NORGEN BIOTEK CORP.

The Sample Preparation Experts

PLANT AND ENVIRONMENTAL SAMPLE PREPARATION KITS

The New Standard in RNA Purification, Best-in-Class, Pure & Simple

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An ISO 13485:2003, ISO 9001:2008 & ISO 15189:2007 Certified Company

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Norgen Biotek is dedicated to providing our customers with first class sample preparation kits for RNA, microRNA, DNA and protein purification, clean-up and concentration for research and diagnostic applications; and to providing dedicated and expert support services to our customers and commercial partners worldwide.

Norgen is an **ISO 9001:2008, ISO 13485:2003 and ISO 15189:2007** certified company, indicating our commitment to quality.

ISO 9001:2008

ISO 13485:2003

ISO 15189:2007

CE

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4. Shipping Address
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6. Name, telephone number and email of contact person
7. Product catalogue number, description, size and quantity

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Table of Contents

A. RNA Sample Preparation

Plant and Environmental RNA and microRNA Isolation and Purification

Kit	Cat. #	Kit size
Plant/Fungi RNA Purification Kit	25800, 31300, 31900	25 preps, 96 preps, 2 x 96 well plates
Plant microRNA Purification Kit	54700	25 preps
Plant RNA/DNA Purification Kit	24400	50 preps
Water RNA/DNA Purification Kit	26400, 26450	25 preps
Soil Total RNA Purification Kit	27700	50 preps

Featured Customer Testimonial:

"I am very pleased to inform you that Plant/Fungi Total RNA Isolation Kit worked very well for Sorghum sample. In a very short time we were able to isolate good quality and quantity RNA."
- University of Kentucky

Plant and Environmental Samples

Plant/Fungi Total RNA Purification Kit — Cat. # 25800, 31300 & 31900

For the rapid purification of total RNA (including microRNA) from plants and fungi

Product Description

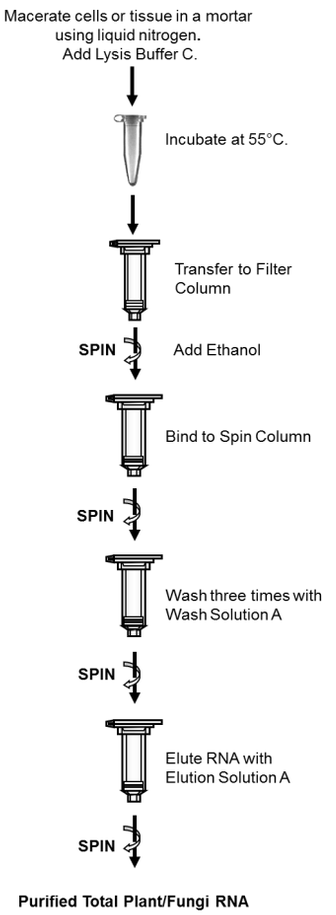
Norgen's Plant/Fungi Total RNA Purification Kit provides a rapid method for the isolation and purification of total RNA, including viral RNA, from a wide range of plant and filamentous fungal species. Total RNA can be purified from fresh or frozen plant tissues, plant cells or filamentous fungi samples using this kit. All sizes of RNA are purified, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The procedure is rapid and convenient, as it does not rely on the use of liquid nitrogen in order to homogenize the samples.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The RNA is preferentially purified from other cellular components, such as proteins, without the use of phenol or chloroform. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, RNase protection and primer extension, and expression array assays.

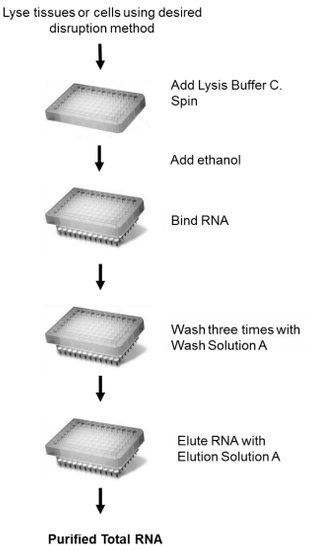
The kit is also available in a 96-well format for high-throughput plant/fungi total RNA purification. Purification with the 96-well plates can be performed using either a vacuum manifold or centrifugation.

Procedure:

Spin Column Format



96-Well Plate Format



Plant/Fungi Total RNA Purification Kit Contents—Spin Columns

1. Lysis Buffer C
2. Wash Solution A
3. Elution Solution A
4. Filter Columns
5. Spin Columns
6. Collection Tubes
7. Elution tubes (1.7 mL)
8. Product Insert

Plant/Fungi Total RNA Purification Kit

Cat. # 25800, 31300 & 31900

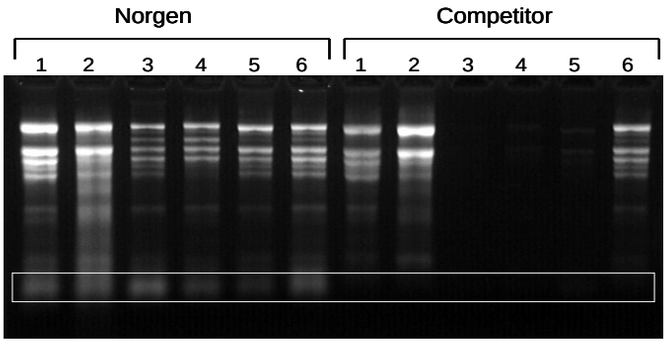


Figure 1. Isolation of High Quality RNA, Even from Difficult Samples. RNA was isolated from 50 mg samples of apple (Lanes 1), peach (Lanes 2), grape (Lanes 3), pine needle (Lanes 4), strawberry (Lanes 5) and pear (Lanes 6) using Norgen's kit and a competitors kit. Norgen's kit allowed for the isolation of high quality RNA from all the samples, including the difficult samples, while the competitor failed to isolate RNA from grape, pine needles and strawberry. Furthermore, only Norgen's kit was able to isolate the small RNA species (white box).

Species	Tissue Type
1. Tobacco (*Nicotiana tabacum*)	Leaf, stem, root
2. Strawberry	Leaf, fruit, flower
3. Tomato (*Lycopersicon esculentum*)	Leaf
4. Blackberry	Leaf, berry
5. Pepper (*Capsicum annuum*)	Leaf
6. Herbs	Leaf
7. Soy bean (legume)	Leaf, stem, root
8. Persimmon (*Ebenaceae*)	Leaf
9. Potato (*Solanum tuberosum*)	Leaf, tuber
11. *Arabidopsisthaliana1*	Leaf, stem
12. Plum	Leaf, fruit
13. Peach (*Prunus persica*)	Leaf
14. Citrus	Leaf
15. Apple (*Malus sp.*)	Leaf, flower, pollen
16. Vanilla bean	Vanilla bean
17. Pear (*Pyrus sp.*)	Leaf
18. Cotton (*Gossypium*)	Leaf, cotton
19. Grape vine (*Vitis sp.*)	Leaf, grape, skin
20. Mangrove	Leaf
21. Plum (*Prunus sp.*)	Leaf
22. Chrysanthemum	Leaf
23. Palm (*Arecaceae*)	Leaf
24. Eastern White Red Cedar	Leaf
25. Pine needle (*Pinaceae*)	Needle
26. Corn	Leaf, corn
27. Cucumber	Leaf

Table 1. List of plant species from which high quality and quantities of RNA have been successfully isolated using Norgen's Plant/Fungi Total RNA Purification Kit.

Features and Benefits

- **Isolate RNA from a wide range of samples -** Total RNA can be isolated from a wide range of plant and filamentous fungi samples.
- **No phenol:chloroform extractions to isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA, without the use of phenol or chloroform.
- **High yield of RNA** - High yields of purified RNA can be isolated with this kit

Feature	Specifications
Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Maximum Amount of Starting Material:	
Plant Tissues	50 mg
Plant Cells	1 x 10^6 cells
Fungi (wet weight)	50 mg
Size of RNA Purified	All sizes
Time to Complete 10 Purifications	30 minutes
Average Yield*	
Tobacco Leaves (50 mg)	60 µg
Grape Leaves (50 mg)	35 µg
Alternaria tenuissima (50 mg)	11 µg

Ordering information

Cat #	Quantity
25800	50 preps
31300	96 preps
31900	2 x 96 wells

Plant and Environmental Samples

Non-Organic-Based Isolation of Plant microRNA using Norgen's Plant/Fungi RNA Purification Kit

W.-S. Kim, PhD1, C. Dobbin,PhD1, Y. Haj-Ahmad, Ph.D1,2
1Norgen Biotek Corporation, Thorold, Ontario, Canada
2Centre for Biotechnology. Brock University, St. Catharines, Ontario, Canada

INTRODUCTION

Small RNAs, including microRNAs (miRNAs) and short interfering RNAs (siRNAs), are key components of an evolutionarily conserved system of RNA-based gene regulation in eukaryotes. In eukaryotes, regulatory small RNAs are divided into two main classes; (a) small interfering RNAs (siRNAs) are double-stranded RNA of ~20-25 nucleotides that are involved in RNA interference, and (b) microRNAs (miRNAs) are single-stranded RNA of ~21-23 nucleotides in length that contain complementary sequences to the 3' untranslated regions of the target messenger RNAs (mRNA). They are involved in many molecular interactions, including defense against viruses and regulation of gene expression during development. miRNAs interfere with expression of messenger RNAs encoding factors that control developmental timing, stem cell maintenance, and other developmental and physiological processes in plants and animals. miRNAs are negative regulators that function as specificity determinants, or guides, within complexes that inhibitprotein synthesis (animals) or promote degradation (plants)of mRNA targets (1).

Unlike larger DNA or RNA molecules, small RNAs are subjected to significant loss in traditional isolation methods that involve alcohol precipitation. Moreover, some available commercial products for small RNA isolation involve the use of organic extraction, which is hazardous and time-consuming. Norgen's Plant/Fungi RNA Purification Kit provides an innovative and rapid method for the isolation and purification of total RNA, including small RNA, from both plant and fungal cells that does not require organic extraction. The procedure is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The procedure is rapid and convenient, as it does not rely on the use of liquid nitrogen in order to homogenize the samples. The purified RNA is of the highest quality and can be used in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, and expression array analysis.

In this application note, Norgen's Plant/Fungi RNA Purification Kit is used to isolate total RNA from a variety of different plant cells. The yield and integrity of the purified RNA is then analyzed by gel electrophoresis, as well as by using an Agilent BioAnalyzer. Furthermore, the downstream application of RT-PCR is performed, indicating the purity and biological activity of the purified RNA.

METHODS AND MATERIALS

Plant RNA Isolation

Plant RNA was isolated from 50 mg of plant leaf tissue (equivalent to ~ 5 x 106 plant cells) using Norgen's Plant/Fungi RNA Purification kit as per the provided protocol (Figure 1). Briefly, the plant cells were ground in a mortar containing 600 µL of Lysis Solution with a pestle until the tissue was completely macerated. The lysate was then transferred into an RNAse-free microcentrifuge tube and centrifuged for 2 minutes to remove cellular debris. The supernatant was then transferred to a new RNAse-free microcentrifuge tube and an equal volume of 70% ethanol was added and mixed by vortexing. Next, 600 µL of the clarified lysate was then loaded onto an assembled column and centrifuged for 1 minute at 14,000 x g (~14,000 rpm). The flow-through was discarded and the column reassembled. The remaining lysate was then loaded onto the same column by centrifugation for 1 minute at 14,000 x g. The column was then washed a total of three times by applying 400 µL of Wash Solution to the column, centrifuging for 1 minute and then discarding the flow-through. The columns were centrifuged for 2 minutes to thoroughly dry the resin. For RNA elution the column was placed into a fresh 1.7 mL elution tube and 50 µL of the Elution Buffer was applied to the column. Columns were then centrifuged for 2 minutes at 200 x g (~2000 rpm), followed by a 1 minute spin at 14,000 x g. Purified RNA was then stored at -20°C for several days or at -70°C for long term storage. For comparison of microRNA isolation, total RNA was also isolated from the same plant samples using a leading market competitor's plant RNA purification kit according to the manufacturer's protocol and used in comparative experiments.

