APPLICATION NOTE

DNA extraction from *Cannabis sativa* using the OMNI Plant DNA Kit

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Introduction

Plant genetics has been studied for centuries dating back to Mendel and the crossbreeding of orchids to get different phenotypic flowers. As time continued, it was discovered that genes were responsible for these features. Scientists now look at the plant's DNA to discover genes for different characteristics like chlorophyll production, water absorption, seed formation, etc. As plants are a complex matrix including chlorophyll and starches, it's important to obtain pure DNA for genetic studies.

One plant in particular, hemp, has been a main focus in the market recently. Hemp, a strain of *Cannabis sativa*, is being studied not only for its industrial uses, but for its nutritional and medicinal uses too. Cannabis growing and cultivation is important for plant geneticists to look for what strains can produce different cannabinoids and terpenes to support the market.

Herein, we evaluate the Omni Plant DNA Purification kit's ability to extract DNA from *Cannabis sativa* using the Bead Ruptor 12 for homogenization of the plant sample prior to DNA purification.

Materials and Methods

- **Bead Ruptor 12 (Cat# 19-050A)**
- **OMNI Plant DNA Purification Kit w/ bead tubes (Cat# 26-023B)**

OMNI Plant DNA Kit

Bead Ruptor 12

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Sample Prep and DNA Purification

Hemp strain "Lifter" samples were obtained from North Carolina All-Natural Farms. Approximately, 30 mg samples were weighed out and placed in a bead tube containing 2.8mm ceramics. 500 uL of CTB buffer and 10 uL of 2-mercaptoethanol was added to each tube. Samples were loaded to the Bead Ruptor 12 and processed at 3.7 m/s for 20 seconds. Tubes were incubated at 65°C for 15 minutes. Procedure was continued henceforth as per manufacture's protocol. DNA was eluted in 100 uL of EB buffer. DNA concentration was determined on the NanoDrop 2000 spectrophotometer (Thermo Fisher) as seen in table one.

Approximately 300 ng of DNA and 5 µL of TBE/Urea sample buffer (Biorad) were loaded onto a 1% agarose gel. DNA was separated by electrophoresis at 140 V for about 50 minutes or until the samples travelled 3/4's of the way down the gel. The gel was stained with ethidium-bromide and then visualized on the Gel-Doc EZ system (Biorad).

Results

Herein, we evaluated the capability of the OMNI Plant DNA Purification Kit to extract genomic DNA from hemp, a challenging matrix composed of many organic small molecules. The Omni Plant DNA kit, in conjunction with the Bead Ruptor 12, was used to disassociate the plant material and purify the DNA using silica spin capture columns. Genomic DNA was quantified via spectrophotometry. The DNA yield averaged 396.5 ng/uL and 489.3 ng/uL respectively. Electrophoretic analysis showed bands of genomic DNA recovered of high quality with little DNA shearing.

Conclusion

The OMNI Plant DNA Purification Kit in conjunction with the Bead Ruptor 12 is able to extract genomic DNA from hemp. The Bead Ruptor 12 is able to process the plant material in less than 30 seconds. High quality DNA is able to be recovered with minimal shearing.

Sample	Weight	Speed	Time	DNA concentration	260/280
1	28 mg	3.7 m/s	20 sec	396.5 ng/uL	2.10
2	30 mg	3.7 m/s	20 sec	489.3 ng/uL	2.09

Table 1. Hemp Processing Parameters and Average DNA Concentrations

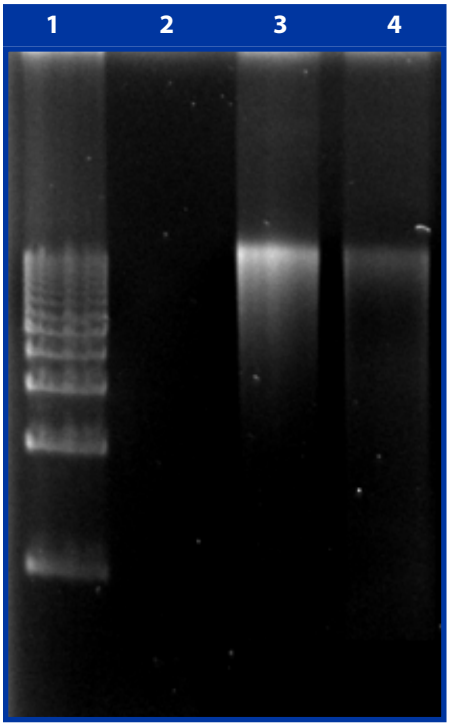

Figure 1. Electrophoresis Analysis of *C. sativa*

Lane1: Ladder, Lane3: Sample 1, Lane4: Sample 2

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