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Abstract

The European Union (EU), within the renewal plan of the Common Fisheries Policy and the Common Market Organization, with the Cape IV of Reg. (EU) n. 1379/2013 have introduced new requirements for the labeling of fisheries and aquaculture products. These, as well as providing consumers with more complete information, integrate the provisions of Reg. (EU) n. 1169/2011 and acts as a tool to prevent frauds and illegal fishing. In this work the new seafood labelling provisions were evaluated, starting from the analysis of the art. 35 of the Chapter IV and comparing it with the previous EU dispositions (Reg. (EC) no. 104/2000 and no. 2065/2001). The exclusion of prepared and processed products and aquatic invertebrates from the application of the mandatory seafood labelling provisions and the role of the mass caterer operators respect to the labeling requirements were identified as the two major shortcomings that still need to be better addressed by the legislator. Overall, what emerged from this work is that, if on the one hand the European legislation on seafood labelling has achieved important goals, evolving and improving itself, on the other it is still controversial and plagued by the same problems as 15 years ago. Therefore, the authors suggest that the regulation is modified at least extending its scope to all products and to at all stages of the fishery chain.

Keywords Fishery and aquaculture products; European legislation; Mandatory Labelling requirements, Seafood Traceability; Processed seafood, Mass caterers.

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Dear Editor,

we would like to submit the following manuscript for possible publication: **New provisions for the labelling of fishery and aquaculture products: difficulties in the implementation of Regulation (UE) n. 1379/2013.**

Seafood consumption has tripled over the last three decades and fish now accounts for almost 17 percent of the global population's intake of protein. However, the increasingly demand, the overexploitation of natural resources and poor management practices as well as the dramatic spread of illegal, unreported and unregulated (IUU) fishing have led the fishery industry to face several critical situations.

Over the past 15 years, governments around the world, including the EU, have been engaged in development and implementation of stringent fishery policies, aimed at sector's sustainability, the recovery of natural stocks and, above all, the repression of IUU. In addition, given complex trade flows featuring fishery chain, important policies, concerning seafood traceability and labeling, were also adopted.

In this work, the EU labeling requirements for fishery products, which have been issued since 2000 to date, have been analyzed, with particular attention to those currently in force and laid down in Chapter IV of Reg. (EU) No. 1379/2013. During the study, was also necessary to take in to account other European legislative references, such as the "Hygiene Package" and regulations on Common Customs Tariff and General Food Labelling, to evaluate important food definitions.

During the analysis of Chapter IV, a series of major and minor shortcomings were revealed. Among the most serious is undoubtedly the exclusion of processed fishery products and aquatic invertebrates from labeling requirements, despite their high commercialization and value in EU. Such gaps already emerged during the implementation of the firsts EU Regulations on seafood labelling and after 15 years they have not yet been redressed. Furthermore, Cap IV calls into question even mass caterers, but it does not clarify whether and how operators must provide specific

information to consumers about the seafood they administer. This represents an open-issue of great concern that has raised several doubts among stakeholders.

Thus, in order to ensure that all seafood marketed within the MS are safe, legally caught and honestly labeled, it is therefore necessary that EU requires more transparency and full chain traceability for all fishery product, included those processed and aquatic invertebrates. Moreover, considering the high mislabeling rate reported in catering sector, it becomes equally necessary that EU extend the application of Cape IV even to seafood products administered by mass caterers.

Best regards

Andrea Armani

Highlights

- Governments worldwide are engaged in improving seafood traceability and labeling
- The EU regulatory framework on seafood labeling and traceability has been evaluated
- EU dispositions on seafood labelling show major and minor shortcomings
- EU should legislate the labelling of processed products and aquatic invertebrate
- EU should define how operators ought to provide seafood information at mass caterers

Table 1 - List of the current regulations belonging to the Common Fisheries Policy (CFP) and to the Common Organization of the Market (COM) and their main objectives

	Basic Regulation	Came into force	Objective	Other Regulations
Common Fisheries Policy (CFP)	Reg. (EU) n. 1380/2013 of the European Parliament and of the Council on the Common Fisheries Policy, amending Council Regulations (EC) No. 1954/2003 and (EC) No. 1224/2009 and repealing Council Regulations (EC) No. 2371/2002 and (EC) No. 639/2004 and Council Decision 2004/585/EC.	1st January 2014	The CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities.	<p>Council Reg. (EC) n. 1224/2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006.</p> <p>Commission Implementing Reg. (EU) n. 404/2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy.</p> <p>Reg. (EU) 2015/812 of the European Parliament and of the Council of 20 May 2015 amending Council Regulations (EC) No 850/98, (EC) No 2187/2005, (EC) No 1967/2006, (EC) No 1098/2007, (EC) No 254/2002, (EC) No 2347/2002 and (EC) No 1224/2009, and Regulations (EU) No 1379/2013 and (EU) No 1380/2013 of the European Parliament and of the Council, as regards the landing obligation, and repealing Council Regulation (EC) No 1434/98.</p>
Common Organization of the Market (COM)	Reg. (EU) n. 1379/2013 on the common organization of the markets in fishery and aquaculture products, amending Council Regulations (EC) No 1184/2006 and (EC) No 1224/2009 and repealing Council Regulation (EC) No 104/2000	1st January 2014	The COM strengthens the role of the actors on the ground: producers are responsible for ensuring the sustainable exploitation of natural resources and equipped with instrument to better market their products. Consumers receive more and better information on the products sold on the EU market, which, regardless of their origin, must comply with the same rules.	<p>Commission Implementing Reg. (EU) No 1418/2013 concerning production and marketing plans pursuant to Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the common organization of the markets in fishery and aquaculture products</p> <p>Commission Implementing Reg. (EU) No 1419/2013 concerning the recognition of producer organizations and inter-branch organizations, the extension of the rules of producer organizations and inter-branch organizations and the publication of trigger prices as provided for by Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the common organization of the markets in fishery and aquaculture products.</p>

				Commission Implementing Reg. (EU) No 1420/2013 repealing Regulations (EC) No 347/96, (EC) No 1924/2000, (EC) No 1925/2000, (EC) No 2508/2000, (EC) No 2509/2000, (EC) No 2813/2000, (EC) No 2814/2000, (EC) No 150/2001, (EC) No 939/2001, (EC) No 1813/2001, (EC) No 2065/2001, (EC) No 2183/2001, (EC) No 2318/2001, (EC) No 2493/2001, (EC) No 2306/2002, (EC) No 802/2006, (EC) No 2003/2006, (EC) No 696/2008 and (EC) No 248/2009 following the adoption of Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the common organization of the markets in fishery and aquaculture products
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Table 2 - European legislative references and related mandatory information for the labeling of FAPs.

