

GENERAL

MONITORING & SURVEILLANCE SERIES



# Fish Labelling Survey

MARCH 2011



### SUMMARY

The Food Safety Authority of Ireland (FSAI) has completed the first extensive survey of fish and fish products on sale throughout Ireland to determine the integrity of the product labels. The survey involved the sampling of fish and fish products (un-smoked and smoked) by environmental health officers from a variety of outlets including restaurants, takeaways and retail premises. These samples were then subjected to genetic analysis in order to establish the identity of the fish species used. Almost one fifth of the products tested were found to be mislabelled. All but one of the non-compliant samples were sold as cod, but were actually found to contain pollock, smelt or other fish species. Nearly three-quarters of the smoked fish products sampled were mislabelled, most of which were purchased in takeaways. Food business operators found to be selling mislabelled fish and fish products received verbal warnings during follow-up visits by environmental health officers and told that further unannounced checks would ensue.

### INTRODUCTION

The Food and Agriculture Organisation of the United Nations has reported that the global consumption of fish in 2009 hit a record high of 145 million tonnes<sup>1</sup>, or approximately 16% of the animal protein intake. Considering the nutritional benefits associated with fish consumption, it is important for consumers that there is full confidence in the safety, quality and integrity of the fish and fish products produced and consumed in Ireland.

The availability of certain fish species can vary throughout the year, depending on seasonality and quotas among other things, with the result that the wholesale and retail price of individual species can fluctuate accordingly. Data provided by Bord Iascaigh Mhara for October 2010 highlights the price differential between fish species such as cod (€11.3/kg); coley, a type of pollock (€7.3/kg); and haddock (€9.7/kg). The substitution of cheaper fish for more expensive species without appropriate labelling may be an attractive prospect at times of the year when particular species are out of season and prices are at a premium. Most consumers rely on product labels to identify the fish species in food products, particularly where the final product is highly processed or presented as smoked and/or battered. Accurate food labelling also facilitates the rapid and efficient traceability of foods from producer to consumer, where risk management measures such as product withdrawal or recall are required.

The FSAI is responsible for the enforcement of food labelling legislation and utilises the latest available technology to prevent or detect mislabelling of food products. DNA-based analytical techniques have made high profile advances in recent decades, most notably through their application to criminal forensic investigations, but also in less publicised areas including food law enforcement. Genetic test methods were used by the FSAI to determine the origin of foreign biological material added to chicken filets in 2002<sup>2</sup>. DNA-based methodology has also been used in detecting illegal fishing with a view to assisting stock conservation around the world<sup>3</sup>, and in identifying the mislabelling of more than 30% of the hake sold in Greece and Spain<sup>4</sup>. In March 2009, the FSAI successfully prosecuted an Irish food business operator for misleading consumers by labelling salmon products as being produced from “wild” salmon, when in fact genetic testing demonstrated that the products had been produced from “farmed” salmon<sup>5</sup>.

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<sup>1</sup> *The State of World Fisheries and Aquaculture 2010*: <http://www.fao.org/docrep/013/i1820e/i1820e00.htm>

<sup>2</sup> *Pork and beef DNA in chicken filets*: <http://www.fsai.ie/details.aspx?id=7312>

<sup>3</sup> *To Fight Illegal Fishing, Forensic DNA Gets Local*; Erik Stokstad. *Science* 10 December 2010: 1468-1469

<sup>4</sup> *Journal of Agriculture and Food Chemistry* 59(2): 475-80, January 2011

<sup>5</sup> *Food Safety Authority Welcomes Court Case Result*: <http://www.fsai.ie/details.aspx?id=7708&terms=farmed+salmon>

In May and June 2010, the FSAI carried out a snapshot survey and sampled 26 fish products that were labelled to indicate they contained cod. The samples, taken from a variety of retail outlets and one takeaway outlet in Dublin were analysed by a commercial laboratory. The results revealed that one of the products, purchased at a takeaway was labelled as “smoked cod”, but actually contained pollock, while a product purchased at a retail outlet and labelled as “cod fish cakes” contained haddock. Though the results of this survey were not indicative of a large scale problem, they have to be viewed in the context that sampling was limited to Dublin premises and white fish species are relatively abundant during the summer months.

### SURVEY

In order to get a broader picture of the authenticity of the labelling and traceability of fish and fish products, a more extensive survey was devised that covered different parts of Ireland and targeted a period of the year when certain white fish species are less plentiful. A total of 111 samples of fish and fish products were taken by 38 environmental health officers, covering eight counties, during the months of November and December 2010. Samples were taken from general retail outlets, fish retail premises, hotels, pubs, restaurants, takeaways and premises that could be considered restaurants/takeaways. Samples were transferred, as purchased, directly to a commercial laboratory in Dublin for analysis.

