

A Novel Technology to Extract Nucleic Acids from Different Environmental Samples including Plants, Water and Soil

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Abstract

Preparation of high quality nucleic acids from environmental samples is critical to allow for the use of the purified DNA and RNA in downstream research and diagnostic applications. However, preparation of RNA and DNA from environmental samples is a challenging process due to tedious and time consuming procedures which often involve the use of hazardous phenol or chloroform. Furthermore, environmental samples often contain high levels of natural inhibitors (including plant phenolic compounds and soil humic acids) which co-purify with the nucleic acids and interfere with sensitive downstream applications, such as real-time PCR. For example, molecular-based diagnosis of pathogenic infections requires highly pure nucleic acid samples, as poor genetic material quality may lead to misdiagnosis where infections may be missed when they are indeed present in a sample due to the presence of PCR inhibitors.

Norgen Biotek produces the leading products in Canada for the isolation and purification of genetic materials from different environmental samples such as plant, soil and water. Norgen's unique proprietary purification technology allows for the isolation of high yields of RNA and DNA that are free from inhibitors. The technology allows for the isolation of all sizes of RNA from environmental samples, including small RNA species (siRNA and miRNA), without the use of phenol or chloroform. The spin-column based procedure is rapid, and the purified nucleic acids can be used in a number of downstream research and diagnostic applications. Here, Norgen's technology is demonstrated through the isolation of high yields of total RNA from a variety of plant samples, the isolation and amplification of DNA from clay and potting soil, and the isolation of both DNA and RNA simultaneously from water samples. In all cases high yields of the nucleic acids are isolated free from any inhibitors.

PLANTS



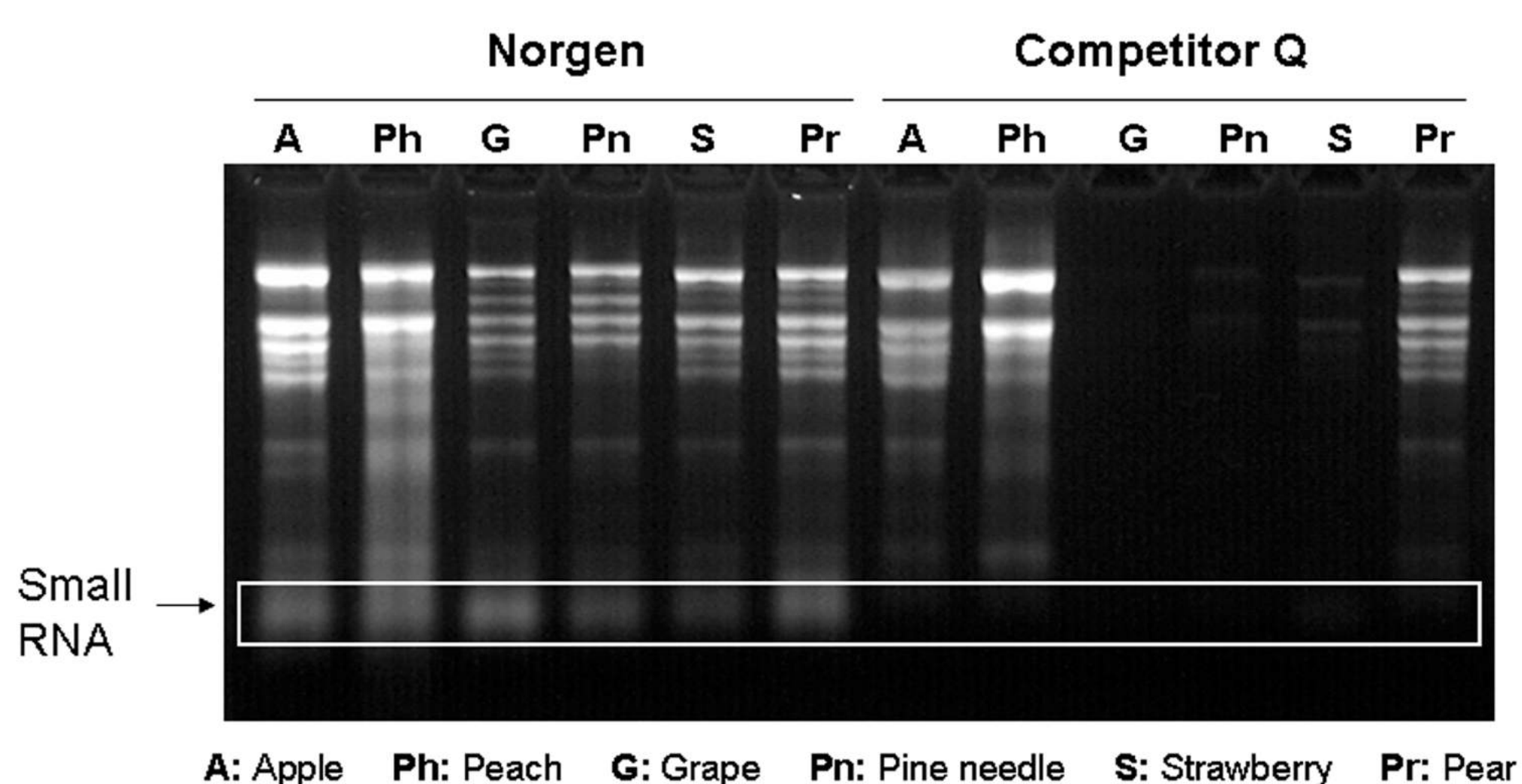
Norgen's Plant RNA/DNA Purification Kit
Norgen's Plant/Fungi DNA Isolation Kit
Norgen's Plant/Fungi Total RNA Purification Kit

