Sex and muscle structural lipids in obese subjects - an impact on insulin action?

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Desaturation of skeletal muscle structural and depot lipids in obese individuals during a very-low-calorie diet intervention

Objective: This study investigated whether a very-low-calorie dietary intervention (VLCD) may influence composition of skeletal muscle cell membrane phospholipid and composition and concentration of intramyocellular triglyceride (IMTG) in obese subjects. The working hypothesis proposed that a VLCD would decrease saturated fatty acids (FAs) and increase long-chain polyunsaturated FAs (LCPUFAs) in muscular structural lipids, as such changes have been associated with improved insulin sensitivity. Research Methods and Procedures: Skeletal muscle biopsies (vastus lateralis) were obtained from 13 obese subjects (nine women) before and after 8 weeks on VLCD (similar to 600 to 800 kcal/d). FA composition in muscle cell membrane phospholipid and concentration and FA composition of IMTG were determined by gas-liquid chromatography. Results: Baseline BMI was 36.0 +/- 3.4 kg/m(2). Weight loss was 9.3 +/- 1.1 kg (8.8 +/- 1.1%; p <0.0001); loss of adipose tissue was 5.9 +/- 0.9 kg (p <0.0001). Insulin resistance (by homeostasis model assessment) decreased (-44 +/- 7%; p <0.001). Muscle cell membrane phospholipid saturated FAs decreased (-3.2 +/- 1.3%; p <0.05), whereas monounsaturated FAs (4.3 +/- 1.7%; p <0.05), LCPUFAs (11 +/- 6%; p <0.05), and the ratio of LCPUFAs to saturated FAs (12 +/- 5%; p <0.05) increased. IMTG decreased, but not significantly (-5%). IMTG-saturated FAs decreased (-3.3 +/- 1.5%; p <0.05), whereas LCPUFAn-3 (29 +/- 9%; p <0.01), LCPUFAn-6 (33 +/- 9%; p <0.01), and the ratio of LCPUFAs to saturated FAs (34 +/- 8%; 1 p <0.001) increased. Plasma total cholesterol (-15 +/- 6%; p <0.05), low-density lipoprotein-cholesterol (-16 +/- 5%; p <0.01), high-density lipoprotein-cholesterol (-8 +/- 2%; p <0.01), and plasma triglyceride (-19 +/- 12%; p = 0.10) all decreased during the VLCD. Discussion: Desaturation of both muscle cell membrane phospholipid and IMTG was significant but modest during a VLCD in obese subjects. Further research must delineate whether such changes in skeletal muscle structural and depot lipid composition themselves are enough to promote the observed improvements in insulin action.

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Authors: Haugaard, S. (Ekstern), Vaag, A. (Ekstern), Høy, C. (Intern), Madsbad, S. (Ekstern)
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Web of Science (2016): Indexed yes
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Dietary intervention increases n-3 long-chain polyunsaturated fatty acids in skeletal muscle membrane phospholipids of obese subjects. Implications for insulin sensitivity

Objective Cross-sectional studies suggest that the fatty acid (FA) composition of phospholipids in skeletal muscle cell membrane may modulate insulin sensitivity in humans. We examined the impact of a hypocaloric low-fat dietary intervention on membrane FA composition and insulin sensitivity. Design Muscle membrane FA profiles were determined in muscle (vastus lateralis) biopsies from 21 obese subjects before and after 6 months of dietary restriction. Diet instructions emphasized low intake of FA of marine origin by recommending lean fish and prohibiting fatty fish and fish oil supplements. Insulin resistance was estimated by the homeostasis model assessment (HOMA-IR). Results The mean weight loss was 5.1 kg (range -15.3 to +1.3 kg). BMI decreased from 36.5 to 34.9 kg/m(2) (P = 0.003). Saturated FA (SFA) decreased 11% (P = 0.0001). Polyunsaturated FA (PUFA)n-6 increased 4% (P = 0.003). Long-chain PUFA n-3 increased 51% (P = 0.0001), mainly due to a 75% increase (P <0.0001) in docosahexaenoic acid. Changes in HOMA-IR correlated significantly with changes in long-chain PUFA n-3 (R = -0.57, P <0.01), SFA (R = 0.58, P <0.01) and waist circumference (R = 0.46, P <0.05). A multivariate linear regression analysis that included changes in weight, fat mass, waist circumference, plasma lipids, PUFA, SFA and long-chain PUFA n-3 indicated that SFA and long-chain PUFA n-3 were independent predictors of HOMA-IR (R=2 = 0.33, P <0.01). Conclusions A hypocaloric low-fat dietary intervention programme increased incorporation of long-chain PUFA n-3 and reduced SFA in skeletal muscle membrane phospholipids of obese subjects, a setting that may impact on insulin action.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Haugaard, S. (Ekstern), Madsbad, S. (Ekstern), Høy, C. (Intern), Vaag, A. (Ekstern)
Dietary structured lipids for post-weaning piglets: fat digestibility, nitrogen retention and fatty acid profiles of tissues

In four groups of post-weaning piglets the effects of triacylglycerol structure and fatty acid profiles of four dietary fats on apparent faecal nutrient digestibility, nitrogen retention and fatty acid profiles of platelet and erythrocyte membranes, liver, adipose tissue and skeletal muscle were examined. Dietary fats included as 10% (w/w) of the diets were two structured fats of rapeseed oil interesterified with tridecanoin (R1) or coconut oil (R2), respectively, one mixture of rapeseed oil and coconut oil (R3) and rapeseed oil as control (R4). Faeces and urine from piglets weaned at 28 days of age were collected quantitatively during three periods each of 5 days, in which the piglets were kept in metabolism cages for measurement of apparent faecal nutrient and energy digestibility and nitrogen retention. Apparent faecal fat digestibilities were significantly improved in groups fed interesterified fats or the physical mixtures (R1, R2 and R3) compared with rapeseed oil (R4).

Apparent faecal nitrogen digestibility and retention were similar in all four groups in the three periods, but increased with time. Apparent faecal fat digestibilities were significantly improved from the first to the third week in the groups R1 and R2. Fatty acid profiles in platelet and erythrocyte membranes and in tissues reflected the fatty acid profile of the dietary fat, except for medium-chain fatty acids, which were only found in low proportions, indicating that 10:0 was mainly used as an energy source.

General information
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Organisations: Department of Systems Biology
Authors: Straarup, E. M. (Intern), Danielsen, V. (Ekstern), Høy, C. (Intern), Jakobsen, K. (Ekstern)
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Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.609 SNIP 0.894 CiteScore 1.15
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.67 SNIP 1.043 CiteScore 1.41
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.514 SNIP 0.972 CiteScore 1.16
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.551 SNIP 0.958 CiteScore 1.12
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.467 SNIP 0.679 CiteScore 0.92
ISI indexed (2011): ISI indexed yes
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Scopus rating (2010): SJR 0.512 SNIP 0.938
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.494 SNIP 0.926
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Scopus rating (2008): SJR 0.469 SNIP 0.775
Scopus rating (2007): SJR 0.478 SNIP 0.854
Scopus rating (2006): SJR 0.576 SNIP 1.04
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.35 SNIP 0.99
Scopus rating (2004): SJR 0.344 SNIP 0.671
Effects of increasing dietary concentrations of specific structured triacylglycerides on performance and nitrogen and energy metabolism in broiler chickens

1. Specific structured triacylglycerides (STG) containing medium chain fatty acids in sn-1,3 positions and long chain fatty acid in sn-2 position were prepared from rapeseed oil and capric acid (C10:0). 2. A total of 80 female broiler chickens (Ross 208) were randomly allocated into five dietary treatments as two series of 40 chicks: a basal diet with graded levels of STG of 0, 20, 40, 60 and 80 g/kg diet at the expense of rapeseed oil were fed to the chickens in groups of four. At 12d of age the chickens were placed pair-wise in metabolism cages. The grower period (d 13-36) was divided into four consecutive balance periods each of 6 d. Two 24 h measurements of gas exchange in two open-air circuit respiration chambers were performed during the second and third day of each balance period. 3. During the whole experiment there was a negative effect of the inclusion of STG on average feed intake. However, this only slightly affected average daily weight gain. Feed conversion efficiency improved linearly with the inclusion level of STG. Daily gain adjusted to mean daily feed intake increased linearly with inclusion rate of STG, indicating that the weight gain was affected by both feed intake and the enhancing effect on digestibility of STG. Weight of small intestine and colon decreased with increasing inclusion of STG. 4. Utilisation of dietary protein relative to intake increased while that of retained fat tended to decrease resulting in a decreased utilisation of metabolisable energy (RE/ME) in birds receiving STG. Heat production (HE) was slightly lower in the STG groups. 5. More of the dietary fat was oxidised when more STG was added, although the total amount of fat in the diets was kept constant.
Lymphatic fatty acids in canine with pharmaceutical formulations containing structured triacylglycerols