Mandatory Information	Council Regulation (EC) n. 104/2000	Council Regulation (EC) n. 1224/2009	Commission Implementing Regulation (EU) n. 404/2011	Regulation (EU) n. 1379/2013
Commercial designation	X	X	X	X
Catch area	X	X	X	X
Production method	X	X	X	X
Scientific name			X	X
If the product has been “Defrosted”			X	X
Fishing gear used				X

Table 3- Product categories of the Council Reg. (EC) No 2658/87 (and its following amendments), which fall under the Cape IV of the Regulation (EU) n. 1379/2013.

Point Annex I of Reg. (UE) 1379/2013	CN code	Description of the goods
(a)	0301	Live fish
	0302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading 0304
	0303	Fish, frozen, excluding fish fillets and other fish meat of heading 0304
	0304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen
(b)	0305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption
(c)	0306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; smoked crustaceans, whether in shell or not, whether or not cooked before or during the smoking process; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human
	0307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; smoked molluscs, whether in shell or not, whether or not cooked before or during the smoking process; flours, meals and pellets of molluscs, fit for human consumption
(e)	1212 20 00	Seaweeds and other algae

Table 4 - Fishery product that do not fall under the Cape IV of the Regulation (EU) n. 1379/2013.

1601 00	SAUSAGES AND SIMILAR PRODUCTS, OF MEAT, MEAT OFFAL OR BLOOD; FOOD PREPARATIONS BASED ON THESE PRODUCTS:			
1602	OTHER PREPARED OR PRESERVED MEAT, MEAT OFFAL OR BLOOD:			
1603 00	EXTRACTS AND JUICES OF MEAT, FISH OR CRUSTACEANS, MOLLUSCS OR OTHER AQUATIC INVERTEBRATES <u>In immediate packings of a net content of 1 kg or less</u> <u>Other</u>			
1604	PREPARED OR PRESERVED FISH; CAVIAR AND CAVIAR SUBSTITUTES PREPARED FROM FISH EGGS			
	<u>Fish, whole or in pieces, but not minced</u>	1 - Salmon		
		2 - Herring	Fillets, raw, merely coated with batter or breadcrumbs, whether or not pre-fried in oil, frozen Other: - In airtight containers - Other	
		3 - Sardines, sardinella and brisling or sprats		
		3a - Sardines	In olive oil Other	
		3b- Other		
		4 - Tuna, skipjack and bonito (<i>Sarda</i> spp.):		
		4a - Tuna and skipjack	In vegetable oil Other: - Fillets known as 'loins' - Other	
		4b - Bonito (<i>Sarda</i> spp.)		
		5 - Mackerel		
		5a - Of the species <i>Scomber scombrus</i> and <i>Scomber japonicus</i>	Fillets Other	
		5b - Of the species <i>Scomber australasicus</i>		
		6 - Anchovies		
		7 - Eels		
		8 - Other	Salmonidae, other than salmon	
			Fish of the genus <i>Euthynnus</i> , other than skipjack (<i>Euthynnus (Katsuwonus) pelamis</i>):	Fillets known as 'loins' Other
			Fish of the species <i>Orcynopsis unicolor</i>	
		Other	Fillets, raw, merely coated with batter or breadcrumbs, whether or not pre-fried in oil,	

				frozen
				Other
				Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)
				Coalfish (<i>Pollachius virens</i>)
				Hake (<i>Merluccius</i> spp., <i>Urophycis</i> spp.)
				Alaska pollack (<i>Theragra chalcogramma</i>) and pollack (<i>Pollachius pollachius</i>)
				Other
	<u>Other prepared or preserved fish</u>	1 - Preparations of surimi		
		2 - Other	Of salmon	
			Of Salmonidae, other than salmon	
			Of anchovies	
			Of sardines, bonito, mackerel of the species <i>Scomber scombrus</i> and <i>Scomber japonicus</i> , fish of the species <i>Orcynopsis unicolor</i>	
			Of tuna, skipjack or other fish of the genus <i>Euthynnus</i>	
			Of other fish	
	<u>Caviar and caviar substitutes</u>	1 - Caviar		
		2 - Caviar substitutes		
1605	CRUSTACEANS, MOLLUSCS AND OTHER AQUATIC INVERTEBRATES, PREPARED OR PRESERVED			
	<u>Crab</u>			
	<u>Shrimps and prawns</u>	1- Not in airtight containers	In immediate packings of a net content not exceeding 2 kg	
			Other	
		2 - Other		
	<u>Lobster</u>	1- Lobster meat, cooked, for the manufacture of lobster butter or of lobster pastes, pâtés, soups or sauces		
		2 - Other		
	<u>Other crustaceans</u>			
	<u>Molluscs</u>	Oysters		
		Scallops, including queen scallops		
		Mussels	In airtight containers	
			Other	
		Cuttlefish and squid		
		Octopus		
		Clams, cockles and arkshells		
		Abalone		
		Snails, other than sea snails		
		Other		
	<u>Other aquatic invertebrates</u>	Sea cucumbers		
		Sea urchins		
		Jellyfish		
		Other		

