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## Cooking losses of long-chain *n*-3 fatty acid in seafood commonly eaten in the UK

M. V. P. James<sup>1</sup>, K. D. Flint<sup>1</sup> and C. H. S. Ruxton<sup>2</sup><sup>1</sup>Young's Seafood Ltd, Ross House, Wickham Road, Grimsby DN31 3SW, UK and <sup>2</sup>Nutrition Communications, Front Lebanon, Cupar KY15 4EA, UK

Differences in the types of fatty acids (FA) present in oily and white fish have implications for loss of very-long-chain *n*-3 fats (LC-PUFA) during cooking. While the majority of LC-PUFA in oily fish is in the relatively stable form of TAG, most LC-PUFA in white fish are present as phospholipids, which are vulnerable to oxidation at higher temperatures<sup>(1)</sup>. The present study analysed FA in three species of fish, in the raw and cooked states, to quantify cooking losses of LC-PUFA.

Whole de-boned fillets of Alaskan Pollock (*Theragra chalcogramma*), cod (*Gadus morhua*) and Atlantic salmon (*Salmo salar*) were homogenised and split into six standardised samples. Three samples were analysed in the raw state for FA content using GC and comparison with a FA reference set. The other three samples were sealed in plastic pouches and cooked in a pan of boiling water until an internal temperature of 72°C was achieved for 2 min. After cooling, the samples were analysed for FA content as for the raw samples. The mean findings for the raw and cooked fish (g/100 g) are presented in the Table:

|                      | Alaskan pollack | Cod  | Atlantic salmon |
|----------------------|-----------------|------|-----------------|
| Raw                  |                 |      |                 |
| Total fat            | 0.36            | 0.70 | 14.4            |
| LC-PUFA              | 0.17            | 0.28 | 2.34            |
| DHA                  | 0.09            | 0.17 | 0.79            |
| EPA                  | 0.08            | 0.11 | 1.15            |
| Cooked               |                 |      |                 |
| Total fat            | 0.33            | 0.72 | 14.5            |
| LC-PUFA              | 0.12            | 0.26 | 2.34            |
| DHA                  | 0.06            | 0.15 | 0.78            |
| EPA                  | 0.06            | 0.10 | 1.15            |
| LC-PUFA retained (%) | 72              | 92   | 100             |

Atlantic salmon, a high-fat oily fish, had a LC-PUFA content that was similar whether in the raw or cooked state. This result agrees with other research findings<sup>(2)</sup>. In contrast, LC-PUFA losses in the white fish were 28% for pollock and 8% for cod. More research is needed for other species and different cooking methods. LC-PUFA losses as a result of cooking should be acknowledged in government advice to consumers and when making on-pack claims about the average LC-PUFA content of seafood. Although white fish contributes to overall LC-PUFA intakes, the cooking losses can be greater than for high-fat species of oily fish.

1. Mai J, Shimp J, Weihrauch J *et al.* (1978) *J Food Sci* **43**, 1669–1674.
2. Al-Saghir S, Thurner K, Wagner KH *et al.* (2004) *J Agric Food Chem* **52**, 5290–5296.