Prepare plant sample



Plant RNA and/or DNA

Comparison of Total RNA Isolated from Different Plant Samples using Norgen's Kit and a Competitor

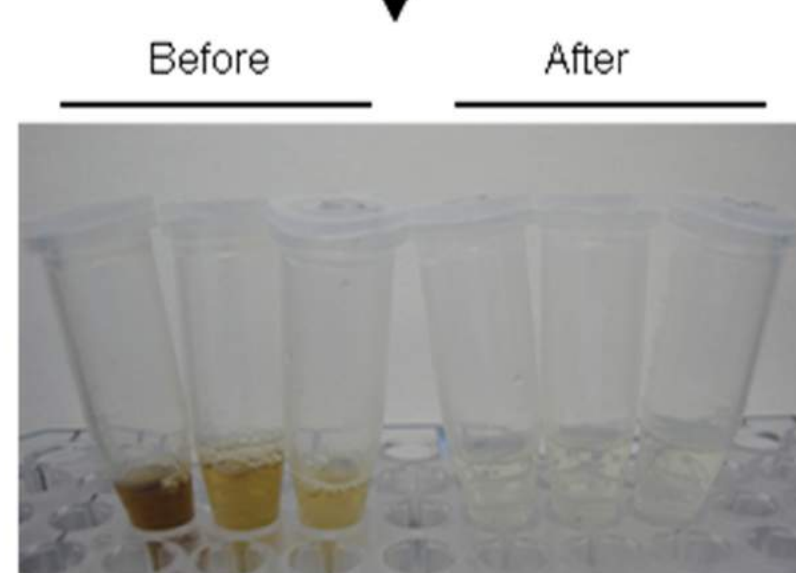


A: Apple Ph: Peach G: Grape Pn: Pine needle S: Strawberry Pr: Pear

SOIL



Norgen's Soil DNA Isolation Kit



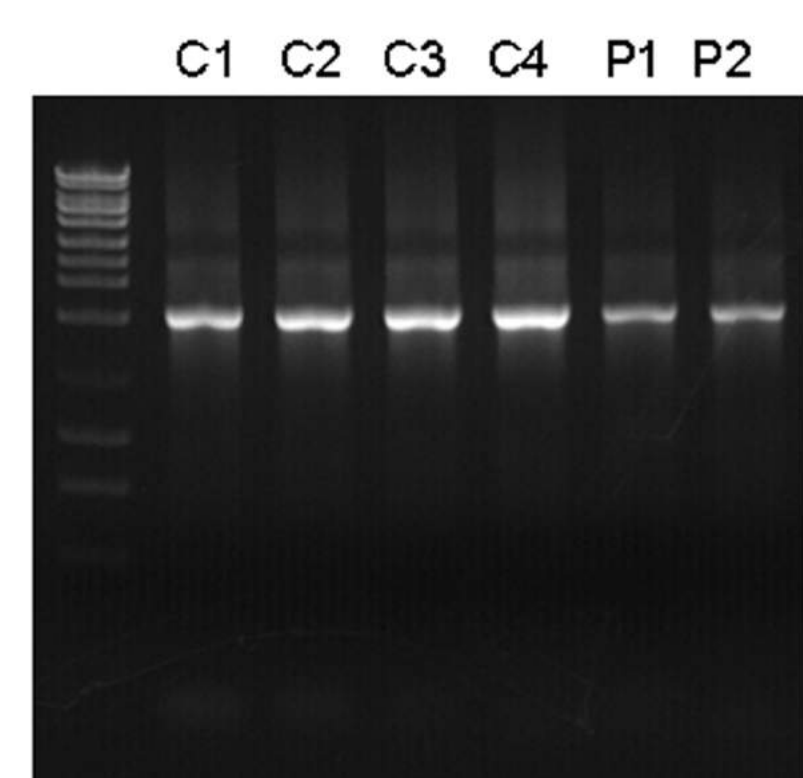
Prepare soil sample



Soil DNA