The intramolecular structure of dietary triacylglycerols (TAG) influences absorption. In this study, two different pharmaceutical formulations were compared containing TAG differing in fatty acid profiles and intramolecular structures: LML and MLM, where M represented medium-chain fatty acids (MCFA; 8:0) and L represented long-chain fatty acids (LCFA). Lymph was collected from thoracic duct-cannulated canines for 12 h and the fatty acid composition was determined. The lymphatic transport of total fatty acids was significantly higher than the amount dosed; hence, the small exogenously dosed lipid recruited a large pool of endogenous fatty acids. The LML vehicle led to a significantly higher total fatty acid transport than the MLM vehicle. The amount of 8:0 recovered in lymph was almost similar and low for both groups. The amount of LCFA recovered from the animals dosed with the LML vehicle was generally higher than from the animals dosed with the MLM vehicle; however, statistically significant differences were only found for 18:0 and 18:3n-3. In conclusion, these results indicated that the fatty acid profile and intramolecular structure of administered TAG influenced the absorption of fatty acids in canines, also when the TAG was incorporated into a pharmaceutical formulation in low amounts.

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Scopus rating (2016): CiteScore 2.06 SJR 0.71 SNIP 1.024
Web of Science (2016): Indexed yes
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**

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Organisations: Department of Systems Biology
Authors: Vistisen, B. (Intern), Mu, H. (Intern), Hey, C. (Intern)
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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
Scopus rating (2005): SJR 0.673 SNIP 0.801
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.75 SNIP 0.876
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.807 SNIP 0.957
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.784 SNIP 0.887
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.754 SNIP 0.925
The recovery of C-13-labeled oleic acid in rat lymph after administration of long chain triacylglycerols or specific structured triacylglycerols

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Organisations: Department of Systems Biology
Authors: Vistisen, B. (Intern), Mu, H. (Intern), Høy, C. (Intern)
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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
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Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.961 SNIP 1.022 CiteScore 2.91
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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
Scopus rating (2008): SJR 0.811 SNIP 0.876
Scopus rating (2007): SJR 0.954 SNIP 1.079
Web of Science (2007): Indexed yes
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Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.98 SNIP 1.108
Web of Science (2005): Indexed yes
The stereospecific triacylglycerol structures and fatty acid profiles of human milk and infant formulas

Background: The stereospecific structures of the triacylglycerol molecules in human milk differ from that of cow's milk and vegetable oils, which are the fat sources used in infant formula. In human milk, palmitic acid (16:0) is predominantly esterified in the sn2 position, whereas vegetable oils or cow's milk fat contain most of their 16:0 in the outer positions of the triacylglycerol molecules. Furthermore, human milk contains long-chain polyunsaturated fatty acids, which are not present in either cow's milk or vegetable oils. Methods: By standard lipid analysis procedures, we examined the triacylglycerol structures and fatty acid profiles of fats from 28 infant formulas or formulas for special indications available in the Danish market from 1999 to 2003. Results: The total fatty acid compositions of the formulas showed a 16:0 content almost similar to human milk, whereas the content in the sn2 position was considerably lower. The content of oleic acid was found to be equal to or higher than in human milk in 21 of 28 formulas, whereas the content in the sn2 position was higher in all but one formula. Most formulas had linoleic acid levels considerably above that of human milk. Long-chain polyunsaturated fatty acids (arachidonic acid and docosahexaenoic acid) were present in all preterm formulas, but only in 3 of the term formulas. Conclusion: We found that most of the examined infant formulas, both preterm and term as well as special formulas, had stereospecific structures and fatty acid profiles that differed considerably from that of human milk.

General information
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Organisations: Department of Systems Biology, Department of Biochemistry and Nutrition
Authors: Straarup, E. M. (Intern), Lauritzen, L. (Ekstern), Færk, J. (Intern), Høy, C. (Intern), Michaelsen, K. (Ekstern)
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Web of Science (2016): Indexed yes
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Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.242 SNIP 1.321 CiteScore 2.4
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.297 SNIP 1.352 CiteScore 2.55
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Lymphatic transport in rats of structured oils containing conjugated linoleic acids

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13C-labeled 18:2n-6 recovered in brush border membrane phospholipids short time after administration.
The purpose of the present study was to examine the short-term effect of dietary specific structured triacylglycerols (MLM, M = 8:0, L = 18:2n-6), LLL and MMM on the fatty acid composition of brush border membrane (BBM) phosphatidylcholine (PC) and phosphatidylethanolamine (PE). Rats were administered intragastrically a bolus of ML*M, M*LM*, L*L*L* or M*M*M* (* = C-13-labeled fatty acid). Rats were decapitated 2 hours and 6 hours later, and the fatty acid composition and C-13-enrichment of BBM-PC and -PE were determined. C-13-enriched 18:2n-6 was observed in BBM-PC after intragastric administration of L*L*L* and ML*M, whereas no C-13-labeled fatty acids were recovered after administration of M*LM* or M*M*M*. Interestingly, no C-13-labeled fatty acids were detected in the BBM-PE fraction. This could be due to a lower turnover of PE than PC and to a different ratio of saturated and unsaturated fatty acids in the two phospholipid pools. Minor effects on BBM-PC and BBM-PE fatty acid profiles (mole-%) were observed. The present study demonstrated for
the first time incorporation of C-13-labeled 18:2n-6 into BBM-PC 2 hours and 6 hours after intragastric administration of \textsuperscript{L}'\textsuperscript{L}'\textsuperscript{L}' or ML\textsuperscript{M}. This emphasizes the influence of the dietary fatty acid on BBM fatty acid composition and the rapid incorporation of dietary long-chain fatty acids into intestinal enterocyte phospholipids. Medium-chain fatty acids in a single meal exert only a minor influence on the BBM phospholipid fatty acid profile.
Does fat in milk, butter and and cholesterol differently?

Objective: To compare the effects of isoenergetic amounts of milk, cheese and butter (adjusted to the same content of lactose and casein) on fasting and postprandial blood lipids and lipoproteins, and on postprandial glucose and insulin response. Design: The experiments were designed to provide 20% of total energy from dairy fat, as either whole milk, mean (+/-SD) 2164 (+/-97) g, butter 93 (4) g, and hard cheese 305 (+/-45) g, which were served to 14 healthy young men for three periods of three weeks each, separated by washout periods, in a randomized, cross-over study with strictly controlled dietary intake. Fasting blood samples were taken at the end of the study periods. Measurements of the postprandial effect of the three different dairy test products (0.7 g of milk fat/kg body weight) were carried out on day 4 of each intervention period. Blood samples were taken before and at 2, 4, 6 and 8 hours following intake of the meals.

Results: Fasting LDL cholesterol concentration was significantly higher after butter than cheese diet (p = 0.037), with a borderline significant difference in total cholesterol (p = 0.054) after the experimental periods of three weeks. Postprandial glucose showed a higher response after cheese diet than after milk diet (p = 0.010, diet X time interaction). Conclusions: A different effect of fat in milk and butter could not be confirmed in this study. The moderately lower LDL cholesterol after cheese diet compared to butter diet should be investigated further.

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Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Tholstrup, T. (Ekstern), Høy, C. (Intern), Andersen, L. (Ekstern), Christensen, R. (Ekstern), Sandstrøm, B. (Ekstern)
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Publication date: 2004
Main Research Area: Technical/natural sciences

Effects of medium-chain fatty acids and oleic acid on blood lipids, lipoproteins, glucose, insulin, and lipid transfer protein activities

Background: Dietary medium-chain fatty acids (MCFAs) are of nutritional interest because they are more easily absorbed from dietary medium-chain triacylglycerols (MCTs) than are long-chain fatty acids from, for example, vegetable oils. It has generally been claimed that MCFAs do not increase plasma cholesterol, although this claim is poorly documented.