RNA Gel Electrophoresis

The purified total plant RNA (Norgen's and competitor's) was run on 1X MOPS, 1.0% formaldehyde-agarose gels for visual inspection and comparison. Generally, 5 µL of each 50 µL elution was run on the gel. The purified RNAs (Norgen's and competitor's) were also resolved on an 8% Urea-PAGE gel for visual comparison.

Capillary Electrophoresis

Purified RNAs from grape, tomato, tobacco and peach leaf tissue were loaded onto an Agilent® RNA Nano 6000 chip and resolved on an Agilent® 2100 BioAnalyzer according to the manufacturer's instructions. RT-qPCR Assay Plant RNA purified from peach leaves was used as template for one step RT-qPCR, and miRNA was detected by employing primers specific to miR398b.

Plant and Environmental Samples

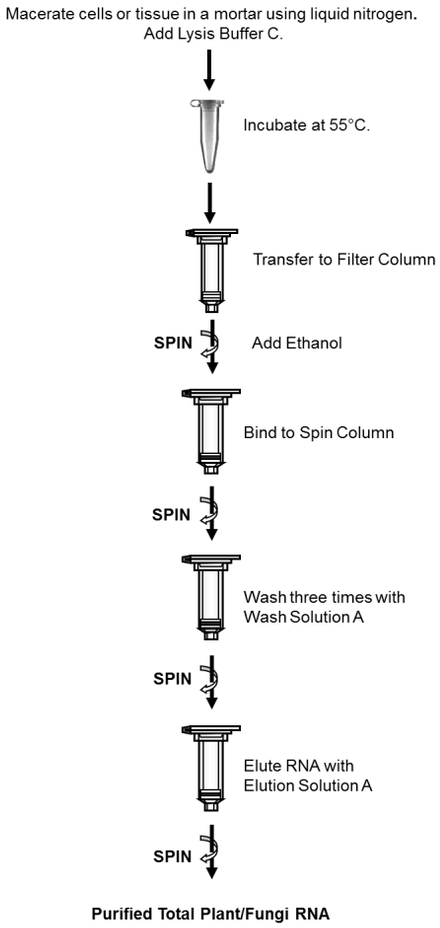


Figure 1. Procedure flowchart for the purification of Plant RNA using Norgen's Plant/Fungi RNA Purification kit.

RESULTS AND DISCUSSION

Total RNA was isolated from 5 x 106 plant cells using Norgen's Plant/Fungi RNA Purification Kit according to the provided protocol as described in Figure 1. The entire protocol was completed in 30 minutes. At the same time, a commercially available competitor's plant total RNA kit was used for comparison. Once total RNA was isolated from the leaf tissues of apple, peach, grape, strawberry and pine needles, they were run on a 1X MOPS, 1.0 %formaldehyde-agarose gel for visual inspection (Figure 2).

As it can be seen in Figure 2, RNA samples prepared using Norgen's Plant/Fungi RNA Purification Kit were of a high quality. In addition, Norgen's kit allowed for the isolation of RNA from all sample types, whereas the competitor's kit was not successful at isolating RNA from some of the more difficult sample types including grape and strawberry leaves and pine needles. Importantly, microRNA and small RNAs could be observed in the total RNA isolated using Norgen's kit. In contrast, the competitor's total RNA kit did not isolate small RNAs. Thus Norgen's Plant/Fungi RNA Purification Kit truly isolates total RNA with a wider size diversity and quality than its competitor's, including RNA from difficult samples.

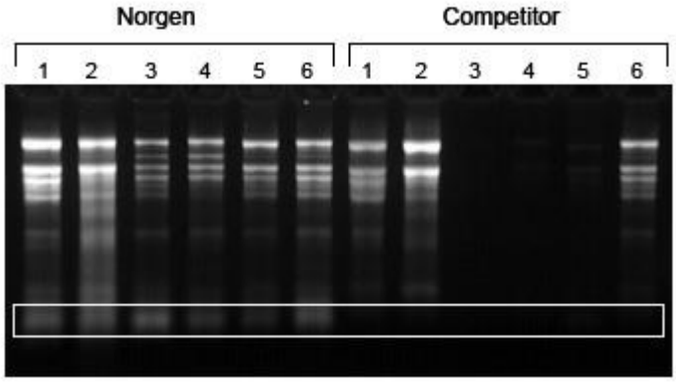


Figure 2. Isolation of True Total RNA, Including Small RNA Species, Using Norgen's Kit.
Total RNA was isolated from 50 mg (~5.0 x 106 cells) of Apple (1), Peach (2), Grape (3), Pine needle (4), Strawberry (5) or Pear (6) leaf tissue using Norgen's Plant/Fungi RNA Purification Kit and a leading competitor's kit. Samples of the purified RNA (5 µL of each 50 µL elution) were loaded onto a 1X MOPS, 1.0% formaldehyde-agarose gel and visualized via ethidium bromide staining. Norgen's kit allowed for the isolation of high quality RNA from all of the samples, including the difficult samples, while the competitor failed to isolate RNA in some cases. Furthermore, only Norgen's kit was able to isolate the small RNA species (white box).

The quality of small RNAs isolated by Norgen's purification kit was further demonstrated by resolution on an 8% Urea-PAGE gel (Fig. 3) and capillary gel electrophoresis (Fig. 4). Total RNA was isolated in duplicate from apple and peach leaf tissue using Norgen's purification kit and the competitor's kit. Fig. 3 demonstrates that unlike its competitor, Norgen's kit is able to isolate small RNA species which are < 200 nucleotides in length.

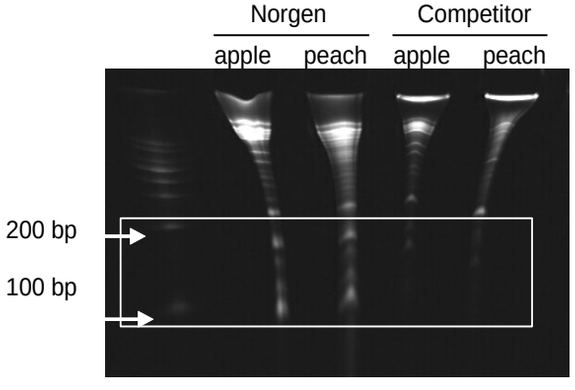


Figure 3. Resolution of Small RNA on an 8% Urea-PAGE Gel. Following purification of total RNA from apple and peach leaf tissue using Norgen's Plant/Fungi RNA Purification Kit and a competitor's kit, the RNA was separated on an 8% urea-PAGE gel (7 µL loaded from the 50 µL elutions). Norgen's kit was able to isolate true total RNA with a wide size diversity, including small RNA species (white box). In contrast, the competitor's total kit was unable to purify RNA species which were below 200 nucleotides in size.

Plant and Environmental Samples

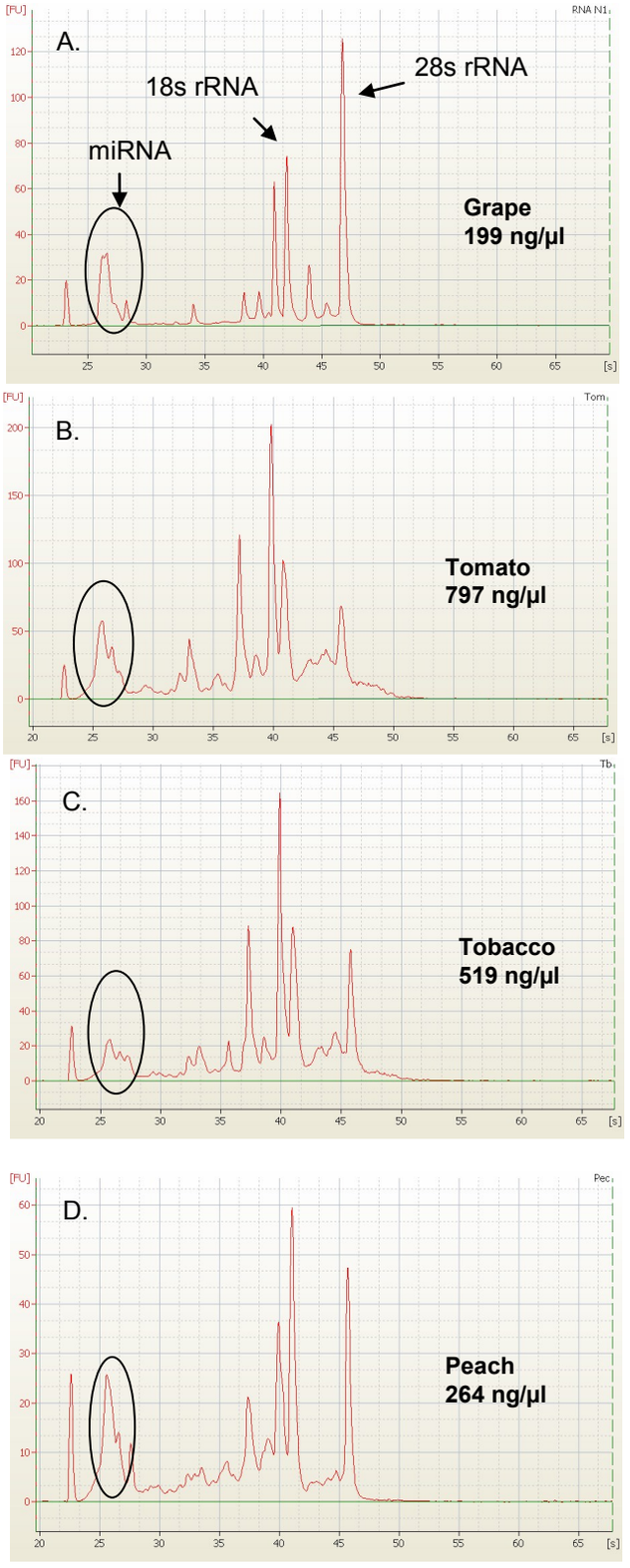


Figure 4. Resolution of Total RNA Isolated Using Norgen's Kit on the Agilent BioAnalyzer.
Total RNA was isolated from grape (Panel A), tomato (Panel B), tobacco (Panel C) and peach (Panel D) leaf tissue using Norgen's kit. Purified DNA was then resolved on an Agilent Lab-on-a-Chip and electropherograms were generated. All RNA species, including small RNA species, can be detected in all 4 cases.

The ability of Norgen's Plant/Fungi RNA Purification Kit to isolate true total RNA, including small RNA, was further demonstrated when total RNA samples purified from grape, peach, tomato and tobacco were resolved on an Agilent Lab-on-a-Chip (Figure 4). Panel A in Figure 4 is an electropherogram of total RNA isolated from grape leaf tissue using Norgen's purification kit. All the RNA species, including microRNA, 18s rRNA and 28s rRNA can be observed. Similar results were obtained when total RNA was purified from tomato (Panel B), tobacco (Panel C) or peach (Panel D). It is evident that RNA species of a wide size diversity can be purified using Norgen's Plant/Fungi RNA Purification Kit, including plant microRNAs.