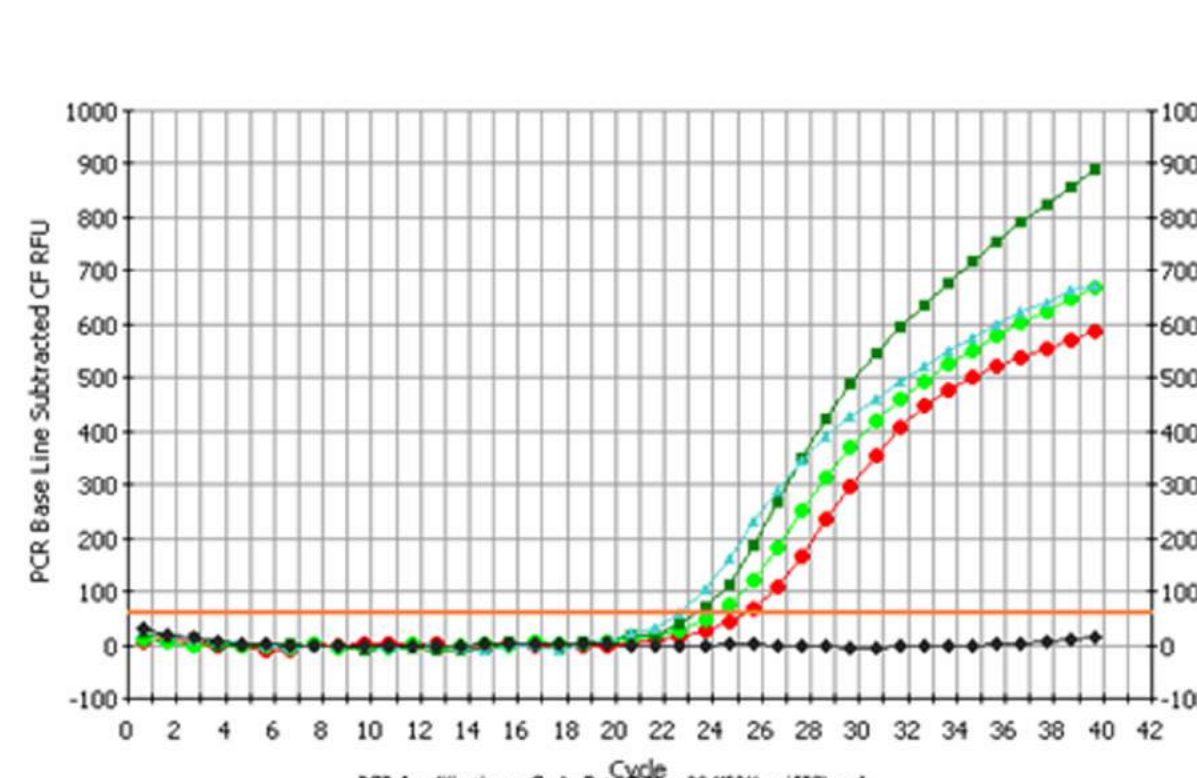
PCR Detection of Prokaryotes and Fungi from Soil DNA isolated using Norgen's Soil DNA Isolation Kit

A. Prokaryotic DNA Detection



C1 - C4: Clay P1 - P2: Potting Soil

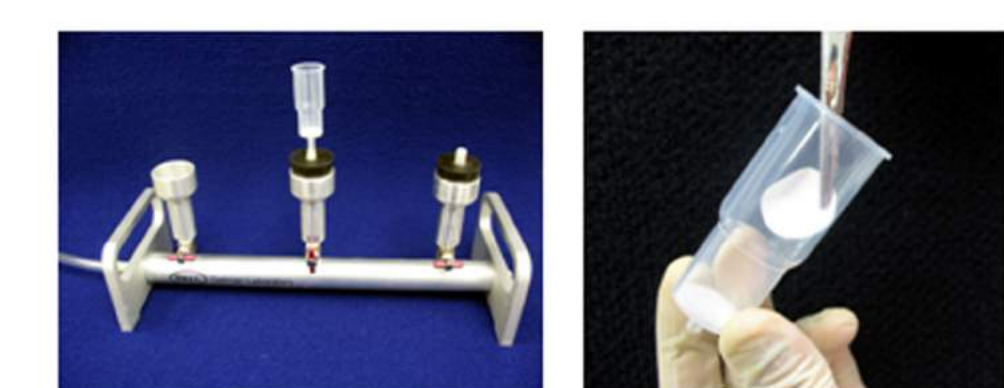
B. Fungal ITS Detection



WATER



Norgen's Water RNA/DNA Purification Kit (0.22 µM)
Norgen's Water RNA/DNA Purification Kit (0.45 µM)