Objective: We compared the effects of a diet rich in either MCFAs or oleic acid on fasting blood lipids, lipoproteins, glucose, insulin, and lipid transfer protein activities in healthy men. Design: In a study with a double-blind, randomized, crossover design, 17 healthy young men replaced part of their habitual dietary fat intake with 70 g MCTs (66% 8:0 and 34% 10:0) or high-oleic sunflower oil (89.4% 18:1). Each intervention period lasted 21 d, and the 2 periods were separated by a washout period of 2 wk. Blood samples were taken before and after the intervention periods. Results: Compared with the intake of high-oleic sunflower oil, MCT intake resulted in 11% higher plasma total cholesterol (P = 0.0005), 12% higher LDL cholesterol (P = 0.0001), 32% higher VLDL cholesterol (P = 0.080), a 12% higher ratio of LDL to HDL cholesterol (P = 0.002), 22% higher plasma total triacylglycerol (P = 0.0361), and higher plasma glucose (P = 0.033). Plasma HDL- cholesterol and insulin concentrations and activities of cholesterol ester transfer protein and phospholipid transfer protein did not differ significantly between the diets. Conclusions: Compared with fat high in oleic acid, MCT fat unfavorably affected lipid profiles in healthy young men by increasing plasma LDL cholesterol and triacylglycerol. No changes in the activities of phospholipid transfer protein and cholesterol ester transfer protein were evident.

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Authors: Tholstrup, T. (Ekstern), Ehnholm, C. (Ekstern), Jauhiainen, M. (Ekstern), Petersen, M. (Ekstern), Høy, C. (Intern), Lund, P. (Intern), Sandstrøm, B. (Ekstern)
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Main Research Area: Technical/natural sciences
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.

General information
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Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Hartvigsen, M. (Ekstern), Mu, H. (Intern), Hougaard, K. (Ekstern), Lund, S. (Ekstern), Xu, X. (Intern), Høy, C. (Intern)
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BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.093 SNIP 1.03 CiteScore 2.55
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.284 SNIP 1.12 CiteScore 2.64
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.949 SNIP 1.014 CiteScore 2.46
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.841 SNIP 0.89 CiteScore 2.35
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.872 SNIP 0.951 CiteScore 2.38
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Lymphatic fat absorption varies among rats administered dairy products differing in physiochemical properties
We examined in rats the intestinal absorption of fat from dairy products differing in physiochemical properties. Five dairy products (cream cheese, cream, sour cream, butter, and mixed butter) with minor differences in fatty acid composition were administered by gavage to rats, and lymphatic fat absorption was examined. Absorption was followed for 8 h after administration of 300 mg fat from the dairy products. Administration of cream and sour cream resulted in faster lymphatic fat absorption than cream cheese, butter, and mixed butter, and at 8 h the accumulated absorption of fat was significantly higher. The lymphatic absorption of fat after cream cheese administration was similar to the absorption after butter and mixed butter administration up to the 4-h time point; then it increased to a level between that of rats administered cream or sour cream and butter or mixed butter. Overall, these results demonstrated different lymphatic absorption patterns of fat from dairy products differing in physiochemical properties. Because the fatty acid composition of the dairy products differed only slightly, other factors such as viscosity, type of emulsion, particle size, and likely also protein content may have contributed to the differences in absorption.
Maternal fish oil supplementation in lactation: Effect on visual acuity and n-3 fatty acid content of infant erythrocytes

Studies on formula-fed infants indicate a beneficial effect of dietary DHA on visual acuity. Cross-sectional studies have shown an association between breast-milk DHA levels and visual acuity in breast-fed infants. The objective in this study was to evaluate the biochemical and functional effects of fish oil (FO) supplements in lactating mothers. In this double-blinded randomized trial, Danish mothers with habitual fish intake below the 50th percentile of the Danish National Birth Cohort were randomized to microencapsulated FO [1.3 g/d long-chain n-3 FA (n-3 LCPUFA)] or olive oil (00). The intervention started within a week after delivery and lasted 4 mon. Mothers with habitual high fish intake and their infants were included as a reference group. Ninety-seven infants completed the trial (44 OO-group, 53 FO-group) and 47 reference infants were followed up. The primary outcome measures were: DHA content of milk samples (0, 2, and 4 mon postnatal) and of infant red blood cell (RBC) membranes (4 mon postnatal), and infant visual acuity (measured by swept visual evoked potential at 2 and 4 mon of age). FO supplementation gave rise to a threefold increase in the DHA content of the 4-mon milk samples (P <0.001). DHA in infant RBC reflected milk contents (r = 0.564, P <0.001) and was increased by almost 50% (P <0.001). Infant visual acuity was not significantly different in the randomized groups but was positively associated at 4 mon with infant RBC-DHA (P = 0.004, multiple regression). We concluded that maternal FO supplementation during lactation did not enhance visual acuity of the infants who completed the intervention. However, the
results showed that infants with higher RBC levels of n-3 LCPUFA had a better visual acuity at 4 mon of age, suggesting that n-3 LCPUFA may influence visual maturation.

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.
Transport of C-13-labelled linoleic and C-13-labelled caprylic acid in rat plasma after administration of specific structured triacylglycerols

The lymphatic transport of structured triacylglycerol consisting of medium and long chain fatty acids in rats has been investigated in several studies, but the following metabolism of the absorbed fatty acids carried in chylomicrons is less elucidated. In the present study we determined the transport of dietary C-13-labelled fatty acids in rat plasma to compare the chylomomicron fatty acid metabolism after administration of specific structured, long chain and medium chain triacylglycerols. Rats were fed ML*M, M*LM*, L*L*L* or M*M*M* (L=linoleic acid, 18:2n-6, M=caprylic acid, 8:0, * = C-13-labelled fatty acid) by gavage. A maximum transport of 0.5% of the administered C-13-labelled 18:2n-6 was observed in 1mL rat plasma both after administration of L*L*L* and ML*M, while approximately 0.04% of the administered C-13-labelled 8:0 was detected in 1mL plasma following administration of M*M*M* or M*LM*. After L*L*L* administration C-13-labelled 20:4n-6 was observed in plasma, probably formed by elongation and desaturation of 18:2n-6 in the enterocyte or liver cells. Furthermore, C-13-labelled 16:0, 48:0, 18:1n-9 and 20:4n-6 were observed in plasma of rats fed M*M*M* and M*LM* due to transformation to long chain fatty acids in the enterocyte and/or the liver. The present study indicates similar chylomicron metabolism of specific structured triacylglycerols compared with long chain or medium chain triacylglycerols and reveals information of elongation and desaturation of the dietary fatty acids.

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Scopus rating (2016): SJR 1.095 SNIP 1.002 CiteScore 3.03
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.

General information
Fat digestibility, nitrogen retention, and fatty acid profiles in blood and tissues of post-weaning piglets fed interesterified fats

The effects of a designer fat as to changes in triacylglycerol structure in dietary fat on nutrient digestibility, nitrogen retention and fatty acid profile of plasma, erythrocyte membranes, liver, adipose tissue and skeletal muscle were examined in four groups of post-weaning piglets. The test fats added by 10% (w/w) to the diets were: R1 regiospecific structured fats with decanoic acid mainly located in the sn-1/3 positions and a long-chain fatty acid from rapeseed oil in the sn-2 position, R2 similar fat subjected to chemical randomization, R3 physical mixture of tridecanoin and rapeseed oil, and R4 rapeseed oil. The piglets were weaned at 28 days of age, and after one week of adaptation faeces and urine were collected quantitatively during three periods each of 7 days, in which the piglets were kept in metabolism cages for measurement of nutrient and energy digestibility and protein retention. Fat digestibility and nitrogen retention were improved significantly by feeding the manufactured oils containing 10:0 (R1-R3) compared to rapeseed oil (R4; P
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
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Publication: Research – Journal article – Annual report year: 2003

Gastric emptying in rats following administration of a range of different fats measured as acetaminophen concentration in plasma

Aim: To investigate the gastric emptying upon administration of ten different fats in order to determine whether major differences in fatty acid profiles resulted in differences in gastric emptying. Methods: Gastric emptying was measured as the appearance of acetaminophen in plasma which represents an indirect measure of gastric emptying. Emulsified fats with added acetaminophen were fed by gavage to rats, and the plasma concentration of acetaminophen was followed for 3 h by repeated blood sampling from the carotid artery. The fats administered included rapeseed, corn, and fish oils, lard, and cocoa butter as well as different structured lipids containing decanoic acid (10:0) and long-chain n-3 polyunsaturated fatty acids of marine origin. Overall, these fats had wide variations in fatty acid compositions and triacylglycerol structures. Results: No statistically significant differences were observed in gastric emptying between the groups fed the different fats, except for the emptying of tridecanoin (tri-10:0) that was statistically significantly slower than that of randomized oil, cocoa butter, and rapeseed oil (p <0.05). The slower emptying of tri-10:0 could be caused by a lower caloric intake of this fat as compared with the other fats, because similar weights of fat were administered. Conclusion: The gastric emptying of fat was not influenced by fatty acid composition and triacylglycerol structure of the fats administered.

