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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**European pilchard/Sardine *Sardina pilchardus* *FAO 37 Mediterranean***
Date	**May 2019**
Assessor	**Jim Daly**

Application details and summary of the assessment outcome				
Name: Sarval Bio-Industries				
Address:				
Country: Spain & Portugal		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		**SAI Global Ltd**		
Assessor Name	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/Re-approval**	**Whole fish/ By-product**
Jim Daly	Virginia Polonio	0.5	SURV 1	By-product
Assessment Period	2018			

Scope Details	
Management Authority (Country/State)	GFCM & National (Spain, Morocco, France, Albania, Croatia, Italy, Montenegro, Slovenia, Greece, Turkey)
Main Species	European pilchard / Sardine *Sardina pilchardus*
Fishery Location	FAO 37 Mediterranean
Gear Type(s)	Purse seiners, Pelagic trawlers
Outcome of Assessment	
Overall Outcome	Pass Stock GSA 17-18 Fail stocks 6, 7, 1-3,22
Clauses Failed	C1.2

Peer Review Evaluation	There are many gaps in the information of the stock status.
Recommendation	Do not approve Stocks GSA 1-3, 6, 7, 22 Approve Stock GSA 17-18

Assessment Determination

Stock assessment in the General Fisheries Commission for the Mediterranean (GFCM) area of application is often conducted by management units, based on Geographical Sub Areas (GSAs). This method does not ensure that the whole stock is assessed, since stocks may cover several different management units.

In some cases, when there is scientific evidence of a stock spreading through different GSAs, as well as information on species from different GSAs, existing information is combined across GSAs; then defined as a "joint stock assessment of a shared stock". The GFCM recommends that when scientific evidence of shared stocks exists, joint stock assessments should be attempted. A number of activities aimed at achieving a better definition of stock boundaries are currently being conducted at the GFCM level.

The GFCM conclude (**R1, R4**) that most stocks for which validated assessments are available continue to be fished outside biologically sustainable limits. However since 2014 the percentage of overexploited stocks (all fisheries) has decreased from 88% to 78% in 2016. Overall, fishing mortality for all species and management units combined is around 2.5 times higher than reference points.

A multiannual management plan for small pelagic fisheries in the Adriatic Sea (GSA 17-18) was adopted by the GFCM in 2013; establishing management measures and harvest control rules for fisheries targeting sardine and anchovy. Since then, additional recommendations have been adopted establishing supplementary precautionary and emergency measures for this fishery in both GSAs for 2019‑2021. The general objective is to ensure that the exploitation levels of small pelagics (including *Sardina pilchardus*) in the Adriatic Sea are at MSY by 2020.

For GSA 17-18 Fishery removals of the species in the fishery under assessment are included in the stock assessment process and the species is considered, in its most recent stock assessment, to have a biomass above the limit reference point. This stock passes Clause C.

The assessment determination of all other GSA stocks is set out below:

- GSA 1, 3 **Alboran Sea**. Stocks continue to be fished outside biologically sustainable limits. No management plan in place. The stock fails clause C1.2
- GSA 6 **Northern Spain**. Proxy reference point is defined; fishing mortality is considered above it so the stock fails clause C1.2
- GSA 7 **Gulf of Lion**. Stocks continue to be fished outside biologically sustainable limits. No management plan in place. The stock fails clause C1.2
- GSA 17-18 **Adriatic**. Reference points are defined and stock is considered above Blim. A management plan is in place. The stock passes clause C1.2
- GSA 22 **Aegean Sea**. No stock assessment available. Stocks continue to be fished outside biologically sustainable limits. The stock fails clause C1.2

European pilchard is currently listed as a species of least concern in the Mediterranean on the IUCN Red List (accessed 14.05.19) and is not currently listed on CITES appendices of threatened species. With the exception of sardine harvested from GSA17-18 this species is not approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard from the assessment area (FAO 37 Mediterranean).
Peer Review Comments
Notes for On-site Auditor
Ensure separation of unapproved GSA sardine stock from approved IFFO-RS material from GSA 17-18 during processing.

Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)
Category C	European pilchard *Sardina pilchardus* GSA 17-18 Adriatic Sea	N/A	Pass
Category C	European pilchard *Sardina pilchardus* GSA 1,3 Alboran Sea	N/A	Fail
Category C	European pilchard *Sardina pilchardus* GSA 6 Northern Spain	N/A	Fail
Category C	European pilchard *Sardina pilchardus* GSA 7 Gulf of Lion	N/A	Fail
Category C	European pilchard *Sardina pilchardus* GSA 22 Aegean Sea	N/A	Fail

[List all Category A and B species. List approximate total %age of landings which are Category C and D species; these do not need to be individually named here]

HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)
Category A: Species-specific management regime in place.
Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)
Category C: Species-specific management regime in place.
Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings	Management	Category
European pilchard/ Sardine	*Sardina pilchardus*	GSA 1, 3	N/A	Species-specific management regime (EU, GFCM & national)	C
		GSA 6	N/A		
		GSA 7	N/A		
		GSA 17, 18	N/A		
		GSA 22	N/A	No species-specific management	C

CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

Species Name		**European pilchard / Sardine *Sardina pilchardus***	
C1	**Category C Stock Status - Minimum Requirements**		
	C1.1	Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible. GSA 1,3; 6; 7; 17-18; 22	Pass
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	Pass GSA 17-18
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	FAIL GSA 1,3
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	FAIL GSA 6
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	FAIL GSA 7
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	FAIL GSA 22
Clause outcome:			**See above**
Evidence: C1.1-C1.2: **GSA 1 and 3 Alboran Sea:** Commercial catch data is used in the assessment. Proxy reference points are identified (F0.1). In 2016 fishing mortality was below F0.1 (F0.1 = 0.79 and current fishing mortality, Fcur = 0.71, Fcur/F0.1 = 0.9) and was considered to be sustainably exploited (Idrissi *et al*, 2016). However GFCM (2018) conclude			

- The stock continues to be fished outside biologically sustainable limits and
- The stock status is uncertain.