0308	AQUATIC INVERTEBRATES OTHER THAN CRUSTACEANS AND MOLLUSCS, LIVE, FRESH, CHILLED, FROZEN, DRIED, SALTED OR IN BRINE; SMOKED AQUATIC INVERTEBRATES OTHER THAN CRUSTACEANS AND MOLLUSCS, WHETHER OR NOT COOKED BEFORE OR DURING THE SMOKING PROCESS; FLOURS, MEALS AND PELLETS OF AQUATIC INVERTEBRATES OTHER THAN CRUSTACEANS AND MOLLUSCS, FIT FOR HUMAN CONSUMPTION	
	<u>Sea cucumbers</u> (<i>Stichopus japonicus</i> , Holothurioidea)	Live, fresh or chilled
		Other
		Smoked, whether or not cooked before or during the smoking process, not otherwise prepared
		Frozen
	<u>Sea urchins</u> (<i>Strongylocentrotus</i> spp., <i>Paracentrotus lividus</i> , <i>Loxechinus albus</i> , <i>Echinus</i> <i>esculentus</i>)	Live, fresh or chilled
		Other
		Smoked, whether or not cooked before or during the smoking process, not otherwise prepared
		Frozen
	<u>Jellyfish</u> (<i>Rhopilema</i> spp.)	Live, fresh or chilled
		Smoked, whether or not cooked before or during the smoking process, not otherwise prepared
		Frozen
		Other
	<u>Other</u>	Live, fresh or chilled
		Smoked, whether or not cooked before or during the smoking process, not otherwise prepared
Frozen		
Other		

Table 1SM – Evolution of EU legislative requirements concerning the labelling of Fishery and Aquaculture Products (FAPs).

Regulation	Article	Information to consumers	Methods of providing information	Main content and new requirements
<p>Council Regulation (EC) n. 104/2000 on the common organization of the markets in fishery and aquaculture products.</p> <p>Commission Regulation (EC) n. 2065/2001 laying down detailed rules for the application of Council Regulation (EC) No 104/2000 as regards informing consumers about fishery and aquaculture products</p>	<p>Art. 4 Consumer information</p>	<p>Commercial designation Scientific name (not at retail) Production method Catch area (number of FAO area)</p>	<p>This information together with the scientific name of the species concerned shall be provided by means of the labelling or packaging of the product, or by means of a commercial document accompanying the goods, including the invoice (Article 8 of Commission Regulation (EC) n. 2065/2001).</p>	<p>Commercial designation must be reported according to the Member States' lists. The scientific name is mandatory only in the stage of sale prior to the retail.</p> <p>To indicate the production method for products caught at sea or in freshwater the terms “caught” or “caught in freshwater” must be used. As regards products of aquaculture, they can be indicated as “farmed” or “cultivated” .</p> <p>The catch area must be reported according to the designation of FAO and is sufficient to communicate even the number.</p>
<p>Commission Implementing Regulation (EU) n. 404/2011 laying down detailed rules for the implementation of Council Regulation (EC) no 1224/2009 establishing a community control system for ensuring compliance with the rules of the common fisheries policy</p>	<p>Art. 68 Information to the consumer</p>	<p>Commercial designation Scientific name (at all stages) Production method Catch area (number of FAO area) If the product has been “Defrosted”</p>	<p>The scientific name of the species may be provided to the consumers at retail level by means of commercial information such as bill boards or posters.</p>	<p>The mention of the scientific name becomes mandatory at retail level.</p> <p>Fisheries and aquaculture products, thawed and then sold, must be identified as "defrosted", except those previously frozen for health safety purposes or defrosted prior to smoking, salting, cooking, pickling, drying or a combination of these processes.</p>
<p>Reg. (EU) n. 1379/2013 on the common organization of the markets in fishery and aquaculture products, amending Council Regulations (EC) No 1184/2006 and (EC) No 1224/2009 and repealing</p>	<p>Art. 35 Mandatory information</p>	<p>Commercial designation Scientific name Production method Catch area (Entire name of FAO Area or Sub Area or Divisions) If the product has been “Defrosted”</p>	<p>For non-prepacked fishery and aquaculture products, the mandatory information listed may be provided for retail sale by means of commercial information such as billboards or posters.</p>	<p>As regards the production method, the legislator indicate how to communicate it to consumers (“...caught...”, “... caught in freshwater...”, “farmed...”), but unlike the</p>

<p>Council Regulation (EC) No 104/2000</p>		<p>Fishing gear used</p>	<p>previous regulations, he also allows the use of other terms than those suggested.</p> <p>The category of fishing gear used in the capture is a new requirement. The FBOs can choose from those reported in the Annex III or can add further clear, unambiguous and verifiable information on the gear used or other fishing techniques not covered by Annex III (e.g. fishing by hand or diving).</p> <p>As regards the catch in Northeast Atlantic (FAO Fishing Area 27 including the Baltic Sea), Mediterranean (FAO Fishing Area 37.1-3) and the Black Sea (FAO Fishing Area 37.4), the fishing area must be indicated on the basis of “sub-area” or “divisions”, Moreover, when a sub-area is divided into several divisions, without one collective name for the “sub-area”, all names of the sub-areas must be listed.</p>
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New provisions for the labelling of fishery and aquaculture products: difficulties in the implementation of Regulation (UE) n. 1379/2013.

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Dear editor,

We are sending you back the revised version of the manuscript entitled “*New provisions for the labelling of fishery and aquaculture products: difficulties in the implementation of Regulation (UE) n. 1379/2013*”.

Thank you for considering the manuscript for publication after revision.

All corrections have been made according to your request.

line 13 (Abstract): 'with respect to';

line 19: suggest: 'fishery logistics chain'; 'fishery chain' does not make sense in English;

line 158: delete 'obligatory'; it is not necessary to convey the sense of the sentence;

line 281: 'such as';

line 399: 'Acknowledgement' not 'Funding Source';

Thank you for highlighting the changes in green. Please now submit a clean copy without the green highlights.

