



Amplimax GenePlex Universal

Cat No. AM-UNI-GP-384

System: Magnetic Beads, suitable for manual or automated workflows

Sample types: serum, plasma, nasopharyngeal swabs, bronchoalveolar lavage (BAL), urine, stool, sputum, whole blood, cervical swabs, urethral swabs

USER MANUAL

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In Vitro Diagnostics

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1. KIT CONTENTS

The AmpliMax GenePlex Universal kit is specifically designed for automated nucleic acid isolation, offering superior performance, ease of use, and compatibility with a wide range of sample types and automated systems. The kit components are meticulously formulated to ensure high purity and yield of isolated nucleic acid, suitable for various downstream applications in diagnostics and research.

Component	Description/Function	Volume Required per Sample	Short Term Storage	Long Term Storage	Total for 384 Samples
Lysis Buffer	Used to break down cell membranes to release DNA/RNA, containing detergents and chaotropic agents.	100 µl	Room temperature	Room temperature	40 ml
Binding Buffer *Add Isopropanol (95%) prior to use	Facilitates the binding of DNA/RNA to the magnetic beads, optimized to enhance the selectivity of DNA/RNA capture.	100 µl	Room temperature	4-8°C	40 ml
Wash Buffer A * Add EtOH (96-100 %) prior to use	Removes proteins and other contaminants from the DNA/RNA-bead complex during the first wash step.	200 µl	Room temperature	Room temperature	80 ml
Wash Buffer B * Add EtOH (96-100 %) prior to use	Further cleanses the nucleic acid by removing salts and residual impurities in the second wash step.	200 µl	Room temperature	Room temperature	80 ml
Wash Buffer C * Add EtOH (96-100 %) prior to use	Completes the washing process by removing any remaining contaminants to ensure high purity nucleic acids.	200 µl	Room temperature	Room temperature	80 ml

Elution Buffer	Elutes the purified DNA/ RNA from the magnetic beads, optimized to maintain nucleic acid integrity during elution.	50 µl	Room temperature	4-8°C	2 ml
Booster	Enhances the yield and purity of DNA/RNA from low-abundance or difficult-to-lyse samples.	5 µl	2-8°C	-20°C	2 ml
Mag beads	Coated with a material that selectively binds DNA/RNA, these beads are crucial for the nucleic acid isolation process.	5 µl	2-8°C	-20°C	2 ml



Buffers contain skin irritants



Wear gloves

2. IMPORTANT NOTES

To ensure optimal performance and safety when using the AmpliMax GenePlex Universal Kit, please adhere to the following detailed guidelines and precautions:

Sample Preparation: It is crucial that samples are thoroughly homogenized before processing. This involves physical disruption, which can be achieved by grinding the tissue in liquid nitrogen and a mortar and pestle. For particularly tough samples, bead beating using a Tissue Lyser can be included to ensure complete cellular disruption and nucleic acid release. Proper homogenization is essential for consistent DNA/RNA yields.

Sample Compatibility: The kit is compatible with a diverse array of sample types, including tissue, cells, bacteria, serum, plasma, and swabs. This versatility makes the kit suitable for various applications in molecular biology, clinical diagnostics, and biotechnology research. For optimal results, it is important to follow the recommended sample preparation procedures specific to each sample type.

Automation Compatibility: The kit is specifically designed for use with automated liquid handling instruments such as the Microlab NIMBUS. Automation compatibility ensures consistent and reproducible results, reduces the risk of human error, and significantly increases throughput. The kit's reagents and protocols are tailored to integrate seamlessly with the automation platform, providing a streamlined workflow from sample preparation to nucleic acid isolation.

Mag beads Resuspension: Before using the mag beads, it is crucial to ensure they are thoroughly resuspended. Vortexing the beads vigorously will ensure an even distribution of magnetic particles, which is essential for consistent nucleic acid binding and isolation. Proper resuspension of the beads is key to achieving high yields and purity of the isolated nucleic acid.

Booster Usage: The booster reagent is provided to enhance nucleic acid yield and purity, especially for challenging samples like muscle tissue. When processing such samples, it is recommended to add booster to the deep well plate in advance of loading onto the deck. This pre-treatment step ensures optimal conditions for nucleic acid isolation, resulting in improved quality and quantity of the extracted DNA/RNA.