### ANALYSIS

A commercial laboratory with ISO 17025 accreditation and based in Dublin carried out PCR analysis, in order to identify the species of fish in the food samples submitted. DNA was isolated and purified by a modified magnetic bead process. DNA fragments were amplified using validated PCR primers according to published protocols<sup>6</sup>. Amplified DNA fragments were sequenced using standard sequencing technology and this information was used to interrogate available databases in order to corroborate the initial PCR results.

### ANALYTICAL RESULTS

Out of the 111 samples analysed, a total of 21 (19%) were found to be mislabelled, 17 of which contained pollock or smelt. Twenty samples labelled to indicate they were made from cod in fact contained a different species, and one product labelled as “smoked haddock” was in fact pollock. While only a small proportion (13%) of the un-smoked fish products were mislabelled, eight out of the 11 smoked fish products (73%) were non-compliant, and seven of those eight were sampled at takeaways. Overall, mislabelling was evident in 15 of the 46 (32%) takeaways from which products were sampled, while other non-compliant samples were taken at restaurants and retail premises.

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<sup>6</sup> Ward, Robert D., Zemlak, Tyler S., Innes, Bronwyn H., Last, Peter R. and Hebert, Paul, D. N. DNA barcoding Australia's fish species. *Philosophical Transactions of the Royal Society. B* (2005), 360, 1847-1857

## Non-Compliant Results

	PRODUCT DESCRIPTION	ACTUAL PRODUCT	PREMISES TYPE
1	Smoked Cod Battered	Pollock	Takeaway, Wexford
4	Battered Cod Piece	Smelt	Restaurant & Takeaway, Wexford
5	Battered Cod Fillet	Haddock	Takeaway, Wexford
11	Smoked Cod	Pollock	Takeaway, Louth
12	Smoked Haddock	Pollock	Fish retailer, Louth
16	Battered Smoked Cod	Pollock	Takeaway, Dublin
27	Cod	Deep water cape hake	Takeaway, Westmeath
32	Cod	Pollock	Takeaway, Westmeath
34	Cod Portion	Smelt	Takeaway, Westmeath
37	Cod	Smelt	Restaurant, Westmeath
38	Cod Portion	Smelt	Takeaway, Laois
40	Fillet of Cod	Deep water cape hake	Takeaway, Laois
43	Cod Square	Smelt	Restaurant & Takeaway, Laois
45	Smoked Cod	Pollock	Takeaway, Offaly
53	Cod battered	European hake	Restaurant, Dublin
63	Smoked Colley Fillet (sold as smoked cod)	Pollock	Takeaway, Dublin
67	Un-dyed Smoked Cod	Pollock	Fish retailer, Dublin
81	Smoked Cod	Pollock	Butcher, Dublin
94	Fresh Cod	Pollock	Takeaway, Cork
95	Cod Pieces	Smelt	Takeaway, Cork
96	Fish Portion Cod	Smelt	Takeaway, Cork

## CONCLUSIONS

This is the first comprehensive labelling survey by the FSAI of fish and fish products on sale in Ireland. Though consumers do not need to be concerned that there are any food safety issues arising out of these results, the substitution of pollock and smelt species for the generally more costly cod is cause for some concern as this practice could be viewed as a means of enhancing profits for the operator(s) involved.

Environmental health officers re-visited the non-compliant premises to inform the food business operator of the analytical results and to determine the source of the problem. From the follow-up visits, it was evident that some confusion, along with a lack of experience in differentiating fish species may have caused some of the labelling errors, while the reason for others was not readily apparent. During traceability checks, the names of two suppliers in particular came to the attention of environmental health officers and this aspect is being further investigated. While formal enforcement action was not taken as a result of this survey, verbal warnings were issued and food business operators were reminded of their legal obligations with respect to traceability and accurate labelling, and that further unannounced visits were planned.

In order to protect consumers' interests, sampling and analysis of fish products will form part of the routine monitoring activities conducted by the FSAI and the Health Service Executive (HSE). Where it can be demonstrated that food business operators fail to keep appropriate traceability records, or are intentionally misleading consumers through inaccurate labelling, enforcement action will be considered. The mislabelling of fish products, whether inadvertent or by design is contrary to the rights and expectations of consumers under EU and Irish law, and the FSAI along with the HSE is committed to eliminating the practice at the earliest possible opportunity.

