



Issue 37: June, 2021: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

Underutilised fish species: - a limited resource?

Underutilised fish species (UUFS) held promise in the 1990s as a hidden fish resource to be exploited as total allowable catch (TAC) quotas on conventional fish species tightened. However, in recent years many UUFS now have TAC quotas. Nevertheless, they are still important as a wild fish source in an age of decreasing wild fish supplies globally. It is estimated that the 2012 global wild:farmed fish ratio of 52:48 will change to 38:62 by 2030 (Ababouch, 2015). Most consumers are aware of conventional fish species such as cod, hake, haddock, monk, plaice, sole, mackerel, herrings, tuna, farmed salmon, sea bass and others. However, they are largely or totally unaware of UUFS, many of which are very good eating. Some of the UUFS are deep water fish and require special fishing technology due to the pressure drop as the net is lifted. This bulletin describes outcomes of Irish trials on the acceptability and processability of some UUFS caught in EU waters.

Sensory acceptability of fresh/frozen UUFS

Gormley & Fagan, (2005) conducted a trial involving seven taste panels (25 tasters in each) who scored steamed fillets of 16 UUFS from unacceptable (0) to highly acceptable (6) using steamed cod as control. The samples were obtained from trawlers landing in Irish ports. The taste panel scores for the UUFS were divided by the score for cod to give a score ratio relative to cod. Bluemouth rockfish and silver cod got higher scores than cod and the 8 species following scored lower but not statistically so to cod (Table 1). The 6 species in blue were rated significantly (statistically) inferior to cod due to over soft, or too firm texture and/or a strong flavour.

Table 1: Taste panel scores (ratios) relative to cod for 16 UUFS samples¹

Species	Score ratio	Species	Score ratio
Bluemouth rockfish	1.10	Black scabbard	0.76
Silver cod	1.03	Scorpion fish	0.76
Morid cod	0.98	Portuguese dogfish	0.64
Roundnose grenadier	0.98	Wolf-fish	0.63
Orange roughy	0.94	Longnose velvet dogfish	0.59
Blue ling	0.89	Blackmouth dogfish	0.53
Birdbeak dogfish	0.87	Roughhead grenadier	0.27
Greater forkbeard	0.81	Rabbit fish	0.25

¹Gormley & Fagan, 2005

The mean score for steamed cod of 3.8 on the 0-6 acceptability scale was lower than expected. However, all samples were tested without sauce or salt and as such were bland and thus 3.8 was a good score. It is stressed that these tests were conducted on spot samples and further samples need to be tested to give more definitive acceptability scores. However, the results suggest that many of the UUFS are of good eating quality and approach that of cod. A sensory trial on silver smelt showed that steamed fillets received excellent flavour scores (mean 7.7/10) and were preferred to steamed cod. Most panellists agreed that silver smelt had a pleasant bland flavour and a firmer texture than cod (Gormley *et al.*, 1991).

Processed products from UUFS

A number of trials have shown that UUFS produce high quality added value processed products. Gormley & Fagan (2005) marinated blue ling fillets for 3h in 10, 20 or 30% salt and sugar-based flavoured (Cajun, tandoori, lemon & lime, arrabiata, southern fried) marinating solutions. All samples received high sensory acceptability scores. A follow-up trial on *sous vide* processing of cardinal fish and blue ling in four sauces (tikka, hollandaise, arrabiata, tomato & pesto) showed good taste panel acceptability scores (0-6 scale) of 4.73, 3.90, 3.77 and 4.94 respectively (cardinal fish), and 4.47, 4.47, 3.84 and 3.98 respectively (blue ling) (Gormley & Fagan, 2005). Tests on frozen/thawed/deep fried breaded nuggets of 9 UUFS showed good acceptability scores (0-6 scale) of 4.94 (roughhead grenadier), 4.81 (Greenland halibut), 4.49 (Bairds smoothhead), 4.42 (silver smelt), 3.99 (Portuguese shark & blue ling), 3.82 (roundnose grenadier), 3.81 (orange roughy) and 3.79 (kitefin shark) (Maier *et al.*, 1997). In a separate trial, breaded boar fish nuggets received a taste panel acceptability score of 4.46 compared to 4.80 for cod nuggets i.e. no significant difference (Cunningham & Gormley, 2015). Minces from most of the UUFS have good water binding capacity thus making them suitable for a range of seafood products.

Conclusions: Many UUFS have good eating quality both as cooked fillets (steamed/fried) and as processed products. UUFS could help to off-set fishing pressures on mainstream whitefish species such as cod, haddock and hake, and help meet market demand for high quality wild fish. Detailed reports on the different trials are available on request as are the Latin names of the different species.

References

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