Sample Volume Considerations: For efficient nucleic acid isolation, it is important to adhere to the recommended sample volume guidelines. Overloading the system with excessive sample volumes can lead to incomplete lysis, reduced binding efficiency, and compromised DNA/RNA purity. Following the specified volume requirements will ensure optimal performance of the kit and high-quality results.

Buffer Handling: Proper handling and storage of buffers are crucial for maintaining their effectiveness. Lysis Buffer, in particular, may precipitate during storage. If this occurs, incubating the bottle at 40°C until all of the precipitate is re-dissolved will restore the buffer to its functional state. Additionally, ensuring that Wash Buffers are at room temperature before use will facilitate efficient removal of contaminants during the washing steps.

Reagent Preparation: Some reagents in the kit may require specific preparation or dilution before use. It is important to verify the conditions and preparation instructions for each reagent, especially the lysis and wash buffers.

Storage and Stability: To maintain the stability and performance of the kit components, it is essential to store them according to the instructions provided. Most reagents are stable at room temperature, but some may require refrigeration. Proper storage conditions help preserve the reagents' efficacy and extend their shelf life.

Concentration and Yield: The elution volume can be adjusted based on the desired concentration. A smaller volume results in higher concentration but may reduce overall yield. It's important to balance these factors based on the requirements of subsequent applications.

Technical Support: If you encounter any issues or have questions regarding the use of the kit, please do not hesitate to contact our technical support team. We are here to assist you in achieving the best possible results with our products and to provide guidance on any aspect of the kit's usage.

3. SAFETY PRECAUTIONS

Ensure the safety of all laboratory personnel by adhering to standard laboratory practices when using the Amplimax GenePlex Universal kit.

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. Guanidine salts can form highly reactive compounds when combined with bleach. If liquid containing these buffers is spilt, clean with suitable laboratory detergent and water. If the spilt liquid contains potentially infectious agents, clean the affected area first with laboratory detergent and water, and then with 1% (v/v) sodium hypochlorite.

Many of the reagents included in the kit are chemical in nature and should be handled in a well-ventilated area. Users should be familiar with the safety data sheets (SDS) for each chemical component for information on potential hazards and first aid measures in case of accidental exposure.

Treat all samples as potentially infectious material. Following the universal precautions for handling biological materials will help protect not only the individual conducting the experiment but also the wider laboratory environment.

Dispose of all waste materials according to your institution's safety guidelines and regulations. This includes the proper disposal of used reagents, consumables, and biological waste to mitigate any potential hazards.

CAUTION: DO NOT add bleach or acidic solutions directly to the sample preparation waste.

4. KIT PRINCIPLES

The AmpliMax Gene Plex Universal Kit is based on a magnetic bead-based nucleic acid isolation technique, which is a highly efficient and automated method for nucleic acid extraction. This technology leverages the principles of magnetic separation, binding affinity, and washing efficiency to isolate high-quality nucleic acids from various sample types. The basic principle involves four main steps:

Cell Lysis: The process begins with the addition of a lysis buffer to the sample, which disrupts the cell membranes and viral envelopes, releasing the nucleic acids into the solution.

The lysis buffer is formulated with chaotropic agents and detergents to ensure complete lysis of cells, including tough-to-lyse samples such as gram-positive bacteria or plant tissues.

The efficiency of cell lysis is critical for the overall performance of the kit, as incomplete lysis can lead to lower yields and purity of the extracted nucleic acid.

DNA/RNA Binding: Once the cells are lysed, the released nucleic acid binds selectively to the magnetic beads in the presence of a binding buffer.

The binding buffer creates the optimal conditions for the interaction between the DNA/RNA and the beads, ensuring that the nucleic acid molecules are efficiently captured while other biomolecules remain in the solution.

The magnetic beads are coated with a material that has a high affinity for DNA/RNA, typically silica or a similar compound, which allows for selective binding of the DNA/RNA.

Washing: After the DNA/RNA has bound to the magnetic beads, the beads are subjected to a series of wash steps to remove contaminants and impurities.

Each wash buffer is specifically designed to remove different types of contaminants. For example, Wash Buffer A may target proteins, Wash Buffer B may remove salts, and Wash Buffer C may eliminate residual chaotropic agents.

The washing process is critical for the purity of the isolated DNA/RNA. Inadequate washing can result in contamination with proteins, salts, or other impurities, which can interfere with downstream applications.

Elution: In the final step, the pure nucleic acid is eluted from the magnetic beads using an elution buffer. The elution buffer disrupts the interaction between the DNA/RNA and the beads, allowing the nucleic acid to be released into the solution.