In order to analyze the biological activity of the purified RNAs, RT-qPCR was performed. Unlike regular RT-PCR, the amplification and detection of small RNA molecules, such as microRNA, requires the addition of an adaptor. One of the commonly-used protocols involves the addition of a poly(A) tail to the microRNA by Poly(A) Polymerase (2). This method was employed here, and Figure 5 shows the amplification of the miR398b transcript from total plant RNA isolated from peach leaves using Norgen's Plant/Fungi RNA Purification Kit. The PCR product was successfully detected from the total RNA purified from peach leaf tissue.

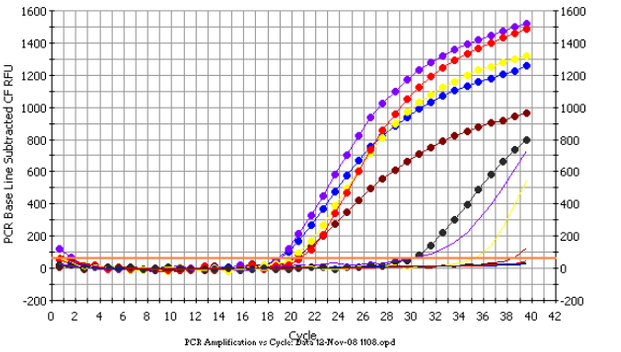


Figure 5. One-step RT-qPCR for the Detection of Plant miRNA.
Total RNA was extracted from peach leaf tissues using Norgen's Plant/Fungi RNA Purification Kit, and miRNA was detected using primers specific for miR398b. miRNA was detected for all stem loop primer concentrations tested: 5nM (red); 10nM (yellow); 25nM (purple); 50nM (blue) and; 100nM (burgundy).

CONCLUSION

Through the analysis of the performance of Norgen's Plant/Fungi RNA Purification Kit for isolating total RNA from plant cells, a number of conclusions regarding Norgen's kit can be made:

1. Norgen's kit allows for the isolation of high quality total RNA, including small RNA, within 30 minutes and

without the use of any organic solvents. Unlike other commercial kits, Norgen's kit does not require the use of organics for extraction, or the use of liquid nitrogen for homogenization of samples, making the RNA purification rapid and convenient

2. Norgen's kit isolates RNAs of high yield, purity and integrity from a wide range of plant and fungal samples. The purity and integrity of the total RNA isolated using Norgen's kit could be seen in the various gel photos. In addition, the RNA was of a high quality, as it could be used in downstream applications including RT-qPCR.

3. Norgen's kit isolates true total RNA, including small RNA, from various plant samples. As can be seen in the various figures, Norgen's kit was able to consistently isolate total RNA, including microRNA. The competitor's kit failed to isolate the small RNA species. Furthermore, Norgen's kit was able to isolate RNA from all the samples tested, while the competitor failed to isolate RNA from some of the more difficult samples.

REFERENCES

1. Carrington, J. C. and V. Ambros. 2003. Role of microRNAs in Plant and Animal Development. Science. 301: 336.

2. Shi, R. and V. L. Chang. 2005. Facile means for quantifying microRNA expression by real-time PCR. BioTechniques. 39: 519-24.

Plant and Environmental Samples

Plant microRNA Purification Kit

Cat. # 54700

For the rapid purification of microRNA from plants

Product Description

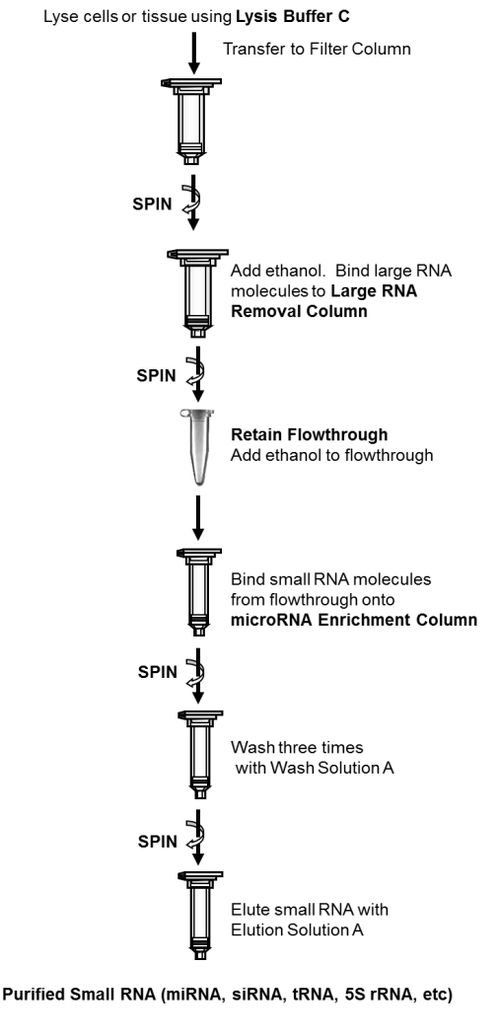
Norgen's Plant microRNA Purification Kit provides a rapid method for the isolation and purification of small RNA molecules (< 200 nt) from cultured plant cells or plant tissues. These small RNAs include regulatory RNA molecules such as microRNA (miRNA) and short interfering RNA (siRNA), as well as tRNA and 5S rRNA. Small RNA molecules are often studied due to their ability to regulate gene expression. miRNAs and siRNAs are typically 20-25 nucleotides long, and regulate gene expression by binding to mRNA molecules and affecting their stability or translation. The small RNA molecules isolated using Norgen's Plant microRNA Purification Kit can be used in various downstream applications relating to gene regulation and functional analysis, including RT-PCR, miRNA sequencing, northern blotting and microarray analysis.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds RNA in a manner that depends on ionic concentrations. The small RNA molecules are preferentially purified from other cellular components such as ribosomal RNA without the use of phenol or chloroform.

Plant microRNA Purification Kit Contents

1. Lysis Buffer C
2. Wash Solution A
3. Elution Solution A
4. Large RNA Removal Column
5. microRNA Enrichment Column
6. Collection Tube
7. Elution tubes (1.7 mL)
8. Filter columns
9. Product Insert

Procedure:



Plant microRNA Purification Kit

Cat. # 54700

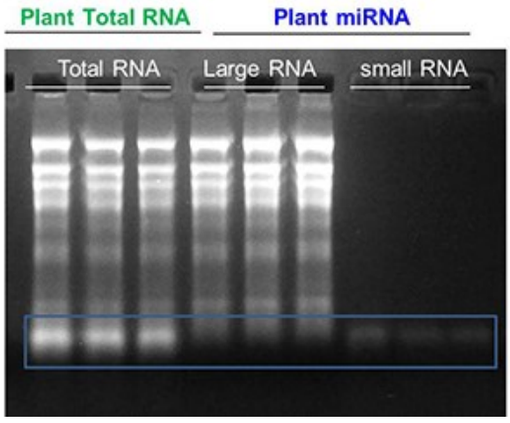


Figure 1. Fractionation of Large and Small RNA. Large RNA and small RNA were sequentially purified using Norgen's Plant miRNA Purification Kit from 50 mg of raspberry leaf tissue and the RNA profile was compared with the RNA isolated using Norgen's Plant/Fungi Total RNA Purification Kit (Cat. #25800). For visualization, 10 µL of RNA from 50 µL of RNA elution was loaded on 2% 1x MOPS agarose gel. Norgen's kit was able to isolate both the large and small RNA fractions, and the small RNA fraction does not contain any of the large RNA species.

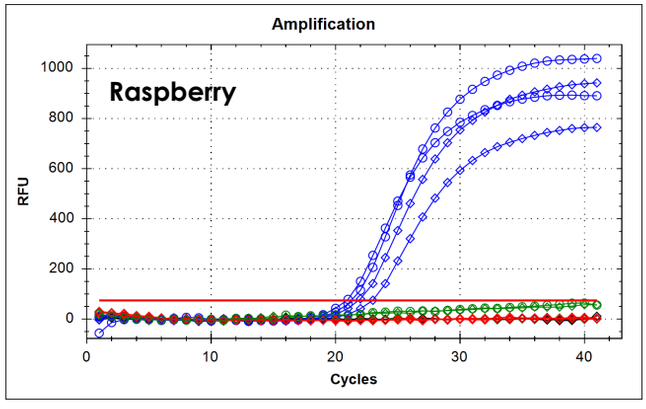


Figure 2. Isolation of Concentrated RNA that can be used in Sensitive Downstream Applications. Three different miRNA purification methods were compared for their ability to isolated and detect plant miRNA. miRNA was purified from grape using three miRNA purification kits according to the manufacture's manual. Next, 3 µL of the elution was directly used for cDNA generation and 3 µL of cDNA was used for the CFX96 Touch™ Real-Time PCR Detection System (Bio-Rad) to detect the miRNA 159a. As it can be seen, only the miRNA purified using Norgen's kit (blue lines) was amplified, while the miRNA isolated using the other 2 kits failed to amplify (red and green lines). Both of the competitor's kits rely on phenol to isolate the miRNA, and therefore residual phenol is likely interfering with the amplification. Norgen's kit isolates high yields of good quality miRNA without the use of phenol. Blue: Norgen Plant miRNA, Red: Qiagen miRNeasy, Trizol: Green.

Features and Benefits

- **Fast and easy** - Fast and easy processing using a rapid spin column format.
- **Inhibitor-free** - No phenol or chloroform extractions.
- **Isolate small RNA** - Isolate all small RNA molecules (< 200 nt).
- **Minimal contamination** - Minimal contamination from large RNA molecules and genomic DNA.
- **Wide compatibility** - High quality small RNA can be used in various downstream applications.

Feature	Specifications
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Minimum Elution Volume	20 µL
Size of RNA Purified	< 200 nt
Amount of Starting Material:	100 mg
Plant Tissues:	5 x 10^6 cells
Time to Complete 10 Purifications	25 minutes

Ordering information

Cat #	Quantity
54700	25 preps

Plant and Environmental Samples

Plant RNA/DNA Purification Kit

Cat. # 24400

For simultaneous isolation of total RNA and DNA from the same plant sample

Product Description

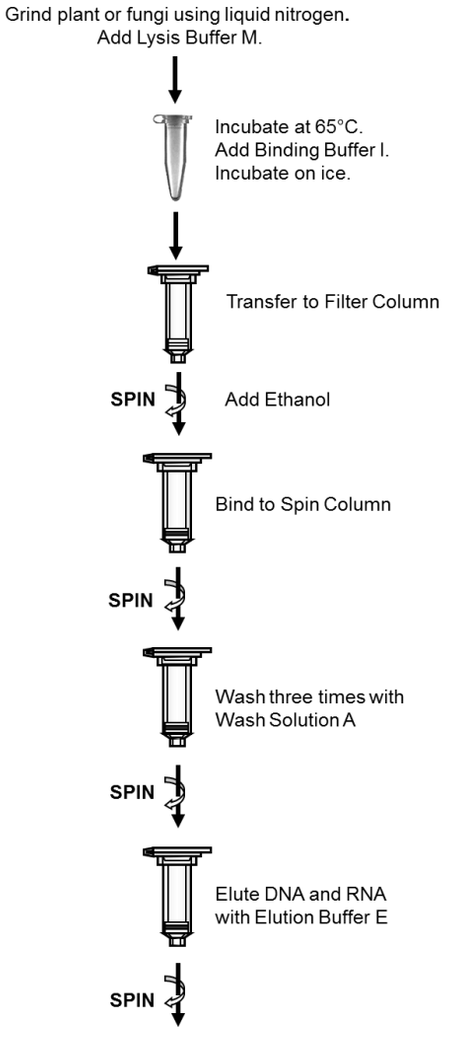
Norgen's Plant RNA/DNA Purification Kit provides a rapid method for the isolation and purification of total RNA and genomic DNA simultaneously from a single sample of plants. The total RNA and DNA (including genomic DNA) are both column purified in under 20 minutes using a single column. It is often necessary to isolate total RNA and genomic DNA from a single plant sample, such as for studies of gene expression, mutant or transgenic plant characterization, and host plant-pathogen characterization. Traditionally the RNA and DNA would be isolated from different aliquots of the same sample, however this novel technology will allow for their simultaneous isolation from the same sample. This will not only save time, but will also be of a great benefit when isolating RNA and DNA from precious, difficult to obtain or very small samples. Furthermore, gene expression analysis will be more reliable since the RNA and DNA are derived from the same sample, therefore eliminating inconsistent results.