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Authors: Porsgaard, T. (Intern), Straarup, E. M. (Intern), Høy, C. (Intern)
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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, α-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.

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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
Scopus rating (2012): SJR 0.83 SNIP 0.994 CiteScore 2.55
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.802 SNIP 1.073 CiteScore 2.51
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.645 SNIP 0.802
Web of Science (2010): Indexed Yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.418 SNIP 0.55
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.334 SNIP 0.426
Scopus rating (2007): SJR 0.347 SNIP 0.5
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.338 SNIP 0.473
Scopus rating (2005): SJR 0.373 SNIP 0.503
Scopus rating (2004): SJR 0.294 SNIP 0.398
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.331 SNIP 0.463
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.328 SNIP 0.457
Web of Science (2002): Indexed yes
Minor amounts of plasma medium-chain fatty acids and no improved time trial performance after consuming lipids

Medium-chain triacylglycerols (MCT) have a potential glycogen-saving effect during exercise due to rapid hydrolysis and oxidation. However, studies comparing intake of carbohydrates (CHO) plus 80-90 g MCT with intake of CHO alone have revealed different results. The present study tested performance after consumption of specific structured triacylglycerol, consisting of a mixture of medium-chain fatty acids and long-chain fatty acids, to prevent the adverse effects observed by MCT (pure medium-chain fatty acids) regarding gastrointestinal distress. Seven well-trained subjects cycled 3 h at 55% of maximum 02 uptake during which they ingested CHO or CHO plus specific structured triacylglycerols. Immediately after the constant-load cycling, the subjects performed a time trial of similar to50-min duration. Breath and blood samples were obtained regularly during the experiment. Fatty acid composition of plasma triacylglycerols, fatty acids, and phospholipids was determined. Performance was similar after administration of CHO plus specific structured triacylglycerol [medium-, long-, and medium-chain fatty acid (MLM)] compared with CHO (50.0 +/- 1.8 and 50.8 +/- 3.6 min, respectively). No plasma 8:0 was detected in the plasma lipid classes, but the amount of phospholipid fatty acids was significantly higher after CHO+MLM compared with CHO intake. The lacking time trial improvement after intake of medium-chain fatty acids might be due to no available 8:0 in the systemic circulation. A higher level of plasma phospholipid fatty acids in the CHO+MLM compared with the CHO group was probably due to endogenous phospholipid release into chylomicrons.
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
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Authors: Vistisen, B. (Intern), Mu, H. (Intern), Høy, C. (Intern)
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Absorption and metabolism of structured lipids

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Authors: Porsgaard, T. (Intern), Straarup, E. M. (Intern), Mu, H. (Intern), Xu, X. (Intern), Høy, C. (Intern)
Pages: 017-AGFD
Publication date: 2002
Main Research Area: Technical/natural sciences

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A packed-bed enzyme mini-reactor for the production of structured lipids using nonimmobilized lipases

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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
Different effects of diets rich in olive oil, rapeseed oil and sunflower-seed oil on postprandial lipid and lipoprotein concentrations and on lipoprotein oxidation susceptibility

Elevated concentrations of fasting and non-fasting triacylglycerol-rich lipoproteins (TRL) as well as oxidative changes of lipoproteins may increase the risk of ischaemic heart disease. To compare the effects of different diets rich in unsaturated fatty acids on the concentrations and in vitro oxidation of fasting and postprandial lipoproteins eighteen males consumed diets enriched with rapeseed oil (RO), olive oil (OO), or sunflower-seed oil (SO) in randomised order for periods of 3 weeks followed by a RO test meal. In the postprandial state the concentrations of cholesterol and triacylglycerol (TAG) in TRL were higher after consumption of OO compared with RO and SO (P
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 enteroctye 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.
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

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Issue number: 1
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Ratings:
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BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.97 SJR 3.664 SNIP 2.355
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Lipase-catalyzed interesterification between fish oil and medium-chain TAG has been investigated in a packed-bed reactor with a commercially immobilized enzyme. The enzyme, a Thermomyces lanuginosa lipase immobilized on silica by granulation (Lipozyme TL IM; Novozymes A/S, Bagsvaerd, Denmark), has recently been developed for fat modification. This study focuses on the new characteristics of the lipase in a packed-bed reactor when applied to interesterification of TAG. The degree of reaction was strongly related to the flow rate (residence time) and temperature, whereas formation of hydrolysis by-products (DAG and FFA) were only slightly affected by reaction conditions. The degree of reaction reached equilibrium at 30-40 min residence time, and the most suitable temperature was 60°C or higher with respect to the maximal degree of reaction. The lipase was stable in a 2-wk continuous operation without adjustment of water content or activity of the column and the substrate mixture.
Production of structured phospholipids by lipase-catalyzed acidolysis: optimization using response surface methodology

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

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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 2.83 SJR 0.759 SNIP 1.025
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.85 SNIP 0.969 CiteScore 2.63
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.061 SNIP 1.214 CiteScore 3.12
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.165 SNIP 1.376 CiteScore 3.2
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.204 SNIP 1.281 CiteScore 2.78
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.062 SNIP 1.27 CiteScore 2.74
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.201 SNIP 1.565
Web of Science (2010): Indexed yes
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Scopus rating (2009): SJR 1.305 SNIP 1.504
Comparison of total oral bioavailability and the lymphatic transport of halofantrine from three different unsaturated triglycerides in lymph-cannulated conscious rats

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Authors: Holm, R. (Ekstern), Mullertz, A. (Ekstern), Christensen, E. (Ekstern), Høy, C. (Intern), Kristensen, H. (Ekstern)
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Publication date: 2001
Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): SJR 1.223 SNIP 1.499 CiteScore 4.2
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.156 SNIP 1.415 CiteScore 4.04
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 0.994 SNIP 1.247 CiteScore 3.48
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Scopus rating (2013): SJR 1.038 SNIP 1.287 CiteScore 3.47
ISI indexed (2013): ISI indexed yes
Effect of high-dose growth hormone and glutamine on body composition, urine creatinine excretion, fatty acid absorption, and essential fatty acids status in short bowel patients - A randomized, double-blind, crossover, placebo-controlled study

Background: Positive effects of high dose growth hormone and glutamine (GH+GLN) on body composition in short bowel patients have been described. Lack of effects on intestinal absorption found in some studies has been ascribed to concomitant essential fatty acid (EFA) deficiency. This study describes changes in body weight (BW) and composition, 24-h urine creatinine excretion, intestinal fatty acid absorption (total, saturated, unsaturated and EFA), and EFA status in relation to treatment with GH+GLN in short bowel patients. Methods: A double-blind, crossover study between placebo and growth hormone (mean, 0.12 mg/kg/day) plus oral (mean, 28 g/day) and parenteral glutamine (mean, 5.28/day) for 28 days. Body composition was measured by dual-energy absorptiometry (DEXA) scans. Intestinal fatty acid absorption was evaluated in balance studies, and EFAs were measured in plasma phospholipids by gas liquid chromatography. Results: Active treatment did not increase BW, lean body mass (LBM), fat mass (FM) and bone mass significantly compared with placebo treatment, but BW increased 1.03 kg (1.7%, P <0.05), LBM 2.93 kg (8.7%, P <0.001) and FM decreased 2.41 kg (10.6%, P <0.001) in comparison with baseline. Twenty-four-hour urine creatinine excretion did not differ between study periods. No changes in intestinal absorption of fatty acids were seen, and no changes in EFAs measured in plasma phospholipids were observed. Only 1 of 8 patients, who did not receive parenteral lipids, had a Holman index above 0.2, indicative of EFA deficiency. Acetate developed peripheral oedema. Conclusions: Combined high dose growth hormone and glutamine administered for 4 weeks, did not improve absorption of fatty acids or EFA status in short bowel patients. No changes in BW or composition were seen when comparing treatment to placebo periods. The increase in LBM measured by DEXA scan, comparing treatment and baseline periods, was not accompanied by an increase in the 24-h urinary creatinine excretion and is suspected to be associated with an accumulation in extracellular fluids.