The eluted DNA/RNA is then collected and ready for use in downstream applications such as reverse transcription PCR (RT-PCR), quantitative PCR (qPCR), next-generation sequencing (NGS), and gene expression analysis.

Key Features:

Versatility Across Sample Types: Designed to accommodate a wide array of sample types, including tissue, cells, bacteria, serum, plasma, nasopharyngeal swabs, bronchoalveolar lavage (BAL), urine, stool, sputum, whole blood, and cervical or urethral swabs. This versatility ensures that the kit can be utilized in various research and diagnostic settings, from clinical laboratories to academic research institutions.

High-Throughput Efficiency: Optimized for processing up to 384 samples in a single run, the kit is ideal for laboratories with high sample throughput requirements. The automated workflow reduces hands-on time and minimizes the potential for human error, ensuring consistent and reproducible results. This capacity is ideal for laboratories dealing with large sample volumes, allowing for efficient batch processing and time-saving in research and diagnostic workflows.

Seamless Automation Compatibility: Specifically designed for seamless integration with automated liquid handling systems such as the Microlab NIMBUS. The click-and-play compatibility with automation platforms enables laboratories to scale up their operations without the need for extensive protocol adjustments or reprogramming.

High Purity and Yield: Incorporates a robust washing protocol to ensure the isolation of high-purity DNA/RNA, free from contaminants such as proteins, salts, and other impurities. The kit is designed to maximize DNA/RNA yield, ensuring that sufficient quantities of DNA/RNA are available for downstream applications, even from challenging or low-yield samples.

Optimised for Downstream Applications: The high-quality nucleic acid isolated with the AmpliMax GenePlex Universal Kit is suitable for a range of downstream applications, including RT-PCR, qPCR, NGS, and gene expression analysis. The kit's performance has been validated to ensure compatibility with these applications, providing researchers with confidence in their experimental results.

5. HARDWARE AND CONSUMABLES (SUPPLIED BY THE USER)

5.1 Hardware

Automated Liquid Handling Instrument: The kit is specifically designed for use with the Microlab NIMBUS automated liquid handling system from Hamilton Company. This instrument is essential for automating the RNA isolation process, providing precise liquid handling, and minimizing manual intervention.

Deep Well Plates: 96-well deep well plates (Cat. No. SDP0096, Supercon) are required for sample processing and reagent preparation. These plates are compatible with the Microlab NIMBUS system and are used to hold samples, reagents, and magnetic beads during the extraction process.

Vortex Mixer: A vortex mixer is required to thoroughly mix samples with lysis and binding buffers, which is crucial for the complete lysis of cells and the homogeneous suspension of DNA/RNA within the solution. This ensures maximum contact between the nucleic acid and the silica binding surface, increasing the efficiency of nucleic acid recovery.

Thermomixer/ heating block/ oven: Required for the incubation of samples at controlled temperatures during the lysis and elution steps. The ability to set precise temperatures is essential, as optimal lysis conditions can vary depending on the sample type and the specific requirements of the nucleic acid extraction protocol.

Magnetic Stand: Required for the pelleting of magnetic beads during the extraction process. During the Lysis, Binding and Washing steps a magnet from the magnetic stand is applied to the sample to separate the lysate from the beads that contain bound DNA/RNA and allows the buffers to be removed via pipetting and discarded.

5.2 Consumables

Filter Tips: Filter tips are necessary to prevent cross-contamination between samples and ensure the accuracy of pipetting. The use of filter tips is crucial for maintaining the integrity of the DNA/RNA samples and the reliability of the extraction process.

Microcentrifuge Tubes: Microcentrifuge tubes are used for the final collection and storage of the eluted DNA/RNA.

Disposable Pipette (25 mL): A disposable pipette (Cat. No. 4489, Corning) with a capacity of 25 mL is required for the transfer of larger volumes of reagents. This pipette is used during the setup of the extraction run to load reagents into the deep well plates or reagent troughs.

β -Mercaptoethanol (β -ME): Needed for the Lysis Buffer to reduce disulfide bonds and protect RNA or DNA from degradation. Handle β -ME in a fume hood and use appropriate protective equipment due to its toxicity and strong odor.

Ethanol (96-100%) and Isopropanol (95%), Molecular grade: These solvents are used in the washing steps to remove contaminants and impurities from the RNA/DNA. Ensure that they are of molecular biology grade for optimal results.