**1 New provisions for the labelling of fishery and aquaculture products: difficulties in the
2implementation of Regulation (EU) n. 1379/2013.**

3 **Abstract**

4 The European Union (EU), within the renewal plan of the Common Fisheries Policy and the
5 Common Market Organization, with the Cape IV of Reg. (EU) n. 1379/2013 have introduced new
6 requirements for the labeling of fisheries and aquaculture products. These, as well as providing
7 consumers with more complete information, integrate the provisions of Reg. (EU) n. 1169/2011 and
8 acts as a tool to prevent frauds and illegal fishing. In this work the new seafood labelling provisions
9 were evaluated, starting from the analysis of the art. 35 of the Chapter IV and comparing it with the
10 previous EU dispositions (Reg. (EC) no. 104/2000 and no. 2065/2001). The exclusion of prepared
11 and processed products and aquatic invertebrates from the application of the mandatory seafood
12 labelling provisions and the role of the mass caterer operators with respect to the labeling
13 requirements were identified as the two major shortcomings that still need to be better addressed by
14 the legislator. Overall, what emerged from this work is that, if on the one hand the European
15 legislation on seafood labelling has achieved important goals, evolving and improving itself, on the
16 other it is still controversial and plagued by the same problems as 15 years ago. Therefore, the
17 authors suggest that the regulation is modified at least extending its scope to all products and to at
18 all stages of the fishery logistic chain.

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26 **Keywords:** fishery and aquaculture products, European legislation, mandatory labelling
27 requirements, processed seafood, mass caterers.

28 1. INTRODUCTION

29 The policies of trade liberalization and the expansion of fishing fleets together with the significant
30 improvement of transportation, logistics and preservation technologies have lead the fishery sector
31 to become more globalized than agriculture, with nearly 40% of the products entering the
32 international market [1] [2] and [3]. Seafood are in fact among the most traded food commodities
33 worldwide [4] and, according to FAO projections, in 2022 the world production is expected to rise
34 to 181 million tons, of which 85 will come from aquaculture [5].

35 The annual per capita seafood food consumption has risen in the last few decades, passing from
36 an average of 9.9 Kg in 1960 to 19.2 kg in 2012 [5] [6] and [7]. In particular, seafood intake has
37 been influenced by several factors, including higher average wage, increased availability of fish
38 resources, changing in eating patterns and public taste, growing consumer orientation towards a
39 varied diet and above all, greater attention towards healthy and quality products [8]. Thanks to their
40 nutritional characteristics and high content in quality protein, omega-3 fatty acids and essential
41 micronutrients, aquatic foods have become very popular and increasingly recognized as an essential
42 dietary component to improve the nutrition, health, and well being of all peoples [9] and [10].
43 Furthermore, the market demand has been largely stimulated by several food scandals occurred
44 between 1990s and 2000s, such as "mad cow" and avian flu, which have lead consumers to prefer
45 seafood to beef and poultry.

46 However, over the years, the massive fishing activity has had a dramatic impact on world fish
47 stocks, 87.3% of which can be currently classified as overexploited, depleted or recovering [7]. In
48 addition, the world's oceans conservation is significantly undermined by illegal fishing vessels,
49 which frequently use destructive fishing methods [11]. The annual global scale of Illegal,
50 Unreported, and Unregulated (IUU) fishing is estimated at about 11–26 million tons, determining an
51 economic loss of 10-23.5 billion dollars [11] and [12]. The entry of IUU products within seafood
52 supply chain is greatly facilitated by the complex fluxes of goods that characterize the sector [13].

53 Seafood often covers very long distances and changes hands several times among various brokers,
54 wholesalers, processors and retailers before reaching the consumer [14]. This makes tracing back
55 their origin very difficult. Moreover, the lack of specific traceability requirements in some
56 countries, in association with the business practice of “Flag of convenience” (operated by many
57 fishing vessels to avoid the regulations of their own state), allow IUU products to be marketed in
58 legal distribution channels [13] [14] and [15].

59 The overexploitation of fish stocks, the increasing complexity of trade flows and the spread of
60 IUU, have determined the need to adopt specific governance arrangements in the fisheries sector, at
61 global and local level [3] [16] and [17].

62 Worldwide the management of the fishery and aquaculture is regulated by an integrated control
63 system that extends throughout the supply chain up to retail, with the dual objective of ensuring the
64 sustainability of the sector and the traceability of the products [3] and [16]. These aims can be found
65 also in Europe’s recent reformed Common Fisheries Policy (CFP), which seeks to achieve
66 sustainable exploitation of Europe’s marine biological resources with a “*broad involvement of*
67 *stakeholders at all stages of the policy from conception to implementation*” [18]. In particular, the
68 EU regulations on the fishing industry are set out in two separate sections: the Common Fisheries
69 Policy Control Regulation (CFP) and the Common Organization of the Markets in Fishery and
70 Aquaculture Products Regulation (COM).

71 The CFP was first introduced in the 1970s, then it went through successive updates following the
72 important changes occurred in the sector over the years and the shortcomings detected in its
73 implementation [3] and [16]. Currently, the new CFP is a complex policy consisting of many rules,
74 principles and concepts. The Basic Regulation is represented by the Council Regulation (EU) n.
75 1380/2013 (adopted in December 2013) [19] aimed at surveillance and enforcement of fish stock
76 and at the management of European fisheries activities [20] (Table 1).

77 **Table 1 here**

78 As regards COM, it has been an integral part of the CFP since the very beginning. It was set up
79to stabilize the markets, in terms of price, fair income for producers and optimal balance between
80supply and demand [20] and [21]. However, the evolving environment and growing complexity of
81the EU market necessarily required new intervention policies and the market organization in fishery
82and aquaculture products has been considerably revised [22]. Over the years, CMO has steadily
83evolved from a system involving market intervention to one that focuses more on sustainability
84[21].

85 Currently, COM is regulated by Reg. (EU) n. 1379/2013 [23], entered into force the 1st January
862014 (Table 1), which provides for new production and marketing plans to help professional
87organizations with the daily implementation of the CFP's reform goals [21]. This regulation, in
88addition to defining the basic principles of market intelligence policies and the new common
89marketing standards, at the Art. 35 of the Cape IV, establishes the new mandatory labelling
90requirements for Fisheries and Aquaculture Products (FAPs), which repeal those previously
91established by the Council Reg. (EC) n. 104/2000 [24] and Commission Reg. (EC) n. 2065/2001
92[25] (Table 2). Moreover, at Art. 39, it also lists voluntary information, such as the date of catch, the
93port of landing, the flag State of the vessel or the fishing gear used, as well as information of an
94environmental, ethical or social nature that can be reported on the label of FAPs.

