Steinbrenner Laborsysteme GmbH

magtivio

MagSi-DNA Animal

Application Note | DNA extraction from whole blood for genetic testing in livestock management

Introduction

This application note describes the evaluation of **MagSi-DNA Animal** for DNA extraction from whole blood of various animal species that are the subject of genetic testing in livestock management, including bovine, porcine, sheep, horse, chicken and turkey blood. The performance of MagSi-DNA Animal is evaluated based on the DNA yield, purity and suitability for applications involving nucleic acid amplification.

MagSi-DNA Animal allows for fast and cost-effective extraction of DNA from various animal samples like blood, semen, hairs, saliva/swabs or tissue.

Materials and methods

Whole blood (K2 EDTA) was collected from US origin normal healthy animals. Prior to DNA extraction, avian blood (nucleated red blood cells) was diluted 1:10 with 1X PBS. For each sample, 100 µL was added to a 96 deepwell microplate containing previously aliquoted Proteinase K. After briefly vortexing, 200 µL Lysis Buffer U1 was added, and the sample was incubated at 56°C under shaking at 1400 rpm on a thermoshaker. Mammalian blood samples were incubated for 10 min and avian blood samples were incubated for 1 h.

After incubation, the sample lysates were used as input for DNA extraction according to the standard protocol for the PurePrep 96 Nucleic Acid Purification System with a final elution volume of 100 µL.

DNA concentrations and purity of the samples were determined by UV-VIS according to manufacturer instructions (NanoDrop One, ThermoFisher Scientific). Next, the extracted DNA was analyzed by qPCR targeting the 16s ribosomal gene using universal primers (Horreo et al., 2013) on the Mx3000P Real-Time PCR system, with 1 µL template DNA for chicken and turkey samples and 4 µL for the mammalian samples 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.

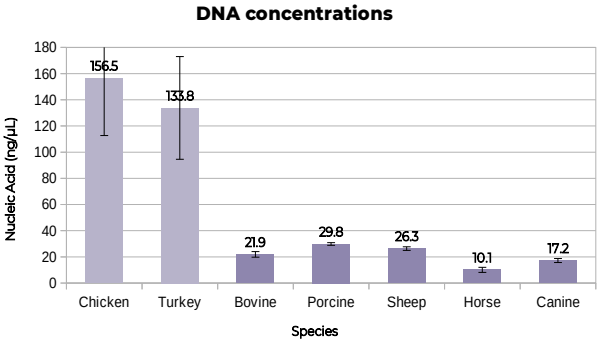

Figure 1. *Nucleic acid concentration obtained from DNA extractions from whole blood of different animal species (n=3). Chicken and turkey blood was lysed for 1 hour, mammalian blood was lysed for 10 min.*

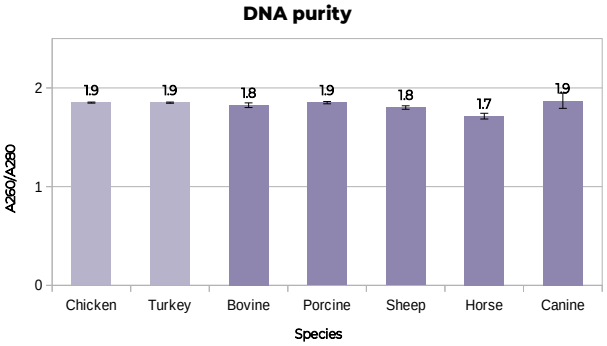

Figure 2. *DNA purity obtained after DNA extractions from whole blood of different animal species. All purity ratios indicate highly pure DNA (A260/A280 > 1.7).*

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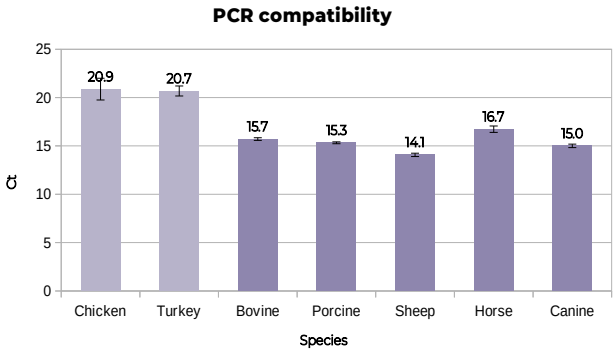

Figure 3. *Ct values obtained from qPCR after extraction from whole blood of different animal species (n=3). For Chicken and turkey 1 µL eluate, for all others 4 µL eluate, where used as PCR input.*

Conclusion

Highly pure DNA could successfully be extracted from all samples tested and PCR amplified. These results demonstrate that **MagSi-DNA Animal** provides a highly efficient method for DNA extraction from avian and mammalian whole blood that is suitable for assays involving nucleic acid amplification such as SNP genotyping, STR analysis or whole genome sequencing. For genetic tests that require DNA concentrations other than reported, the extraction procedure can be adjusted accordingly, e.g. by lowering the elution volume.

When the kit is combined with the **PurePrep 96 Nucleic Acid Purification System**, the purification process can be automated for up to 96 samples per run, reducing hands-on time and providing a convenient solution for small, medium or high-throughput workflows. Further reducing hands-on time and process optimization can be achieved using reagent dispensers (e.g. Integra ViaFill, ThermoFisher Multidrop™ Combi).

Literature

- *Product Manual MagSi-DNA Animal, PM0023, magtivio B.V.*
- *NanoDrop One UG, 269-309102, ThermoFisher Scientific*
- *Horreo, Jose & Ardura, Alba & Pola, Ivan & Martínez, J. & Garcia-Vazquez, Eva. (2013). Universal primers for species authentication of animal foodstuff in a single polymerase chain reaction. Journal of the science of food and agriculture. 93. 10.1002/jsfa.5766.*

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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