Saline: Use saline (not phosphate-buffered saline) for resuspending dry swabs, typically around 600 μ L per sample. Saline solution can also be used for washing or diluting other sample types, depending on the specific requirements of your extraction protocol.

Please note that the necessity of these reagents varies depending on the type of samples being processed and the specific goals of your RNA/DNA extraction. Always refer to the specific protocol for your particular application.

6. QUICK VIEW PROTOCOL

Step	Procedure	Details
Sample Preparation & Loading	1. Resuspend swabs in saline solution. 2. Load samples and reagents.	- Begin by resuspending dry swabs in approximately 600 µl of saline solution. Avoid using phosphate-buffered saline as it may interfere with the extraction process. - For swabs in storage buffers, use VTM or UTM. - Load the samples into the designated wells of a 96-well deep well plate. - Prepare the reagent cassettes by filling them with Lysis Buffer, Binding Buffer, Wash Buffers A, B, and C, and Elution Buffer. Remove the lids from the cassettes and place them onto the deck of the Microlab NIMBUS system in standard positions.
Initialization	Power on and initialize the system.	- Turn on the Microlab NIMBUS system and open the controlling software. - Follow the on-screen prompts to set up the system, selecting the protocol for the AmpliMax Gene Plex Universal Kit. - Use the barcode from the last run of the Seegene kit for identification purposes.
Lysis	Apply Lysis Buffer.	- The system will pipette Lysis Buffer into the samples to ensure complete disruption of cells and viral particles. This step is critical for releasing DNA/RNA from the cells into the solution. The buffer contains detergents and chaotropic agents that solubilize membranes and denature proteins.
Binding	Add magnetic beads for DNA/RNA binding.	- After lysis, magnetic beads are added to the lysed samples. These beads are coated with a material that selectively binds DNA/RNA under the conditions provided by the Binding Buffer. - This step is crucial for capturing the DNA/RNA while excluding most other cellular components.
Washing	Perform sequential washes.	- The system performs a series of wash steps using Wash Buffers A, B, and C to remove contaminants while retaining the bound DNA/RNA. - Wash Buffer A typically removes proteins; Wash Buffer B removes salts, and Wash Buffer C removes other residual impurities.

Elution	Elute purified RNA.	- In this final step, Elution Buffer is used to elute the purified DNA/RNA from the magnetic beads. - The buffer disrupts the interactions between the DNA/RNA and the beads, releasing the DNA/RNA into the solution, ready for collection in microcentrifuge tubes.
Additional Considerations	Ensure proper handling and maintenance.	- Thoroughly resuspend mag beads before use by vortexing to ensure effective DNA/RNA binding. - Add booster reagent to the deep well plate for muscle tissue samples or other challenging types before loading onto the deck.

7. KIT SPECIFICATIONS

Parameter	AmpliMax Gene Plex Universal Kit
Format	Automated magnetic bead-based nucleic acid isolation system
Sample Material	Tissue, cells, bacteria, serum, plasma, nasopharyngeal swabs, BAL, urine, stool, sputum, whole blood, cervical or urethral swabs
Typical Yield	Depends on the sample type and quality, generally high yield due to optimized lysis and binding conditions
Elution Volume	25 µL to 50 µL, allowing for concentration adjustments based on specific research needs
Preparation Time	Total processing time from sample preparation to elution is approximately 1-2 hours, depending on sample volume
Binding Capacity	Up to 100 µg DNA/RNA per sample, sufficient for most research and diagnostic applications

8. WORKFLOW TIPS

For the AmpliMax GenePlex Universal Kit, proper collection and storage of starting material are essential to ensure the integrity of the extracted RNA/DNA. Here are detailed guidelines for the collection and storage of various sample types:

COLLECTION AND STORAGE OF STARTING MATERIAL

Swabs (Nasopharyngeal, Cervical, Urethral): Process swabs as soon as possible after collection. If immediate processing is not feasible, swabs can be stored in viral transport medium (VTM) or universal transport medium (UTM). Store swabs in VTM or UTM at 2-8°C for short-term storage (up to 72 hours) or at -80°C for long-term storage.

Serum and Plasma: Collect blood samples using standard phlebotomy techniques. Centrifuge to separate serum or plasma from whole blood. Store serum or plasma at -80°C until ready for extraction.

Urine and BAL (Bronchoalveolar Lavage) Fluid: Collect urine in a sterile container. For BAL fluid, follow standard collection procedures. Store urine and BAL fluid at -80°C until ready for extraction.