95 **Table 2 Here**

96While the mention of voluntary information represent a novelty respect to the previous legislation,
97the same shortcomings that had emerged following the entry into force of Council Reg. (EC) n.
98104/2000 [26] and [27] seem to be still present in the Cape IV, Art. 35 of the Reg. (EC) n.
991379/2013, especially as regards the categories of fishery products subject to the mandatory
100labelling provisions. Moreover, considering that the Art 35 has explicitly involved the mass
101caterers, several doubts have raised among stakeholders as regards the procedures for providing
102information to the consumers at the administration level.

103 Starting from the difficulties in the practical application of the Reg. (EC) n. 1379/2013 by the
104 Control Authority in charge of the checks and by FBOs operating in the seafood chain, the aim of
105 this work was to perform an in-depth analysis of the mandatory labelling requirements issued over
106 the years in EU, focusing in particular on those set by Art. 35 of the current regulation in force
107 (Reg. (EU) n. 1379/2013), in order to highlight the main shortcomings in its implementation. This
108 work was intended to promote a discussion among all the stakeholders involved in the fishery and
109 aquaculture sector. Despite the shortcomings arising from the implementation of the aforesaid
110 regulation can have detrimental fallout on the sustainability of the fishery sector, this issue has not
111 been taken into consideration in the present article because it is beyond the scope of this paper and
112 deserves an in-depth dedicated discussion.

113 2. MATERIALS AND METHODS

114 The assessment of legislative changes concerning FAPs mandatory labeling requirements (and
115 the kind of FAPs subject to these rules), began with the analysis of the Article 35 “*Mandatory*
116 *information*” and Article 4 “*Consumer information*” of the Council Reg. (EC) n. 104/2000. Council
117 Reg. (EC) n. 1224/2009 (Art. 58 “Traceability”) [28] and, of the detailed rules for its
118 implementation, laid down by the Commission Implementing Reg. (EU) n. 404/2011 (Art. 68
119 “*Information to the consumer*”) [29] were also taken into consideration. Then, these dispositions
120 were compared with the new mandatory requirements established by the Art. 35 “*Mandatory*
121 *Information*” of the Reg. (EU) n. 1379/2013 (Table 2).

122 During the analysis, it was necessary to take into account some definitions set out in other
123 European food legislative references. In fact, considering that the Art. 35 of the Reg. (EU) n.
124 1379/2013, refers to the Common Customs Tariff Combined Nomenclature (CN), as regards the
125 FAPs which fall within its scope (Table 3), the Council Reg. (EC) n. 2658/87 [30] and its following
126 amendments, were analyzed. In particular, Chapter 3 “*Fish and crustaceans, mollusks and other*
127 *aquatic invertebrates*” and Chapter 16 “*Preparations of meat, of fish or of crustaceans, mollusks or*

128other aquatic invertebrate” (Tables 3 and 4). In addition, the CN code 1212 21 00 “Seaweeds and
129other algae fit for human consumption” in Chapter 12 “Oil seeds and oleaginous fruits;
130miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder”, was also
131considered.

132 **Table 3 and Table 4 here**

133 In order to better clarify the kind of FAPs to which the Cape IV must be applied, other
134definitions on food preparations, such as “processing”, “unprocessed products” and “processed
135products”, reported in the Art. 2 of Reg. (EC) n. 852/2004 [31] and those regarding fishery products
136(“Fresh fishery products” and “Prepared fishery products”) and processed food (“Processed fishery
137products”), included in the Annex I of Reg. (CE) n. 853/2004 [32] were also analyzed. Finally,
138given that certain provisions established by the Reg. (EU) n. 1379/2013 concerning the catering
139sector resulted ambiguous, the definition of “retail” and “mass caterer” established by Reg. (EU) n.
140178/2002 [33] and 1169/2011 [34] were taken into consideration.

141 **3. RESULT AND DISCUSSION**

142 Traceability is intended to enable tracking of a product throughout a production and distribution
143chain, from the raw materials supplier to the end-consumer. For these reasons, traceability ought to
144be based on reliable, fast and simply working systems and schemes. In this regard, the labelling of
145foodstuff represents a basic tool for achieving these aims and assure sustainability within each
146sector of the food industry.

147 Over the years the EU has created a more stringent framework for the labeling of foods (both
148vegetables and of animal origin), which currently are settled by the Reg. (EU) n. 1169/2011. In this
149context, the fishing industry has been one of the first sectors, together with that of beef meats (Reg.
150(CE) n. 1760/2000 [35]), to be regulated by specific traceability and labelling provisions.

151 **3.1. Before the entrance into force of Cape IV, Art. 35 of the Reg. 1379/2013: a brief**
152**historical excursus.**

153 At European level, the dispositions on seafood labeling were introduced by the Art. 4 of the
154 Council Reg. (EC) n. 104/2000 which, together with the Implementing Commission Reg. (EC) n.
155 2065/2001, dealt with the organization of the fisheries marketing regime, consumer information and
156 seafood labeling. In particular, the Art.4 required that all FAPs “*offered for retail sale to the final*
157 *consumer*” had to report the commercial designation of the species, the production method and the
158 catching or farming area and, voluntarily, also the scientific name (Table 2). This information was
159 mandatory for products sold as fresh, chilled, frozen, dried, smoked, salted or in brine as well as
160 headed, de-tailed, gutted, fillets or steaks (products referred to in Article 1 (a), (b) and (c) of the
161 Council Reg. (EC) n. 104/2000).

162 In informing consumers on commercial designation, production method and origin it is essential
163 to be made aware of purchase decisions as well as to avoid fraud or illegal practices. The trade
164 name, for example, allows accurate identification of seafood [36] and this is extremely useful for
165 buyers, considering that to date, about 1200 different species are marketed within EU [37]. Trade
166 name is even more necessary for filleted products, where the loss of morphological characteristics
167 makes it difficult (if not impossible) to identify the species. In addition, the availability of this
168 information can reduce the risk of allergic reaction in consumers [38]. Providing information on
169 production method is equally important especially because it allows to differentiate wild from
170 farmed products. In fact, consumers perceive clear qualitative differences between them, preferring
171 and willing to pay more for the wild ones [39]. Furthermore, also as regards the nutritional values,
172 there are some little differences between wild and aquacultured, depending on environment and
173 feeding. Finally, reporting the origin is not only important for traceability itself but also to allow
174 consumers to identify local products or seafood coming from countries with low hygienic and
175 quality standards [40] or from sea areas affected by pollutants and contaminants [41].

