



MSC DNA testing report 2013

1. Introduction

The MSC has been using DNA testing at species and population levels since 2009 to help monitor the effectiveness of the chain of custody program. This report provides an update on MSC's work in 2013.

2. Objectives of DNA testing by MSC

Verifying species or catch area of MSC ecolabelled products with DNA tests is one way in which the MSC provides oversight of the MSC program. DNA tests give objective and credible information on these products, and if used together with documented tracebacks or reconciling volumes through supply chains, can give an indication of whether the chain of custody program is effective at ensuring MSC ecolabelled products originate from MSC certified fisheries.

3. Tests used and methodology

In most cases it is possible to verify species using DNA tests. The MSC uses species-level tests where there is a potential to substitute one species with another in the supply chain. In the past, media reports of seafood product testing (not specific to MSC) have shown cases of **white fish species** substituted between one another, **tuna** substituted with cheaper alternatives, and wild **Pacific salmon** substituted for farmed Atlantic salmon. The MSC has therefore focused on sampled and tested MSC ecolabelled products from these three groups and used DNA techniques to verify the species labelled.

When there is not enough genetic difference between populations, using DNA tests to verify the catch area of a fish is not always possible. There is, however, some research on Atlantic cod that has made it possible to differentiate the fish from the various catch areas. The population-level test used by the MSC differentiates between the MSC-certified catch areas in Iceland, East Baltic, North East Arctic and Barents and some non-MSC-certified catch areas including the North Sea.

Both species and catch-area tests used by the MSC compare a genetic sequence in the sample with a reference database of known sequences for particular species or catch areas. These tests were developed by TRACE Wildlife Forensics network (<http://www.tracenetwork.org/>) for the MSC.

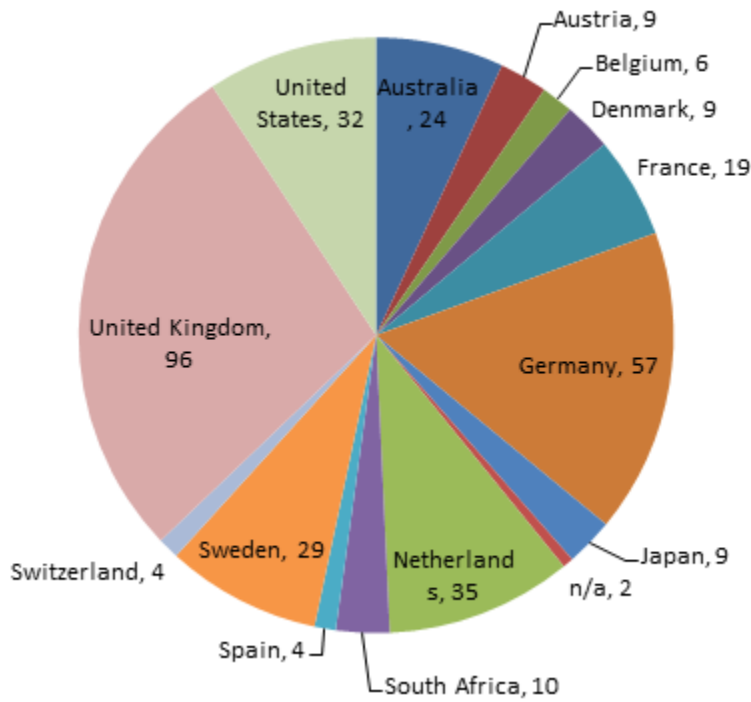
4. Sample plan and methodology

In 2013, sampling was planned to cover the broadest range of countries and sectors in order to target the highest number of supply chains. The target was to sample 400 products, with 10% of these non-MSC labelled products as a point of comparison. The products sampled came from 15 countries and a range of sectors, including restaurants, cafeterias, and supermarket fish counters and packed products. The sampling data includes over 300 MSC-certified products (i.e. with the MSC code on the packaging). The following pie charts show the products sampled by country and sector. The pie charts show the greatest number of samples in the countries and sectors where most MSC products are sold i.e. retail-packed products and fresh food counter products sold in Netherlands, Germany, US and the UK.



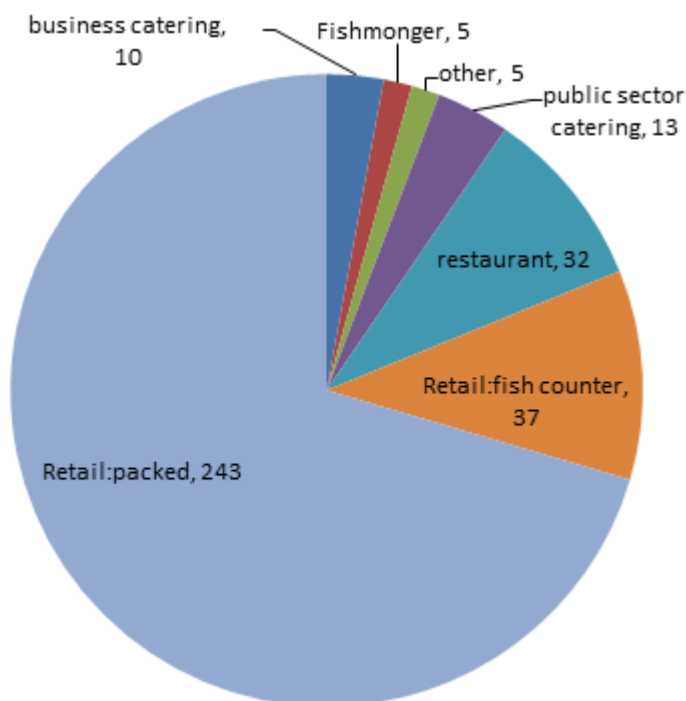
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MSC products sampled by country



NB. The 2 samples not assigned to a country relate to product samples MSC received that were tested.

