

TESTING DNA, TESTING SUPPLY CHAINS

Executive Summary

By Liane Arness and Emily De Sousa



EXECUTIVE SUMMARY

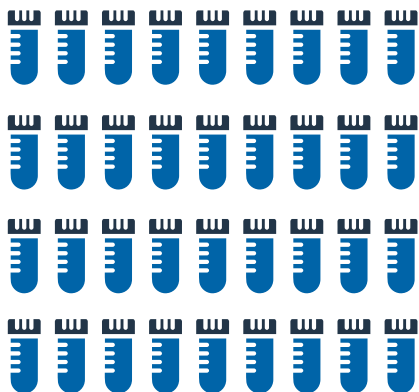
In Canada, a seafood product is considered to be mislabelled if the common name on the label is not an allowable name for that species according to the guidance in the Canadian Food Inspection Agency's (CFIA) [Fish List](#). Seafood mislabeling and fraudulent labelling (mislabelling with an intent to deceive) are significant problems with harmful impacts across the supply chain, from consumers to harvesters, and on aquatic ecosystems.



In summer 2021, Organic Ocean, Emily De Sousa, Dr. Robert Hanner and SeaChoice collaborated on a study to investigate whether DNA authentication could be a useful and practical way for a seafood business to mitigate the risk of mislabelling by verifying species' information for its products. Organic Ocean provided samples of its products, Dr. Hanner's lab performed the DNA testing, Emily De Sousa managed the project and promoted it on social media and SeaChoice collected the samples and interpreted the results.

36

samples collected



METHODOLOGY

SeaChoice collected 36 samples from 12 suppliers at Organic Ocean's warehouse in Richmond, B.C. DNA from the samples was extracted, amplified using Polymerase Chain Reaction, sequenced and compared against the reference sequences in the global Barcode of Life Database (BOLD) or, if needed, the GenBank sequence database. The process from collection to results took about two weeks.

For all 36 samples, the genetic barcoding provided:

- The species the DNA sample most closely matched with,
- The "per cent pairwise identity", i.e., how closely the sample matched the reference sequence for that species, and
- The "sequence length", i.e., the number of base pairs in the sequences that were compared.

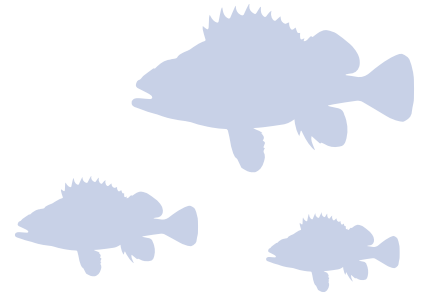
RESULTS

With this information from the DNA barcoding, the analysis answered three questions:

QUESTION 1 - Was the scientific name listed by the suppliers correct?

Of the eight suppliers that provided scientific names for their products, two product types were identified by DNA analysis to be a different species.

- All three calamari samples, listed by the supplier as *Ommastrephes bartramii*, were matched by the DNA analysis to a different species, *Dosidicus gigas*.
- Two of the three rockfish fillets, listed by the supplier as *Sebastes borealis*, were matched by the DNA analysis to a different species, *Sebastes aleutianus* (the third rockfish fillet was correctly identified as *Sebastes borealis*).



QUESTION 2 - Was the common name listed by the supplier in accordance with CFIA's labelling guidance?

Of the product types tested from 12 suppliers, all but one used an allowable common name for all samples collected.

- The supplier of the rockfish samples gave a specific allowable common name for its products (Shortraker rockfish) and since the DNA analysis indicated that two of the samples were from *Sebastes aleutianus* (specific common name Roughey rockfish) and not *Sebastes borealis* (specific common name Shortraker rockfish), these two samples would be considered to be mislabelled according to CFIA's guidelines.
- Despite the supplier of the squid samples using the wrong scientific name, it used a generic common name, calamari, which is an allowable common name under CFIA guidelines for both *Ommastrephes bartramii* (the species name given by the supplier) and *Dosidicus gigas* (the species indicated by the DNA analysis).

QUESTION 3 - Was Organic Ocean using a CFIA allowable common name on its online product pages?

Despite the supplier using a generic common name for its squid product (calamari), Organic Ocean was using a more specific common name, Neon flying squid, which is not an allowable common name for the species indicated by the DNA authentication.

Organic Ocean was using a generic common name for its rockfish product (rockfish), so all samples would have been labelled with an allowable common name under CFIA guidelines, even though two of the samples came from different species.

CONCLUSIONS

This study confirmed other published accounts of the usefulness of DNA authentication as a method for verifying the accuracy of labelling information. The DNA results allowed Organic Ocean to know with certainty both the scientific name of the species, and by consulting the Fish List database, its allowable common name(s). From a business perspective, these are both important pieces of information - the first allows for verification of information from a supplier and the second allows the business to ensure it is using an allowable common name for the species it is selling.

However, DNA authentication is only one piece of the seafood labelling puzzle. In order for consumers to really have trust in the seafood sold in Canada, the CFIA's labelling guidelines **should be adapted** to be more specific to each species. Reducing redundancies in the CFIA Fish List and strengthening its naming guidance would not only allow consumers to know what they're really eating, it would also introduce positive incentives for seafood producers, importers, processors and distributors to invest in better traceability systems so that retailers can label products with all the information that consumers need.