

Documents

- 1) Kirkhus, B., Afseth, N.K., Borge, G.I.A., Grimsby, S., Steppeler, C., Krona, A., Langton, M.
Increased release of carotenoids and delayed in vitro lipid digestion of high pressure homogenized tomato and pepper emulsions
(2019) *Food Chemistry*, 285, pp. 282-289.

Abstract

Carotenoids are lipophilic compounds that are digested and absorbed along with lipids. Emulsions based on a mixture of plum tomato and red sweet pepper, with 5% or 10% rapeseed oil, were obtained by high pressure homogenization, and the concentration of carotenoids in the emulsion oil droplets was quantified. The fraction of lycopene and beta-carotene released from the plant matrix into the oil droplets was highest in the 10% emulsion, which had larger oil droplets than the 5% emulsion. Xanthophylls were easily released into oil droplets in both 5% and 10% emulsions. The results suggest that the release of carotenoids made available for intestinal absorption depends on carotenoid type and can be significantly improved by increasing the homogenization pressure and oil content. However, in vitro gastrointestinal digestion indicated the presence of constituents or structures in the emulsions, originating from tomato, that reduced pancreatic activity, which may delay micellization and uptake of carotenoids. © 2019 Elsevier Ltd

Document Type: Article

Publication Stage: Final

Source: Scopus

- 2) Svanberg, L., Wassén, S., Gustinelli, G., Öhgren, C.
Design of microcapsules with bilberry seed oil, cold-set whey protein hydrogels and anthocyanins: Effect of pH and formulation on structure formation kinetics and resulting microstructure during purification processing and storage
(2019) *Food Chemistry*, 280, pp. 146-153.

Abstract

Encapsulation of polar and non-polar bioactive compounds from bilberries was achieved by designing microcapsules with bilberry seed oil (BSO) distributed in an aqueous phase of anthocyanins (AC) stabilized by whey protein isolate (WPI). Non-thermal emulsification method (o/w/o) was developed and the effect of pH (3 or 4.5), concentration of WPI (8.4–10.8% w/w), addition of AC (72–216 ppm) and emulsifier on the structure-forming kinetics, resulting microstructure during storage and after centrifugation and washing was investigated. Agglomeration of BSO was observed in all microcapsules at pH 4.5 due to slow gelling process and in samples at pH 3 at low concentrations of WPI ($\leq 8.4\%$). Capsules with pH 3 (9.6–10.8% WPI) had weak structures but as the gelling process was faster, it generated an even distribution of BSO droplets. All samples at pH 4.5 and samples with WPI concentration $\geq 10.8\%$ at pH 3 exhibited intact structures after centrifugation and washing. © 2018 Elsevier Ltd

Document Type: Article

Publication Stage: Final

Source: Scopus

- 3) Garg, A., Malafronte, L., Windhab, E.J.
Baking kinetics of laminated dough using convective and microwave heating
(2019) *Food and Bioproducts Processing*, 115, pp. 59-67.

Abstract

Microwave baking is gaining popularity due to improved time efficiency of the process as compared to the traditional convective baking. Several studies focused on combining microwave baking with other heating techniques in order to achieve desirable product properties. However, not much is known about the principles of combining these techniques for complex laminated structures like puff pastry. In this work, the independent influence of convection and microwave was studied for baking of puff pastry. Product properties such as moisture content, expansion, texture and color were characterized in order to assess the effect of the heating methods. As compared to convection, microwave baking resulted in a much faster process, up to 5 times reduction in baking time, without significant difference in volume and hardness of the pastry. However, it led to a different structure formation in terms of pore size distribution. Browning quality of the product was more desirable and uniform in case of convection as expected. The study helped in understanding influence of convection and microwave heating on development of product properties during baking of laminated doughs. The knowledge from this study will be useful in forming combination of these heating modes for optimising the process further. © 2019 Institution of Chemical Engineers

Document Type: Article

Publication Stage: Final

Source: Scopus

- 4) Saari, H., Rayner, M., Wahlgren, M.

Effects of starch granules differing in size and morphology from different botanical sources and their mixtures on the characteristics of Pickering emulsions

(2019) *Food Hydrocolloids*, 89, pp. 844-855.

