

# Anticancer compound found in American mayapple

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A common weed called American mayapple may soon offer an alternative to an Asian cousin that's been harvested almost to extinction because of its anti-cancer properties. The near-extinct Asian plant, *Podophyllum emodi*, produces podophyllotoxin, a compound used in manufacturing etoposide, the active ingredient in a drug used for treating lung and testicular cancer. *Podophyllum emodi* is a cousin of the common mayapple weed found in the United States.

Podophyllotoxin is found in Indian mayapple (*Podophyllum emodii* Wall.), American mayapple (*Podophyllum peltatum* L.), and other species. Podophyllotoxin and its derivatives are used in several commercially available pharmaceutical products such as the anticancer drugs etoposide, teniposide, and etopophos, which are used in the treatment of small-cell lung cancer, lymphoblastic leukemia, testicular cancer, and [brain tumors](#). Podophyllotoxin derivatives are also used for the treatment of psoriasis and malaria, and some are being tested for the treatment of [rheumatoid arthritis](#). Currently, podophyllotoxin is produced commercially using the roots and rhizomes of Indian mayapple, an endangered species harvested from the wild in India, Pakistan, Nepal, and China.

Researchers at Mississippi State University and the University of Mississippi recently set out to identify American mayapple types with high podophyllotoxin content. Valtcho D. Zheljzakov and colleagues at Mississippi State University published the research results in *HortScience*. According to Zheljzakov; "The objective of this study was

to estimate podophyllotoxin concentration in American mayapple across its natural habitats in the eastern United States and to identify high podophyllotoxin types that could be used for further selection and cultivar development."

Mayapple has been long been grown as a cash crop in Europe and Russia, but has never been introduced or domesticated in the United States, although the idea was suggested by researchers more than 30 years ago. Previous research demonstrated that American mayapple leaves contain podophyllotoxin, making way for the development of American mayapple as a high-value crop for American growers. Zheljzakov explained that, until now, there has been no comprehensive study on the genetic resources of American mayapple colonies across the United States. "We hypothesized that there might be great variation with respect to podophyllotoxin content within American mayapple across the eastern United States."

The researchers studied the effect of location, plant nutrient concentration, and phytoavailable nutrients in soil on podophyllotoxin concentration in American mayapple across its natural habitats in the eastern United States. The study was the largest of its kind ever conducted; American mayapple leaves were collected from 37 mayapple colonies across 18 states.

This groundbreaking study confirmed that mayapple colonies in the eastern part of the United States can be used for the development of high podophyllotoxin cultivars, which could subsequently provide the base for commercial production of podophyllotoxin in the United States. The results from this study will help to develop a Geographic Information System (GIS) map of the genetic resources of American mayapple in the U.S.

[More information:](#) The complete study and abstract are available on the

ASHS Hortscience electronic journal web site:

[hortsci.ashspublications.org/c ... nt/abstract/44/2/349](http://hortsci.ashspublications.org/content/abstract/44/2/349)

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