Tissue and Cells: Process tissue samples and cultured cells as soon as possible after collection. If immediate processing is not feasible, proceed to step 2. Freeze tissue samples and cell pellets in liquid nitrogen immediately after collection or harvesting. Store frozen tissue samples and cell pellets at -80°C until ready for extraction.

Stool and Sputum: Collect stool samples in a sterile container. For sputum, follow standard collection procedures. Store stool and sputum samples at -80°C until ready for extraction.

Sample Containers:

Cryovials: Use cryovials for storing frozen samples, such as tissue, cells, and swabs in VTM or UTM.

Sterile Containers: Use sterile containers for liquid samples like urine, serum, plasma, and BAL fluid.

SAMPLES SIZE CONSIDERATIONS

The AmpliMax GenePlex Universal Kit is designed to accommodate a wide range of sample types and volumes for efficient RNA/DNA extraction. Properly adjusting the sample size based on the kit's specifications is crucial to optimize the extraction process, ensuring efficient RNA/DNA recovery, and preventing overloading that could negatively impact yield and purity.

When preparing samples, consider the following:

Optimal Sample Volume:

Determine the ideal sample volume based on the specific requirements of the AmpliMax GenePlex Universal Kit. For example, for swabs, resuspend in approximately 600 µL of saline (not phosphate-buffered saline).

For liquid samples like serum, plasma, and urine, use the volume recommended in the kit protocol, typically ranging from 200 µL to 1 mL.

Weight of Starting Material:

For solid samples like tissue and cells, ensure that the weight of the starting material is appropriate for the extraction process. Typically, 10-25 mg of tissue or 1×10^6 cells are sufficient for extraction.

Ensure that the starting material fits within the capacity of the deep well plates used in the Hamilton Nimbus system.

Considerations for Automated Processing:

When using the Hamilton Nimbus system, ensure that sample volumes are compatible with the deep well plates and the automated liquid handling protocols.

Adjust the extraction protocol settings in the Hamilton Nimbus software to accommodate the specific sample types and volumes being processed.

9. PREPARING BUFFERS AND EQUIPMENT

Before Starting

Pipette Calibration and Maintenance: Regular calibration and maintenance of pipettes are mandatory to ensure precise volume dispensing. Accurate pipetting is vital for the correct addition of reagents and buffers, which is crucial for the efficiency and reliability of DNA/RNA extraction.

Workspace Preparation: Ensure that the work area is free from contaminants and organized. A decontaminated and well-organized workspace is essential to prevent sample cross-contamination and to promote an efficient workflow.

Reagent and Solution Preparation: Confirm that all reagents are within their expiration dates and have been stored according to the manufacturer's instructions. Expired or improperly stored reagents may lead to suboptimal DNA yield or quality.

Prepare Fresh Solutions: Some solutions, such as the ethanol mixture for washing, should be prepared freshly on the day of the extraction to ensure their effectiveness.

Magnetic Bead Suspension: Ensure that the magnetic beads are well-suspended before use. Vortex the beads and verify homogeneity to guarantee efficient DNA binding.

Elution Buffer Preparation: To enhance elution efficiency, preheat the Elution Buffer to the temperature recommended in the kit protocol (usually around 60°C).

Storage: Store Elution Buffer at room temperature. After opening, the buffer can be stored for up to 4 months.

Booster Preparation: Place the Booster in the ProK position on the Hamilton Nimbus deck. Ensure that the cap is cut off and retain the lid for reuse at the end of the run. Store the Booster at room temperature. After opening, it can be stored for up to 4 months.

Lysis Buffer: Before using the Lysis Buffer, carefully inspect it for any signs of precipitation. Precipitation can occur during storage and may affect the efficiency of cell lysis and RNA/DNA release. If you observe any precipitates in the Lysis Buffer, gently heat the buffer to dissolve them completely. Incubate the Lysis Buffer bottle at 40°C until all the precipitate is re-dissolved. This step ensures that the buffer is in the optimal condition for efficient cell lysis.

10. COMPLETE PROTOCOL

1. Preparation of Work Area and System

- 1.1 Ensure the Hamilton Nimbus system is clean and calibrated
- 1.2 Set up the system with the appropriate pipetting head, typically a 96-channel head capable of handling 1-1000 µL, equipped with liquid level detection for accuracy.

