Steinbrenner Laborsysteme GmbH

magtivio

MagSi-DNA Animal

Application Note | DNA extraction from Atlantic mackerel for fisheries management

Introduction

Genetic analysis has much to offer fisheries managers. It has important applications in the marine area to identify origin, and its use can be seen in the fields of fish conservation and management, such as quota, by-catch monitoring and assessing sustainable fisheries. The largest observed change in mackerel (*Scomber scombrus*) abundance in the North Atlantic happened when the so-called "North Sea mackerel" collapsed due to overfishing. Despite protection, it has remained in a depleted state.

MagSi-DNA Animal allows for a fast and cost-effective extraction of DNA from fish fins. This application note provides an extensive quantity and quality analysis of DNA extracted from Atlantic mackerel (*Scomber scombrus*), showing the suitability for use in fish DNA testing methods (e.g. genotyping by PCR or DNA sequencing).

Materials and methods

Fish fins were sampled from frozen whole fish and lysed in Lysis Buffer TS with Proteinase K at 56°C under shaking at 1000 rpm according to the standard protocol of the kit until the tissue was completely digested (~3h).

After a brief centrifugation step to remove insoluble components, 300 µL sample lysate was used as input for DNA extraction on the PurePrep 96 Nucleic Acid Purification System with a final elution volume of 150 µL.

After extraction, DNA concentrations and purity of the samples were determined according to manufacturer instructions (Qubit™ dsDNA BR Assay Kit and NanoDrop™ One, ThermoFisher Scientific). Next, the extracted DNA was analyzed by qPCR targeting the cox1 gene using universal primers (Ward et al., 2005) on the AriaMx Real-Time PCR system, with 2 µL template DNA (1/10 diluted) in a total reaction volume of 20 µL (primaQUANT CYBR qPCR Master Mix, Steinbrenner Laborsysteme).

Results

Results of the DNA analyses are presented in figures 1, 2 and 3 below.

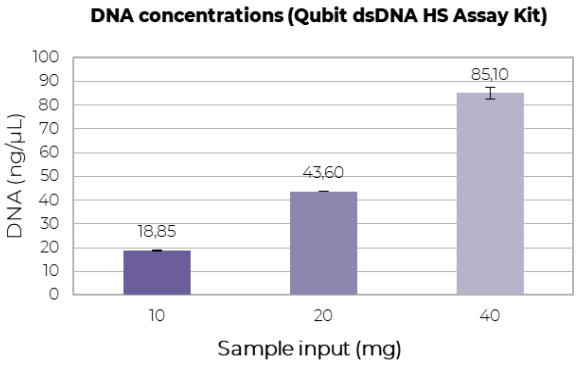

Figure 1. *DNA concentrations obtained after extraction from 10, 20 and 40 mg Scomber scombrus fin tissue. The DNA concentration increases proportionally with increasing amount of input sample.*

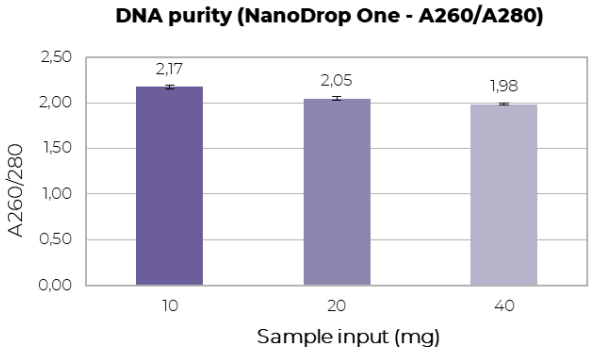

Figure 2. *DNA purity obtained after extraction from 10, 20 and 40 mg Scomber scombrus fin tissue. All purity ratios indicate highly pure DNA (> 1.7) regardless of sample input amount.*

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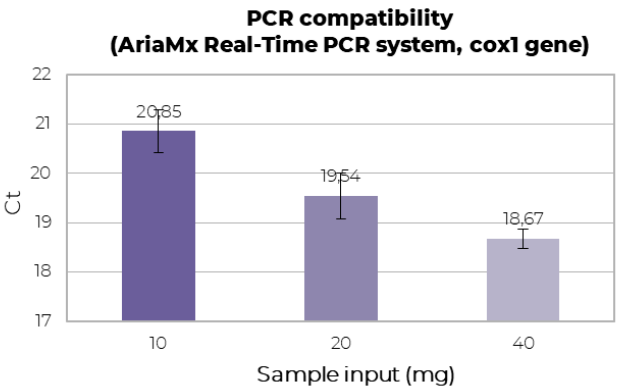

Figure 3. *Ct values obtained by qPCR (cox1) after extraction from 10, 20 and 40 mg Scomber scombrus fin tissue. A decrease of approximately 1 Ct is consistent with a 2-fold higher amount of sample input, demonstrating the scalability of the sample amount.*

Conclusion

The data presented here demonstrates that the **MagSi-DNA Animal kit** provides a highly efficient method for DNA extraction from fish fins that is suitable for assays involving nucleic acid amplification (PCR or sequencing).

When the kit is combined with the **PurePrep 96 Nucleic Acid Purification System**, the process can be automated with minimum hands-on time, providing a solution for small, medium or high-throughput workflows. If desired, lysis time could decreased by applying mechanical disruption (e.g. with Geno/Grinder®, Spex SamplePrep).

Literature

- *Product Manual MagSi-DNA Animal, PM0023-005, magtivio B.V.*
- *User Guide Qubit™ 1X dsDNA BR Assay, MAN0019617, ThermoFisher Scientific*
- *NanoDrop One UG, 269-309102, ThermoFisher Scientific*
- *Ward et al., 2005: R.D. Ward, T.S. Zemlak, B.H. Innes, et al. DNA barcoding Australia's fish species. Philosophical Transactions of the Royal Society of London Series B Biological Sciences, 360 (2005), pp. 1847-1857*
- *Jansen, T. 2014. Pseudocollapse and rebuilding of North Sea mackerel (Scomber scombrus). – ICES Journal of Marine Science, 71: 299–307.*

PurePrep 96 Nucleic Acid Purification System

Ordering information

Art. No.	Description	Amount
MDKT00150096	MagSi-DNA Animal	96 preps
MDKT00150960	MagSi-DNA Animal	10 x 96 preps
AS00001	PurePrep 96 Nucleic Acid Purification System	1 unit
MDPL00200050	2 mL Deepwell Plate with square wells for KingFisher™/PurePrep 96	50 pcs/pack
MDPL00190060	200 µL square-well Elution Plate for KingFisher™/PurePrep 96	60 pcs/pack
MDPL00210060	96 well Tip-Comb for KingFisher™/PurePrep 96	60 pcs/pack

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