FUEL TO BURN

With the cost of gasoline rising and an unsure supply available from volatile areas of the world, American scientists are constantly on the lookout for new and unusual places to produce fuel additives and extenders to gasoline such as ethanol.

Most methods to make ethanol utilize biotechnology as many plants, plant refuse, plant stalks and other types of plant biomass can generally be converted into ethanol. The process involves microbial action or fermentation on the plants cellulosic material. The end result is bioethanol.

Ethanol is among the cleaner-burning alternatives to petroleum, and is credited with reducing tailpipe emissions of carbon monoxide and other pollutants when added to gasoline. So forget about putting a "Tiger in your Tank"--- how about mushrooms in your tank?

Shitake mushrooms that grow on rotting logs in the forest are a gourmet's delight. The mushroom can grow and get nutrients from the log because the Shitake contains a special enzyme that can digest wood. Scientists found and copied the mushroom gene enabling it to dissolve wood. Called Xyn11A, the gene carries the instructions the mushroom uses to make an enzyme known as xylanase. The researchers want to see if a ramped-up version of the gene could be put to work digesting rice hulls or other harvest leftovers.

If enzymes can do that quickly and efficiently in huge vats, or fermenters, at biorefineries, they could help make ethanol and other products a practical alternative to today's petroleum-based fuels said Charles C. Lee, an ARS research chemist in California

In laboratory experiments, scientists transferred the Xyn11A gene into yeast which was able to produce xylanase. In nature, the yeast normally can't do that. Next, the scientists will work on engineering the mushroom gene so that it enables yeast or some other organism to produce greater amounts of the xylanase enzyme in less time.

Maybe mushrooms are too exotic for your car. How about some field peas in your tank? Most peas grown in the northern United States and elsewhere are fed whole to animals as a rich source of protein. The remainder is sold for human consumption as split peas.

Besides protein, field peas also contain lots of starch. The farmers thought they might earn more if the crop's starch could be used to make ethanol for fuel, while still using the leftover protein as high-value feed for animals.

Nancy Nichols, microbiologist at the Agricultural Research Service, began fermenting pea starch. According to Nichols' results, fermented pea starch produced somewhat less ethanol than corn (1.7 gallons per bushel versus 2.8), because the legume has less starch to begin with. Conversely, the pea starch fermented just as easily as corn starch.

So although you may not have peas in your diet, you may end up with them in your gas tank. Either way, they are a good starchy, protein fuel.