Abstract

The aim of this work was to investigate how mixtures of starch granules of different size and shape from different botanic sources affect starch-stabilized Pickering emulsions, and to understand which type of granules that dominate at the interface of the emulsion droplets. Pickering emulsions were prepared by combining quinoa starch with waxy maize or oat starch. The effects of the individual starches as well as the mixtures on drop size and Emulsion were investigated as a function of concentration and emulsification time. For the emulsion done with one type of starch granules the size of the starch particles influenced emulsion droplet sizes. The droplet size was also strongly influenced by starch concentration, showing a decrease in droplet size with increasing starch concentration. The emulsification time (1–5 min) influenced emulsions containing waxy maize or oat starch, but not quinoa. In the quinoa/waxy maize system, quinoa dominated at the surface of the droplets. While in the quinoa/oat system, oat is more likely to dominate the interface. Increasing the emulsification time led to a decrease in drop size in all samples, most notably for quinoa/oat emulsions for which the mean droplet size was decreased by up to 80% at the longest emulsification time (5 min). The emulsion index increased as the total starch concentration in the system was increased. In general, we could conclude that the particle size alone did not decide which starch type would dominate at the interface but that the larger the starch granules was the more the droplet size of the emulsion was affected by the emulsion time. © 2018 Elsevier Ltd

Document Type: Article

Publication Stage: Final

Source: Scopus

- 5) Thadavathi, Y.L.N., Wassén, S., Kádár, R.

In-line rheological and microstructural characterization of high moisture content protein vegetable mixtures in single screw extrusion

(2019) *Journal of Food Engineering*, 245, pp. 112-123.

Abstract

To increase the utilization of side-streams from the food industry more investigations of multiple protein systems could be beneficial, complementary to the extensive studies available on single sourced protein isolates. Here, high moisture content protein-rich side streams were investigated in single screw extrusion. Vegetable protein mixtures comprising potato protein, oat protein and wheat bran were considered. Potato starch and potato fibers were used as structuring agents. Microstructurally, all compositions were dominated by protein aggregates. The structural agents enhanced the interconnected starch phase and/or additionally introduced fiber aggregates, with little apparent influence on the protein aggregates size and distribution. The moisture content was found to exert a dominant influence on the shear viscosity of the compositions. In addition, a saturation behavior of the power law parameters over 45% moisture content was apparent in the presence of the structural agents. An improved knowledge of industrial side-streams processability could increase their use in novel food products and exploited to create products with improved nutritional profiles. © 2018

Document Type: Article

Publication Stage: Final

Source: Scopus

- 6) Cottrell, R.S., Nash, K.L., Halpern, B.S., Remenyi, T.A., Corney, S.P., Fleming, A., Fulton, E.A., Hornborg, S., Johne, A., Watson, R.A., Blanchard, J.L.

Food production shocks across land and sea

(2019) *Nature Sustainability*, 2 (2), pp. 130-137.

Abstract

Sudden losses to food production (that is, shocks) and their consequences across land and sea pose cumulative threats to global sustainability. We conducted an integrated assessment of global production data from crop, livestock, aquaculture and fisheries sectors over 53 years to understand how shocks occurring in one food sector can create diverse and linked challenges among others. We show that some regions are shock hotspots, exposed frequently to shocks across multiple sectors. Critically, shock frequency has increased through time on land and sea at a global scale. Geopolitical and extreme-weather events were the main shock drivers identified, but with considerable differences across sectors. We illustrate how social and ecological drivers, influenced by the dynamics of the food system, can spill over multiple food sectors and create synchronous challenges or trade-offs among terrestrial and aquatic systems. In a more shock-prone and interconnected world, bold food policy and social protection mechanisms that help people anticipate, cope with and recover from losses will be central to sustainability. © 2019, The Author(s), under exclusive licence to Springer Nature Limited.

Document Type: Article

Publication Stage: Final

Source: Scopus

- 7) Barman, M., Jonsson, K., Wold, A.E., Sandberg, A.-S.

Exposure to a farm environment during pregnancy increases the proportion of arachidonic acid in the cord sera of offspring

(2019) *Nutrients*, 11 (2), art. no. 238, .

