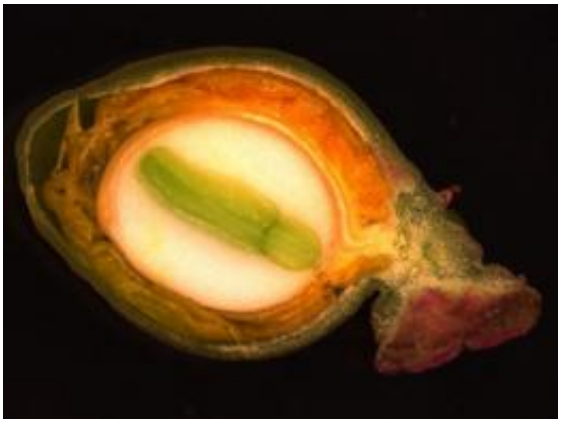
Research promises healthier vegetable oil -- and tractor fuel to harvest it

May 20 2010



Developing fruit of Euonymus alatus, or burning bush. The white seed endosperm produces novel acetyl triacylglycerols, or acTAGs, while the orange aril tissue around the seed produces normal vegetable oil. Photo courtesy of Timothy Durrett, MSU

(PhysOrg.com) -- Genetic discoveries from a shrub called the burning bush, known for its brilliant red fall foliage, could fire new advances in biofuels and low-calorie food oils, according to Michigan State University scientists.

New low-cost DNA sequencing technology applied to seeds of the species Euonymus alatus - a common ornamental planting - was crucial to identifying the gene responsible for its manufacture of a novel, high-quality oil. But despite its name, the burning bush is not a suitable oil

crop.

Yet inserted into the mustard weed - well-known to researchers as Arabidopsis and a cousin to commercial oilseed canola - the burning bush gene encodes an enzyme that produces a substantial yield of unusual compounds called acetyl glycerides, or acTAGs. Related vegetable oils are the basis of the world's oilseed industry for the food and biofuels markets, but the oil produced by the burning bush enzyme claims unique and valuable characteristics.

One is its lower viscosity, or thickness.

"The high viscosity of most plant oils prevents their direct use in diesel engines, so the oil must be converted to biodiesel," explained Timothy Durrett, an MSU plant biology research associate. "We demonstrated that acTAGs possess lower viscosity than regular plant oils. The lower viscosity acTAGs could therefore be useful as a direct-use biofuel for many diesel engines."

Improved low-temperature characteristics noted for the oil also could make it suitable for diesel fuel, he said. And acTAGs boast lower calorie content than other vegetable oils, Durrett added, "thus they could be used as a reduced-calorie food oil substitute."

With University Distinguished Professor of plant biology John Ohlrogge, visiting professor of plant biology Michael Pollard and other MSU researchers, Durrett published the findings in the May 18 issue of Proceedings of the National Academy of Sciences.

The burning bush is certainly not a rare species - the team gathered its samples from plantings around MSU's campus. The researchers now are working to improve the modified mustard weed seeds' acTAGs yield and already report purity levels of up to 80 percent.

"It should now be possible to produce acetyl glycerides in transgenic oilseed crops or single cell production systems such as algae that are the focus of much current effort in biofuels research," said Pollard, who is keen to explore the technology's commercial potential. "With the basic genetics defined and thus one major technical risk greatly reduced, the way is open to produce and assess this novel oil in food and nonfood applications."

Provided by Michigan State University

Citation: Research promises healthier vegetable oil -- and tractor fuel to harvest it (2010, May 20) retrieved 23 June 2024 from https://phys.org/news/2010-05-healthier-vegetable-oil-tractor.html