With Norgen's Plant RNA/DNA Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's resin binds nucleic acids in a manner that depends on ionic concentrations, thus the RNA and DNA will bind to the column while the proteins are removed in the flowthrough. At this point, optional on-column DNase or RNase digestions may be carried out in order to isolate pure RNA or DNA. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA). The purified RNA and DNA are of the highest integrity and can be used in a number of downstream applications.

Plant RNA / DNA Purification Kit Contents

1. Lysis Buffer M
2. Binding Buffer I
3. Wash Solution A
4. Elution Buffer E
5. Enzyme Incubation Buffer B
6. Filter Columns
7. Spin Columns
8. Collection Tubes
9. Elution tubes (1.7 mL)
10. Product Insert

Procedure:



Plant RNA/DNA Purification Kit

Cat. # 24400

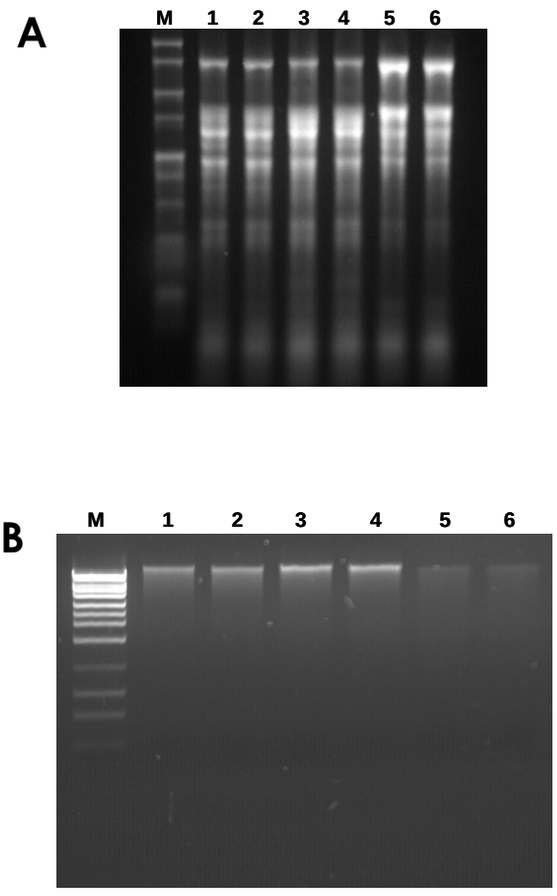


Figure 1. Isolation of Total RNA and Genomic DNA from Tobacco, Tomato and Peach Leaf Tissue. Total RNA and genomic DNA were isolated from 60 mg of tobacco leaf, 52 mg of tomato leaf and 56 mg of peach leaf using Norgen's Plant RNA/DNA Purification Kit. Panel A is a 1X MOPS 1.5% agarose gel showing the total RNA that was isolated after the optional on-column DNase digestion. Lane M is Norgen's 1 kb RNA Ladder, Lanes 1 and 2 contain RNA isolated from tobacco leaf, Lanes 3 and 4 contain RNA isolated from tomato leaf, and Lanes 5 and 6 contain RNA isolated from peach leaf. Panel B is a 1.5% agarose gel containing the genomic DNA that were isolated after the optional on-column RNase digestion. Lane M is Norgen's HighRanger 1kb DNA Ladder, Lanes 1 and 2 contain the tobacco DNA, Lanes 3 and 4 contain the tomato DNA and Lanes 5 and 6 contain the peach DNA. The RNA and DNA are intact and of the highest quality, and can be used in a number of different downstream applications.

Features and Benefits

- **Complete column purification** - The RNA and DNA are both column purified simultaneously using the same column.
- **Reduce variability** - RNA and DNA are isolated from a single sample with no splitting of the lysate, thus reducing inconsistent results and variability.
- **Isolate a diversity of RNA species** - All sizes of RNA are isolated, from large mRNA down to microRNA.
- **Isolate from small samples** - Simultaneous isolation of RNA and DNA from a single sample. Ideal for precious, difficult to obtain or small samples.
- **Isolate DNA-free plant RNA or RNA-free plant DNA** - Optional protocols for on-column DNase or RNase digestion are provided if the user wishes to isolate pure, DNA-free RNA or pure, RNA-free DNA.

Feature	Specifications
Column Binding Capacity (RNA)	50 µg
Column Binding Capacity (DNA)	15 µg
Maximum Amount of Starting Material:	
Plant Tissues	100 mg
Plant Cells	5 x 10^6 cells
Size of RNA Purified	All sizes
Time to Complete 10 Purifications	30 minutes
Average Yield*	
Peach Leaves (100 mg)	40 µg RNA
Peach Leaves (100 mg)	5 µg DNA

Ordering information

Cat #	Quantity
24400	50 preps

Plant and Environmental Samples

Water RNA/DNA Purification Kit

Cat. # 26400 & 26450

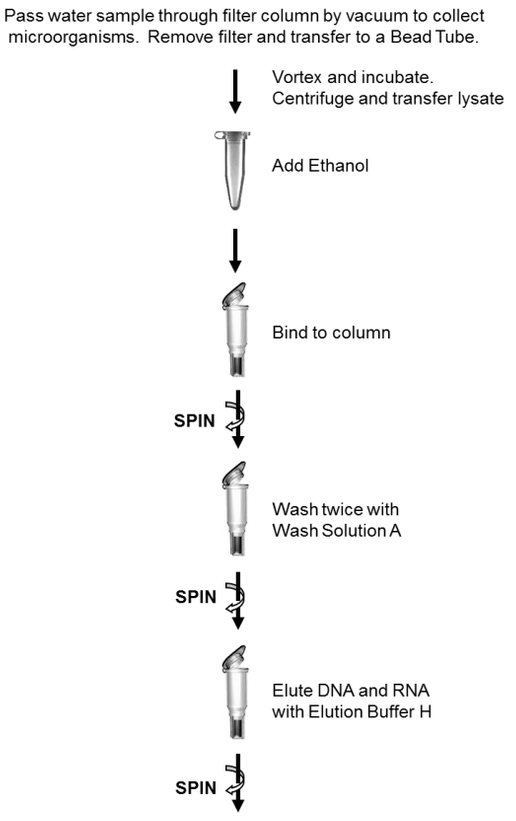
For convenient purification of RNA and DNA from microorganisms in water samples

Product Description

Norgen's Water RNA/DNA Purification Kit provides a convenient and rapid method for the detection of microorganisms from environmental water samples. The kit allows for the rapid isolation and purification of total RNA and DNA simultaneously from the microorganisms found in different types of water samples. The total RNA and DNA (including genomic DNA) are isolated from all the microorganisms found in the water, including bacteria, fungi and algae without the use of any inhibitory organic substances. The microorganisms are captured by passing the water sample through either a 0.22 µm or a 0.45 µm filter, and are subsequently lysed using the provided Bead Tubes. Both the RNA and DNA are then column purified in under 45 minutes using a single column.

With Norgen's Water RNA/DNA Purification Kit, the purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. Norgen's kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA), without the use of phenol or chloroform. The purified RNA and DNA are highly concentrated, and can be used directly in a number of downstream applications including real time PCR, reverse transcription PCR, Northern blotting, Southern blotting and sequencing reactions.

Procedure:



Water RNA/DNA Purification Kit Contents

1. Lysis Buffer E
2. Wash Solution A
3. Enzyme Incubation Buffer B
4. Elution Buffer H
5. Mini Spin Columns
6. Filter Columns (0.22 µm or 0.45 µm)
7. Bead Tubes
8. Collection Tubes
9. Elution tubes (1.7 mL)
10. Product Insert

Water RNA/DNA Purification Kit

Cat. # 26400 & 26450

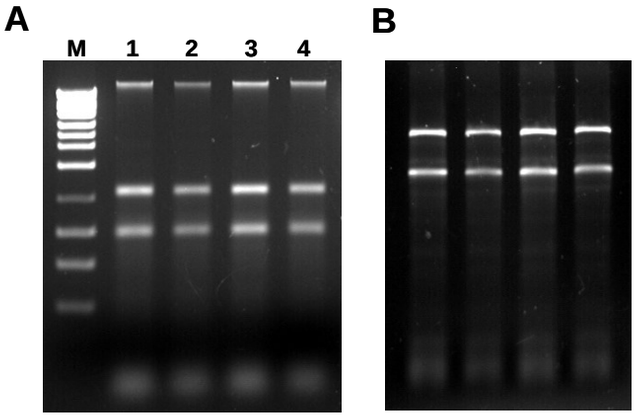


Figure 1. High Yield and Purity of RNA and DNA. Total RNA and DNA were isolated from a water sample using Norgen's Water RNA/DNA Purification Kit and subsequently run on gels for visual analysis. In Panel A 10 mL aliquots of the elution were run on a 1% TAE agarose gel, and in Panel B 5 mL aliquots of the elution were run on a 1.5% formaldehyde agarose gel. From observing the gels it can be seen that the kit allows for the isolation and purification of high yields of concentrated and high quality RNA and DNA.

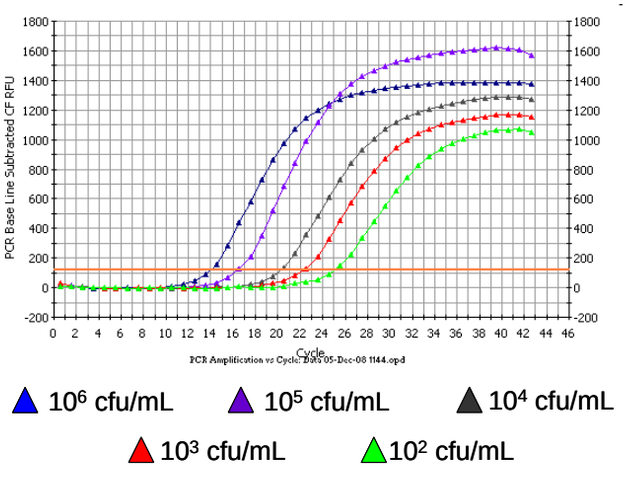


Figure 2. Detection of *E. coli* 16S rDNA by Real-Time PCR. *E. coli* was spiked into 50 mL water samples at increasing concentrations and the RNA and DNA were isolated using Norgen's Water RNA/DNA Purification Kit. The RNA/DNA elution was then used as the template in a real-time PCR reaction using *E. coli* 16S rDNA primers. The *E. coli* was successfully detected in all cases, indicating the high sensitivity of the kit for detecting microorganisms within the water.