General information
State: Published
Organisations: Enzyme and Protein Chemistry, Department of Systems Biology
Authors: Jeppesen, P. (Ekstern), Szkudlarek, J. (Ekstern), Høy, C. (Intern), Mortensen, P. (Ekstern)
Pages: 48-54
Publication date: 2001
Main Research Area: Technical/natural sciences
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). 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. Ex perimentally, 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
Pages: 57-64
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
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
Scopus rating (2006): SJR 0.658 SNIP 0.851
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.706 SNIP 0.973
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.73 SNIP 0.993
Web of Science (2004): Indexed yes
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.

General information
State: Published
Organisations: Department of Systems Biology
Authors: Mu, H. (Intern), Kurvinen, J. (Ekstern), Kallio, H. (Ekstern), Xu, X. (Intern), Høy, C. (Intern)
Pages: 959-964
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of the American Oil Chemists Society
Volume: 78
Issue number: 9
ISSN (Print): 0003-021X
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 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
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
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; 8, = 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.
Absorption by rats of tocopherols present in edible vegetable oils

General information

State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Porsgaard, T. (Intern), Høy, C. (Intern)
Application of atmospheric pressure chemical ionization liquid chromatography-mass spectrometry in identification of lymph triacylglycerols

Chromatographic methods in the monitoring of lipase-catalyzed interesterification
Deficiencies of essential fatty acids, vitamin A and E and changes in plasma lipoproteins in patients with reduced fat absorption or intestinal failure

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Jeppesen, P. B. (Ekstern), Høy, C. (Intern), Mortensen, P. B. (Ekstern)
Pages: 632-642
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: European Journal of Clinical Nutrition
Volume: 54
Issue number: 8
ISSN (Print): 0954-3007
Ratings:
BFI (2018): BFI-level 1
Effect of simulated household heating on fat absorption

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Porsgaard, T. (Intern), Høy, C. (Intern)
Pages: 373-382
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
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 177491
Publication: Research - peer-review › Article in proceedings – Annual report year: 2000

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
Issue number: 10
ISSN (Print): 0003-021X
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 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
Scopus rating (2006): SJR 0.658 SNIP 0.851
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
BFI (2008): BFI-level 1
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, 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 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. 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.

**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
- 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
- Scopus rating (2004): SJR 0.657 SNIP 1.261
- Scopus rating (2003): SJR 0.662 SNIP 1.248
- Web of Science (2003): Indexed yes
- Scopus rating (2002): SJR 0.556 SNIP 0.952
Lymphatic transport in rats of several dietary fats differing in fatty acid profile and triacylglycerol structure

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Porsgaard, T. (Intern), Høy, C. (Intern)
Pages: 1619-1624
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Nutrition
Volume: 130
Issue number: 6
ISSN (Print): 0022-3166
Ratings:
BFI (2018): BFI-level 2
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
Plasma phospholipid fatty acid pattern in severe liver disease

**General information**

State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Clemmensen, J. O. (Ekstern), Høy, C. (Intern), Jeppesen, P. B. (Ekstern), Ott, P. (Ekstern)
Pages: 481-487
Publication date: 2000
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Journal of Hepatology
Volume: 32
Issue number: 3
ISSN (Print): 0168-8278
Ratings:
BFI (2018): BFI-level 2
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): SJR 4.796 SNIP 2.82 CiteScore 7.43
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 4.7 SNIP 3.137 CiteScore 7.56
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 4.09 SNIP 2.818 CiteScore 7.18
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 3.693 SNIP 2.684 CiteScore 6.86
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 3.325 SNIP 2.436 CiteScore 6.34
ISI indexed (2012): ISI indexed yes
Splanchnic metabolism of fuel substrates in acute liver failure

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Clemmensen, J. O. (Ekstern), Høy, C. (Intern), Kondrup, J. (Ekstern), Ott, P. (Ekstern)
Pages: 941-948
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Hepatology
Volume: 33
Issue number: 6
ISSN (Print): 0168-8278
Ratings:
BFI (2018): BFI-level 2
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): SJR 4.796 SNIP 2.82 CiteScore 7.43
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 4.7 SNIP 3.137 CiteScore 7.56
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 4.09 SNIP 2.818 CiteScore 7.18
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 3.693 SNIP 2.684 CiteScore 6.86
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 3.325 SNIP 2.436 CiteScore 6.34
Structured lipids improve fat absorption in normal and malabsorbing rats

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Straarup, E. M. (Intern), Høy, C. (Intern)
Pages: 2802-2808
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Nutrition
Volume: 130
Issue number: 11
ISSN (Print): 0022-3166
Ratings:
BFI (2018): BFI-level 2
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
We examined in rats the intestinal absorption of 4 different dietary fats (rapeseed oil (RO), rapeseed oil interesterified with decanoic acid (R/C10), olive oil (OO), and butter) after feeding a high-fat (30 wt-%) diet rich in trans-fatty acids (mainly trans-C18:1) for 3 weeks. The trans-fatty acids were used as markers for the contribution from the endogenous stores to the circulating pool of fatty acids during the absorption, thereby enabling us to measure differences in release of endogenous fatty acids caused by differences in the administered fats. Rats with cannulated left carotid artery were divided into 4 groups after a 24 h fast and fed intragastrically with a fat load. Blood samples were collected regularly and fatty acid compositions as well as insulin and glucagon concentrations were determined (experiment 1). In 2 other groups of rats the mesenteric lymph duct was cannulated and they were fed intragastrically either R/C10 or butter. Lymph was collected and analyzed for fatty acid composition (experiment 2). The fatty acid composition of plasma lipids changed rapidly according to the administered fats and a biphasic response was observed for nearly all fatty acids investigated. Although decreasing during the early absorptive phase a continuous contribution of endogenous trans-C18:1 and arachidonic acid was observed in plasma. Small differences were observed between the 4 dietary fats. In lymph, the transport of trans-C18:1 rose markedly after butter administration partly caused by the content of this fatty acid in butter, while the transport of trans-C18:1 after R/C10 was unchanged although still transported at a reasonable high rate. The transport of arachidonic acid increased after administration of both butter and R/C10. Minor changes were observed in plasma concentrations of insulin and glucagon during the absorption. (C) Elsevier Science Inc.
Differences in essential fatty acid requirements by enteral and parenteral routes of administration in patients with fat malabsorption

Background: Essential fatty acid (EFA) requirements of patients receiving home parenteral nutrition (HPN) are uncertain.

Objective: The objective was to evaluate the influence of the route of administration (enteral compared with parenteral) on plasma phospholipid EFA concentrations.

Design: Intestinal absorption, parenteral supplement of EFAs, and plasma phospholipid EFA concentrations were investigated in balance studies in 4 groups (A, B, C, and D) of 10 patients with short-bowel syndrome and a fecal loss of >2000 kJ/d. Groups A (fat malabsorption <50%) and B (fat malabsorption >50%) did not receive HPN, whereas group C received HPN containing Lipids (7.5 and 1.2 g/d linoleic and linolenic acids, respectively) and group D received fat-free HPN.

Results: Intestinal absorption of linoleic and linolenic acids was 8.9 and 1.3 g/d and 2.6 and 0.4 g/d in groups A and B, respectively, whereas EPA absorption was negligible in groups C and D. Thus, intestinal absorption of EFAs in group A corresponded to parenteral EFA supplements in group C, whereas group D was almost totally deprived of EFAs. The median plasma phospholipid concentration of linoleic acid decreased by 21.9%, >16.3%, >13.8%, 11.0%, and >7.7% and linolenic acid by 0.3%, 0.2%, 0.2%, >0.2%, and 0.1%, respectively, in 10 healthy control subjects and groups A, B, C, and D (P < 0.001).

