

# Skim Milk Drastically Improves the Efficacy of DNA Extraction from Andisol, a Volcanic Ash Soil

Soil

## CASE STUDY

Takada-Hoshino, Y. ; Matsumoto, N. Skim milk drastically improves the efficacy of DNA extraction from Andisol, a volcanic ash soil. *Japan Agricultural Research Quarterly*. 2005, 39, 247- 252.

### Introduction

The challenge with extractions from soil is isolating DNA or RNA without contamination by humic acids or other PCR inhibitors. Effective, efficient sample preparation is critical for successful downstream results. DNA extraction from Andisol, a volcanic ash soil, is known to be very difficult because this soil has a complex matrix, including allophane as a clay mineral. Soil properties such as high clay content contribute to high adsorption of DNA to soil particles.

### Overview

- **Keywords:** Environmental DNA, microbial community analysis, molecular methods, unculturable microorganisms.
- **Aim of the study:** Improvement of DNA extraction from volcanic ash soil
- **Application:** PCR
- **Sample name:** Andisol
- **Sample type:** Volcanic ash soil
- **Material:** FastPrep-24™ instrument, FastDNA™ SPIN Kit for Soil, skim milk (carrier minimizing adsorption of nucleic acids to soil)

### Protocol and Parameters

1. Add the soil sample together with or without 40 mg skim milk per gram of soil to a Lysing Matrix E tube.
2. Add 978  $\mu$ L sodium phosphate buffer to the sample in the Lysing Matrix E tube.
3. Add 122  $\mu$ L MT Buffer.
4. Homogenize in a FastPrep instrument for 40 seconds at a speed setting of 6.0.
5. Centrifuge at 14,000 x g for 5-10 minutes to pellet debris.
6. Follow the FastDNA™ SPIN Kit for Soil protocol for DNA purification from the homogenate.

### Conclusion

DNA could successfully be extracted from Andisol soil samples with the FastDNA Spin Kit for Soil and the addition of 40 mg of skim milk per gram of soil sample. PCR products of the expected size were amplified from all extracts with skim milk. Resultant extracts were suitable for PCR and no other purification procedures were needed.