Abstract

Growing up in a farm environment is protective against allergy development. Various explanations have been put forward to explain this association. Fatty acids are regulators of immune function and the composition of fatty acids in the circulation system may affect immune development. Here, we investigate whether the fatty acid composition of cord serum differs for infants born to Farm (n = 26) or non-Farm mothers (n =29) in the FARMFLORA birth-cohort. For comparison, the levels of fatty acids in the maternal diet, serum and breast milk around 1 month post-partum were recorded. The fatty acids in the cord sera from infants born to Farm mothers had higher proportions of arachidonic acid (20:4 n-6) and adrenic acid (22:4 n-6) than those from infants born to non-Farm mothers. No differences were found for either arachidonic acid or adrenic acid in the diet, samples of the serum, or breast milk from Farm and non-Farm mothers obtained around 1 month post-partum. The arachidonic and adrenic acid levels in the cord blood were unrelated to allergy outcome for the infants. The results suggest that a farm environment may be associated with the fatty acid composition to which the fetus is exposed during pregnancy. © 2019 by the authors. Licensee MDPI, Basel, Switzerland.

Document Type: Article

Publication Stage: Final

Source: Scopus

Access Type: Open Access

- 8) Ceresino, E.B., Kuktaite, R., Sato, H.H., Hedenqvist, M.S., Johansson, E.

Impact of gluten separation process and transglutaminase source on gluten based dough properties

(2019) *Food Hydrocolloids*, 87, pp. 661-669.

Abstract

This study evaluated the effect of the wheat gluten (WG) separation process and transglutaminase (TG) microbial source on WG dough quality, and opportunities to use these factors to tailor dough quality. Two types of gluten (harshly and mildly separated), two types of TG (commercial and novel SB6), and three TG concentrations were evaluated for effects on dough mixing properties, protein structure and solubility. Mildly separated gluten improved dough development parameters, resulting into higher values of most compared with harshly separated gluten. Despite more strongly cross-linked proteins being found in the harshly separated gluten, both gluten types showed similar levels of cross-linking at optimum mixing time, although differences in the secondary protein structure were indicated. Thus, disulfide-sulfhydryl exchange reactions were found to be promoted by mixing, although restrictions on establishment of new bonds because of prior cross-links in the material were clearly indicated. Degree of polymerization in doughs made from mildly separated gluten increased to varying extents with TG addition depending on TG source and concentration. Thus, for the first time, we show that an appropriate combination of WG separation procedure and TG source can be used to tailor gluten dough end-use properties. © 2018 Elsevier Ltd

Document Type: Article

Publication Stage: Final

Source: Scopus

- 9) Svanberg, L., Malmberg, K., Gustinelli, G., Öhgren, C., Persson, I., Brive, L., Wassén, S.

Effect of anthocyanins on lipid oxidation and microbial spoilage in value-added emulsions with bilberry seed oil, anthocyanins and cold set whey protein hydrogels

(2019) *Food Chemistry*, 272, pp. 273-278.

Abstract

The objective of this work was to explore the storage properties of a structured oil-in-water emulsion containing both water- and fat-soluble bioactive compounds from bilberries (*Vaccinium myrtillus* L.). Bilberry seed oil (BSO) was dispersed in a continuous aqueous phase of anthocyanins (AC) and whey protein isolate. The microstructure was evaluated using light microscopy and the effect of anthocyanins on lipid oxidation and microbial growth was investigated. The results showed that it was possible to generate a stable emulsion structure that resisted phase separation during 25 weeks of storage. Gas chromatography–mass spectrometry measurements of the fatty acids in the BSO during storage showed that AC had a protective effect against lipid oxidation. The AC did not have an antimicrobial effect against the investigated strains *Zygosaccharomyces bailii* (ATCC 42476) and *Aspergillus niger* (ATCC 6275 (M68)). © 2018 The Authors

Document Type: Article

Publication Stage: Final

Source: Scopus

Access Type: Open Access

- 10) Samborska, K., Eliasson, L., Marzec, A., Kowalska, J., Piotrowski, D., Lenart, A., Kowalska, H.

The effect of adding berry fruit juice concentrates and by-product extract to sugar solution on osmotic dehydration and sensory properties of apples

(2019) *Journal of Food Science and Technology*, .

