MagSi-DNA Plant CLS

Application Note *| Automated magnetic bead–based DNA purification from plant seeds using a Myra liquid handling system*

Introduction

Magnetic bead-based DNA purification is a critical step in genomics workflows, where consistent and reproducible DNA yield and quality depend heavily on precise pipetting and careful sample handling. Manual purification methods can introduce operator-dependent variability, particularly between different users and across sample batches. By automating the purification process on the Myra Liquid Handling System from Bio Molecular Systems, this protocol delivers a highly standardized and reproducible workflow that significantly reduces hands-on time while minimizing technical variability.

Myra incorporates a built-in camera for visual calibration and AI-driven deck verification, enabling straightforward setup and helping reduce the risk of deck configuration errors before run execution. Its compact footprint, lightweight design, and minimal maintenance requirements make Myra particularly well suited to laboratories of all sizes.

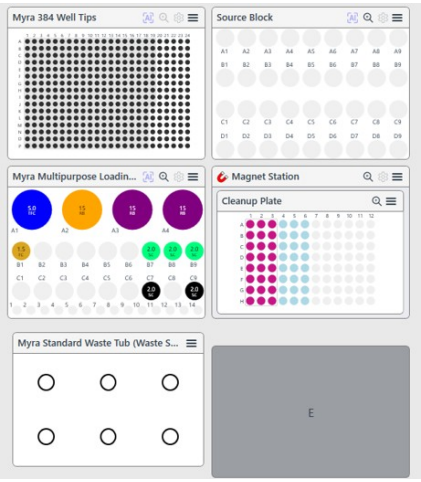

Figure 1. Myra deck layout configuration *for DNA purification using the MagSi-DNA Plant CLS kit (software BMS Workbench v2.0).*

MagSi-DNA Plant CLS is designed for robust, rapid and cost-effective DNA extraction from a wide range of plant sample types, with reagents optimised for the processing of cotyledons, leaves, and seeds. In this application note, we demonstrate the suitability of the kit for DNA extraction from a selection of plant seeds. The resulting DNA yield, purity, and suitability for downstream qPCR-based analysis are evaluated and presented.

Materials and methods

Up to 24 samples were used to evaluate the automated DNA purification protocol. Seed samples were homogenized using 4 mm stainless steel beads in a 2010 Geno/Grinder (SPEX SamplePrep) at 1500 rpm for 5 cycles of 1 min. Following homogenization, 500 µL of Lysis Buffer VG was added, and samples were incubated at 65°C for 30 minutes using a ThermoMixer C from Eppendorf. Lysed samples were then centrifuged at 6000xg for 15 minutes to pellet cellular debris. Following centrifugation, 100 µL of clear lysate was transferred and used as input for automated DNA purification on the Myra.

Workflow parameters, including buffer volumes, magnetic bead volume, and elution volume, can be readily customized through the graphical user interface. For this study, 5 µL of magnetic beads and 150 µL wash buffer volumes were used. DNA was eluted in a final volume of 75 µL.

DNA concentration and purity were assessed by UV-Vis spectrophotometry using a NanoDrop One according to the manufacturer's instructions (Thermo Fisher Scientific). The presence or absence of PCR inhibitors was evaluated by real-time PCR using the AriaMx Real-Time PCR System from Agilent Technologies with primers targeting the tRNA-leucine gene. For qPCR analysis, 2 µL of undiluted DNA, as well as 1:10 and 1:100 dilutions, were analyzed in a total reaction volume of 20 µL using primaQUANT CYBR qPCR Master Mix from Steinbrenner Laborsysteme.

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Results

The results demonstrate that automated DNA extraction using MagSi-DNA Plant CLS on the Myra produces consistent, high-quality purified DNA from plant seed samples. DNA concentrations and quality for automated Myra DNA purification was evaluated from 24 identical samples of pepper seeds (2 seeds per extraction). A mean DNA concentration of 42.5 ng/µL ± 3.6 ng/µL was achieved. DNA purity ratios are A260/280 = 2.05 ± 0.7, A260/230 = 1.92 ± 0.4.

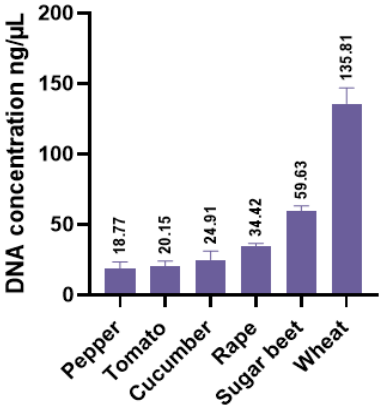

Figure 2 *DNA extraction from seeds of various species (1 seed per extraction). Concentrations were measured by UV-VIS with the NanoDrop™ One (n=4).*

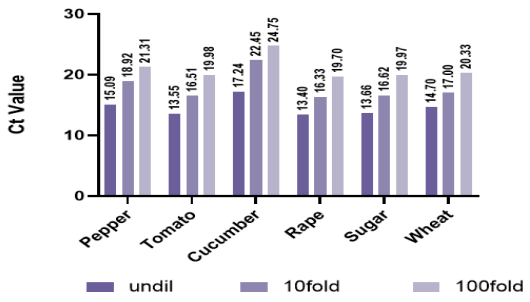

Figure 3: *Real time PCR results from extracted seed DNA with primers targeting the tRNA-leucine gene. The data are presented as mean (n=4), from undiluted, 10 fold diluted or 100 fold diluted samples*

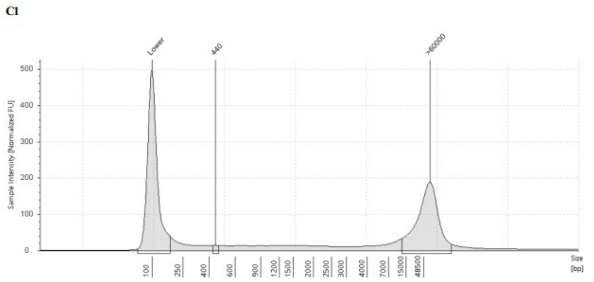

Figure 4: *Representative electropherogram of a purified DNA sample from pepper seeds. The sample was analysed on an Agilent Tape Station using the Genomic DNA Screen Tape assay. The sample shows a high fraction of high molecular weight DNA (fragment size > 60 kb) and no significant fragmentation.*

Discussion and Conclusion

The Myra Liquid Handling System is a low-footprint, low-maintenance device suitable for automating molecular biology workflows such as qPCR setup and magnetic bead-based DNA clean-up and extraction. Automated processing of plant-derived samples, including seeds, using MagSi-DNA Plant CLS on the Myra system delivered consistent DNA yields with high purity and minimal DNA fragmentation. Efficient mixing, achieved through repeated pipette aspiration and dispense cycles combined with simultaneous tip movement, contributed to the high purity of the extracted DNA. All purified samples were successfully analyzed in downstream qPCR assays, demonstrating the absence of significant co-purified inhibitors.

Literature

Product Manual MagSi-DNA Plant CLS , magtivio B.V.

Ordering information

Art. No.	Description	Amount
MDKT00260096	MagSi-DNA Plant CLS	96 preps
MDKT00260960	MagSi-DNA Plant CLS	10 x 96 preps
Bulk deliveries are available on request		

For inquiries and orders or technical support please contact sales@magtivio.com.

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