Perhaps the single most valuable gift the desert-dwelling guayule plant offers us is its superb natural latex. The white, rubber-rich substance, extracted and purified from this southwestern U.S. native shrub (*Parthenium argentatum*), is ideal for making high-quality gloves, medical devices, and other in-demand natural rubber products.

Importantly, latex from guayule (pronounced *why*-YOU-lee) is free of the proteins responsible for the sometimes-deadly latex allergies caused by the most widely used natural-rubber source, the rubber tree, *Hevea brasiliensis*.

But guayule may also prove to be an economical, environmentally friendly source of yet another prized commodity: energy. That energy can be made from the ground-up stems and branches, called “bagasse,” that are left after their latex has been removed.

“Bagasse is a soft, light-brown, sawdust-like material,” says ARS chemist Colleen M. McMahan. “Guayule bagasse would provide 8,000 to 9,000 BTUs per pound—about the same as charcoal.” She’s with the Crop Improvement and Utilization Research Unit, part of the Western Regional Research Center in Albany, California.

Now, along with ARS colleagues there and in Arizona and Pennsylvania—and industry and university coinvestigators—McMahan is probing guayule’s potential as a fuel of the future.

They’re exploring use of the bagasse as a source of ethanol, “bio-oil,” and synthetic gas, or “syn-gas.”
Guayule is under development as a domestic source of natural rubber and bioenergy. Chemist Colleen McMahan inspects 1-year-old greenhouse-grown guayule plants at ARS’s Western Regional Research Center, Albany, California.

PEGGY GREB (D1349-1)

is looking into converting guayule bagasse into bio-oil using pyrolysis—heating the bagasse in the absence of air.

“The energy content of the guayule bio-oil we tested here at Wyndmoor is more than 13,000 BTUs per pound,” says Boateng. “That’s approximately 70 percent of the BTUs in No. 6 diesel oil, the kind used primarily to heat boilers, he says.

“We’re also testing gasification, which is combustion under ‘starved oxygen,’ to make syngas,” Boateng adds. Syngas can either be burned in a turbine to generate electricity or converted into diesel fuel.

As the research continues to heat up, perhaps guayule will become tomorrow’s biofuel “queen of the desert.”—By Marcia Wood, ARS.

This research is part of Quality and Utilization of Agricultural Products, an ARS national program (#306) described on the World Wide Web at www.nps.ars.usda.gov.

Colleen M. McMahan, Maureen C. Whalen, and Kevin M. Holtman are with the USDA-ARS Western Regional Research Center, 800 Buchanan St., Albany, CA 94710; phone (510) 559-5600, fax (510) 559-5777, e-mail colleen.mcmahan@ars.usda.gov, maureen.whalen@ars.usda.gov, kevin.holtman@ars.usda.gov.

Terry A. Coffelt and Michael E. Salvucci are with the USDA-ARS Arid-Land Agricultural Research Center, 21881 N. Cardon Lane, Maricopa, AZ 85239; phone (520) 316-6359 [Coffelt], (520) 316-6355 [Salvucci], fax (520) 316-6330, e-mail terry.coffelt@ars.usda.gov, mike.salvucci@ars.usda.gov.

Akwasi A. Boateng is with the USDA-ARS Eastern Regional Research Center, 600 E. Mermaid Lane, Wyndmoor, PA 19038; phone (215) 233-6493, fax (215) 233-6406, e-mail akwasi.boateng@ars.usda.gov.