176 This first attempt to regulate seafood labelling has shown both serious and minor deficiencies.
177 The major deficiency of the Reg. (EC) n. 104/2000, which unfortunately has not been solved by

178subsequent regulations (see section 3.2.1), was related to its scope. In fact, even though the most
179part of fishery products were included in the scope of the Reg. (EC) n. 104/2000, processed
180products (preserves and semi-preserves) were not requested to report mandatory information.
181However, processed products, because of the loss of morphological characteristics and the difficult
182in species recognition, are very susceptible to frauds and illegal practices [42].

183 As regards the minor deficiencies of Reg. (EC) n. 104/2000, these certainly include the non-
184obligation to report the scientific name at retail level and the lack of the description on how the
185capture area must be indicated on the label (Table 1). In particular, concerning the capture area, as
186Reg. (EC) n. 104/2000 did not specify how this information ought to be given to consumers, if by
187simply reporting the number or (more plausibly) by reporting the full name of the area, for practical
188convenience, operators used to report only the FAO number (author's note). This was seen as an
189obstacle to awareness of the purchasing [26], because it was technically impossible for consumers
190tracing back the origin through a number, unless illustrative posters or maps were exposed in the
191store. Later in 2009, following the enactment of the Council Reg. (EC) n. 1224/2009, new and
192important labelling requirements for marketing of FAPs were introduced in EU. However, as
193regards retail marketing, the labelling requirements remained the same previously established by the
194Reg. (EC) n. 2065/2001, with the exception of the obligation to report the term "defrosted", in case
195they had been previously frozen.

196 Some of the minor gaps of the Council Reg. (EC) n. 104/2000 were partially filled by the
197Commission Implementing Reg. (EU) n. 404/2011 (implementation regulation of Reg. (EC) n.
1981224/2009). In fact, the Art. 68, which introduce the obligation to report the scientific name of
199seafood sold at retail level, definitely helped to provide better information to consumers.

200 However, both Reg. (EC) n. 1224/2009 and Reg. (EU) n. 404/2011 did not provide further
201explanations on how to report the catch area.

202 **3.2. After the entrance into force of Cape IV of the Reg. (EC) n. 1379/2013: the current**
203**situation.**

204 In 2014, all of the aforesaid provisions have been repealed by the current regulation Reg. (EU) n.
2051379/2013 [3] and [16] (Table 2).

206 According to Art. 35 of *Cape IV*, pre-packed and non-prepacked FAPs, listed in Annex I of the
207Reg. (EC) n. 1379/2013 under letters (a), (b), (c) and (e), may be “*offered for sale to the final*
208*consumer or to a mass caterer*”, only if properly labeled. This Regulation introduces important
209changes by defying some new mandatory information, as the obligation to report the fishing gear
210used for the capture in the label, and making some little changes as regard the production method
211and the catch area (Table 2). In fact, in order to overcome the weakness highlighted in the previous
212regulations, the information to provide about the capture (or farming) area has become more
213detailed and indicating only the FAO number of the fishing area is not allowed, as it is too vague.
214FBOs can report the name by writing of the FAO Area, Sub-Area or division (expressed in terms
215understandable to the consumer) or alternatively a map or pictogram showing that zone. Moreover,
216when a Sub-Area has several divisions, without one collective name for the Sub-area, all names of
217the sub-areas must be listed. According to the Guideline of the German Federal Association of Fish
218Industry and Fish Wholesalers, it seems that the information value of such a “list of divisions” is of
219no use for the consumer [43]. In fact, the legislator does not define the basic educational level of the
220consumer regarding catch areas and “*this provision is fulfilled, if the official indications of the sub-*
221*areas used by the regional fishery organizations are generally understandable*” and it is technically
222difficult to display all this information on one single label [43]. Certainly, these technical difficulties
223are true, but it is very important to provide information as detailed as possible about the origin of the
224FAPs, especially in those contexts where local products are more appreciated than others. For
225example, in the case of certain wide FAO areas, such as the n. 37 that includes the Mediterranean

226and the Black Sea, the lack in reporting the division or sub-area could probably mislead the
227consumers (Author's note).

228 One of the most important novelties of the Regulation (EU) n. 1379/2013 is the introduction of
229seaweed and other algae in the scope of the Cape IV, Art. 35. In the Annex I of the Reg. (EU)
2301379/2013, they are identified with the letter (e), which refers to the category “*Locust beans,*
231*seaweeds and other algae, sugar beet and sugar cane, fresh, chilled, frozen or dried, whether or not*
232*ground; fruit stones and kernels and other vegetable products (including unroasted chicory roots of*
233*the variety *Cichorium intybus sativum*) of a kind used primarily for human consumption”*, under the
234Chapter 12 of the Customs Tariff Code (Table 3).

235 For thousands of years seaweeds have been highly valued and widely consumed as a direct
236human food by oriental communities [10]. In the West no such tastes or traditions have been
237acquired but as eastern people, especially from China, Japan and the Republic of Korea, have
238migrated around the world, seaweeds have moved with them. Today, respect to the past, there are
239many more countries where the consumption of such products is common [44] and [45]. Worldwide
240250 species of seaweed are utilized and despite they are quite common in EU, especially in Asian
241retail markets and restaurants, with a demand that is expected to grow by 7-10% annually [46] it's
242not easy to find algae species in Member States official lists of seafood trade names [47]. Currently,
243Slovenia is the only Member State which has defined a generic trade name for Algae (Morske alge)
244and specific commercial designations for the Genus *Fucus* spp. (Haluge) and for the species
245*Chondrus crispus* (Irski Mah) and *Fucus serratus* (Nazobčana haluga) [48].