Abstract

Osmotic dehydration (OD) of apples caused a reduction of normalized water content (NWC) and an increase of normalized solids gain (NSG), independently of the kind of osmotic solution. The use of 22°Brix osmotic solutions with the addition of fruit concentrates or bilberry extract resulted in only slight reduction in the NWC in the samples, i.e. by about 15 and 20%, respectively after 6 and 24 h, against a value up to 80% in case of 65°Brix use. Similarly, larger NSG was achieved at higher solution concentrations, but the differences were smaller. In the case of the use of 80% bilberry press cake extract the NSG was very low but NWC was relatively high. Such a low concentration of slightly concentrated fruit juices is not effective for dehydration of apples, but it may be sufficient to enrich the fruit with the desired colorants. This higher concentration of osmotic solution and a larger addition, especially of the concentrate of chokeberry juice, significantly affected the color changes of dehydrated apples. The apple dehydrated in mixture of 65°Brix sucrose and 15% chokeberry juice concentrate solution exhibited the highest sensory parameters. The addition of berry fruit juices and extract was able to improve the apple sensory quality after 24 h OD in comparison with sucrose solution. Ethanol extract was a good osmotic agent, but not accepted due to taste and overall quality. However, the addition of the extract can be successfully used in conjunction with a sugar solution. © 2019, The Author(s).

Document Type: Article**Publication Stage:** Article in Press**Source:** Scopus**Access Type:** Open Access

- 11) Palau-Rodriguez, M., Garcia-Aloy, M., Miñarro, A., Bernal-Lopez, M.R., Brunius, C., Gómez-Huelgas, R., Landberg, R., Tinahones, F.J., Andres-Lacueva, C.

Effects of a long-term lifestyle intervention on metabolically healthy women with obesity: Metabolite profiles according to weight loss response(2019) *Clinical Nutrition*, .**Abstract**

Background & aims: The benefits of weight loss in subjects with metabolically healthy obesity (MHO) are still a matter of controversy. We aimed to identify metabolic fingerprints and their associated pathways that discriminate women with MHO with high or low weight loss response after a lifestyle intervention, based on a hypocaloric Mediterranean diet (MedDiet) and physical activity. **Methods:** A UPLC-Q-Exactive-MS/MS metabolomics workflow was applied to plasma samples from 27 women with MHO before and after 12 months of a hypocaloric weight loss intervention with a MedDiet and increased physical activity. The subjects were stratified into two age-matched groups according to weight loss: <10% (low weight loss group, LWL) and >10% (high weight loss group, HWL). Random forest analysis was performed to identify metabolites discriminating between the LWL and the HWL as well as within-status effects. Modulated pathways and associations between metabolites and anthropometric and biochemical variables were also investigated. **Results:** Thirteen metabolites discriminated between the LWL and the HWL, including 1,5-anhydroglucitol, carotenediol, 3-(4-hydroxyphenyl)lactic acid, N-acetylaspargate and several lipid species (steroids, a plasmalogen, sphingomyelins, a bile acid and long-chain acylcarnitines). 1,5-anhydroglucitol, 3-(4-hydroxyphenyl)lactic acid and sphingomyelins were positively associated with weight variables whereas N-acetylaspargate and the plasmalogen correlated negatively with them. Changes in very long-chain acylcarnitines and hydroxyphenyllactic levels were observed in the HWL and positively correlated with fasting glucose, and changes in levels of the plasmalogen negatively correlated with insulin resistance. Additionally, the cholesterol profile was positively associated with changes in acid hydroxyphenyllactic, sphingolipids and 1,5-AG. **Conclusions:** Higher weight loss after a hypocaloric MedDiet and increased physical activity for 12 months is associated with changes in the plasma metabolome in women with MHO. These findings are associated with changes in biochemical variables and may suggest an improvement of the cardiometabolic risk profile in those patients that lose greater weight. Further studies are needed to investigate whether the response of those subjects with MHO to this intervention differs from those with unhealthy obesity. © 2019 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism

Document Type: Article**Publication Stage:** Article in Press**Source:** Scopus

- 12) Lind, M.V., Lauritzen, L., Kristensen, M., Ross, A.B., Eriksen, J.N.