Features and Benefits

- **Rapid detection of microorganisms in water samples** - Isolate total DNA and RNA from all microorganisms found in the water, including bacteria, fungi and algae.
- **Complete column purification** - The RNA and DNA are both column purified simultaneously using the same column.
- **Different pore sizes of the filter columns available** - The filter columns included with the kit are available in either 0.22 µm or 0.45 µm pore size, depending on your needs.
- **Fast and easy processing** - Rapid spin column format allows for the isolation of both RNA and DNA in under 45 minutes.
- **Isolate highly concentrated RNA and DNA** - The purified RNA and DNA is eluted in low volumes, allowing for the direct use of the nucleic acid in downstream applications

Feature	Specifications
Minimum Water Input	10 mL
Maximum Water Input	100 mL
Elution Volume	100 µL
Maximum Filter Column Loading Volume	650 µL
Maximum Spin Column Loading Volume	100 µL
Time to Complete 10 Purifications	45 minutes

Ordering information

Cat #	Quantity
24400 (0.22 µm)	25 preps
26450 (0.45 µm)	25 preps

Plant and Environmental Samples

Soil RNA Purification Kit

Cat. # 27750

For the rapid preparation of inhibitor-free total RNA from soil

Product Description

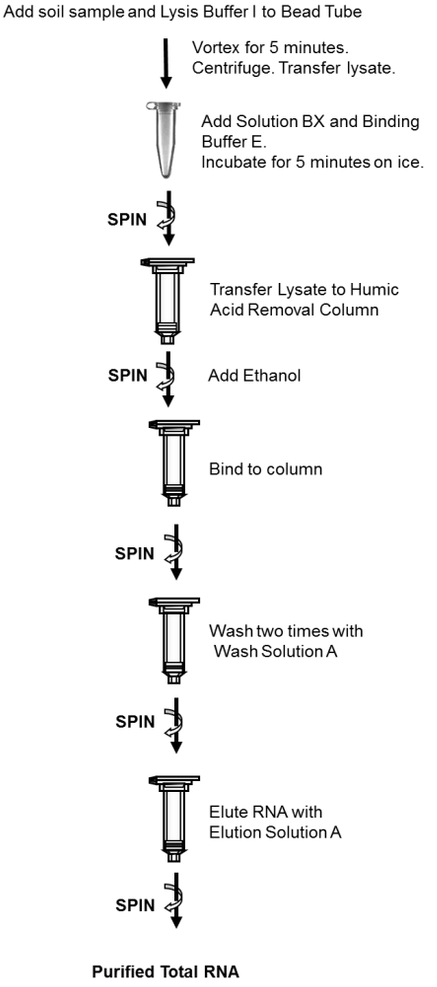
Norgen's Soil Total RNA Purification Kit provides a convenient and rapid method to purify total RNA from small amounts of soil samples. All types of soil samples can be processed with this kit, including common soil samples and difficult soil samples with high humic acid content such as compost and manure. The kit removes all traces of humic acid using the provided Bead Tubes and a combination of chemical and physical homogenization and lysis. A simple and rapid spin column procedure is then used to further purify the RNA. The kit purifies all sizes of RNA, from large mRNA and ribosomal RNA down to microRNA and small interfering RNA. The protocol does not rely on the use of phenol or chloroform, thereby providing a user friendly procedure and allowing high-throughput analysis on the lab bench. The purified RNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR and reverse transcription PCR for gene expression analysis.

Purification is based on spin column chromatography using Norgen's proprietary resin as the separation matrix. The purified RNA is of the highest integrity, and can be used in a number of downstream applications.

Soil RNA Purification Kit Contents

1. Lysis Buffer I
2. Binding Buffer E
3. Solution BX
4. Wash Solution A
5. Elution Solution A
6. Bead Tubes
7. Spin Columns
8. Humic Acid Removal Columns
9. Collection Tubes
10. Elution tubes (1.7 mL)
11. Product Insert

Procedure:



Soil RNA Purification Kit

Cat. # 27750

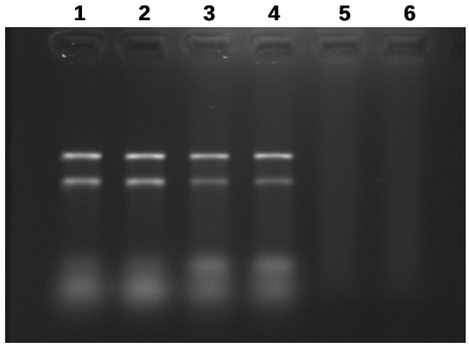


Figure 1. Isolate Total RNA from Bacteria in Soil. *Pseudomonas fluorescens* was spiked into 250 mg samples of autoclaved soil and total RNA was isolated using Norgen's Soil Total RNA Isolation Kit. RNA was visualized by running 7.5 µL of each 75 µL elution on a 1.2% agarose-formaldehyde RNA gel. Total RNA (large and small) of *Pseudomonas fluorescens* was recovered from the autoclaved spiked soil without any significant degradation, indicating that RNA can be purified from the microorganisms in the soil with high integrity. Lanes 1 and 2 contain total RNA from *Pseudomonas fluorescens*, Lanes 3 and 4 contain total RNA purified from the autoclaved soil spiked with *Pseudomonas fluorescens*, Lanes 5 and 6 contain RNA purified from the autoclaved soil (no RNA was found).

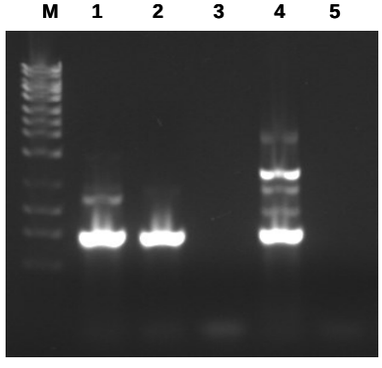


Figure 2. High Quality RNA Free from PCR Inhibitors. *Pseudomonas fluorescens* was spiked into 250 mg samples of autoclaved soil and total RNA was isolated using Norgen's Soil Total RNA Isolation Kit. One microliter of each elution was then used as the template in a 20 µL RT-PCR reaction to detect the 16s rRNA. Lane 1 contains the results when total RNA from *Pseudomonas fluorescens* was used as the input, Lane 2 is the results when total RNA from the autoclaved soil spiked with *Pseudomonas fluorescens*, was used as the input, Lane 3 is the results when RNA purified from non-spiked autoclaved soil was the input, Lane 4 is a positive control and Lane 5 is the Negative control. Therefore the purified RNA was of a high quality and can be used in sensitive downstream applications.

Features and Benefits

- **Isolate a diversity of RNA species** - All RNA species can be isolated, from large mRNA and ribosomal RNA down to microRNA (miRNA) and small interfering RNA (siRNA).
- **Process all types of soil** - All types of soil samples can be processed with this kit, including common soil samples and difficult soil samples with high humic acid content such as compost and manure.
- **Remove all humic acid from RNA samples** - The kit removes all traces of humic acid using the provided Bead Tubes and a combination of chemical and physical homogenization and lysis. Remove all brown colour from the samples.
- **Fast and easy processing** - Rapid spin column format allows for the isolation of RNA in under 30 minutes.
- **Isolate high quality total RNA** - The purified RNA is free from all inhibitors including humic acid, and can be used directly in a number of downstream applications including real time PCR and reverse transcription PCR for gene expression analysis.

Feature	Specifications
Suggested Soil Input	500 mg
Maximum Column Loading Volume	650 µL
Type of Soil Processed	All types, including common soil, compost, and manure
Time to Complete 10 Purifications	30 minutes

Ordering information

Cat #	Quantity
27750	50 preps

TruScript Reverse Transcriptase Kits

Available in three different formats:

TruScript Reverse Transcriptase Kit (Cat.#54440)
TruScript First Strand cDNA Synthesis Kit (Cat.#54420)
TruScript First Strand cDNA Synthesis Kit for mRNA (Cat.#54400)

Visit our website for more information.
www.norgenbiotek.com

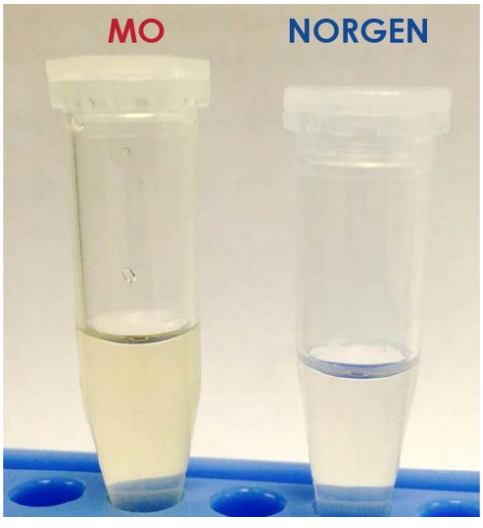
All-in-One, Ready-to-use First Strand cDNA Synthesis Kits

NORGEN BIOTEK CORP.

B. DNA Sample Preparation

Plant and Environmental DNA Isolation and Purification

Kit	Cat. #	Kit size
Fungi/Yeast Genomic DNA Isolation Kit	27300	50 samples
Phage DNA Isolation Kit	46800, 46850	50, 100 preps
Plant/Fungi DNA Isolation Kit (Spin Columns and 96-Well Plates)	26200, 26900	50 preps, 2 x 96 well plates
Soil DNA Isolation Kit	26500	50 preps
Soil DNA Isolation 96-well Kit	26560	2 x 96 well plates



Superior Removal of Humic Acid Versus Competitor Kit

Plant and Environmental Samples

Fungi/Yeast Genomic DNA Isolation Kit

Cat. # 27300

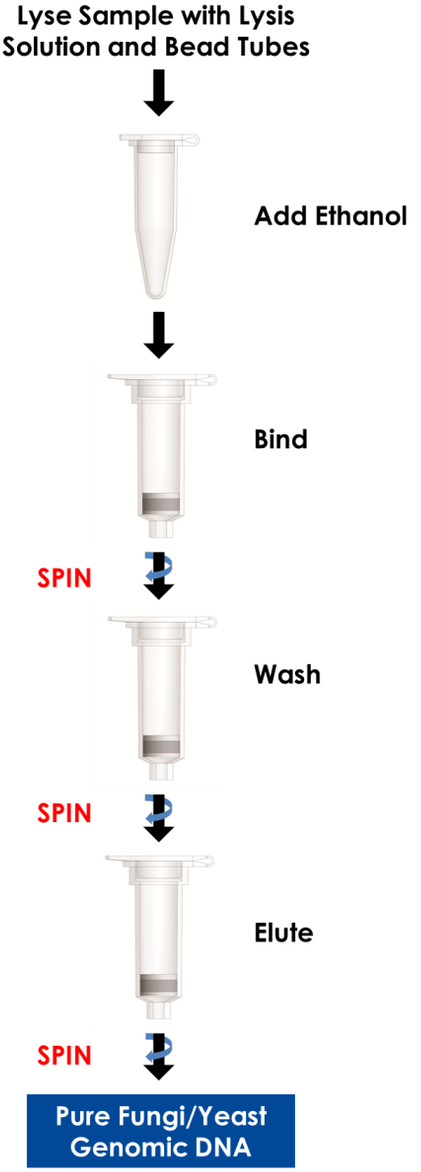
For the rapid purification of DNA from yeast cells and fungal spores or mycelium

Product Description

Norgen's Fungi/Yeast Genomic DNA Isolation Kit is designed for the rapid preparation of genomic DNA from viable yeast cells, fungal spores or mycelium and Gram-positive bacteria. Genomic DNA is efficiently extracted from the cells by a combination of heat treatment, detergents and the use of provided Bead Tubes. Purification is based on spin column chromatography. The purified genomic DNA is fully digestible with all restriction enzymes tested, and is completely compatible with downstream applications such as PCR, Restriction Fragment Length Polymorphism (RFLP) and Amplified Fragment Length Polymorphism (AFLP). Typical yields of genomic DNA will vary depending on the cell density of the yeast or fungal culture and species. The option of an additional lyticase treatment is also provided in order to allow for improved DNA yields for certain fungal and yeast species.

