

The Handling, Storage, Processing and Eating Qualities of Deep Water Fish

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This information sheet discusses the findings of trials aboard a trawler fishing at depths up to 1000m off the West coast of Scotland. Fish samples from this trip and other commercial landings were assessed also for their handling characteristics, fillet yields, storage life, eating quality and suitability for smoked products.

The fish

Many species of fish are to be found in depths ranging from 500m to 2500m off the Western seaboard of the UK. These fish vary considerably in their anatomy, appearance and eating quality.

The main demersally trawled species are:



In addition, quantities of moro mora, forkbeard, argentine, cardinal and sharks are landed commercially.

Handling at Sea

General Handling

- These species are more difficult to handle than usual white fish and tend not to flow freely in mechanised handling systems. Equipment such as hoppers and conveyors may have to be modified to prevent jamming. Sharks need to be handled separately.
- Some species, such as scabbard, require careful handling because of needle sharp teeth or spines.



Gutting and Trimming

- Blue ling and some other species gut in a similar way to typical roundfish whereas different gutting techniques are needed for species such as grenadier and scabbard.
- Scabbard are often headed to remove their needle sharp teeth and assist in gutting. Grenadier are often headed and tailed to fetch better market prices. Removal of the long thin tail of the grenadier helps handling and flow in conveyors, and it is of little eating value.



Stowage

Proper box filling practices are as important for deep water fish as for usual species.

Using large containers may better suit long fish such as blue ling, scabbard and sharks.

Processing

- Deep water fish can be hand filleted but new techniques are required for the scabbard, grenadier, orange roughy, sharks and rabbitfish because of their differences in anatomy to the usual white fish.

Typical hand filleting yields for the major species and including cod for comparison				
Species	Raw Material Description	Fillet Yield %		
		Untrimmed fillet	Trimmed fillets	Skinned & trimmed fillets
Grenadier (<i>Coryphaenoides rupestris</i>)	Ex-Frozen, head on, gutted and tailed	44.2	38.5	32.7
Black Scabbard (<i>Aphanopus carbo</i>)	Ex-Frozen, head on, gutted	53.3	46.7	No data
Blue Ling (<i>Molva dipterygia</i>)	Ex-Frozen, head on, gutted	58.3	56.5	49.5
Orange Roughy (<i>Hoplostethus atlanticus</i>)	Fresh, head on, ungutted	No data	No data	33.7
Cod (<i>Gadus morhua</i>)	Fresh, head on and gutted	No comparative data	47	43

- The difficulties of preventing product contamination from grenadier scales and of removing the black belly lining of scabbard can increase filleting times. Orange roughy, blue ling and grenadier can be filleted by machine.

Eating Quality and Storage Life

Raw Fish Freshness Assessment

- The appearance and odour of the gills of the major species were found to be a good indicator of freshness, and the pattern of changes during storage on ice were similar to cod.
- The condition of the eyes was also found to be a reasonable indicator of freshness, although the eyes of these deep water fish are more likely to be damaged during the catching process.

Eating Quality

- The grenadier, mora moro, forkbeard and blue ling have acceptable eating qualities that are similar to the usual white fish.
- The scabbard has a fatty layer under the skin, and has a delicate texture and interesting halibut and chicken like flavours.
- The orange roughy has an excellent firm texture and sweet flavour.
- The argentine and cardinal fish have flavours and textures combining both oily and white fish characteristics.
- The sharks and rabbit fish have bitter flavours from the start of iced storage.

Storage Lives

- All the species, except the sharks and rabbit fish, follow the usual pattern of flavour changes during storage on ice.
- The spoilage patterns of grenadier, orange roughly, mora moro, forkbeard and blue ling follow those of cod and similar white fish.
- The argentine and cardinal fish have similar flavour changes and spoilage characteristics to pelagic fatty fish.
- The scabbard follows the usual white fish pattern of spoilage but with some fatty fish characteristics on extended storage.
- All these species have significantly longer storage lives compared to that of cod.

Products

- The species with typical white fish characteristics could substitute for traditional white fish in many products.
- The scabbard has a more delicate and interesting halibut and chicken-like flavour and whether fresh or hot smoked (Arbroath smokie style) may be potentially more valuable.
- Orange roughy is already highly valued.

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