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	PRODUCT DESCRIPTION	ACTUAL PRODUCT	PREMISES TYPE	COMPLIANT Y/N
1	Smoked Cod Battered	Pollachius virens (Pollock)	Takeaway, Wexford	N
2	Battered Cod Fillet	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Wexford	Y
3	Fillet of cod	Gadus morhua (Atlantic cod)	Retail, Wexford	Y
4	Battered Cod Piece	Argentina silus (Smelt)	Restaurant & Takeaway, Wexford	N
5	Battered Cod Fillet	Melanogrammus aeglefinus (Haddock)	Takeaway, Wexford	N
6	Cod Fillets in Beer Batter	Gadus macrocephalus (Pacific cod)	Wholesaler, Wexford	Y
7	Cod Fillets Skinless	Gadus macrocephalus (Pacific cod)	Restaurant, Wexford	Y
8	Cod Fillet with skin on	Gadus morhua (Atlantic cod)	Hotel, Wexford	Y
9	Atlantic Cod Fillets	Gadus morhua (Atlantic cod)	Takeaway, Wexford	Y
10	Fresh Cod	Gadus macrocephalus (Pacific cod)	Takeaway, Louth	Y
11	Smoked Cod	Pollachius virens (Pollock)	Takeaway, Louth	N
12	Smoked Haddock	Pollachius virens (Pollock)	Fish retailer, Louth	N
13	Battered Cod	Gadus morhua (Atlantic cod)	Fish retailer, Louth	Y
14	Fresh Haddock	Melanogrammus aeglefinus (Haddock)	Fish retailer, Louth	Y
15	Fresh Cod	Gadus morhua (Atlantic cod)	Fish retailer, Louth	Y
16	Battered Smoked Cod	Pollachius virens (Pollock)	Takeaway, Dublin	N
17	Battered Cod	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Dublin	Y
18	Fresh Cod Cooked	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Dublin	Y
19	Fresh Cod Raw	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Dublin	Y
20	Fresh Cod	Gadus morhua (Atlantic cod)	Fish retailer, Louth	Y
21	Smoked Cooley	Pollachius virens (Pollock)	Fish retailer, Louth	Y
22	Haddock	Melanogrammus aeglefinus (Haddock)	Fish retailer, Louth	Y
23	Smoked Cooley	Pollachius virens (Pollock)	Fish retailer, Louth	Y
24	Battered Cod Ogurvik	Gadus morhua (Atlantic cod)	Takeaway, Westmeath	Y
25	Cod	Gadus morhua (Atlantic cod)	Fish retailer, Westmeath	Y
26	Cod	Gadus macrocephalus (Pacific cod)	Takeaway, Westmeath	Y
27	Cod	Merluccius paradoxus (Deep water cape hake)	Takeaway, Westmeath	N
28	Cod	Gadus morhua (Atlantic cod)	Butcher, Westmeath	Y
29	Battered Cod home cooked	Gadus morhua (Atlantic cod)	Restaurant, Westmeath	Y
30	Cod	Gadus morhua (Atlantic cod)	Retail, Westmeath	Y
31	Cod	Gadus macrocephalus (Pacific cod)	Takeaway, Westmeath	Y
32	Cod	Theragra chalcogramma (Alaskan Pollock)	Takeaway, Westmeath	N
33	Fresh Cod	Gadus morhua (Atlantic cod)	Fish retailer, Westmeath	Y
34	Cod Portion	Argentina silus (Smelt)	Takeaway, Westmeath	N
35	Frozen Cod Fillet	Gadus morhua (Atlantic cod)	Restaurant, Westmeath	Y
36	Cod	Gadus morhua (Atlantic cod)	Restaurant, Westmeath	Y
37	Cod	Argentina silus (Smelt)	Restaurant, Westmeath	N
38	Cod Portion	Argentina silus (Smelt)	Takeaway, Laois	N
39	Cod Portion	Gadus morhua (Atlantic cod)	Takeaway, Laois	Y
40	Fillet of Cod	Merluccius paradoxus (Deep water cape hake)	Takeaway, Laois	N
41	Cod Portion	Gadus morhua (Atlantic cod)	Takeaway, Laois	Y
42	Cod	Gadus morhua (Atlantic cod)	Restaurant, Laois	Y
43	Cod Square	Argentina silus (Smelt)	Restaurant & Takeaway, Laois	N
44	Fillet of Cod	Gadus macrocephalus (Pacific cod)	Restaurant & Takeaway, Laois	Y
45	Smoked Cod	Pollachius virens (Pollock)	Takeaway, Offaly	N
46	Fillet of Cod	Gadus morhua (Atlantic cod)	Takeaway, Offaly	Y
47	Cod	Gadus morhua (Atlantic cod)	Restaurant, Offaly	Y
48	Cod Portion	Gadus morhua (Atlantic cod)	Takeaway, Offaly	Y
49	Fresh Cod	Gadus morhua (Atlantic cod)	Takeaway, Offaly	Y



