



POSTER

LABELLING ASSESSMENT AND MOLECULAR AUTHENTICATION OF SQUID-BASED PRODUCTS FROM TWO MAJOR EUROPEAN CITIES

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Accurate species information is essential for seafood traceability, consumer protection and market transparency. Squid products are particularly vulnerable to mislabelling because they include numerous morphologically similar species and are frequently marketed in processed forms. This study assessed labelling compliance and species authenticity of squid-based products sold in Brussels (Belgium) and Milan (Italy), two major European cities characterised by different national seafood nomenclature systems.

Between February and May 2025, 198 products were collected from supermarkets, fishmongers and the food service sector: 98 in Brussels and 100 in Milan. Products were classified as fresh, frozen or processed and as mono-species or multi-species. Labelling compliance with Regulation (EU) No 1379/2013 was evaluated for fresh and frozen products, while the voluntary provision of species information was recorded for processed products. Molecular authentication was performed by DNA barcoding for 150 mono-species samples and by 16S rRNA metabarcoding for 48 multi-species samples. Molecular identifications were compared with the declared scientific names and/or authorised commercial designations.

Among fresh and frozen products, only 20.0% of those collected in Brussels and 43.3% of those collected in Milan complied with the mandatory species and origin information

requirements. Scientific names were voluntarily provided for only about one fifth of processed products in both cities. Molecular authentication was successful for nearly all samples and revealed mismatches in 12/90 products from Brussels (13.3%) and 29/96 from Milan (30.2%). Substitution frequently involved high-value Mediterranean or Northeast Atlantic squid species being replaced by lower-priced imported taxa, particularly *Dosidicus gigas*, *Doryteuthis gahi* and *Illex argentinus*. However, when the analysis was restricted to products allowing species-level verification, mislabelling rates were comparable between cities: 27.3% in Brussels and 26.5% in Milan. This convergence indicates that the lower apparent rate in Brussels was mainly driven by the Belgian use of broad umbrella commercial designations, which hinder species-level verification. No significant association was found between mislabelling frequency and either product category or retailer type.

These findings reveal substantial transparency gaps in the squid markets analysed and show that apparent differences in mislabelling rates can be strongly influenced by national nomenclature systems. Harmonised EU commercial designations, mandatory species information for processed products and the food service sector, and wider use of DNA-based authentication would strengthen traceability, enforcement and consumer protection