

DIOXIN AND FURAN LEVELS IN FEEDINSTUFFS USED IN SPANISH TURBOT AQUACULTURE.

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INTRODUCTION

At the end of 90's we have attended several cases of contamination by "dioxins" that have damaged food image and have focused consumer attention on these polluting agents. Very recently a new mediatic alert affected the consumer safety perception of both wild and farmed salmon¹.

This and other studies point to feedinstuffs as the key to control the risks associated to contamination of aquacultured fish. Persistent Organic Pollutants in feedingstuffs could be caused by inadequately treatment or enriched them with unsuitable materials as it has been happening in previous episodes like in 1999 in Belgium where the feeding stuffs consumed by farm animals showing high dioxin levels or another one in Spain in 2000 known as "coline chloride" which is an habitual component in feeding stuffs manufactured. But the main reason is that fish feedingstuffs are made mainly from fish oil and fish meal, being fish fat one of the main components where dioxins and furans are accumulated due bioaccumulation and biomagnification in the aquatic environment.

Spain is a world-leader in turbot aquaculture due to the optimal conditions of the sea water of the northwest of the country. The aim of this project is to study the levels of dioxin and furans in commercial feedingstuffs used in Spain for turbot aquaculture.

METHODS AND MATERIALS

Sampling:

All the samples (feeding stuffs, fish oil and fish meal) were provided by spanish producers of fish oil and fish meal. Feedingstuffs were obtained from turbot aquaculture companies located in Spain. 15 feedinstuffs used in those spanish companies were analyzed.

Determination:

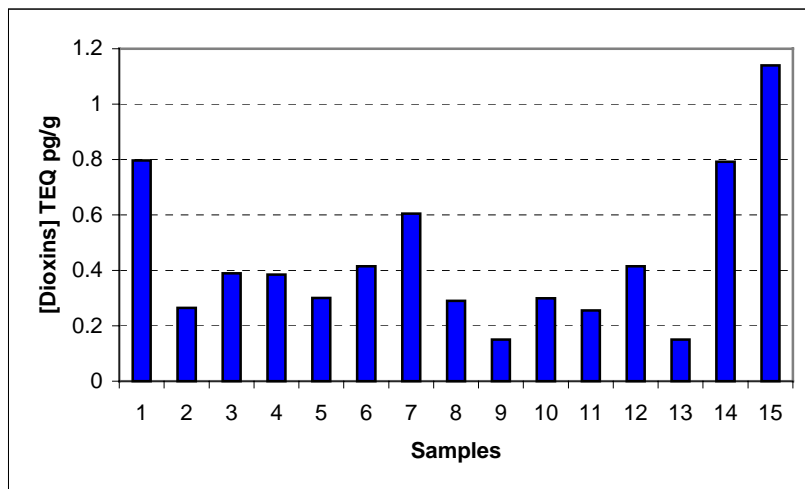
PCDDs/PCDFs were determined as described elsewhere in this volume, using a high resolution gas chromatography connected to an ion trap tandem mass spectrometer (HRGC-MS/MS) based on the pattern of fragmentation of the congeners by MS/MS and quantification by isotope dilution. Methodological details and validation are shown in the second short paper presented by the authors in this symposium.

RESULTS AND DISCUSSION

In this work 17 2,3,7,8-substituted polychloride dioxin and furan have been analysed in feeding stuffs samples manufactured in Spanish industries to study the chemical contamination to which aquaculture species are exposed in this country.

In the figure 1 are represented dioxin and furan results expressed in toxic equivalent quantities.

The values interval is between 0.15 and 1.14 TEQ pg/g, therefore no samples have risen the maximum legal limit according to the 2001/102/CE Directive of the Council on November 27th 2001, that established a value of 2.25 TEQ pg/g. Besides, it is observed that most of the samples have lower values than 0.8 TEQ pg/g that is approximately the third part of the maximum limit established in this matrix.