The purified genomic DNA is fully digestible with all restriction enzymes tested, and is completely compatible with downstream applications such as PCR, Restriction Fragment Length Polymorphism (RFLP) and Amplified Fragment Length Polymorphism (AFLP).

Procedure:



Fungi/Yeast Genomic DNA Isolation Kit Contents

1. Lysis Buffer L
2. Resuspension Solution A
3. Solution BX
4. Wash Solution A
5. Elution Buffer B
6. Bead Tubes
7. Spin Columns
8. Collection Tubes
9. Elution tubes (1.7 mL)
10. Product Insert

Fungi/Yeast Genomic DNA Isolation Kit

Cat. # 27300

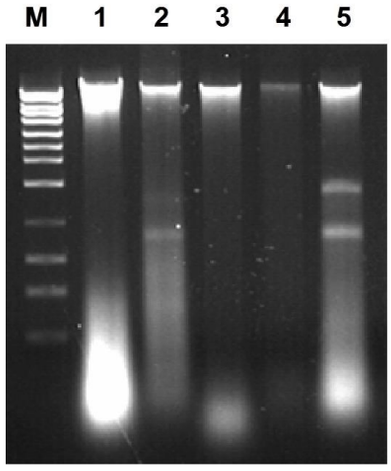


Figure 1. Isolate DNA from a Wide Range of Samples. DNA was isolated from 50 mg (wet weight) samples of *Pichia sp.* (Lane 1), *Aspergillus niger* (Lane 2), *Cladosporium cladasporioides* (Lane 3), *Botrytis cinerea* (Lane 4) and *Mucor racemosus* (Lane 5) using Norgen's Fungi/Yeast Genomic DNA Isolation Kit, and 5 µL aliquots were run on a 1X TAE 1% agarose gel. As it can be seen, high quality DNA was isolated in all cases. The M Lane contains Norgen's HighRanger 1kb DNA Ladder.

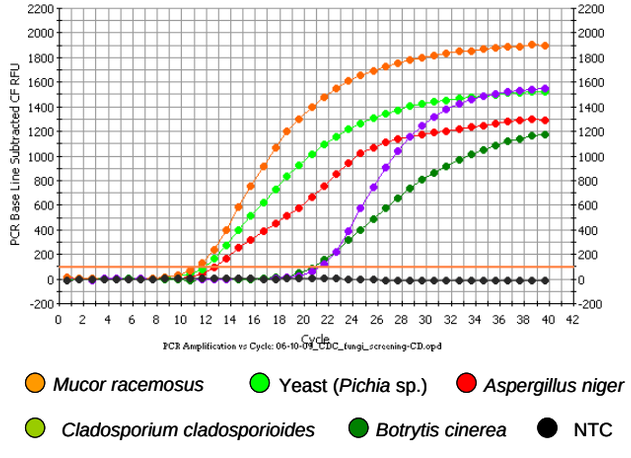


Figure 2. Purified DNA Can be Amplified in a qPCR Reaction. DNA was isolated from 50 mg samples of *Pichia sp.*, *Aspergillus niger*, *Cladosporium cladasporioides*, *Botrytis cinerea* and *Mucor racemosus* using Norgen's Fungi/Yeast Genomic DNA Isolation Kit, and 2 µL of the DNA was used in a qPCR (SYBR Green) reaction with specific fungal and yeast primers. The qPCR was successful in amplifying and detecting all the yeast and fungal DNA, indicating that the DNA is of a high quality and can be used in sensitive downstream applications.

Features and Benefits

- **Isolate DNA from a wide range of samples** - Genomic DNA can be isolated from viable yeast cells, fungal spores or mycelium and Gram-positive bacteria.
- **No phenol :chloroform extractions** - DNA is isolated without the use of harmful chemicals such as phenol or chloroform.
- **Rapid and simple processing** - Rapid spin-column format allows for the processing of multiple samples in 45 minutes.
- **Isolate high quality DNA** - Purified DNA is of the highest quality and can be used in a number of downstream applications including PCR, Restriction Fragment Length Polymorphism (RFLP) and Amplified Fragment Length Polymorphism (AFLP).

Feature	Specifications
Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Time to Complete 10 Purifications	45 minutes
Maximum Amount of Starting Material:	
Fungi (wet weight)	50 mg
Yeast or Bacteria Culture	1 x 10^8 cfu's (~0.5 - 1 mL)
Average Yield*	
Pichia sp. (yeast)	25 µg
Botrytis cinerea	32 µg
Fusarium sp.	42 µg
Aspergillis niger	26 µg
Penicillium sp.	40 µg
Alternaria tenuissima	30 µg

Ordering information

Cat #	Quantity
27300	50 preps

Plant and Environmental Samples

Phage DNA Isolation Kit

Cat. # 46800 & 46850

For the rapid purification of DNA from yeast cells and fungal spores or mycelium

Product Description

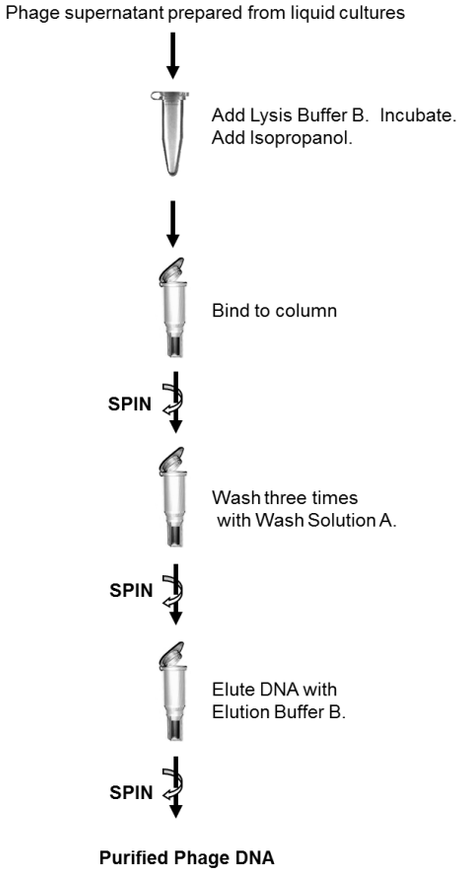
Norgen's Phage DNA Isolation Kit provides a rapid method for the isolation and purification of total DNA from bacteriophages propagated in bacteria grown in liquid cultures. The DNA is isolated without the use of phenol, chloroform or cesium chloride. The spin-column based procedure is rapid, and can be completed in less than 45 minutes. The kit is highly efficient for processing small volumes of phage supernatant (1 mL). The purified DNA is of the highest integrity, and can be used in a number of downstream applications including Southern Blot, Restriction Fragment Length Polymorphism (RFLP), sequencing, cloning and real time PCR.

Purification is based on spin column chromatography. The phage DNA is preferentially purified from other cellular components such as proteins without the use of phenol, chloroform or cesium chloride. Norgen's spin column binds nucleic acids in a manner that depends on ionic concentrations, thus only the DNA will bind to the column while most of the RNA and proteins are removed in the flowthrough. The bound DNA is then washed with the provided Wash Solution A in order to remove any remaining impurities, and the purified total DNA is eluted with the Elution Buffer B. The purified total phage DNA is of the highest integrity, and can be used in a number of downstream applications.

Phage DNA Isolation Kit Contents

1. Lysis Buffer B
2. Wash Solution A
3. Elution Buffer B
4. Spin Columns inserted into Collection Tubes
5. Elution tubes (1.7 mL)
6. Product Insert

Procedure:



Phage DNA Isolation Kit

Cat. # 46800 & 46850

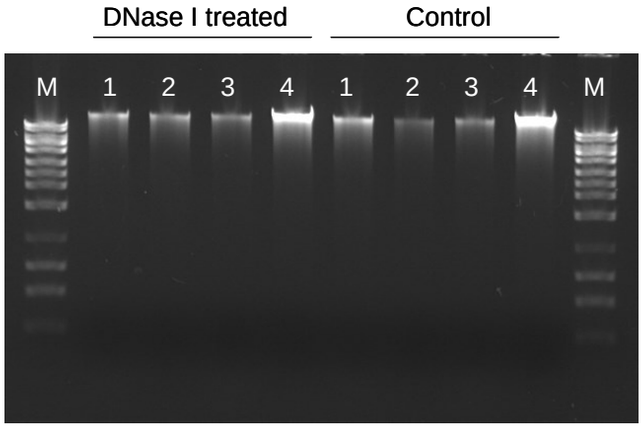


Figure 1. Effective Host Genomic DNA Removal without Reducing Phage DNA Yield. Total DNA was isolated from four enriched phage cultures using Norgen's Phage DNA Isolation Kit. A DNase I pre-treatment was performed prior to performing the isolation procedure. As a control, DNA was isolated from aliquots of the same 4 cultures using Norgen's Phage DNA Isolation Kit without performing the DNase I treatment. For DNA analysis 10 µL of each 50 µL elution was loaded onto a 1X TAE agarose gel. As it can be seen, the phage DNA was safely protected from the DNase I treatment by its coat protein, while the host genomic DNA was efficiently degraded by the DNase I. Thus the DNase I pre-treatment resulted in less host gDNA contamination in the final phage elution without influencing the total phage DNA yield. Lane M is Norgen's Highranger 1 kb DNA Ladder (Cat. 11900)

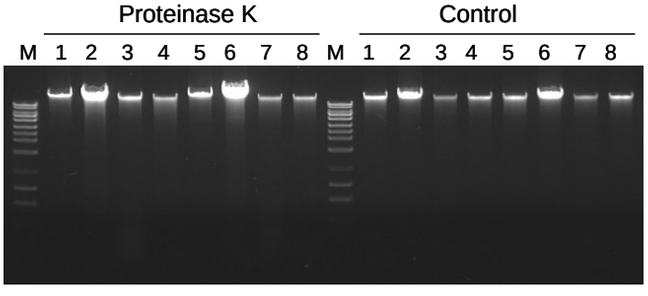


Figure 2. Optional Proteinase K Treatment Improves DNA Yield for Certain Phage Strains. Total DNA was isolated with and without the optional Proteinase K treatment using Norgen's Phage DNA isolation kit. For DNA analysis 10 µL of each 50 µL elution was loaded onto a 1X TAE agarose gel and the yield of DNA was compared from the eight different phage types (lane 1 to 8). As it can be seen, the optional treatment of Proteinase K improved the phage DNA yield in Lanes 2, 5 and 6 dramatically. Lane M is Norgen's Highranger 1 kb DNA Ladder (Cat. 11900)

Features and Benefits

- **Fast and easy processing** - Rapid spin-column format allows for the processing of multiple samples in 45 minutes.
- **No phenol extraction or cesium chloride banding** - Isolate total phage DNA with a simple spin-column format; no phenol extraction or cesium chloride banding required.
- **Versatile procedure** - Isolate total phage DNA from a variety of phage strains.
- **High yield of total DNA -** Isolate 3-15 µg of DNA from 106-1010 pfu/ mL of enriched phages.
- **Recovered DNA is suitable for downstream applications** - Purified total DNA is compatible with Southern Blot, Restriction Fragment Length Polymorphism (RFLP), sequencing, cloning and real time PCR.