Effect of folate supplementation on insulin sensitivity and type 2 diabetes: A meta-analysis of randomized controlled trials(2019) *American Journal of Clinical Nutrition*, 109 (1), pp. 29-42.**Abstract**

Background Various mechanisms link higher total homocysteine to higher insulin resistance (IR) and risk of type 2 diabetes (T2D). Folate supplementation is recognized as a way to lower homocysteine. However, randomized controlled trials (RCTs) show inconsistent results on IR and T2D outcomes. **Objective** The aim of this study was to examine the effect of folate supplementation on IR and T2D outcomes. **Design** We conducted a systematic literature search in PubMed, Web of Science, and EMBASE and prior systematic reviews and meta-analyses and identified 29 RCTs (22,250 participants) that assessed the effect of placebo-controlled folate supplementation alone or in combination with other B vitamins on fasting glucose, insulin, homeostasis model assessment for insulin resistance (HOMA-IR), glycated hemoglobin (HbA1c), or risk of T2D. The meta-analysis was conducted using both random-and fixed-effects models to calculate weighted mean differences (WMDs) or risk ratios with 95% CIs. Subgroup analyses were conducted based on intervention type (folate alone or in combination with other B vitamins), as well as analysis based on population characteristics, duration, dose, and change in homocysteine. **Results** When compared with placebo, folate supplementation lowered fasting insulin (WMD:-13.47 pmol/L; 95% CI:-21.41,-5.53 pmol/L; P < 0.001) and HOMA-IR (WMD:-0.57 units; 95% CI:-0.76,-0.37 units; P < 0.0001), but no overall effects were observed for fasting glucose or HbA1c. Heterogeneity was low in all meta-analyses, and subgroup

analysis showed no signs of effect modification except for change in homocysteine, with the most pronounced effects in trials with a change of $>2.5 \mu\text{mol/L}$. Changes in homocysteine after folate supplementation correlated with changes in fasting glucose ($\beta = 0.07$; 95% CI: 0.01, 0.14; $P = 0.025$) and HbA1c ($\beta = 0.46$; 95% CI: 0.06, 0.85; $P = 0.02$). Only 2 studies examined folate supplementation on risk of T2D, and they found no change in RR (pooled RR: 0.91; 95% CI: 0.80, 1.04; $P = 0.16$). Conclusion Folate supplementation might be beneficial for glucose homeostasis and lowering IR, but at present there are insufficient data to conclusively determine the effect on development of T2D. This trial was registered on the Prospero database as CRD42016048254. © 2019 American Society for Nutrition.

Document Type: Article
Publication Stage: Final
Source: Scopus

- 13) Zamaratskaia, G., Mhd Omar, N.A., Brunius, C., Hallmans, G., Johansson, J.-E., Andersson, S.-O., Larsson, A., Åman, P., Landberg, R.

Consumption of whole grain/bran rye instead of refined wheat decrease concentrations of TNF-R2, e-selectin, and endostatin in an exploratory study in men with prostate cancer

(2019) *Clinical Nutrition*, . Article in Press.

Abstract

Background & aims: Rye consumption has shown beneficial effects on prostate cancer tumors, as indicated by slower initial tumor growth in animal models and lowering of prostate-specific antigen (PSA) in humans. This study evaluated the effects of whole grain/bran rye consumption on low-grade inflammation and endothelial function biomarkers in men with prostate cancer. Methods: Seventeen men with untreated, low-grade prostate cancer consumed 485 g rye whole grain and bran products (RP) per day or refined wheat products with added cellulose (WP) in a randomized crossover design. Fasting blood samples were taken before and after 2, 4, and 6 weeks of treatment. Results: Concentrations of tumor nuclear factor-receptor 2 (TNF-R2), e-selectin, and endostatin were significantly lower after consumption of the RP diet compared with WP ($p < 0.05$). Cathepsin S concentration was positively correlated to TNF-R2 and endostatin concentrations across all occasions. Strong correlations were consistently found between intercellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1) and between interleukin-6 (IL-6) and interleukin-1 receptor antagonist (IL-1RA). No effect of intervention was found in 92 inflammation-related protein biomarkers measured in a proximity extension assay. Conclusions: RP diet lowered TNF-R2, e-selectin, and endostatin, compared with WP in men with prostate cancer. These effects were accompanied by a reduction in PSA. © 2019 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism

Document Type: Article in Press
Publication Stage: Article in Press
Source: Scopus

- 14) Vazquez, D., Berger, A., Prieto-Linde, M.L., Johansson, E.

