

# Twice the DNA yield in less time

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Molecular studies of plants often depend on high-quantity and high-quality DNA extractions. This can be quite difficult in plants, however, due to a diversity of compounds and physical properties found in plants. "Tannins, tough fibrous material, and/or secondary compounds can interfere with DNA isolation," explains Dr. Thomas Givnish, principal investigator of a new study published by Jackson Moeller et al. in the October issue of *Applications in Plant Sciences*.

This is further complicated by the fact that different plant groups have different compounds and, therefore, different DNA extraction methods may be necessary to obtain sufficient high-molecular-weight DNA depending on the species you are working with.

Moeller, Givnish, and their colleagues at the University of Wisconsin–Madison evaluated a new DNA isolation technique and compared it to two often-used DNA extraction methods for plant tissues. The new technique is based on MagnaCel paramagnetic cellulose particles (PMC), and was originally designed and developed for forensic applications in which only minute amounts of DNA are present.

The utility of the PMC method was compared with both a silica column technique (DNeasy Plant Mini Kit) and the cetyltrimethylammonium bromide (CTAB) method. This comparison was done across a wide range of [flowering plants](#), from lilies to sunflowers. The PMC method was found to be more efficient and, unlike the CTAB technique, does not involve the use of hazardous chemicals. Most important, DNA yield from PMC was double that of either DNeasy or CTAB.

"We were eager to explore techniques that might reduce the amount of time and labor required to obtain genomic DNA reliably from leaf samples from taxa with a very wide range of leaf chemistries," says Givnish.

Statistical analyses were conducted to test for significant differences in quality and quantity of DNA obtained between extraction techniques and the different species tested. "We feel this study provides a telling test of the efficacy of paramagnetic cellulose DNA isolation relative to other techniques. We found that Promega's MagnaCel DNA extraction kit substantially outperformed CTAB and DNeasy extractions—providing an average of twice the DNA yield across 25 plant species in 21 families and producing more consistent DNA purity based on absorbance ratios at 260 nm vs. 280 nm and 230 nm," explains Givnish. "The advantage of the MagnaCel approach is especially high at low DNA concentrations."

**More information:** Moeller, J. R., N. R. Moehn, D. M. Waller, and T. J. Givnish. 2014. Paramagnetic cellulose DNA isolation improves DNA yield and quality among diverse plant taxa. *Applications in Plant Sciences* 2(10): 1400048. [DOI: 10.3732/apps.1400048](https://doi.org/10.3732/apps.1400048)

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