Feature	Specifications
Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Time to Complete 10 Purifications	45 minutes
Maximum Amount of Starting Material:	1×10^{10} pfu/mL enriched phages
Size of DNA Purified	All sizes
Average Yield*	3-15 µg DNA from 10^{6}-10^{10} pfu/ mL of enriched phages

* Average yield will vary depending upon a number of factors including type of phage, growth conditions used and developmental stage.

Ordering information

Cat #	Quantity
46800	50 preps
46850	100 preps

Plant and Environmental Samples

Plant/Fungi DNA Isolation Kit

Cat. # 26200 & 26900

For rapid isolation of total DNA from plants and fungi

Product Description

Norgen's Plant/Fungi DNA Isolation Kit provides a rapid method for the isolation and purification of total DNA from a wide range of plant and fungi species. Furthermore, the kit also provides a convenient method for the detection of pathogens which may be infecting a plant, as it allows for the purification of any pathogen DNA along with the purification of the total DNA. Total DNA can be purified from fresh or frozen plant tissues, plant cells or fungi samples using this kit. The DNA is preferentially purified from other cellular components, such as proteins, without the use of phenol or chloroform. The purified DNA is of the highest integrity, and can be used in a number of downstream applications including real time PCR, Southern blotting, SNP analysis and sequencing.

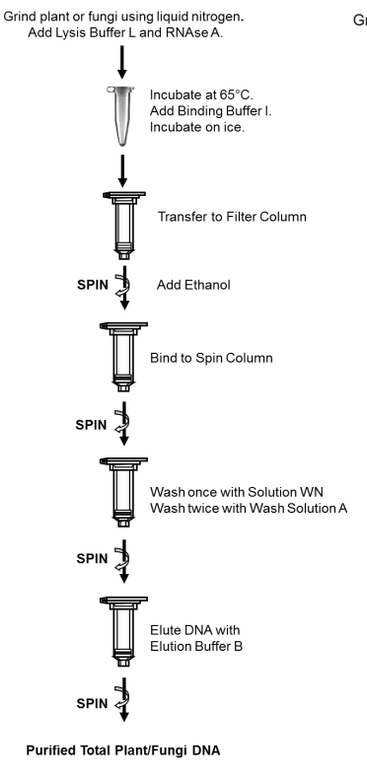
This kit is also available in a 96-well format for high-throughput plant/fungi DNA purification. Purification with the 96-well plates can be performed using either a vacuum manifold or centrifugation.

Plant/Fungi DNA Isolation Kit Contents - Spin Columns

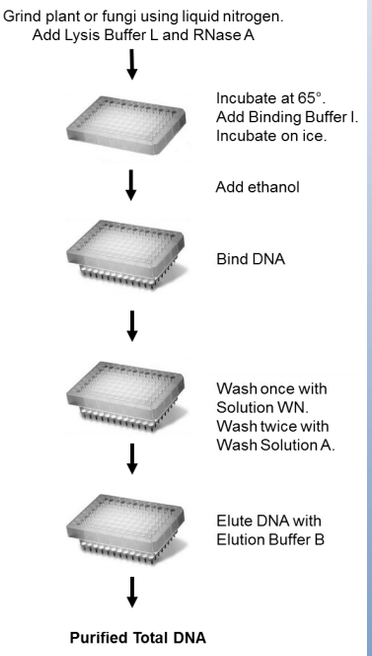
1. Lysis Buffer L
2. Binding Buffer I
3. Solution WN
4. Wash Solution A
5. Elution Buffer B
6. RNAse A
7. Filter Columns
8. Spin Columns
9. Collection Tubes
10. Elution tubes (1.7 mL)
11. Product Insert

Procedure:

Spin Column Format:



96-Well Format:



Plant/Fungi DNA Isolation Kit

Cat. # 26200 & 26900

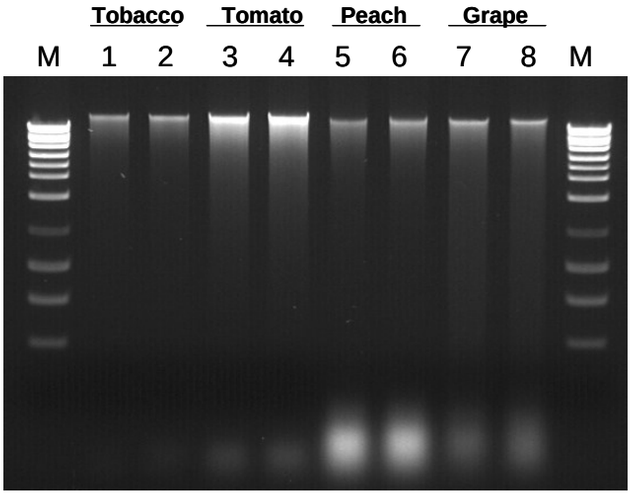


Figure 1. Isolate DNA from a Wide Range of Plants. DNA was isolated from 50 mg samples of tobacco leaves (Lanes 1 and 2), tomato leaves (Lanes 3 and 4), peach leaves (Lanes 5 and 6) and grape leaves (Lanes 7 and 8) using Norgen's Plant/Fungi DNA Isolation Kit, and 5 µL aliquots were run on a 1X TAE 1% agarose gel. As it can be seen, high quality DNA was isolated in all cases. High quality DNA isolated in all cases. The M Lanes contain Norgen's HighRanger 1kb DNA Ladder.

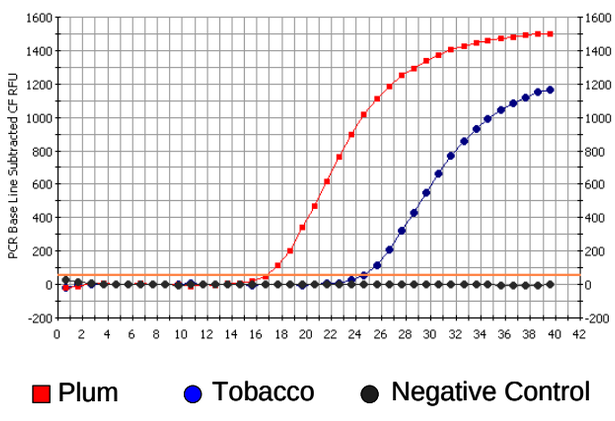


Figure 2. Purified DNA Can be Amplified in a qPCR Reaction. DNA was isolated from 50 mg samples of plum and tobacco leaves using Norgen's Plant/Fungi DNA Isolation Kit, and 2 µL of the DNA was used in a qPCR reaction with 18 srDNA primers. The qPCR was successful in amplifying both the plum and tobacco DNA, indicating that the DNA is of a high quality and can be used in sensitive downstream applications.

Features and Benefits

- No liquid nitrogen required for homogenization - Liquid nitrogen is not required for homogenization of samples, making DNA purification rapid and convenient.
- Isolate total DNA, including viral DNA Purified - DNA samples can be used for the detection of viral pathogens, as viral DNA is isolated with the plant/ fungi DNA.
- Rapid and simple processing - Rapid spin-column format allows for the processing of multiple samples in 45 minutes, while the 96-well plates can be processed in 30 minutes using either a vacuum manifold or centrifuge format.
- High yield of DNA - High yields of purified DNA can be isolated with this kit.
- No phenol :chloroform extractions - DNA is isolated without the use of harmful chemicals such as phenol or chloroform. The DNA is of the highest quality and can be used in a number of downstream applications.

Feature	Specifications
Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Maximum Amount of Starting Material:	
Plant Tissues	50 mg
Plant Cells	1 x 10^6 cells
Fungi (wet weight)	50 mg
Time to Complete 10 Purifications	45 minutes
Average Yield*	
Tomato Leaves (50 mg)	18 µg
Grape Leaves (50 mg)	10 µg
B. cinerea (50 mg wet weight)	1.5 µg
A. niger. (50 mg wet weight)	4 µg

Ordering information

Cat #	Quantity
26200	50 preps
26900	2 x 96 wells

Plant and Environmental Samples

Soil DNA Isolation Kit

Cat. # 26500

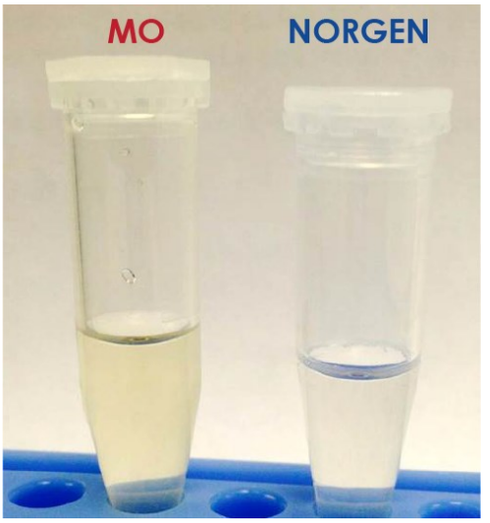


Figure 1. Superior Removal of Humic Acid Versus Competitor Kit (MO). Samples of clay (250 mg) were processed using Norgen's Soil DNA Isolation Kit and a competitor's kit (MO). As can be seen, Norgen's kit successfully removed more humic acid than the competitor, as evidenced by the removal of the brown colour in Norgen's lysed sample. Humic acids in soil are known PCR inhibitors and inhibit a number of downstream applications.

For the rapid preparation of inhibitor-free DNA from all types of soil, including difficult samples with high humic acid content

Product Description

Norgen's Soil DNA Isolation Kit provides a convenient and rapid method for the detection of microorganisms from soil samples. All types of soil samples can be processed with this kit, including common soil samples and difficult soil samples with high humic acid content such as compost and manure. The kit removes all traces of humic acid using the provided Humic Acid Removal Column and the OSR (Organic Substance Removal) Solution. A simple and rapid spin column procedure is then used to further purify the DNA. Total genomic DNA can be isolated and purified from all the various microorganisms found in soil, such as bacteria, fungi and algae. The purified DNA is of the highest quality and is fully compatible with downstream PCR applications, as all humic acid substances and PCR inhibitors are removed during the isolation.

This kit is also available in a 96-well format for high-throughput soil DNA purification. Purification with the 96-well plates can be performed using either a vacuum manifold or centrifugation.