MSC products sampled by sector





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Sampling was carried out to a documented methodology to ensure there was no contamination. Samples were coded and full product details were logged, including the batch number on the packaging. In order to ensure independence of testing, the samples were provided to the laboratories without the product details.



5. Results and analysis

The independent accredited laboratory at Science and Advice for Scottish Agriculture (SASA) conducted the testing on behalf of MSC. A full technical laboratory report can be found on the MSC website at follows: www.msc.org/about-us/credibility/dna-testing-methodology-and-results-2013

The full results table is shown on the following page, overall this set of testing showed that less than 1 per cent of MSC products were mislabelled (3 out of 320 test results). Details of the mislabelled products can be summarised as follows:

Product information	Test result
Frozen fish fillets sold in Belgium retailer labelled as Pacific cod	Atlantic cod
Fresh fish fillets supplied to a restaurant in Netherlands as Saithe	Atlantic cod
Chilled pre-prepared meal sold in the UK as containing haddock	Atlantic cod

Each of these results are being currently investigated by tracing back the documentation through the supply chain, notifying the related certifiers, and ultimately informing the brand owners of the result. Any evidence of substitution with non-MSC certified seafood will result in a suspension of certification.

Use of the catch-area tests showed that four of the Atlantic cod samples could have been either from MSC or non-MSC-certified catch areas. Two of these samples could have been from the Faroes and two could have been from the North Sea. However, in neither case can they be excluded from the MSC-certified catch area. In these cases, tracebacks are conducted to provide documented evidence of MSC origin.



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A smaller sample of non-MSC certified products found 2 in 38 products tested were mislabelled, although this sample is not directly comparable to the larger sample size of MSC-certified products, it suggests a higher level of mislabelling at 5 per cent.



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Results for all the samples tested

The verification tests run	Numbers of MSC products tested					Numbers of Non-MSC products tested			
	Total	Verified correctly labelled	Confirmed Mislabelled	No evidence mislabelled ¹	Test failed	Total	Verified correctly labelled ²	Mislabelled	Test failed
Atlantic cod – <i>Gadus morhua</i> verify MSC catch area ³	75	68	0	4	3	8	8	0	0
Pacific cod – <i>Gadus macrocephalus</i> verify species	17	16	1	0	0	2	1	0	1
Pollock – <i>Gadus/ Theragra chalcogrammus</i> – verify species	36	36	0	0	0	4	3	0	1
Haddock – <i>Melanogrammus aeglefinus</i> – verify species	33	30	1	0	2	9	9	0	0
Halibut – <i>Hippoglossus stenolepis</i> – verify species	3	3	0	0	0	4	3	0	1
Hoki – <i>Macruronus sp.</i> – verify species	17	14	0	0	3	0	0	0	0
Hake – <i>Merluccius paradoxus/productus/capensis</i> – verify species	27	26	0	0	1	3	3	0	0
Plaice – <i>Pleuronectes platessa</i> – verify species	24	24	0	0	0	3	3	0	0
Saithe – <i>Pollachius virens</i> – verify species	11	7	1	0	3	0	0	0	0
Rock Sole – <i>Lepidopsetta bilineata/ polyxystra</i> – verify species	5	5	0	0	0	1	1	0	0
Pacific salmon – <i>Oncorhynchus sp</i> differentiate from	55	55	0	0	0	2	2	0	0

¹ This relates to catch area tests where in some cases the results shows a fish could be from either an MSC or non-MSC catch area.

² For the non-MSC products sampled some have generic labelling which means that in some cases where other species are identified it is still correctly labelled.

³ For the non-MSC products sampled this test was most relevant in verifying the species.



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<i>Salmo</i>									
Skipjack tuna – <i>Katsuwonus pelamis</i> – verify species	12	7	0	0	5	9	1	0	8
Albacore tuna – <i>Thunnus alalunga</i> – verify species	28	21	0	0	7	1	0	1	0
Other ⁴ – verify species	2	1	0	0	1	3	2	1	0
Totals:	345	313	3	4	25	49	36	2	11

⁴ This relates to samples submitted of other species not in the original plan.



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6. Future plans

Test development and improvement

Looking ahead, the MSC will seek to expand the range of geographic origin tests, either using DNA or other techniques. This will include looking at the feasibility to test the following species: **Pacific salmon** from MSC catch areas, MSC **North Sea haddock** and **Maldives skipjack tuna**.

For species verification tests, the MSC wishes to increase efficiency, allow for more mixed species products to be tested, and potentially to develop a point of use test (i.e. a test kit that a person sampling can use to test a product directly).

In-supply chain testing

The MSC currently takes all samples for testing from products as they are sold or served to the final consumer (e.g. retail or restaurant). In addition to continued testing at the end of the supply chain, over the next three years the MSC would like to pilot testing of certified seafood from early points within the supply chain. This could include, for example, testing at points of landing or primary processors, either during standard audits by certifiers, or on an ad-hoc basis as needed.

Through doing this, the MSC can better target certain tests to stages in the supply chain where there is the most potential for substitution, and it can be easier to identify where mislabeling problems occur.

Collaborations

The MSC would like develop further collaboration with industry, regulators, research organizations and other related bodies with shared objectives to help advance and use molecular technologies (this includes DNA and other techniques i.e. analysis of lipids, proteins, isotopes or trace elements) to detect and reduce any mislabeling of MSC seafood products.