Can nitrogen fertilization be used to modulate yield, protein content and bread-making quality in Uruguayan wheat?

(2019) *Journal of Cereal Science*, 85, pp. 153-161.

Abstract

Genotype and environment jointly determine yield and bread-making quality of bread wheat, being possible modulators for these characters. Eleven cultivars were grown at three different nitrogen regimes combining quantity and timing of nitrogen availability for two years; yield, grain protein concentration and Alveograph parameters were determined. Amount and size distribution of proteins were measured using Size Exclusion-High Performance Liquid Chromatography. The results showed year to be the most important determinant of percentage of unextractable polymeric protein in total polymeric protein (%UPP) and yield, while nitrogen regime determined grain protein concentration, the total amount of SDS-extractable and -unextractable proteins, Alveograph W and L. High nitrogen regime generated three types of responses among the cultivars; i) an increase of yield and grain protein concentration, ii) an increase in grain protein concentration but a reduction in %UPP, and iii) an increase in %UPP. For group ii, a low nitrogen regime at early stages but high at later stages was preferential, while for other groups, a high nitrogen regime during the whole season was the most beneficial. This study showed that it is possible to modulate yield and quality in bread wheat by the nitrogen regime, although an understanding of genotype-environmental relationships is necessary. © 2018 Elsevier Ltd

Document Type: Article
Publication Stage: Final
Source: Scopus

- 15) De Arcangelis, E., Djurle, S., Andersson, A.A.M., Marconi, E., Messia, M.C., Andersson, R.

Structure analysis of β -glucan in barley and effects of wheat β -glucanase

(2019) *Journal of Cereal Science*, 85, pp. 175-181.

Abstract

In this study, β -glucan in samples of sifted flour from six barley varieties was sequentially extracted with water and NaOH obtaining three fractions: water-extractable (WE), NaOH- extractable (NaE) and residual (Res). β -Glucan isolates were incubated with lichenase and oligomers released were analysed with high performance anion exchange chromatography coupled with pulsed amperometric detection (HPAEC-PAD). A higher ratio of 3-O- β -cellobiosyl-D-glucose (DP3) to 3-O- β -

cellotriosyl-D-glucose (DP4) is reported in WE, NaE and Res fractions in variety SLU 7 (shrunken endosperm) compared to the other varieties, suggesting a more packed β -glucan structure. Water-extractable and water-unextractable β -glucan fractions were incubated with wheat extract and effects of wheat β -glucanase on the structure was assessed after lichenase digestion and analysis with HPAEC-PAD. Findings suggest that wheat β -glucanase manifests a selective hydrolysis towards β -glucan with lower DP3/DP4 ratio and that β -glucan of SLU 7 is composed of a population with higher DP3/DP4 ratio and hence with a more tighten structure which may be more resistant to enzymic action. Overall, the results obtained are of interest to characterise barleys differing in starch and dietary fibre composition, specifically shrunken endosperm barley SLU 7 in the perspective of its inclusion in the production of β -glucan enriched foods. © 2018 Elsevier Ltd

Document Type: Article
Publication Stage: Final
Source: Scopus

- 16) Hagsten, C., Innings, F., Trägårdh, C., Hamberg, L., Paulsson, M., Nylander, T.
Removal of UHT dairy fouling — An efficient cleaning process by optimizing the rate controlling alkaline cleaning step
 (2019) *Food and Bioproducts Processing*, 113, pp. 101-107.

