Analyses of organochlorine pesticides residues in eels \textit{(Anguilla anguilla)} from Lake Garda using Gas chromatography coupled with Tandem Mass Spectrometry (GC-MS/MS)

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Abstract

Lake Garda is located in one of the most populated and industrialized area of Italy (Camusso \textit{et al.}, 2001). Therefore, the Lake water, and also the fish species present, could be affected by environmental contamination. European eels \textit{(Anguilla anguilla)} are considered as suitable matrix for biomonitoring environmental contaminants in European water (Belpaire \textit{et al.}, 2007), being widespread in many European waters and highly contaminated by lipophilic compounds, due to the high lipid content (up to 40\%) (Larsson \textit{et al.}, 1991). Moreover, eel is an edible species (its farming currently supplies approximately 45,000 tons/year) (Nielsen \textit{et al.}, 2008), so it also represents a public health issue. Based on these considerations, the aim of this study was to evaluate the occurrence of fourteen organochlorine pesticides (OCs) in forty-five eels \textit{(Anguilla anguilla)} from Lake Garda, using Accelerated Solvent Extraction (ASE) procedure for the analytes extraction and Gas chromatography coupled with Tandem Mass Spectrometry (GC-MS/MS) for the analysis of OCs. GC-MS/MS analysis was developed and validated according to the SANTE/11945/2015 guidelines. Uncontaminated eel sample (previously checked for the presence of OCs and considered blank with a concentration of compounds < Limit of Detection) were used for all procedure's optimization steps. For all the OCs, satisfactory results were achieved in terms of linearity (R\textsuperscript{2} higher than 0.985); recovery (ranging between 70–120 \%) and repeatability (coefficient of variation \% lower than 20 \%). The results met the validation criteria required by EU guidelines. Regarding eel samples, several pesticides were detected, but DDT and its metabolites were found with the highest prevalence (92 \%). The concentration range was from not detected (n.d.) to 19000 ng g\textsuperscript{-1}. Although DDTs levels in the environment are declining (Albaiges \textit{et al.}, 2011), they continue to bioaccumulate in tissues of human and animal and biomagnify in food chains.
References

Camusso, M., Balestrin, R., Binelli, A. 2001. Use of zebra mussel (Dreissena polymorpha) to assess trace metal contamination in the largest Italian subalpine lakes. Chemosphere. 44, 263-270.