Conclusions: Intestinally absorbed EFAs maintained plasma EFA status better than did an equal quantity of parenterally supplied EFAs. Intravenous requirements of EFAs in patients with negligible absorption of EFAs are probably higher than the amounts recommended to patients with preserved intestinal absorption of EFAs.
Lipidemic effects of an interesterified mixture of butter, medium-chain triacylglycerol and safflower oils

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Harvard Medical School, Tufts University
Authors: Mascioli, E. (Ekstern), McLennan, C. (Ekstern), Schaefer, E. (Ekstern), Lichtenstein, A. (Ekstern), Høy, C. (Intern), Christensen, M. S. (Intern), Bistrian, B. (Ekstern)
Pages: 889-894
Publication date: 1999
Main Research Area: Technical/natural sciences

Lymphatic Fatty Acid Absorption Profile During 24 Hours After Administration of Triglycerides to Rats

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Porsgaard, T. C. (Intern), Straarup, E. M. (Intern), Høy, C. (Intern)
Pages: 103-107
Publication date: 1999
Main Research Area: Technical/natural sciences

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
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: 171936
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

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Department of Biotechnology
Authors: Mu, H. (Intern), Xu, X. (Intern), Adler-Nissen, J. (Intern), Høy, C. (Intern)
Pages: 158-164
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Fett/Lipid
Volume: 101
Original language: English
Source: orbit
Source-ID: 172388
Publication: Research - peer-review › Journal article – Annual report year: 1999

Schistosoma japonicum infection and serum and tissue concentrations of retinol and zinc in pigs

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Royal Veterinary and Agricultural University, Queen's University Belfast
Authors: Kæstel, P. (Ekstern), Lewis, F. (Ekstern), Willingham, A. (Ekstern), Bøgh, H. (Ekstern), Eriksen, L. (Ekstern), Michaelsen, K. (Ekstern), Sandström, B. (Ekstern), Høy, C. (Intern)
Pages: 489-499
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Annals of Tropical Medicine and Parasitology
Volume: 93
ISSN (Print): 2047-7724
Ratings:
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
Dietary structured triacylglycerols containing docosahexaenoic acid given from birth affect visual and auditory performance and tissue fatty acid profiles of rats

To examine whether it is possible to enhance the level of 22:6(n-3) in the central nervous system, newborn rats were fed dietary supplements containing oils with either specific or random triacylglycerol structure, but similar concentrations of polyunsaturated fatty acids. In the specific structured oil, 22:6(n-3) was located in the sn-2 position, whereas it was equally distributed among the three positions in the triacylglycerol molecule in the randomized oil. A reference group was fed rat milk before weaning and nonpurified diet after weaning. After 12 wk, the levels of 22:6(n-3) in brain and liver phospholipids were higher in the groups fed the experimental diets than in the reference group. The specific structured oil resulted in the highest level of 22:6(n-3) in the brain, whereas the level of 22:6(n-3) was highest in the liver of the group fed randomized oil, indicating differences in metabolism of fatty acids resulting from their position in the dietary triacylglycerol molecule. The higher levels of 22:6(n-3) were accompanied by significantly lower levels of the long-chain (n-6) polyunsaturated fatty acids compared with the reference group. The fatty acid profiles, including the level of 22:6(n-3), in the retina phospholipids were not affected by the three different diets apart from a lower level of 20:4(n-6) in rats fed the experimental diets, indicating a strong tendency to maintain a high level of 22:6(n-3) in the retina. The changes in the fatty acid profiles did not result in differences in learning ability, but caused changes in visual function, evidenced by higher latency of the b-wave and lower oscillatory potential, and in auditory brainstem response, evidenced by generally greater amplitude of wave Ia in the group fed specific structured oil.

General information
State: Published
Organisations: Division of Toxicology and Risk Assessment, National Food Institute, Department of Systems Biology
Effects of lipid-borne compounds on the activity and stability of lipases in micro-aqueous systems for lipase-catalyzed reaction

**General information**

State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Høy, C. (Intern), Adler-Nissen, J. (Intern)
Pages: 441-446
Publication date: 1998

**Host publication information**

Title of host publication: Stability and Stabilization of Biocatalysts
Place of publication: Amsterdam
Publisher: Elsevier Science
Main Research Area: Technical/natural sciences
Source-ID: 171233
Publication: Research › Article in proceedings – Annual report year: 1998

Essential fatty acid deficiency in patients receiving home parenteral nutrition 1,2

Home parenteral nutrition (HPN), initiated in patients with severe malabsorption or decreased oral intake, may exhaust stores of essential fatty acids and cause clinical manifestations, mainly dermatitis. Plasma fatty acid profiles were measured by gas-liquid chromatography in 37 healthy control subjects and 56 patients receiving HPN. The concentration (% by wt of total fatty acids) of 18:2n-6 was 22.8% and 11.4% (P < 0.001), whereas 18:3n-3 was 0.2% and 0.1% (P < 0.01) in control subjects and patients, respectively. Reduced small bowel length was associated with aggravated biochemical signs of essential fatty acid deficiency (EFAD). The effect of parenteral lipid on plasma phospholipids was evaluated in subgroups of patients. In patients with > 200 cm of remaining small intestine, those receiving parenteral lipids had only minor changes in the fatty acids of plasma phospholipids compared with patients not receiving parenteral lipids. In patients with < 100 cm of remaining small intestine, those receiving parenteral lipids had increased concentrations of total n-6 fatty acids; however, these did not reach the concentrations in control subjects. No differences were seen in n-3 fatty acids. Twenty-five of the 56 patients receiving HPN reported skin problems. No differences were found in plasma phospholipid fatty acids, Holman index, or the supply of parenteral lipids between patients with and without skin problems. Patients receiving HPN had biochemical signs of EFAD. Parenteral lipids did not increase the concentration of essential fatty acids to values comparable with those of control subjects, but 500 mt 20% Intralipid once a week was sufficient to prevent an increase in the Holman index above 0.2.

**General information**

State: Published
Organisations: Department of Biochemistry and Nutrition, Copenhagen University Hospital
Authors: Jeppesen, P. B. (Ekstern), Høy, C. (Intern), Mortensen, P. B. (Ekstern)
Pages: 126-133
Publication date: 1998
Main Research Area: Technical/natural sciences

**Publication information**

Journal: American Journal of Clinical Nutrition
Volume: 68
Issue number: 1
ISSN (Print): 0002-9165
Ratings:

BFI (2018): BFI-level 2
BFI (2017): BFI-level 2
Metabolism of specific structured triacylglycerols

General information
Pilot batch production of specific-structured lipids by lipase-catalyzed interesterification: preliminary study on incorporation and acyl migration

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: 301-308
Publication date: 1998
Main Research Area: Technical/natural sciences
Publication information
Journal: Journal of American Oil Chemists’ Society
Volume: 75
Issue number: 2
Original language: English
Source: orbit
Source-ID: 171200
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 lipids by enzymatic interesterification in a pilot continuous enzyme bed reactor

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Balchen, S. (Intern), Høy, C. (Intern), Adler-Nissen, J. (Intern)
Pages: 1573-1579
The effect of fish oil enriched margarine on plasma lipids, low density lipoprotein particle composition, size and susceptibility to oxidation

We investigated the effect of incorporating n-3 polyunsaturated fatty acids (PUFAs) into the diet on the lipid-class composition of LDLs, their size, and their susceptibility to oxidation. Forty-seven healthy volunteers incorporated 30 g sunflower-oil (SO) margarine into their habitual diet during a 3-wk run-in period and then used either SO or a fish-oil-enriched sunflower oil (FO) margarine for the following 4 wk. Plasma concentrations of total cholesterol, triacylglycerols, HDL cholesterol, LDL cholesterol, and apolipoproteins A-I and B did not differ significantly between the groups during intervention. The FO margarine increased the concentration of n-3 very-long-chain PUFAs in the LDL particles, showing 93% (P less than or equal to 0.0001), 8% (P = 0.05), and 35% (P = <0.0001) increases in eicosapentaenoic acid, docosapentaenoic acid, and docosahexaenoic acid, respectively, in the FO group compared with 3%, 7%, and 7%, respectively, in the SO group during the intervention. The cholesterol content of the LDL particles increased in the FO group [total cholesterol: 6% (P = 0.008); cholesterol ester: 12% (P = 0.014)], although it was not significantly different from that in the control group, whereas the other lipid classes and the size of the LDL particles remained unchanged in both groups. A reduction in the alpha-tocopherol content in LDL (6%, P = 0.005) was observed in the FO group. Ex vivo oxidation of LDL induced with Cu2+ showed a significantly reduced lag time (from 91 to 86 min, P = 0.003) and lower
maximum rate of oxidation (from 10.5 to 10.2 nmol.mg(-1).min(-1), P = 0.003) after intake of the FO margarine. The results indicate that consumption of the FO compared with the SO margarine had no effect on LDL size and lipid composition and led to minor changes in LDL alpha-tocopherol content and oxidation resistance.
Early dietary intervention with structured triacylglycerols containing docosahexaenoic acid. Effect on brain, liver, and adipose tissue lipids