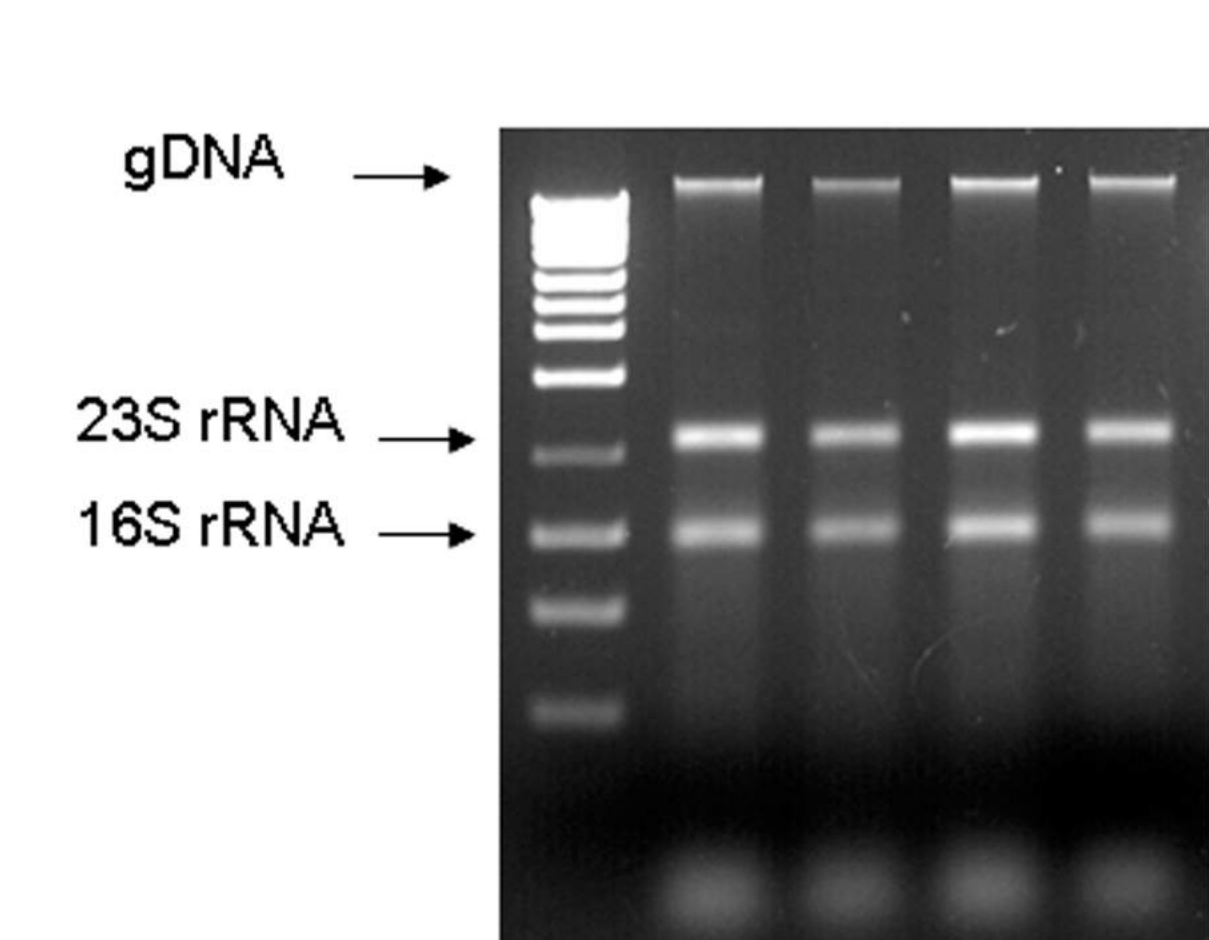


Prepare water sample



Water RNA/DNA

Simultaneous Isolation of both Total RNA and DNA from Water Samples using Norgen's Kit



Benefits:

- rapid spin column format
- isolate total RNA, including siRNA and miRNA
- no phenol or chloroform extractions
- isolate high quality RNA and DNA
- applicable to a wide range of plant and fungal species

Benefits:

- rapid method to detect microorganisms in soil, including bacteria, fungi and algae
- process all types of soil, including potting soil, clay, sandy soil and compost
- removes all humic acid from DNA samples
- rapid spin column format
- isolate high quality DNA

Benefits:

- rapid method to detect microorganisms in environmental water samples
- rapid spin column format
- no phenol or chloroform extractions
- high yields of RNA and DNA
- available in 0.22 µM and 0.45 µM format