It has been studied the contribution of each dioxin and furan isomer to the toxicity is shown in the next figure:

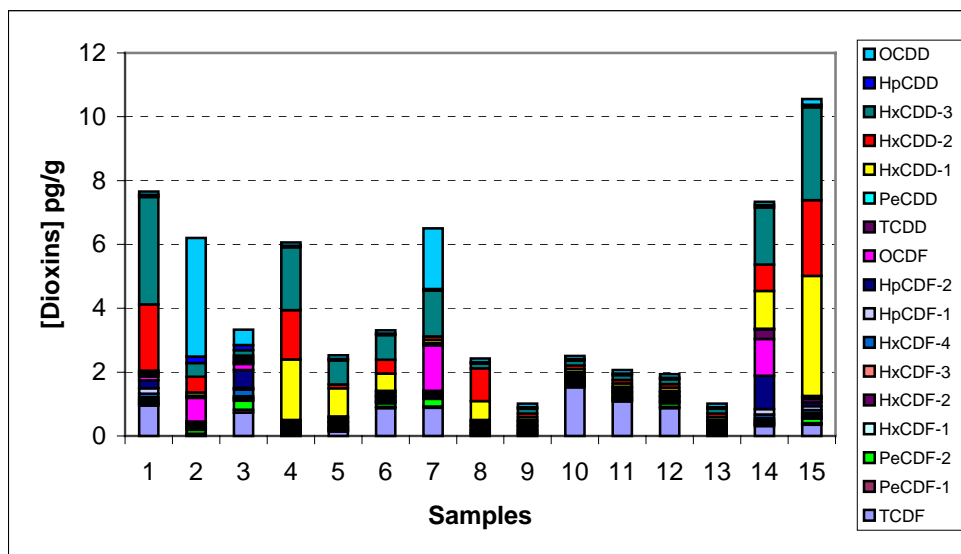


Figure 2 shows the concentration of each isomers in the analysed samples. The analites more concentrated in a great number of Spanish feeding stuffs samples are the hexachloro dibenzo-p-dioxins and tetrachloro dibenzofuran. Although the concentration values is superior to 2 pg/g in most of the samples, the toxic equivalent quantity is lower, because the toxic equivalent factor for the main isomers present on the samples is 0.1, respect to the 2,3,7,8-tetrachloro dibenzo-p-dioxin which is the most toxic congener with a toxic equivalent factor of 1.

Considering that feeding stuffs are manufactured from fish oil and fish meal, it is necessary to study dioxin and furan levels in these matrices, to verify if the results obtained are also lower than allowed maximum limits by the European Union legislation.

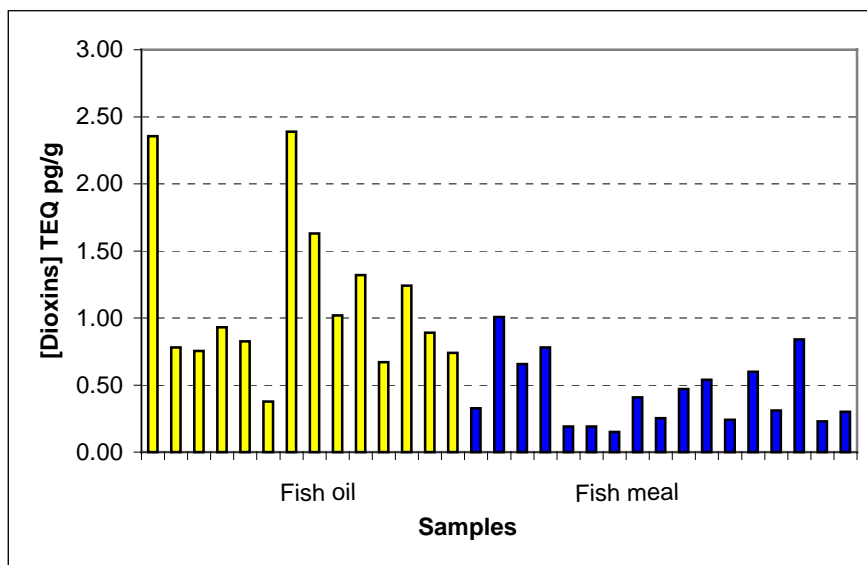


Figure 3 shows the total toxic equivalent quantity in fish meal and fish oil samples. It is shown that results are lower than the maximum legal limit (6 pg/g TEQ for fish oil and 1,25 pg/g TEQ for fish meal).

Although it is necessary to increase the representativity of the sample, the analyzed feeding stuffs manufactured in Spain have lower dioxin and furan levels than maximum allowed limits from European Union legislation²⁻⁴.

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REFERENCES

EN.REFLIST