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50	Fresh Cod	Gadus morhua (Atlantic cod)	Takeaway, Offaly	Y
51	Fresh Cod	Gadus macrocephalus (Pacific cod)	Restaurant & Takeaway, Offaly	Y
52	Fresh Cod	Gadus morhua (Atlantic cod)	Retail, Offaly	Y
53	Cod battered	Merluccius merluccius (European hake)	Restaurant, Dublin	N
54	Cod	Gadus morhua (Atlantic cod)	Hotel, Dublin	Y
55	Cod	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
56	Cod	Gadus morhua (Atlantic cod)	Takeaway & Restaurant, Dublin	Y
57	Fresh Cod Portion in batter	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
58	Whole Frozen Cod	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
59	Battered Cod	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
60	Cod Battered	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
61	Cod Fillet	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
62	Cod	Gadus macrocephalus (Pacific cod)	Takeaway, Dublin	Y
63	Smoked Colley Fillet (sold as smoked cod)	Pollachius virens (Pollock)	Takeaway, Dublin	N
64	Skinless Boneless Cod	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
65	Skin on Cod Fillets	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
66	Smoked Cod	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
67	Undyed Smoked Cod	Pollachius pollachius (Pollock)	Fish retailer, Dublin	N
68	Boneless Skinless Cod Fillet	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
69	Fresh Cod	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
70	Fresh Cod Fillet	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
71	Cod Fish Fingers	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
72	Ocean Trader Chunky Cod Fillets	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
73	Reef Crest Cod Fillets	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
74	Cod Fillets	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
75	Cod	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
76	Line Caught Cod Fillet	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
77	Cod Fillets with Skin	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
78	Cod Fillets	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Dublin	Y
79	Cod Skinless	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
80	Fresh Cod	Gadus morhua (Atlantic cod)	Butchers, Dublin	Y
81	Smoked Cod	Pollachius virens (Pollock)	Butchers, Dublin	N
82	Battered Cod	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
83	Cod	Gadus morhua (Atlantic cod)	Takeaway, Dublin	Y
84	Atlantic Cod Fillets	Gadus morhua (Atlantic cod)	Retail, Dublin	Y
85	Fresh Cod Fillet	Gadus morhua (Atlantic cod)	Fish retailer, Dublin	Y
86	Fresh Cod (cooked)	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Dublin	Y
87	Frozen Cod Fillet	Gadus macrocephalus (Pacific cod)	Takeaway, Cork	Y
88	Breaded Cod Skinned Boned	Gadus macrocephalus (Pacific cod)	Restaurant, Cork	Y
89	Breaded Cod Skinned Boned	Gadus morhua (Atlantic cod)	Restaurant, Cork	Y
90	Cod North Atlantic	Gadus morhua (Atlantic cod)	Hotel, Cork	Y
91	Cod Fillets with breadcrumbs	Gadus morhua (Atlantic cod)	Retail, Cork	Y
92	Chunky Cod Fillets in batter	Gadus macrocephalus (Pacific cod)	Retail, Cork	Y
93	Cod Fillets Florentine	Gadus morhua (Atlantic cod)	Retail, Cork	Y
94	Fresh Cod	Theragra chalcogramma (Alaskan Pollock)	Takeaway, Cork	N
95	Cod Pieces	Argentina silus (Smelt)	Takeaway, Cork	N
96	Fish Portion Cod	Argentine silus (Smelt)	Takeaway, Cork	N
97	Atlantic Cod Fillet	Gadus morhua (Atlantic cod)	Hotel, Wexford	Y
98	Battered Cod	Gadus morhua (Atlantic cod)	Takeaway, Wexford	Y



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99	Cod Fillet	Gadus morhua (Atlantic cod)	Restaurant & Takeaway, Wexford	Y
100	Cooked Cod	Gadus morhua (Atlantic cod)	Takeaway, Mayo	Y
101	Cod	Gadus morhua (Atlantic cod)	Hotel, Mayo	Y
102	Battered Cod	Gadus morhua (Atlantic cod)	Restaurant, Mayo	Y
103	Cod gougans	Gadus morhua (Atlantic cod)	Retail, Mayo	Y
104	Cod	Gadus morhua (Atlantic cod)	Restaurant, Mayo	Y
105	Cod Fillet	Gadus morhua (Atlantic cod)	Hotel, Mayo	Y
106	Cod	Gadus morhua (Atlantic cod)	Fish retailer, Mayo	Y
107	Cod fillet	Gadus morhua (Atlantic cod)	Retail, Mayo	Y
108	Cod Battered	Gadus morhua (Atlantic cod)	Takeaway, Mayo	Y
109	Cod	Gadus morhua (Atlantic cod)	Fish retailer, Mayo	Y
110	Fillet of Cod	Gadus morhua (Atlantic cod)	Takeaway, Mayo	Y
111	Cod	Gadus morhua (Atlantic cod)	Fish retailer, Mayo	Y









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