246 Another novelty of the Art. 35, is the explicit involvement of the mass caterers. All FAPs under
247the letters (a), (b), (c) and (e) of the Annex I of the CMO, even when offered for sale to a mass
248caterers, which includes food businesses such as restaurants, canteens, schools, hospitals and
249catering enterprises, must be labeled according to the Art. 35. However, the interpretation of this
250point still represents an open issue (see section 3.2.2).

251 **3.2 Difficulties in implementation of Regulation 1379/2013**

252 *3.2.1 Kind of products within the scope.* The Art. 35 provides specific rules for consumer
253 mandatory information for pre-packed and non-prepacked FAPs, listed in Annex I of the Regulation
254 (CE) n. 1379/2013, under the letters (a), (b), (c) and (e), irrespective of their origin or marketing
255 method (Table 3). The FAPs referred to in points (a), (b) and (c) are all under the Chapter 3 “*Fish*
256 *and Crustaceans, Molluscs and other Aquatic Invertebrates*” of the Customs Tariff Code which
257 include unprocessed FAPs (fresh, chilled or frozen) as whole, filleted or minced. However, in the
258 Chapter 3 certain processed products, such as those dried, salted, in brine or smoked can be also
259 found. In particular, as regards the crustaceans, even those “*in shell, cooked by steaming or by*
260 *boiling in water*” (whether or not they are chilled, frozen, dried, salted or in brine) are considered
261 (Table 3). All the other processed FAPs (preserves and semi-preserves), falling under Chapter 16 of
262 the Customs Tariff Code, have not to be labeled according to the Art. 35 (Table 4). Even though
263 fishery products are accurately categorized according to the EU categories reported in the Customs
264 Tariff Code, it must be highlight that this system of good classification is just intended for applying
265 taxes or relief on imports and therefore it does not take into account the definitions of processed and
266 unprocessed products given by the EU Food Regulations.

267 According to the Article 2 of Regulation (EC) n. 852/2004, on the hygiene of foodstuffs,
268 ‘*Unprocessed products*’ can be defined as “*foodstuffs that have not undergone processing, and*
269 *includes products that have been divided, parted, severed, sliced, boned, minced, skinned, ground,*
270 *cut, cleaned, trimmed, husked, milled, chilled, frozen, deep-frozen or defrosted*”. For ‘*Processing*’
271 the Regulation (CE) n. 852/2004 intend “*any action that substantially alters the initial product,*
272 *including heating, smoking, curing, maturing, drying, marinating, extraction, extrusion or a*
273 *combination of those processes*”. According to this definition, smoked, dried and salted FAPs, must
274 be considered ‘*Processed products*’, but despite this, they must comply with the FAPs labelling
275 provisions, as they are included in the commercial categories, (b) and (c), of the Customs Tariff

276Code. On the contrary, other processed FAPs, as those marinated, must not comply with the
277provisions of Art. 35 as they belong to other categories of the Customs Tariff Code and only the FIC
278must be applied (Table 4). The complexity of the Customs Tariff Code and the mismatch between
279its commercial categories and the definitions of the EU Food Regulations, even determines certain
280paradoxical situations, such as that of cooked crustaceans. In the case where the crustaceans are
281steamed or boiled with the shell (point (c) of the Annex I), they must be labeled in accordance with
282Article 35, while those cooked without shell, which are not covered under the letter (c), are just
283subject to the FIC rules. In this case, in order to determine if the product goes under the Chapter 03
284or 16, the customs classification refers to the temperatures used for steaming/boiling the
285crustaceans.

286 The exclusion of processed FAPs from the scope of the Art. 35 may have detrimental effects on
287consumers, especially considering that the 56% of FAPs consumed by humans has undergone some
288transformation process [49]. The fact that these products should not meet the mandatory labelling
289requirements compromises their traceability, which is already threatened by the complex trade
290flows that characterize the fishery. In fact, seafood, after being caught or farmed are often subject to
291several transport and exchanges, in particular at the primary level between producers and first
292buyers or primary processors [3]. Moreover, several companies have started to outsource processing
293steps, such as filleting, to third-party countries, and sell the end product back at their point of origin
294or elsewhere [3] [50] [51]. Thus, for fishery products, this involves long paths from harvesting to
295consumption, and concomitant increases in food safety risks [3].

296 In addition, favoring the loss of important information, the complexity of the commercial flow of
297processed FAPs can easily encourage both the introduction, by fishers, processors or distributors, of
298illegally caught fish in the legal supply and the occurrence of fraud [52]. In this regard, several
299studies on seafood species identification have shown that fraudulent replacement are significantly
300higher for unrecognizable processed products than for whole fish. In fact, deliberate mislabeling is

301easier when seafood are marketed as skinned, chopped, filleted, sliced, prepared or cooked [49] [53]
302[54] [55] [56] [57] [58] [59] [60] and [61]. In particular, cases of mislabeling have been found in
303fish fillets [54] [57] and [62], fish fingers [49] as well as canned, smoked and salted products [59]
304and [63], frequently involving high value species [42].

305 In the light of these findings, it is clear that processed FAPs are easily and commonly replaced
306and the lack of specific and mandatory labeling requirements strongly expose consumers to illicit
307practice that can also have serious health implications if toxic species are involved [60] and [64].

308 Beyond these economic and health implications, the lack of labelling requirements for processed
309FAPs hampers consumers to select products that contain species caught from sustainable fisheries
310[49] as well as can lead to a distortion of catch data and adversely affect estimates of stock size
311[65]. For these same reasons, mandatory labeling requirements should be extended even to aquatic
312invertebrates, such as sea urchin, sea cucumber and jellyfish (CN Code 0308) (Table 4). In recent
313decades, these types of products have had a significant increase in sales in EU and worldwide there
314has been a great expansion in catch [66] [67]. Edible sea urchins (especially their gonads), due to
315their nutritional and health potential, have a good international market [68] and Japan, with sushi
316driving up demand, imports about 97% of global exportation. In Asia, especially in China, sea
317cucumbers (class Holothuroidea), which are considered luxury seafood commodities, are
318particularly appreciated and have a high value also as medicine [66] and [69]. They use to be sold
319dried as “trepang” or “beche-de-mer” and depending on the species, organoleptic properties and
320main market demand, they can be ranked as of high, medium or low commercial value [69] [70]
321and [71]. However, once processed (gutted, boiled, roasted, dried and smoked), sea cucumbers can
322be difficult to identify creating a problem for trade officials [70] and [71]. This represent a real
323threat for the conservation and protection of CITES species and for this reason very restrictive
324labeling provisions should be adopted (Author’s note), also to prevent illegal fishing [72].

