

Baseline

Pollutant levels in discarded fish species by Spanish trawlers operating in the Great Sole Bank and the Atlantic coast of the Iberian Peninsula



Luis T. Antelo^a, Tatiana Ordóñez-del Pazo^a, Carla Lopes^a, Amaya Franco-Uría^{b,*}, Ricardo I. Pérez-Martín^a, Antonio A. Alonso^a

^a Marine Research Institute IIM-CSIC, Eduardo Cabello, 6, 36208 Vigo, Spain

^b Dept. of Chemical Engineering, School of Engineering, University of Santiago de Compostela, Campus Vida, 15782 Santiago de Compostela, Spain

ARTICLE INFO

Article history:

Received 25 February 2016

Received in revised form 11 April 2016

Accepted 15 April 2016

Available online 26 April 2016

Keywords:

Metals

Persistent organic pollutants

Discarded fish

Tissues

Valorization

ABSTRACT

Organic and inorganic pollutant levels were determined for the most discarded species from trawlers operating in Great Sole and Spanish coastal fishing grounds. Results for heavy metals indicated that Cd can reach values higher than legal limits for some species and tissues, while Hg and Pb concentrations are below established values. No significant variation was noticed with fishing grounds, but both season influences in the case of Pb and interspecies variation for Hg and Cd have been detected. Valorization recommendations could be therefore established according to the levels found in the different species.

© 2016 Elsevier Ltd. All rights reserved.

Discards are among the best examples of shortcomings that the Common Fisheries Policy (CFP) reform will amend, since this biomass is considered as impossible to justify to fishermen or the public (EC, 2013). The discard reduction and/or by-catch utilization must be undertaken to the possible extent in a manner that is consistent with the Code of Conduct for Responsible Fisheries (FAO, 1995). These objectives of FAO were presented in a specific technical report for discard reduction ("International guidelines for by-catch management and reduction of discards", in December 2010). The valorization of the inevitable unwanted by-catch is also the main motivation of the optimal and efficient discard management network that was and is being developed in FAROS and iSEAS Projects, respectively. These projects were co-funded under the LIFE + Environmental Program of the European Union (LIFE08 ENV/E/000119 – www.farosproject.eu and LIFE13ENV/ES/000131 – www.lifeiseas.eu). The objective of these initiatives was to demonstrate a real sustainable valorization, and therefore, aspects like environmental impacts and consumer's safety issues associated with the valorization process must be addressed.

As a first step to attain sustainability, raw material quantification (percentage over the total discarded mass and quantity of each discarded species in tons per year) and evaluation (status of stocks in their habitat as well as valorization potential) was carried out by the most discarded species in Great Sole Bank and Atlantic coast of the Iberian Peninsula (Ordóñez-del Pazo et al., 2014). Once the potential

valorization strategy was established, the sustainable management of this biomass through its optimum recovery will depend on the quality of this new raw material, as well as of the products that may be obtained from it. Scientific studies, apart from fish product surveys on the markets of different countries and monitoring reports by the Public Administrations and the European Commission, reveal the presence of significant pollutant levels (particularly dioxins, PCBs, organochlorine pesticides and heavy metals) in the commercial species of different fisheries (Licata et al., 2005; Nadal et al., 2008; Miniero et al., 2014; Cano-Sancho et al., 2015). Therefore, it is logical to consider the more than possible presence of these pollutants in the discarded non-commercial species even though their levels are not usually determined (Antelo et al., 2012). Furthermore, significant differences on pollutant concentration depending on the considered tissue have been reported by several studies in literature (Kojadinovic et al., 2007; Afonso et al., 2007; Lozano et al., 2009; Webster et al., 2009). Organs like liver are well known to preferentially accumulate higher pollutant concentrations (both inorganic and organic) (Bustamante et al., 2003; Coelho et al., 2010; Storelli et al., 2011a).

With this aim, the pollutant content has been analyzed in the most discarded species of these two fishery areas, including heavy metals (mercury, lead and cadmium) and polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs) and dioxin-like polychlorinated biphenyls (dl-PCBs), and pesticides. A statistical analysis of the data was performed on heavy metal levels. Besides, different target tissues were analyzed for cartilaginous fish (liver, skin, and cartilage). This task is a key step in the correct definition of recovery strategies that may overcome the

* Corresponding author.

E-mail address: amaya.franco@usc.es (A. Franco-Uría).

drawbacks arising from certain fish by-products (such as fishmeal and oil), which may concentrate pollutants to non-appropriate levels. Comparison with current legislation for commercial species was developed, taking into account the variability due to the analyzed tissues.

