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Effects of two cooking methods on omega-3 polyunsaturated fatty acid contents of Yellow Belly Flounders

XQ Su, LS Chung

School of Biomedical & Clinical Sciences, Victoria University, Melbourne, VIC 8001, Australia

Background – Seafoods are good sources of omega-3 long chain polyunsaturated fatty acids (n-3 LC-PUFA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fatty acids have beneficial effects on health and can reduce the risk of coronary heart diseases, lower blood pressure and plasma triacylglycerol levels, as well as a range of other disorder. Understanding the effects of different cooking process on n-3 PUFA content could improve the intake of these beneficial fatty acids.

Objective – To investigate the variation of n-3 PUFA contents of flounders processed by different cooking methods.

Design – Muscle samples of five fish processed by steam and deep-fry were examined. The total lipid was extracted with chloroform/methanol (2:1 v/v) containing butylated hydroxytoluene. The fatty acid methyl esters (FAMES) were prepared by saponification using KOH, followed by transesterification in BF$_3$ in methanol. The FAMES were separated by gas chromatography for analysis. One-way ANOVA and Scheffe’s multiple comparisons were performed to determine differences in individual fatty acid level between different cooking methods.

Outcomes – Fried flounders had significantly higher concentrations of n-6 PUFA, monounsaturated fatty acids (MUFA), and saturated fatty acids (SFA) than steamed and fresh fish. The highest contents of EPA and DHA were found in steamed fish. Steamed flounders also showed higher contents of MUFA, total n-3 and n-6 PUFA than fresh fish. There was no significant change in n-3/n-6 PUFA ratio in steamed flounders while fried fish showed a markedly lower ratio. In addition, fried flounders also showed a higher total lipid content than steamed and fresh fish.

Conclusion – n-3 LC-PUFA content of flounders is significantly affected by the cooking methods. Steaming is a better process than frying as it concentrates the health-benefiting n-3 LC-PUFA without the addition of other components from the cooking oil.

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Dietary intake and food source of omega-3 and omega-6 poly-unsaturated fatty acids in the Belgian population

I Sioen$^{1,2}$, J Van Camp$^2$, C Matthys$^{1,3}$, S De Henauw$^1$

$^1$Department of Public Health, Ghent University, Belgium
$^2$Department of Food Safety and Food Quality, Ghent University, Belgium
$^3$Institute of Food, Nutrition and Human Health, Albany Campus, Massey University, New Zealand

Background - Health benefits are considered to be related to omega-6 (n-6) and omega-3 (n-3) poly-unsaturated fatty acids (PUFAs). But, modern diets in developed countries are very poor in n-3 PUFAs.

Objective - The aim of the study is to assess (1) the intake and dietary sources of PUFAs in three Belgian subgroups: linoleic acid (LA), α-linolenic acid (LNA), arachidonic acid (AA), eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and docosahexaenoic acid (DHA).

Design - The used food consumption data originate from (1) parentally reported 3-day dietary records collected in 2002-2003 of 661 children (2.5-6.5 years), (2) 7-day food diaries collected in 1997 of 341 adolescents (13-18 years), (3) 2-day food diaries collected in 2002 of 641 women (18-39 years). A food composition database was developed using existing data and included the content of total fat, LA, LNA, AA, EPA, DPA, DHA. Belgian nutrient recommendations were used to evaluate PUFAs intakes.

Outcomes - Mean LA and overall n-6 PUFA intake corresponded with the recommendations, with a part of the population exceeding the upper level. Conversely, the population showed a large deficit for LNA and total n-3 PUFA (mean n-3 PUFA intake was 0.57, 0.66 and 0.75 %E for pre-school children, adolescents and women, respectively). The major food LA and LNA source was fats & oils, followed by cereal products. The main sources of LC-PUFA were fish & seafood, and meat, poultry & eggs.

Conclusion - Population intake for n-3 PUFAs is low compared to recommendations. From a public health perspective, it seems desirable to tackling this problem. Belgian people would benefit from higher consumption of n-3 rich products in order to decrease the n-6/n-3 ratio. Replacement of meat products rich in saturated fats by fatty fish consumption needs to be encouraged, as it is a rich source of LC n-3 PUFAs.