



Issue 17: August 2015: This e-bulletin is aimed at personnel in fisheries & aquaculture, at fish packers, processors, distributors, retailers, health professionals and consumers

Boarfish: a suitable candidate for processing

This is the second of two articles on boarfish (*Capros aper*) and deals with processing (gel strength), sensory tests and levels of heavy metals. The first article dealt with the weight of boarfish body parts, flesh composition and omega-3 status (SeaHealth-ucd, Issue 16, May 2015). The four UCD trials described here focused on the potential use of boarfish as human food. Their most likely use would be as fish mince and its suitability for seafood products such as nuggets, bites, fishcakes and other products. In this regard the ability of boarfish mince to bind inherent and added water is a key attribute of processability.

Firmness of full strength & added water boarfish gels (Trial 1)

Gels were made from (i) freeze-thawed cod (full strength gels); (ii) freeze-thawed boarfish (full strength gels); (iii) freeze-thawed boarfish (10% added water gels); (iv) freeze-thawed boarfish (15% added water gels). Gels were made by blending thawed boarfish flesh (120g) with salt (1g) and added water (for added water gels). The blends (30g lots) were transferred to small screw capped glass jars, and cooked at 90°C/60min in a water bath. After cooling the gel cylinders (4cm high; 3cm diameter) were compressed (Instron Universal Testing Machine) individually by 1cm between two flat plates. Gel firmness values [Newtons (N)] for samples (i-iv) were 12.8, 23.9, 16.3 and 17.3N showing that the full strength boarfish gels were by far the firmest and that the added water boarfish gels were still firmer than cod full strength gels. This shows that boarfish mince has excellent water binding properties which will be beneficial when it is used to make seafood products.

Effect of freeze-thaw cycles on firmness of boarfish gels (Trial 2)

Freeze-thaw (FT) cycles can have a negative effect on muscle foods by damaging protein matrices with consequent reduced water-holding ability (Anese & Gormley, 1996). Tests were conducted, therefore, on gels made from boarfish subjected to different numbers of FT cycles both as whole fish and mince as follows: (a) 1 FT cycle; (b) 2 FT cycles (F-T whole fish, re-F-T whole fish, then

fillet, mince; (c) 2 FT cycles (F-T whole fish, then fillet, mince, and re-F-T mince); (d) 3 FT cycles (F-T whole fish, then fillet, mince, re-F-T mince, re-F-T mince); Firmness values for gels (a-d) were 29.5, 24.2, 21.1 and 20.8N respectively showing that FT cycles reduced gel strength but the effect was small especially for treatments (b to d). The gel firmness values suggest that boarfish should be stored as frozen whole fish and not as frozen mince.

Sensory tests (Trial 3)

Cod and boarfish deep fried breaded nuggets (each 20-25g) were served to 20 taste panellists who scored for overall acceptability [6-cm line with end-points of 0 (unacceptable) and 6 (acceptable)]. No significant differences were detected between the nuggets with scores of 4.80 (cod) and 4.46 (boarfish). However, coefficients of variability (CV) were higher for boarfish (30.4) than for cod (17.5%) indicating greater uniformity of scoring by the panellists for cod nuggets. Comments by the 20 panellists for boarfish nuggets were: good fishy flavour (14); flavour too fishy (2); meaty texture (5); dark flesh colour (3) and juicy product (1 panellist). Comments on cod nuggets were good flavour (7); bland flavour (7); good texture (5); too soft (3) and good colour (5 panellists).

Heavy metal content (Trial 4)

Heavy metal contents of boarfish from five separate catches ranged 0.01-0.02 (cadmium), <0.12 (lead) and <0.05-0.08mg/kg uncooked flesh (mercury). The values were orders of magnitude below the maximum limits for cadmium (2), lead (4) and mercury (0.5mg/kg) in seafood cited by the US Food and Drug Administration in 2014.

Conclusions

Boarfish have good water binding properties and are strong candidates for processing into seafood products. Boarfish breaded nuggets also received good sensory scores. A comprehensive report on these boarfish trials is available from ronan.gormley@ucd.ie

Acknowledgements: The following are thanked: Michael Cavanagh for catching the boarfish; Mick & Michael O'Donnell (Island Seafoods Ltd) & Stephen Christie (Nicky's Plaice) for transporting boarfish to Dublin; Dr Wayne Anderson (FSAI) for facilitating heavy metal analysis; AllinAll Ingredients Ltd for breeding ingredients; Malachy McCloskey (Boyne Valley Foods) for small glass jars used as gel moulds; Michael Cooney & Eamon Power (UCD) for their skilled technical assistance.

References

Anese, M. & Gormley, T.R. 1996. *Food Science & Technology (LWT)*, 29, 151-157.

This study was conducted by Sinead Cunningham and Ronan Gormley of the UCD Institute of Food and Health, School of Agriculture & Food Science, Belfield, Dublin 4.
DISCLAIMER: While every care has been taken in ensuring the accuracy of the material presented, no liability as to its use or interpretation is accepted by the authors or by UCD.

