

# Mole®

## DNA extraction plant material

“ GeneMole® is a benchtop instrument for automated nucleic acid purification. Automation reduces the risk of injuries caused by repetitive pipetting, limits exposure to chemicals and infectious agents, and gives you more time to focus on other operations. GeneMole® can process 1-16 samples in one run and all the reagents required are available as pre-filled disposable MoleStrips™. ”

### Introduction

Through the selective cross-breeding of common pea plants (*Pisum sativum*) over many generations, Gregor Mendel discovered the basic underlying principles of heredity. Today, the genes involved in Mendel's discoveries can be sequenced directly from the plant DNA. Here we show that the GeneMole® instrument can be used to extract high quality DNA from different plant tissues. GeneMole® processes 1-8 samples in less than 60 minutes and 9-16 samples in less than two hours. DNA can be extracted from 20-150 mg fresh plant tissue (or 5-30 mg dry material). The extracted DNA is suitable for sensitive downstream assays such as PCR and sequencing.

### Methods

#### Homogenization

The first step in DNA extraction from plant material is homogenization, which involves breaking down and removing cell walls and membranes. Suitable homogenization methods are typically grinding with pestle and mortar in the presence of liquid nitrogen, or using bead beating. We recommend using a commercial bead mill. Plant material is effectively homogenized in 250-300 µl Mole DNA Plant lysis buffer using MoleBeads and a Precellys 24 homogenizer (Bertin technologies). After the mechanical disruption, incubate the sample at 65°C for at least 10 minutes. In order



Figure 1:  
The GeneMole® instrument can extract DNA directly from lysate of 16 plant samples.

to remove contaminating RNA, we approve an optimal RNase treatment using 0.25 µl of 100 mg/ml RNase A to 300 µl lysate. After incubation centrifuge the samples at 12,000 rpm for 1 minute.

Load MoleStrips™, tips and tubes onto the freestanding work tray according to the chosen number of samples (1-16). Add 200 µl plant lysate to the sample tubes, place the work tray into the GeneMole® and run the “DNA Plant” protocol selected from the drop-down menu on the touch screen.

### Results

Different plant tissues have different DNA content, meaning that the amount of input and the DNA yield will depend on what sort of tissue is used. Typical yield for wheat is 199 ng/µl, whereas for lettuce and parsley the yields are 41 ng/µl and 143 ng/µl respectively. More results are summarized in table 1.

Table 1: Examples of quality and amount of DNA isolated from different plant materials.

Group	Plant Material			DNA		
	Plant	Material	Amount	OD <sub>260/280</sub>	Total ug in 100 ul	PCR check <sup>1)</sup>
Vegetables	Tomato	leaf	2 leaf discs <sup>3)</sup>	2.1	2.8 <sup>2)</sup>	OK
	Pepper	leaf	2 leaf discs <sup>3)</sup>	2.1	6.7	OK
	Garden Onion	leaf base	4 leaf discs <sup>3)</sup>	1.7	4.7	OK
	Lettuce	leaf	3 leaf discs <sup>3)</sup>	1.3	4.1	OK
	Chicory	leaf	3 leaf discs <sup>3)</sup>	1.7	4.6	OK
Fruit	Pomegranate	seeds with pulp	2 seeds	1.7	2.6	OK
	Vine	red grapes	~ 200 mg	1.3	3.0	OK
Cereal	Wheat	kernels	4 kernels	1.8	19.9	OK
	Rice	leaf	2 leaf discs <sup>3)</sup>	1.7	1.0	OK
	Maize	leaf	1 leaf disc <sup>3)</sup>	1.7	1.6	OK
Oilplants	Rape	leaf	2 leaf discs <sup>3)</sup>	1.9	3.2	OK
	Sunflower	seeds	1 seeds	1.7	11.1	OK
Others	Parsley	leaf	3 leaf discs <sup>3)</sup>	1.6	14.3	OK
	Cotton	leaf	2 leaf discs <sup>3)</sup>	1.8	5.1	OK
	Common Hop	umbel	~150 mg	1.7	6.8	OK
Trees	Chestnut	bud	~140 mg	1.9	6.8	OK
	Oak	bark	~30 mg	1.4	11.9	OK
	Pine	leaf	1 needle	1.6	17.9	OK

1) PCR was performed with primer C and D according to Taberlet et al. (2007) Nucl. Acid. Res. 35: e14

2) No RNase treatment.

3) Diameter of leaf discs were 6 mm.

## Comment

We recommend using young plant samples and if possible to keep plants for about 12 hours in the dark before collecting sample in order to reduce polysaccharide content. If using dried plant samples, reduce the amount of starting material by the factor of 5 (e.g. use 10 mg dried plant leaves instead of 50 mg fresh weight). For more information visit: [www.molegenetics.com](http://www.molegenetics.com) and [www.molecookbook.com](http://www.molecookbook.com)

input material. The isolated genomic DNA is suitable for sensitive downstream applications. Compared to manual methods DNA extraction on the GeneMole® is efficient and require minimal hands-on time.

## References

Taberlet et al. (2007) Nucl. Acid. Res. 35: e14

## Conclusion

GeneMole® offers a convenient, fully automated procedure for DNA extraction from plant tissue. Output yields varies depending on the type of tissue used and the amount of

“Simplify When Possible”

## Ordering Information

Product	Content	Product Number
GeneMole®	Instrument	MG10-000-000
MoleStrips™ DNA Plant	64 Reagent Strips	MGK20-103-102
MoleStrips™ DNA Plant Convenience Kit <sup>1</sup>	32 Reagent Strips	MGK20-103-101

<sup>1</sup> The convenience kit contains 32 Reagent Strips and all the required tips, tubes and caps.