This stock fails Clause C1.2

GSA 6 Northern Spain
Commercial catch data is used in the assessment. Proxy reference points were identified (F0.1). Fishing mortality is above F0.1 (F0.1 = 0.32 and Fcur = 1.5, Fcur/F0.1 = 4.7). The stock is considered to be overfished and subject to high fishing pressure This stock fails C1.2.

GSA 7 Gulf of Lion
Commercial catch data is used in the assessment. Proxy reference points were identified (Patterson reference point, E). Fishing mortality is below E (E = 0.4 and Fcur = 0.003, Fcur/E = 0.0075). However Saraux and Bourdeix (2016), note that as the biomass is intermediate, the fishing mortality very low and the biological state of the population poor. The stock is judged as ecologically unbalanced: its poor condition related to external factors (i.e. environment) rather than the fisheries pressure. This stock continues to be fished outside biologically sustainable limits and fails Clause C1.2.

GSA 17-18 Adriatic
Commercial catch data is used in the assessment. Reference points are identified (limit, precautionary and MSY). Current biomass (Bcur 183,873) is above Blim (125,318) but below Bpa (250,636). Since 2013 additional recommendations have been adopted establishing supplementary precautionary and emergency measures for this fishery in both GSAs for 2019‑2021. The general objective is to ensure that the exploitation levels of small pelagics in the Adriatic Sea are at MSY by 2020. As the stock biomass is currently above Blim it passes Clause C1.2.

GSA 22 Aegean Sea
No stock assessment available. Stocks continue to be fished outside biologically sustainable limits**.** The stock is overexploited. The output of models were suitable to provide an indication of the current status of the stock, as they both indicated F > FMSY. However due to the lack of surveys and catch-at-age data for a big part of the time series since 2009, the WGSASP (R1) agreed not to provide forward projections and catch advice based on this assessment. The stock fails Clause C1.2 .

References

R1 GFCMC (2018) State of the Mediterranean and Black Sea Fisheries 176pp
http://www.fao.org/3/ca2702en/CA2702EN.pdf

R2 Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a multi-annual plan for small pelagic stocks in the Adriatic Sea and the fisheries exploiting those stocks including GSA 17 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017PC0097 COM/2017/097 final - 2017/043 (COD)

R3 M.H. Idrissi, P. Torres, A. Giráldez, M. Iglesias, M. González, M.J. Meléndez, A. Ventero, A. Ligas, F. Colloca and P. Hernández, 2016. 2015 stock assessment for sardine *Sardina pilchardus* in Geographical Sub-area 1 and 3.

R4 GFCM NOV 2017 Working Group on Stock Assessment of Small Pelagic species (WGSASP) http://www.fao.org/gfcm/reports/technical-meetings/detail/en/c/1107436/ pdf 66pp
Standard clauses 1.3.2.2

CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

"*The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of* r_m *(see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in*

biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of K, t_m and t_{max} and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on r_m (see below) as we are not yet confident with the reliability of the current method for estimating rm. If users have independent r_m or fecundity estimates, they can refer to Table 1 for using this information."

Parameter	**High**	**Medium**	**Low**	**Very low**
Threshold	0.99	0.95	0.85	0.70
r_{max} (1/year)	> 0.5	0.16 – 0.50	0.05 – 0.15	< 0.05
K (1/year)	> 0.3	0.16 – 0.30	0.05 – 0.15	< 0.05
Fecundity (1/year)	> 10,000	100 – 1000	10 – 100	< 10
t_m (years)	< 1	2 – 4	5 – 10	> 10
t_{max} (years)	1 - 3	4 – 10	11 – 30	> 30

Taken from the FishBase manual, "Estimation of Life-History Key Facts": http://www.fishbase.us/manual/English/key%20facts.htm#resilience]

Appendix B – Background on the 5% catch rule

The proposed fishery assessment methodology uses a species categorisation approach to divide the catch in the assessment fishery into groups. These groups are:

- **Category A:** "Target" species with a species-specific management regime in place.
- **Category B:** "Target" species with no species-specific management regime in place.
- **Category C:** "Non-target" species with a species-specific management regime in place.
- **Category D:** "Non-target" species with no species-specific management regime in place

The distinction between 'target' and 'non-target' species is made to enable the assessment to consider the impact of the fishery on all the species caught regularly, without requiring a full assessment be conducted for each. Thus 'target' species are subjected to a more detailed assessment, while 'non-target' species are considered more briefly. For the purposes of the IFFO RS fishery assessment, 'target' and 'non-target' species are defined by their prevalence in the catch, by weight. Applicants must declare which species are considered 'target' species in the fishery, and the combined weight of these must be at least 95% of the annual catch. The remaining 5% can be made up of 'non-target' species. Note also that ETP species are considered separately, irrespective of their frequency of occurrence in the catch.

The proposed use of 5% as a limit for 'non-target' species is one area in which feedback is being sought via the public consultation. The decision to propose a value of 5% ensures consistency with other fishery assessment programmes, such as the MSC which uses 5% to distinguish between 'main' and 'minor' species (see MSC Standard, SA3.4 and GSA3.4.2); and Seafood Watch, which uses 5% when defining the 'main' species for the assessment (see Seafood Watch Standard, Criterion 2). The value is also consistent with the approached used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.

Comments on this proposition are welcomed along with any other feedback on the proposed approach.