'Plastic oil' could improve fuel economy in cars, chemists say

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Recycled plastic bottles could one day be used to lubricate your car's engine, according to researchers at Chevron and the University of Kentucky, who in laboratory experiments converted waste plastic into lubricating oil. These polyethylene-derived oils, they say, could help improve fuel economy and reduce the frequency of oil changes.
The pilot study appears in the July 20 issue of the American Chemical Society's peer-reviewed journal *Energy & Fuels*. ACS is the world's largest scientific society.

"This technology potentially could have a significant environmental impact. It could make a difference in communities that want to do something positive about their waste plastic problem, especially if there is a refinery nearby that could do all of the processing steps," says the study's lead author Stephen J. Miller, Ph.D., a senior consulting scientist and Chevron Fellow at Chevron Energy Technology Company in Richmond, Calif.

Americans use about 25 million tons of plastic each year. However, only about 1 million tons of it is recycled, according to the Environmental Protection Agency. The remainder ends up in landfills.

Some researchers have tried to use recyclable plastic to produce fuels, but commercial interest in this application has been limited. Most of this plastic is polyethylene, which the Chevron and University of Kentucky researchers showed can be broken down by heat into a wax that can be converted into a high quality lubricating oil, Miller says.

Of the plastic used in the pilot study, about 60 percent was converted into a wax with the right molecular properties for further processing to make lubricating oil for uses such as motor oil or transmission fluid. These high quality oils derived from wax can assist auto manufacturers in meeting mandated fuel economy specifications, Miller says.

The process for converting wax to lubricating oil used in this pilot study was put into commercial use by Chevron in the early 1990s with waxy petroleum-derived sources. In the future, superior lubricating oils will be produced from wax derived from a catalytic process known as Fischer-Tropsch, which starts with natural gas, Miller says. This process will be used commercially overseas, primarily in the Middle East, where natural gas is less costly than in the United States. In the U.S., production of Fischer-Tropsch wax will likely be limited for a number of years.

However, this new study suggests that using wax derived from recyclable plastic can produce lubricants that are of equal quality compared to those derived from Fischer-Tropsch wax, Miller says.

Source: American Chemical Society