



Issue 16: May 2015: This e-bulletin is aimed at personnel in fisheries & aquaculture, at fish packers, processors, distributors, retailers, health professionals and finally consumers

Boarfish: a good source of omega-3s

This is the first of two articles on boarfish (*Capros aper*) and deals with the weight of boarfish body parts, flesh composition and omega-3 status. The second article (SeaHealth-ucd Issue 17: August 2015) will deal with processing (gel strength), sensory tests and levels of heavy metals. Boarfish are about 12cm long and have the body shape of a John Dory. To date boarfish are used mostly for fishmeal but there is increased interest in boarfish as a source of beneficial bioactive compounds and also as human food. Ireland has an adjusted quota of 45,630 tonnes in 2015. The current UCD trials were conducted in view of the limited amount of published information on the omega-3 status and processability of this species. Five batches of boarfish were tested. Batch 1 (May 2014; Irish waters) was a by-catch by a whitefish trawler while Batches 2-5 were part of commercial boarfish catches on 23 October (Irish waters), 23 November (British waters), 25 November (French waters) and 29 November 2014 (Irish waters) respectively. Boarfish were frozen on board and were received in UCD as frozen fish.

Weight of boarfish body parts

Eighteen frozen fish from each of the five batches were selected, weighed collectively before and after thawing at 4°C overnight. Drip on thawing was measured and the tails, heads and guts were removed from the fish with a scissors. All parts were weighed separately. Mean whole fish weights were 42, 42, 44, 44 and 41g for Batches 1-5 respectively with a grand mean for all 90 fish of 42.6g. Corresponding percentage coefficients of variability were 23.2, 19.1, 29.7, 22.8 and 30.7% indicating that Batch 2 samples had the least variation in individual boarfish weights and Batches 3 and 5 the most. The weights of body parts (means for 90 fish) as percentages of total frozen weight were 22.4 (heads), 7.7 (guts), 1.9 (tails), 65.2 (remaining edible bone-in parts) and drip on thawing (2.8). The amount of bone in the edible bone-in parts was about 6% which means that the edible part of each fish is about 26g from an original whole fish weight of 42.6g. The process of beheading, gutting, tail/fin removal and de-skinning is highly labour intensive on a laboratory scale but equipment is available for rapid boarfish mince separation on a commercial scale.

Composition & omega-3 content (edible part on-the-bone)

Protein contents of boarfish from the different batches were similar and ranged from 17.6 (Batch 1) to 18.7% (Batch 4). However, the oil content of Batch 1 (4.1) was much lower than that of Batch 2 (9.4), Batch 3 (12.6), Batch 4 (8.9) and Batch 5 (8.4%). This was probably due to the fact that Batch 1 fish were either close to spawning or had spawned. Omega-3s EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) were measured by gas chromatography (GC) and boarfish samples were prepared for GC analysis by a microwave-assisted preparation method for fatty acid methyl esters (FAMES). EPA and DHA are beneficial for cardiovascular health (SeaHealth-ucd Issue 3, July 2012) and DHA is particularly linked to brain development and improved cognitive function (SeaHealth-ucd Issue 2, April 2012). Contents of EPA and DHA largely paralleled boarfish oil contents i.e. fish with the lowest oil content had the lowest content of EPA and DHA. Contents for boarfish Batches 1-5 were respectively: EPA (42, 143, 97, 91, 134 mg/100g); DHA (192, 439, 316, 315, 395mg/100g) and totals (EPA+DHA) (234, 582, 413, 406, 529mg/100g). The grand mean value for EPA+DHA of 433mg/100g over the five boarfish batches is close to the daily minimum intake of EPA+DHA of 500mg recommended by the International Society for the Study of Fats & Lipids, (www.issfal.org). However, nutritionists differ as indicated by other recommended minimum daily intakes of EPA/DHA of 250mg (EU dietary reference value) and 1250mg (British Nutrition Foundation). EPA+DHA values in the current study are higher than that (353mg/100g) found in big spine boarfish (*Pentaceros decacanthus*) by Nichols *et al.* 2010. Their value included DPA (docosapentaenoic acid) in addition to EPA and DHA.

Conclusion

The current study shows that boarfish are a good source of omega-3s (EPA/DHA) and eating four boarfish (about 100g in total) will deliver about 433mg of EPA/DHA. A comprehensive report on these boarfish trials is available from ronan.gormley@ucd.ie

Acknowledgements: The following are sincerely thanked: Michael Cavanagh for catching the boarfish; Mick and Michael O'Donnell (Island Seafoods Ltd) and Stephen Christie (Nicky's Plaice) for transporting boarfish to Dublin; Dr Sabene Harrison (UCD) for assistance with the omega-3 analysis; Michael Cooney (UCD) and Eamon Power (UCD) for their skilled technical assistance.

Reference

Nichols, P., Petrie, J. and Singh, S. 2010. Long-chain omega-3 oils:--an update on sustainable sources. *Nutrients*, 2(6), 572-585.

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