Samples of discards were collected by scientific observers on board Spanish fishing trawlers operating in Great Sole and Spanish coastal waters (ICES areas VIb, VIc, VIg, VIIh, VIIj, VIIk, VIIIc and IXa) during 2011–2012 (Fig. 1). Samples for metal analysis were collected on a

monthly temporal basis, while those for the determination of organic pollutants were collected seasonally (summer months in 2011 and winter months in 2012). A specific protocol for observers was created and implemented on board in order to properly define target species, required sample amounts, collection methodology, conservation and labeling requirements.

The sampled species and their target tissues were selected based on discarded amounts and their valorization potential, this being analyzed

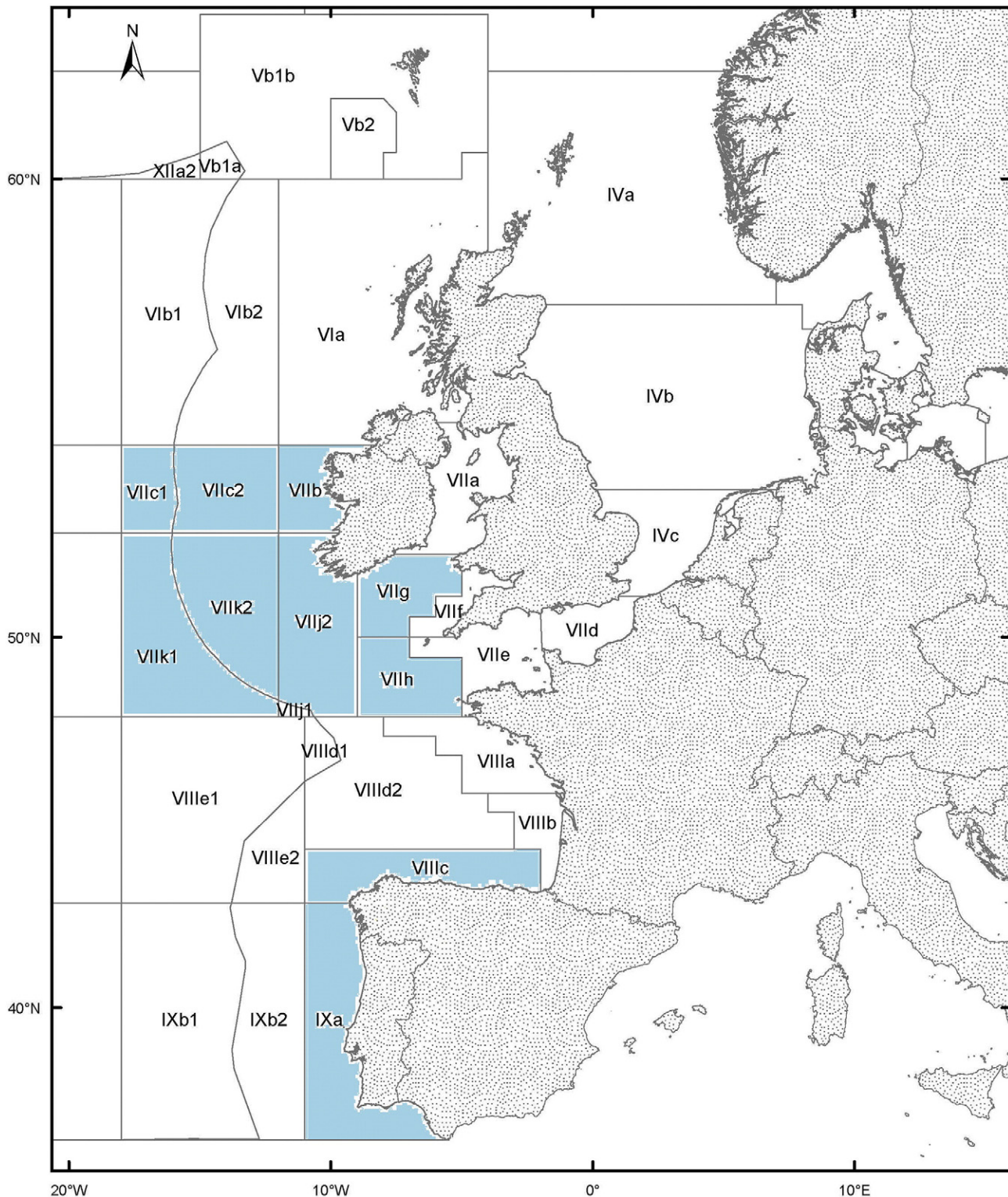


Fig. 1. Target ICES areas of the considered Spanish trawling fleet.

Download English Version:

<https://daneshyari.com/en/article/6355983>

Download Persian Version:

<https://daneshyari.com/article/6355983>

[Daneshyari.com](https://daneshyari.com)