2. Reagent Setup

- 2.1 Binding Buffer: Prepare and place in the designated reservoir.
- 2.2 Wash Buffers: Set up two types of wash buffers, including an ethanol-based wash buffer for nucleic acid cleaning.
- 2.3 Elution Buffer: Prepare and place in a separate reservoir. The elution volume can be set between 50-200 µL depending on desired nucleic acid concentration.

3. Sample Loading

- 3.1 Load samples into the system, adjusting volumes according to the sample type (e.g. whole blood, buccal swabs, tissue).
- 3.2 Use the software interface to enter sample number and desired elution volume.

4. Addition of booster and Magnetic Beads

- 4.1 Add booster directly to the sample wells to initiate the digestion of nucleic acids.
- 4.2 Introduce magnetic beads for the binding of DNA and RNA. These beads should be thoroughly resuspended prior to addition.

Automated Extraction Process

5. System Operation

- 5.1 Select the appropriate predefined program on the Hamilton Nimbus tailored for either DNA or RNA purification.
- 5.2 Begin the automated process, which includes steps for binding, washing with buffers, and final elution.

6. Post-Processing Handling

- 6.1 Once the extraction run is complete, immediately transfer the eluted nucleic acids to sterile, nuclease-free tubes for storage or further analysis.
- 6.2 Assess the quality of the extracted nucleic acids using spectrophotometric or fluorometric methods if necessary.

7. Storage

Store the extracted nucleic acids at -20°C or -80°C if not used immediately.

11. TROUBLESHOOTING GUIDE

Problem	Possible Causes	Solutions
Low Yield of DNA/ RNA	Incomplete lysis of sample due to tough or fibrous tissue.	Increase lysis time or use mechanical disruption methods (e.g., bead beating) to ensure complete breakdown of cellular material.
	Insufficient binding of DNA/ RNA to beads due to incorrect buffer pH or temperature.	Ensure all buffers are at recommended pH and temperature before use. Adjust conditions as necessary.
Degradation of DNA/ RNA	Exposure to RNase/DNase during sample handling.	Use certified RNase-free and DNase-free consumables. Always handle samples in a clean area, wearing gloves and face masks.
	Improper storage or repeated freeze-thaw cycles of samples or reagents.	Store all reagents and samples as recommended. Avoid multiple freeze-thaw cycles by aliquoting samples and reagents.
High Contaminant Levels	Incomplete washing due to insufficient volume or number of wash steps.	Increase the volume or number of wash steps. Check the protocol to ensure proper sequence and completeness of wash steps.
Poor or Inconsistent Recovery across Samples	Variations in sample processing or handling.	Standardize sample processing. Train all users on the correct protocol steps and monitor consistency.
PCR/RT-PCR Inhibition	Residual salts or ethanol from inadequate washing.	Ensure complete removal of wash buffers, especially ethanol. Extend the drying time after the final wash step.
Cross-contamination	Pipetting errors or use of non-filter tips.	Use filter tips for all liquid handling steps. Implement strict pipetting protocols and regular equipment cleaning.
Unexpected Size or Quality of Isolated Nucleic Acids	Shearing of DNA/RNA during processing.	Minimize physical manipulation of samples, especially during pipetting and transfer steps. Use gentle mixing techniques.

	Chemical degradation due to contaminants.	Review chemical purity of reagents and buffers. Replace any suspect chemicals and check for contamination.
Kit Components Reacting Poorly	Reagents not at optimal conditions due to incorrect storage.	Verify storage conditions for each component. Replace any reagents stored under incorrect conditions.
	Expired reagents impacting performance.	Regularly check expiry dates and replace outdated components.
Low Purity of Isolated Nucleic Acids	Contamination with proteins, fats, or other organic compounds.	Optimize lysis and wash conditions. Consider additional cleanup steps if dealing with particularly dirty samples.
No Amplification in PCR/RT-PCR	Inhibitors present in the final preparation.	Utilize an additional cleanup step specifically designed to remove PCR inhibitors. Test different elution volumes.
Fluctuations in Yield	Batch-to-batch variations in sample quality or reagent formulation.	Conduct pre-experimental validations for each new batch of reagents or samples. Adjust protocols based on preliminary results.

12. PRODUCT USE RESTRICTION / WARRANTY

GENE VANTAGE kit components are intended, developed, designed, and sold for research purposes only. All kit components are for general laboratory use only and should only be used by qualified personnel wearing the appropriate protective clothing. GENE VANTAGE does not assume any responsibility for damages due to improper application of our products in other fields of application. Any user, whether by direct or resale of the product, is liable for any and all damages resulting from any application outside of research.

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