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Christensen, M. M. (Ekstern), Høy, C. (Intern)
Pages: 185-191
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 32
Issue number: 2
Original language: English
Source: orbit
Source-ID: 175122
Publication: Research - peer-review › Journal article – Annual report year: 1998

Essential fatty acid deficiency in patients with severe fat malabsorption
Essential fatty acid deficiency is commonly described in patients receiving parenteral nutrition, but the occurrence in patients with severe fat malabsorption not receiving parenteral nutrition is uncertain. One hundred twelve patients were grouped according to their degree of fat malabsorption: group 1, < 10% (n = 52); group 2, 10-25% (n = 21); group 3, 25-50% (n = 24); and group 4, > 50% (n = 15). Fecal fat was measured by the method of Van de Kamer the last 2 of 5 d of a 75-g fat diet. Serum fatty acids in the phospholipid fraction were measured by gas-liquid chromatography after separation by thin-layer chromatography and expressed as a percentage of total fatty acids. The concentration of linoleic acid in groups 1, 2, 3, and 4 was 21.7%, 19.4%, 16.4%, and 13.4% respectively (P < 0.001). The concentration of linolenic acid in groups 1, 2, 3, and 4 was 0.4%, 0.4%, 0.3% and 0.3%, respectively (P = 0.017). Evidence of essential fatty acid deficiency, defined as a serum concentration of linoleic acid less than the lower limit of the 95% CI in patients without fat malabsorption (group 1), was 5% (1/21), 38% (9/24), and 67% (10/15) in groups 2, 3, and 4, respectively. A considerable proportion of patients with gastrointestinal diseases resulting in malabsorption of > 25-50% of dietary fat intake and not treated with parenteral nutrition have biochemical signs of essential fatty acid deficiency. The clinical effect of these changes are yet to be elucidated.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Copenhagen University Hospital
Authors: Jeppesen, P. B. (Ekstern), Christensen, M. S. (Ekstern), Høy, C. (Intern), Mortensen, P. B. (Ekstern)
Pages: 837-843
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: American Journal of Clinical Nutrition
Volume: 65
Incorporation of n-3 polyunsaturated fatty acids of marine or vegetable origin into rat enterocyte phospholipids

We examined time related effects of an intake of n-3 polyunsaturated fatty acids (PUFA) on the fatty acid profiles of rat enterocyte phospholipids. Three diets containing 20 wt% fat with similar levels of linoleic acid (C18:2n-6), approximately 11 wt% of the fatty acids, were prepared. The diets were: Palm oil diet (PD), 0.6 wt% n-3 PUFA; fish oil diet (FD), 32 wt% n-3 PUFA (C20-C22); and linseed oil diet (LD), 32 wt% n-3 PUFA (C18:3n-3). Forty weanling male Wistar rats were fed PD for 34 days and then divided into three groups. Two groups of sixteen rats each were then fed FD or LD, respectively, and eight rats remained on PD as a control group. At 6, 12, 18, 24, 72, 144, and 288 hours following the change of diets rats were killed, the enterocytes were isolated and the fatty acid profiles of the intestinal phospholipids were examined. During the first 12 hours following the change from PD to FD, the content of n-3 PUFA in the intestinal phospholipids increased from less than 1 mol% to approximately 20 mol%, whereas the contents of n-6 PUFA and of monoenes were reduced from 40 mol% to 28 mol% and from 19 mol% to 12 mol%, respectively. The fatty acid profiles were then largely constant during the remaining experimental period. In the LD group, the n-3 PUFA contents rose from less than 1 mol% to 10 mol% during the first 144 hours, and the content of n-6 PUFA and monounsaturated fatty acids were reduced from 40 mol% to 36 mol% and from 19 mol% to 14 mol%, respectively. Desaturation and elongation products of C18:3n-3, such as C20:5n-3, C22:5n-3 and C22:6n-3, were observed following intake of LD. All three groups contained approximately 40 mol% of saturated fatty acids in the intestinal phospholipids. Copyright (C) 1996 Elsevier Science Inc.

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Technical University of Denmark
Authors: Poulsen, C. (Ekstern), Christensen, M. S. (Ekstern), Høy, C. (Intern)
Pages: 149-162
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Nutrition Research
Volume: 17
Issue number: 1
ISSN (Print): 0271-5317
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): 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
Scopus rating (2012): SJR 0.83 SNIP 0.994 CiteScore 2.55
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.802 SNIP 1.073 CiteScore 2.51
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.645 SNIP 0.802
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.418 SNIP 0.55
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.334 SNIP 0.426
Scopus rating (2007): SJR 0.347 SNIP 0.5
Web of Science (2007): Indexed yes
Specific-structured lipids: nutritional perspectives and production potentials

General information
State: Published
Organisations: Department of Biotechnology, Department of Biochemistry and Nutrition
Authors: Xu, X. (Intern), Høy, C. (Intern), Balchen, S. (Intern), Adler-Nissen, J. (Intern)
Pages: 806-813
Publication date: 1997

Host publication information
Title of host publication: Proceedings of International Symposium on the Approaches to Functional Cereals and Oils
Place of publication: Beijing
Publisher: CCOA
Main Research Area: Technical/natural sciences
Conference: International Symposium on the Approaches to Functional Cereals and Oils and Exhibitions, Beijing, 01/01/1997
Source: orbit
Source-ID: 171231
Publication: Research › Article in proceedings – Annual report year: 1997

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)
Number of pages: 151
Publication date: 1997

Host publication information
Title of host publication: Abstracts for posters og foredrag, Levnedsmiddelkongres 1997
Place of publication: Copenhagen
Publisher: LMC
Main Research Area: Technical/natural sciences
Conference: Food Science Conference, Copenhagen, 01/01/1997
Source: orbit
Source-ID: 166800
Publication: Research - peer-review › Book chapter – Annual report year: 1997
Effects of dietary triacylglycerol structure on triacylglycerols of resultant chylomicrons from fish oil- and seal oil-fed rats

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Høy, C. (Intern), Christensen, M. S. (Intern)
Pages: 341-344
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 31
Issue number: 3
Original language: English
Source: orbit
Source-ID: 165498
Publication: Research - peer-review » Journal article – Annual report year: 1996

Effects of triacylglycerol structure of dietary oils rich in n-3 polyunsaturated fatty acids on the triacylglycerol structure of chylomicrons

General information
State: Published
Organisations: Department of Biochemistry and Nutrition
Authors: Christensen, M. S. (Intern), Høy, C. (Intern)
Pages: 341-344
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 31
Issue number: 3
Original language: English
Source: orbit
Source-ID: 168047
Publication: Research - peer-review » Journal article – Annual report year: 1996

Influence of triacylglycerol structure and fatty acid profile of dietary fats on milk triacylglycerols in the rat

General information
State: Published
Organisations: Department of Biochemistry and Nutrition, Center for Food Research and Department of Biochemistry and Nutrition
Authors: Jensen, M. M. (Ekstern), Sørensen, P. H. (Ekstern), Høy, C. (Intern)
Pages: 187-192
Publication date: 1996
Main Research Area: Technical/natural sciences

Publication information
Journal: Lipids
Volume: 31
Issue number: 2
Original language: English
Source: orbit
Source-ID: 165325
Publication: Research - peer-review » Journal article – Annual report year: 1996
Extravascular lipid deposition and morphology of atherosclerosis in heterozygous WHHL rabbits fed vegetable (n-6) and marine (n-3) oils

General information
State: Published
Organisations: Department of Systems Biology, Division of Toxicology and Risk Assessment, National Food Institute
Authors: Mortensen, A. (Ekstern), Hansen, B. F. (Ekstern), Frandsen, H. (Ekstern), Hansen, J. F. (Ekstern), Andersen, P. S. (Ekstern), Høy, C. (Intern), Meyer, O. A. (Intern)
Pages: 213-225
Publication date: 1995
Main Research Area: Technical/natural sciences

