyme Catalysed Production of Phospholipids with Modified Fatty Acid Profile**
Department of Systems Biology
Period: 01/05/2003 → 04/12/2006
Number of participants: 7
Phd Student:
Vikbjer, Anders Falk (Intern)
Supervisor:
Optimization of butter fat by enzymatic interesterification with plant oils

Administration

Department of Systems Biology
Period: 01/01/2003 → 01/01/2006
Number of participants: 1
Project participant:
Mu, Huiling (Intern)

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

Production and Nutritional Aspects of Butter Enriched with Diacylglycerols

Department of Systems Biology
Period: 15/10/2002 → 27/03/2006
Number of participants: 8
Phd Student:
Kristensen, Janni Brogaard (Intern)
Supervisor:
Jacobsen, Charlotte (Intern)
Nielsen, Nina Skall (Intern)
Xu, Xuebing (Intern)
Main Supervisor:
Mu, Huiling (Intern)
Examiner:
Hellgren, Lars (Intern)
Adlercreutz, Patrick (Ekstern)
Jensen, Merete Myrup (Intern)

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

Dietary fats: Technology - Quality - Nutrition

The production of interesterified fats is optimized in laboratory scale as well as in pilot plant. The intestinal absorption of the fats is examined in animal models and the fats are incorporated into food.

Department of Biochemistry and Nutrition
National Institute of Aquatic Resources
Department of Systems Biology
Period: 01/01/1999 → 31/12/2003
Number of participants: 9
Project participant:
Porsgaard, Trine (Intern)
Jensen, Karen (Intern)
Nielsen, Nina Skall (Intern)
Mu, Huiling (Intern)
Børresen, Torger (Ekstern)
Jacobsen, Charlotte (Ekstern)
Adler-Nissen, Jens (Ekstern)
Xu, Xuebing (Ekstern)
Project Manager, organisational:
Høy, Carl-Erik (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 14,300,000.00 Danish Kroner
Project

Absorption og metabolisme af omestrede triglycerider
Department of Systems Biology
Period: 01/08/1998 → 21/02/2003
Number of participants: 6
Phd Student:
Vistisen, Bodil (Intern)
Supervisor:
Mu, Huiling (Intern)
Main Supervisor:
Høy, Carl-Erik (Intern)
Examiner:
Hellgren, Lars (Intern)
Christensen, Michael Søberg (Intern)
Müllertz, Anette (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-lønned stipendie
Project: PhD

Absorption of interesterified fats
We examine the effect of triglyceride structure of dietary fats on the absorption of the fat and modify the composition by lipase mediated interesterification.
Department of Biochemistry and Nutrition
Period: 01/01/1998 → 31/12/2000
Number of participants: 3
Project participant:
Mu, Huiling (Intern)
Agersten, Jannie Felskov (Intern)
Project Manager, organisational:
Høy, Carl-Erik (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 1,830,000.00 Danish Kroner
Project
Nutritional Effects of the Triacylglycerol structure of Dietary Fats

Triglycerides are synthesized by enzymatic interesterification. The effects of polyunsaturated fatty acids as well as of medium chain fatty acids are investigated in animal models for absorption.

Department of Biochemistry and Nutrition

Department of Biotechnology

Department of Systems Biology

Period: 01/01/1995 → 31/12/1997
Number of participants: 8

Project participant:

Christensen, Michael Søberg (Intern)
Mu, Huiling (Intern)
Vermehren, Charlotte (Intern)
Haim, Lisbeth (Intern)
Andreassen, Ulla Martvig (Intern)
Askland, Winnie (Intern)
Adler-Nissen, Jens (Intern)

Project Manager, organisational:
Hey, Carl-Erik (Intern)

Financing sources

Source: Unknown
Name of research programme: Ukendt
Amount: 4,100,000.00 Danish Kroner

Project