Soil DNA Isolation Kit Contents

1. Lysis Buffer G
2. Lysis Additive A
3. Binding Buffer I
4. OSR Solution
5. Buffer SK
6. Wash Solution A
7. Elution Buffer B
8. Bead Tubes
9. Humic Acid Removal Columns
10. Spin Columns
11. Collection Tubes
12. Elution tubes (1.7 mL)
13. Product Insert

Soil DNA Isolation Kit

Cat. # 26500

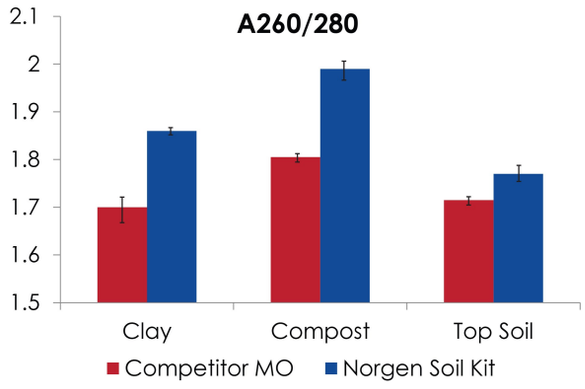


Figure 2. High Purity of DNA Samples Isolated from Clay. DNA was isolated from 250 mg samples of clay using Norgen's Soil DNA isolation Kit and a competitor's kit (MO). DNA purity was determined using NanoDrop for the DNA isolated using Norgen's kit (260/280 = Blue sky) and the competitor's kit (MO) (260/280 = Brown).

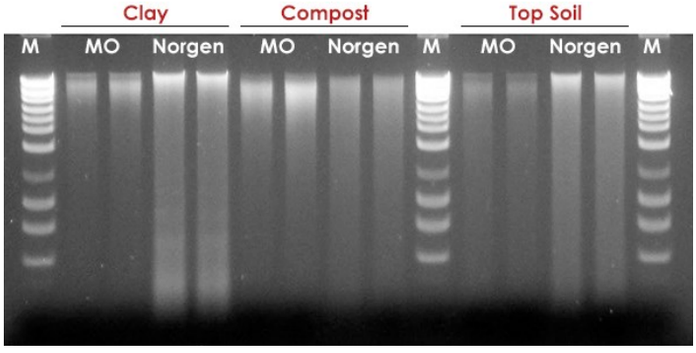


Figure 3. High Yields of Genomic DNA. DNA was isolated from 250 mg of clay, compost and top soil using Norgen's kit and a competitor's kit (MO). Following isolation, 10 µL from each 100 µL elution was loaded on 1% TAE agarose gel. Lane M: Norgen's HighRanger 1kb DNA Ladder.

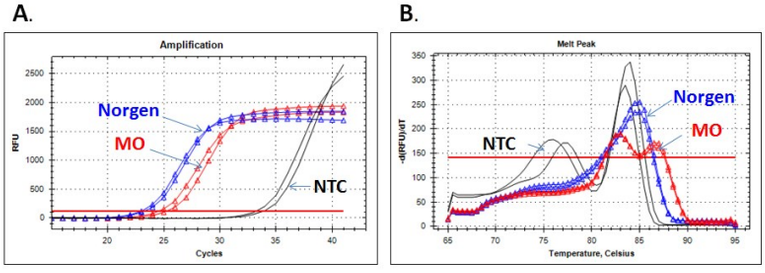


Figure 4. High Quality DNA free from PCR Inhibitors - Superior Quality Versus a Competitor Kit (MO). Total DNA was isolated from 250 mg samples of compost using Norgen's Soil DNA Isolation Kit and a competitors kit (MO). 4 µL was then used as the template in 20 µL PCR reactions using universal prokaryotic 16s rDNA primers in real-time PCR (SYBR Green). Norgen's DNA was successfully amplified, indicating the high quality of the inhibitor-free DNA (A), whereas competitor-isolated DNA showed an unspecific PCR amplification as indicated in the melting curve analysis (B). Recombinant Taq polymerase used showed detection of E.coli DNA as a background from No template control (NTC).

Features and Benefits

- **Process all types of soil** - All types of soil samples can be processed with this kit, including common soil samples such as clay, loam and sandy soil as well as difficult soil samples with high humic acid content such as compost and manure.
- **Remove all humic acid from DNA samples** - The kit removes all traces of humic acid using the provided Humic Acid Removal Columns and the OSR Solution
- **Rapid detection of microorganisms in soil samples** - Isolate total DNA from all microorganisms found in soil, including bacteria, fungi and algae.
- **Fast and easy processing** - Rapid spin column format allows for the isolation of DNA in under 30 minutes.
- **Isolate high quality total DNA** - The purified DNA is free from all inhibitors including humic acid, and ca be used directly in downstream applications including PCR.

Feature	Specifications
Maximum Soil Input	250 mg
Type of Soil Processed	All soil types
Maximum Column Binding Capacity	50 µg
Maximum Column Loading Volume	650 µL
Time to Complete 10 Purifications	30 minutes

Ordering information

Cat #	Quantity
26500	50 preps

Plant and Environmental Samples

Soil DNA Isolation 96-well Kit

Cat. # 26560

For the rapid preparation of inhibitor-free DNA from all types of soil, including difficult samples with high humic acid content

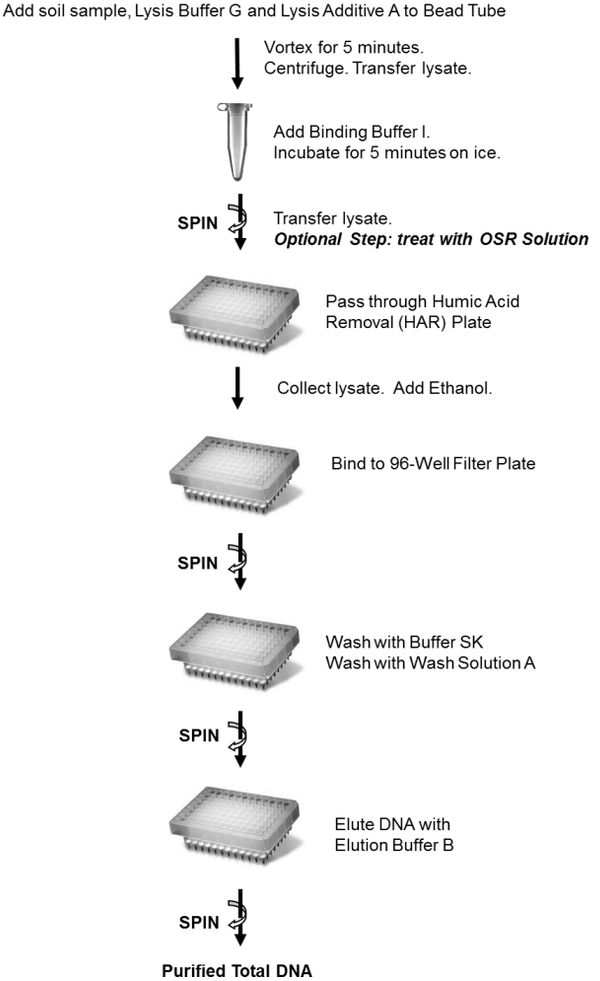
Product Description

Norgen's Soil DNA Isolation 96-Well Kit provides a fast, reliable and simple procedure for high throughput isolation of DNA from all types of soil samples including common soil samples and difficult soil samples with high humic acid content such as compost and manure. The kit removes all traces of humic acid using the provided Organic substance removal (OSR) solution, Humic Acid Removal column (HAR) and a combination of chemical and physical homogenization and lysis Total genomic DNA can be isolated and purified from all the various microorganisms found in soil, such as bacteria, fungi and algae. The purified DNA is of the highest quality and is fully compatible with downstream PCR applications for any metagenomic study, as all humic acid substances and PCR inhibitors are removed during the isolation.

Soil DNA Isolation Kit Contents

1. Bead Tubes
2. Lysis Buffer G
3. Lysis Additive A
4. Binding Buffer I
5. OSR Solution
6. Buffer SK
7. Wash Solution A
8. Elution Buffer B
9. HAR Plate
10. 96-Well Filter Plate
11. 96-Well Collection Plate
12. Adhesive Tape
13. 96-Well Elution Plate
14. Product Insert

Procedure:



Soil DNA Isolation 96-well Kit

Cat. # 26560

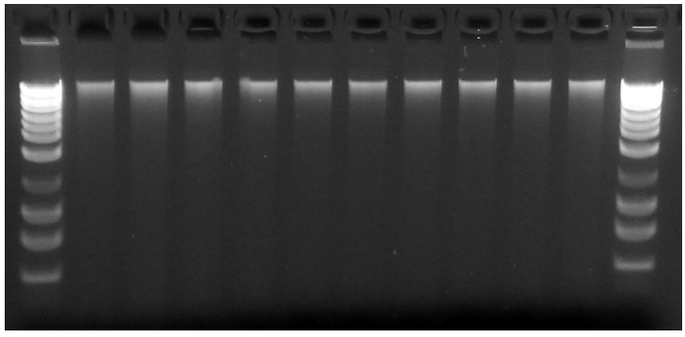


Figure 1. Consistent Yield of High Quality of Soil DNA Isolation. Total soil DNA was isolated from gardening top soil samples using Norgen's Soil DNA Isolation 96-Well Kit. 10 µL from each 100 µL elution isolated from 10 different wells was run on a 1.2% TAE agarose gel. Lane M is Norgen's High Ranger DNA ladder.

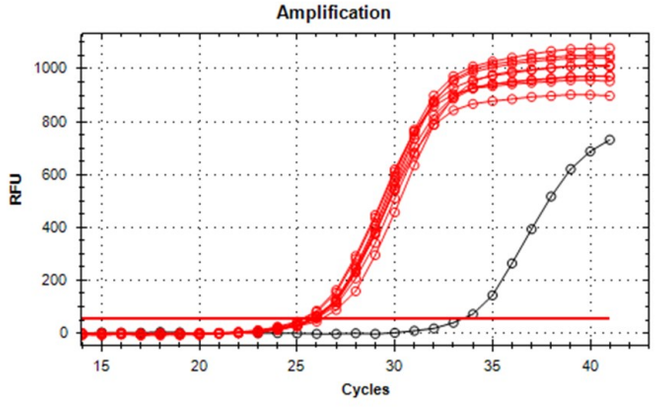


Figure 2. Consistent Yield and Quality of DNA. Total DNA was isolated from gardening top soils using Norgen's Soil DNA Isolation 96-Well Kit. Three µL of DNA from each 100 µL elution was used as the template in a real-time PCR reaction (SYBR Green) for the detection of the 16s rDNA. All the DNA templates from different wells showed a consistent Ct, indicating the consistent high DNA quality and yield of soil DNA. Black circle: NTC.

Features and Benefits

- **Versatile procedure** - 96-well plates can be processed using either centrifugation or a vacuum manifold.
- **Process all types of soil** - All types of soil samples can be processed with this kit, including common soil samples and difficult soil samples with high humic acid content such as compost and manure.
- **Effective removal of all humic acid from DNA samples** - The kit removes all traces of humic acid using the provided Organic Substance Removal (OSR) solution and Humic Acid removal (HAR) plate.
- **High DNA quality for Metagenomic studies in soil samples** - Inhibition free high quality of DNA supports sensitive downstream applications to identify the diversity of all microorganisms found in soil, including bacteria, fungi and algae.
- **Fast and easy processing** - Rapid 96-well format allows for the high throughput isolation of DNA

Feature	Specifications
Binding Capacity Per Well	50 µg
Maximum Loading Volume Per Well	500 µL
Size of DNA Purified	All sizes
Maximum Amount of Starting Material	250 mg
Time to Complete 96 Purifications	50 minutes

Ordering information

Cat #	Quantity
26560	2 x 96 wells

Commitment to Quality

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