Publication information
Journal: Scandinavian Journal of Laboratory Animal Science
Volume: 22
Issue number: 3
ISSN (Print): 0901-3393
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): SJR 0.126 SNIP 0.395 CiteScore 0.26
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.101 SNIP 0 CiteScore 0
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.122 SNIP 0.667 CiteScore 0.21
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.122 SNIP 0.377 CiteScore 0.26
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.241 SNIP 0.383 CiteScore 0.44
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.133 SNIP 0.2 CiteScore 0.28
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.207 SNIP 0.273
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.162 SNIP 0.22
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.158 SNIP 0.378
Scopus rating (2007): SJR 0.258 SNIP 0.37
Scopus rating (2006): SJR 0.215 SNIP 0.433
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.152 SNIP 0.11
Scopus rating (2004): SJR 0.13 SNIP 0.103
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.164 SNIP 0.537
Scopus rating (2002): SJR 0.214 SNIP 0.388
Scopus rating (2001): SJR 0.225 SNIP 0.541
Scopus rating (2000): SJR 0.159 SNIP 0.346
Scopus rating (1999): SJR 0.218 SNIP 0.304
Original language: English
Source: orbit
Source-ID: 245886
Publication: Research - peer-review › Journal article – Annual report year: 1995
Projects:

Mælkephospholipider
Mælkephospholipiders ernæringsmæssige betydning
Department of Biochemistry and Nutrition
Period: 01/01/2000 → 31/12/2001
Number of participants: 1
Project Manager, organisational: Hey, Carl-Erik (Intern)

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)
Berresen, Torger (Ekstern)
Jacobsen, Charlotte (Ekstern)
Adler-Nissen, Jens (Ekstern)
Xu, Xuebing (Ekstern)
Project Manager, organisational: Hey, Carl-Erik (Intern)

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

Triglycerides for infant formulas
The relation between triglyceride structure of fats for infant milk formulas and the absorption in rats is examined. Also the ability of these fats to form calcium soaps resulting in fecal loss of calcium and energy is examined in rats and in infants. The compositions of infant formulas available are analyzed.
Department of Biochemistry and Nutrition
Department of Systems Biology
Period: 01/01/1999 → 31/12/2000
Number of participants: 4
Project participant: Straarup, Ellen Marie (Intern)
Lien, Eric (Ekstern)
Fleischer-Michaelsen, Kim (Ekstern)
Project Manager, organisational: Hey, Carl-Erik (Intern)

Financing sources
Source: Unknown
**Fats optimized for human nutrition**

We produce fats with an optimized fatty acid profile, which takes into consideration an extract of all recommendations. The fats are given to human test persons and the effects on blood parameters are investigated. The same fats are examined in animal test models for absorption of fats.

**Department of Biochemistry and Nutrition**

**Period**: 01/12/1998 → 30/11/2000
**Number of participants**: 7

**Project participant**:
- Christensen, Egon (Intern)
- Straarup, Ellen Marie (Intern)
- Astrup, Arne (Ekstern)
- Sandström, Brittmarie (Ekstern)
- Marckmann, Peter (Ekstern)
- Tholstrup, Tine (Ekstern)

**Project Manager, organisational**: Høy, Carl-Erik (Intern)

**Financing sources**

**Source**: Unknown
**Name of research programme**: Ukendt
**Amount**: 75,000.00 Danish Kroner

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**Metabolism of interesterified fats**

The metabolism of interesterified fats is investigated by synthesis of C13-labeled triglycerides with specified triacylglycerol structure and fatty acid profile. The absorption and metabolism into longer chain polyunsaturated fatty acids is investigated.

**Department of Biochemistry and Nutrition**

**Period**: 01/09/1998 → 31/08/2001
**Number of participants**: 2

**Project participant**:
- Vistisen, Bodil (Intern)

**Project Manager, organisational**: Høy, Carl-Erik (Intern)

**Financing sources**

**Source**: Unknown
**Name of research programme**: Ukendt
**Amount**: 200,000.00 Danish Kroner

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**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)
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

Ernæringsmæssige effekter af mælkefedtstoffers fysiske tilstand

Department of Systems Biology
Period: 01/04/1997 → 07/10/2002
Number of participants: 5
Phd Student:
Fruekilde, Maj-Britt (Intern)
Main Supervisor:
Høy, Carl-Erik (Intern)
Examiner:
Hellgren, Lars (Intern)
Jensen, Merete Myrup (Intern)
Müllertz, Anette (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Sektorministerium, Stip-SU
Project: PhD

Production of Specific Structured Lipids by Lipase Catalyzed Interestepification

Department of Systems Biology
Period: 01/02/1997 → 17/07/2000
Number of participants: 4
Phd Student:
Xu, Xuebing (Intern)
Supervisor:
Høy, Carl-Erik (Intern)
Main Supervisor:
Adler-Nissen, Jens (Intern)
Examiner:
Villadsen, John (Intern)

Financing sources
Source: Internal funding (public)
Nutritional properties of milk fats
We examine if the physical form of milk fats, e.g. butter versus milk versus yougurt, will affect the absorption of the fat in animal models.

Department of Biochemistry and Nutrition

Department of Systems Biology
Period: 01/01/1997 → 31/12/2000
Number of participants: 4
Project participant:
Jensen, Karen (Intern)
Fruekilde, Maj-Britt (Intern)
Sandström, Brittmarie (Ekstern)
Project Manager, organisational:
Høy, Carl-Erik (Intern)

Financing sources
Source: Unknown
Name of research programme: Ukendt
Amount: 3,200,000.00 Danish Kroner

Rapsolie's indflydelse på human lipoproteinmetabolisme

Department of Systems Biology
Period: 01/06/1995 → 20/10/1999
Number of participants: 2
Phd Student:
Nielsen, Nina Skall (Intern)
Main Supervisor:
Høy, Carl-Erik (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Sektorministerium, Stip-SU

Studies on the absorption of vegetable oils in the rat

Department of Systems Biology
Number of participants: 4
Phd Student:
Porsgaard, Trine (Intern)
Supervisor:
Christensen, Michael Søberg (Intern)
Main Supervisor:
Høy, Carl-Erik (Intern)
Examiner:
Christophe, Armand (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Sektorministerium, Stip-SU

Svinekød: Forbedrede fetstoffer til start- og fravænningsfoder samt slagtefoder

Department of Systems Biology
Trans-Fedtsyrer Versus mættede fedtsyrer i føden - relationer til metabolismen af polyumættede fedtsyrer og blodlipider

Technical University of Denmark
Period: 01/04/1995 → 31/07/2000
Number of participants: 4
PhD Student: 
Bysted, Anette (Intern)
Main Supervisor: 
Hølmer, Gunhild Kofoed (Intern)
Examiner: 
Høy, Carl-Erik (Intern)
Christensen, Erling (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Sektorministerium, Stip-SU
Project: PhD

Improved fats for piglets.
Specially fats for piglets are manufactured with the intention of increasing the survival rate during weaning.

Department of Biochemistry and Nutrition
Department of Systems Biology
Research Center Foulum
Aarhus Olie A/S
Association of Danish Fish Meal and Fish Oil Manufacturers
Period: 01/03/1995 → 28/02/1999
Number of participants: 4
Project participant: 
Straarup, Ellen Marie (Intern)
Kejser, Flemming (Intern)
Jakobsen, Kirsten (Ekstern)

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

Financing sources
Source: Unknown
Name of research programme: Uндend
Amount: 3,374,000.00 Danish Kroner
Project

Dietary fats for short bowel patients.
Short bowel patient frequently suffer from fat malabsorption. The project aims at describing the extent of clinical fat malabsorption and to produce modified fats for the patients.
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.

Rapeseed oil in human nutrition.

The project aims at substituting a major part of the dietary fats with rapeseed oil. Rapeseed oil is improved by selection of plants. The effects of processing and storage are examined. Rapeseed oil is compared with alternative fats in both animal models for fat absorption and in human studies.
Structured triglycerides for infant milk formulas

Department of Systems Biology
Period: 01/11/1992 → 24/08/1995
Number of participants: 2
PhD Student:
   Jensen, Merete Myrup (Intern)
Main Supervisor:
   Høy, Carl-Erik (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: samarbejdsaftale-finans.
Project: PhD

Structured triglycerides in the prevention of coronary heart disease

Department of Systems Biology
Period: 01/10/1991 → 23/04/1996
Number of participants: 2
PhD Student:
   Andersen, Peder Søren (Intern)
Main Supervisor:
   Høy, Carl-Erik (Intern)

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

Structured lipids in enteral nutrition

Department of Systems Biology
Period: 01/04/1991 → 16/06/1994
Number of participants: 2
PhD Student:
   Christensen, Michael Søberg (Intern)
Main Supervisor:
Hay, Carl-Erik (Intern)

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