

Identifying commercial fish species and detection mislabeling using DNA barcoding

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In order to protect the consumer, the EU has strict regulations for seafood labeling, which must include the species name (EU Council Regulation No 104/2000, EU Commission Regulation No 2065/2001). However, commercial fish species available on the market cannot always be easily identified, especially when morphological characters have been removed in processed products (e.g. fish fillets). DNA barcoding, i.e. the sequencing of the mitochondrial reference marker gene cytochrome oxidase subunit 1 (CO1), can be used to identify species (Hebert *et al.*, 2003). In order to identify processed fish products, DNA will be extracted from the samples and CO1 will be amplified by Polymerase Chain Reaction (PCR) with fish-specific primers (Kochzius *et al.*, 2010) and sequenced. The sequences will be compared with the known sequences of voucher specimens available in sequence databases (e.g. Ward *et al.*, 2009; Kochzius *et al.*, 2010). For this aim, the program Mega5 (Molecular Evolutionary Genetic Analysis) will be used for analyzing the sequences. In this study, samples will be taken in fish shops, supermarkets and sushi take away restaurants in Brussels and other Belgian cities to evaluate if mislabeling and fraud occurs. There will be a focus on higher priced species, e.g. cod (*Gadus morhua*), sole (*Solea solea*) and tuna (*Thunnus spp.*). These species are more likely to be replaced by other, less valuable species as recent research in Dublin could show. About 25% of product from cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) appeared to be a different species like saithe (*Pollachius virens*) and Pollack (*Pollachius pollachius*). (Miller, 2010).

References

- Hebert P.D.N., A. Cywinska, S.L. Ball, J.R. de Waard. 2003. Biological identifications through DNA barcodes. *Proc. R. Soc. Lond.* 270:313-321.
- Kochzius M., C. Seidel, A. Antoniou, S.K. Botla, D. Campo, A. Cariani, E.G. Vazquez, J. Hauschild, C. Hervet, S. Hjörleifsdottir, G. Hreggvidsson, K. Kappel, M. Landi, A. Magoulas, V. Marteinson, M. Nölte, S. Planes, F. Tinti, C. Turan, M.N. Venugopal, H. Weber and D. Blohm. 2010. Identifying fishes through DNA barcodes and microarrays. *PLoS ONE* 5(9):e12620.
- Miller D.D. and S. Mariani. 2010. Smoke, mirrors and mislabeled cod: poor transparency in the European seafood industry. *Front. Ecol. Environ.*
- Ward R.D., R. Hanner and P.D.N. Hebert. 2009. The campaign to DNA barcode all fishes. *FISH-BOL. Journal of Fish Biology* 74:329-356.