325 Due to the rapid growth of immigrant settlements in Western countries, edible jellyfish have
326 become increasingly popular and readily available even in EU, so that some Member States, such as
327 Italy and Germany, have defined a trade name for such products (although jellyfish is not under the
328 Art. 35). Jellyfish products can be easily found in Asian supermarkets and restaurants, but they are
329 often subject to identification problems and mislabeling [73] [74] and [75]. Given all this, it is
330 difficult to understand why highly marketed and popular aquatic invertebrates, of which traceability
331 and mislabeling issues are well-known, have been excluded from the scope of Art. 35, while algae,
332 whose consumption in EU is very limited, have been explicitly included (see section 3.2).

333 3.2.2 *Information at retail level.* The inclusion of mass caterers is not properly new, in fact they
334 were also subject to the application of the previous regulations on seafood labelling (Reg. (EC) n.
335 104/2000 and 2065/2001) products “...*offered for retail sale to the final consumer*”. However, the
336 definition of “retail” was not initially provided by the Reg. (EC) n. 104/2000, but it was clarified
337 later by the Reg. (EU) n. 178/2002. It establishes that for “retail” should be intended “*the handling*
338 *and/or processing of food and its storage at the point of sale or delivery to the final consumer, and*
339 *includes distribution terminals, catering operations, factory canteens, institutional catering,*
340 *restaurants and other similar food service operations, shops, supermarket distribution centers and*
341 *wholesale outlets*”. In addition, with the Reg. (EU) n. 1169/2011 a specific definition for mass
342 caterers was provided: “*any establishment (including a vehicle or a fixed or mobile stall), such as*
343 *restaurants, canteens, schools, hospitals and catering enterprises in which, in the course of a*
344 *business, food is prepared to be ready for consumption by the final consumer*” (Reg. (EU) n.
345 1169/2011). While the FIC regulation clearly reports that the Regulation (EU) n. 1169/2011 “...*shall*
346 *apply to all foods intended for the final consumer, including foods delivered by mass caterers and*
347 *foods intended for supply to mass caterers*”, the Art. 35 it is not so detailed. In fact, analyzing its
348 scope, it seems that it must be applied only to FAPs (in points (a), (b), (c) and (e) of the Annex I),
349 sold to mass caterers and not to those administered by them.

350 This difficulty of interpretation resulted in a series of questions and doubts raised from
351stakeholders to which the EU has sought to answer through a series of online FAQs (European
352Commission, 2015d). As explained by the EU, restaurants and other mass caterers are not obliged to
353put the mandatory information on their menus unless the Competent Authority requires so. They
354can do it voluntarily to improve the image and credibility of their business, as they are just obliged
355to keep such information and show the documents to the consumers if they require it [76]. This
356probably does not reflect the policy of transparency and accurate information promoted by the EU
357as regards food labelling. Moreover, there are certain types of products commonly administered by
358restaurants, such as sashimi and cooked crustaceans in shells, which fully falls within the scope of
359Art. 35. Also in this case, considering the several cases of fraud detected in sashimi and cooked
360crustaceans [42] [77] [78] and [79], it would be appropriate that specific indications concerning the
361labeling of these products were provide by FBOs to consumers during administration.

362 Currently, at European level, the Art. 35 is not applicable to prepared and processed FAPs and
363the dishes made of seafood can be indicated in the menu by generic and incomplete names, such as
364“Tuna”, “Salmon”, “Mussels” with no further specifications. The omission of more specific
365information, especially regarding the origin and the method of production, benefits mass caterers at
366the expenses of the public. In this regards, it has been highlighted mislabeling of fish and seafood at
367restaurants and takeaways are significantly greater than that occurring at retail level [42]. In
368particular, frauds at restaurant level are much more frequent in the case of sales of local or niche
369seafood often substituted with imported similar products [79], as well as the replacement of wild
370with farmed fish is frequent [52]. At mass caterers, these fraudulent activities are also facilitated by
371the nature of checks. In fact, control actions by official food control Authorities directed towards
372species authenticity normally focus on samples taken from the storages of restaurants rather than
373directly from the prepared dishes [80].

374 Without traceability that tracks seafood from the fishing boat to the final consumer, frauds will
375continue to occur [52]. Key information such as the species name, and where, when and how the
376seafood were caught should follow the product throughout the supply chain, including
377administration level (Author's note). Consumers should not be put in the position to ask for the
378information but they should be publicly informed by the FBOs. It would certainly be very onerous
379for the FBOs having to update, even daily, their menu, but it would be necessary to protect
380consumers from misleading, limiting the several cases of adulteration that are often performed by
381restaurants, and to rise their level of awareness on seafood complex supply chain . In this light,
382managers of restaurant activities could be facilitated by the development and implementation of
383innovative and user-friendly digital tools able to manage the menu on a daily basis.

384 **4. CONCLUSIONS**

385 In EU, the lack of labeling provisions for processed FAPs and aquatic invertebrates further
386compromise the complex patterns of seafood traceability and deprive consumers of important
387information on product origin. This problem already emerged during the implementation of the
388Regulation (EU) n. 104 and such shortcomings have not yet been redressed so far. In fact, despite
389the newly requirements introduced by the regulation 1379/2013, some aspects must be better
390clarified. In this regard, EU should requires more transparency and full chain traceability for such
391products, in order to ensure that all seafood marketed within the Member State are safe, legally
392caught and honestly labeled. Traceability, or tracking seafood from the fishing vessel to the final
393point of sale, would provide seafood buyers and consumers with more information about the origin
394of their seafood purchases and build confidence. In particular, also considering the high mislabeling
395rate reported in catering, it becomes necessary that the EU direct legislative efforts at this level,
396extending the labeling requirements and the application of Art. 35 even to FAPs administered by
397mass caterers.

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