Abstract

A rigid mineral-based deposit, termed ultra-high temperature (UHT) fouling, is formed on heat exchanger surfaces during milk processing at 140 °C. The removal of this type of fouling is for the first time assessed using a laser triangulation sensor and a camera, to measure changes in the thickness and to visualize structural changes in the fouling in situ. The process was monitored during both the alkali and acid cleaning steps. There was no global swelling of the fouling layer during alkali cleaning under the investigated conditions. However, significant degradation of the protein network was observed, which affected the acid cleaning step and the efficiency of the cleaning process. We conclude that treatment with alkali is required to facilitate the removal of deposits with high mineral content during the acid cleaning step. The results have implications for optimizing the cleaning process so as to minimize energy expenditure, while ensuring efficient heat transfer and maintaining product quality. © 2018 Institution of Chemical Engineers

Document Type: Article
Publication Stage: Final
Source: Scopus

- 17) Ulaszewska, M.M., Weinert, C.H., Trimigno, A., Portmann, R., Andres Lacueva, C., Badertscher, R., Brennan, L., Brunius, C., Bub, A., Capozzi, F., Cialìè Rosso, M., Cordero, C.E., Daniel, H., Durand, S., Egert, B., Ferrario, P.G., Feskens, E.J.M., Franceschi, P., Garcia-Aloy, M., Giacomoni, F., Giesbertz, P., González-Domínguez, R., Hanhineva, K., Hemeryck, L.Y., Kopka, J., Kulling, S.E., Llorach, R., Manach, C., Mattivi, F., Migné, C., Münger, L.H., Ott, B., Picone, G., Pimentel, G., Pujos-Guillot, E., Riccadonna, S., Rist, M.J., Rombouts, C., Rubert, J., Skurk, T., Sri Harsha, P.S.C., Van Meulebroek, L., Vanhaecke, L., Vázquez-Fresno, R., Wishart, D., Vergères, G.
Nutrimetabolomics: An Integrative Action for Metabolomic Analyses in Human Nutritional Studies
 (2019) *Molecular Nutrition and Food Research*, 63 (1), art. no. 1800384, .

Abstract

The life sciences are currently being transformed by an unprecedented wave of developments in molecular analysis, which include important advances in instrumental analysis as well as biocomputing. In light of the central role played by metabolism in nutrition, metabolomics is rapidly being established as a key analytical tool in human nutritional studies. Consequently, an increasing number of nutritionists integrate metabolomics into their study designs. Within this dynamic landscape, the potential of nutritional metabolomics (nutrimetabolomics) to be translated into a science, which can impact on health policies, still needs to be realized. A key element to reach this goal is the ability of the research community to join, to collectively make the best use of the potential offered by nutritional metabolomics. This article, therefore, provides a methodological description of nutritional metabolomics that reflects on the state-of-the-art techniques used in the laboratories of the Food Biomarker Alliance (funded by the European Joint Programming Initiative "A Healthy Diet for a Healthy Life" (JPI HDHL)) as well as points of reflections to harmonize this field. It is not intended to be exhaustive but rather to present a pragmatic guidance on metabolomic methodologies, providing readers with useful "tips and tricks" along the analytical workflow. © 2018 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim

Document Type: Review
Publication Stage: Final
Source: Scopus
Access Type: Open Access

- 18) Tullberg, C., Vegarud, G., Undeland, I.
Oxidation of marine oils during in vitro gastrointestinal digestion with human digestive fluids – Role of oil origin, added tocopherols and lipolytic activity
 (2019) *Food Chemistry*, 270, pp. 527-537.

Abstract

The formation of malondialdehyde (MDA), 4-hydroxy-2-hexenal (HHE), 4-hydroxy-2-nonenal (HNE), and 4-oxo-2-nonenal (ONE) in cod liver-, anchovy-, krill-, and algae oil during in vitro digestion with human gastrointestinal fluids was investigated. Adding rabbit gastric lipase, lipase inhibitor (orlistat) and tocopherols to cod liver oil, lipolysis and oxidation was also studied. Among the marine oils, the highest aldehyde levels (18 μ M MDA, 3 μ M HHE and 0.2 μ M HNE) were detected

after digestion of cod liver oil, while the lowest levels were detected in krill and algae oils. Addition of rabbit gastric lipase significantly increased the release of HNE during the digestion. Orlistat significantly reduced lipolysis and MDA formation. Formation of MDA and HHE was delayed by tocopherols, the tocopherol mix Covi-ox® T 70 EU being more effective than pure α -tocopherol. © 2018 The Authors

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