

Fuel alcohol from biomass

Robert G. Curley

Petroleum shortages and price increases have stimulated considerable interest in the production of ethyl alcohol from biomass (plant material)—using certain agricultural crops and crop residues.

Some people view biomass alcohol as a logical solution to the nation's energy problem. Others see it as having a very limited potential. Some farmers view biomass alcohol production as a potentially important outlet for certain commodities and a means of increasing prices for those commodities.

The true potential for biomass alcohol is difficult to determine for several reasons. First of all, there are many variables in the production and use of alcohol that must be taken into account. Secondly, the economic

picture fluctuates because of inflation and rising fuel prices. A third reason is the biased evaluation and conclusions that sometimes receive widespread publicity.

It is important to keep the biomass alcohol fuel picture in perspective. The United States consumes approximately 100 billion gallons of gasoline per year. To replace 10 percent of this with ethanol from corn—10 billion gallons per year—would require approximately 50 percent of the corn acreage based on 1978 data. It is obvious that any large-scale conversion of agricultural commodities, such as grain, will involve a trade-off between feed or food production on the one hand and fuel on the other. The production of ethanol from agricultural com-

modities is a major public policy issue.

There is a need for objective scientific research and analysis on the subject and also a need to provide the public with information that is as factual and reliable as possible. In an attempt to address the latter need, Cooperative Extension and University Extension co-sponsored a January conference at the University of California, Davis, on biomass alcohol. The following articles are based on papers presented at that conference.

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Barley straw and some other crop residues may eventually offer an economical source of feedstocks for alcohol processing plants.

Harvesting crop residues for alcohol production

George E. Miller, Jr.

An estimated 7 to 15 percent of energy now used in California could come from cellulosic biomass, if fully utilized. From 20 to 35 million tons of this underutilized residue from forest and farming operations are produced annually in California; quantities from biomass farming on underutilized land would be substantially larger but are unknown at this time.

The term "cellulosic biomass" for the purpose of this discussion is defined as organic plant materials that are unused or underused by-products of crop or forest production and harvest operations, and products from biomass farming. The definition should also be extended to include certain organic waste products from animal and poultry production and forest and agricultural processing plants, such as sawmills, planing mills, feedlots, poultry production facilities, canneries, packing-houses, cotton gins, feed and grain mills, and seed refining plants.

A major economic advantage of these latter production and processing wastes is

that they are already collected at central points. Where sufficiently large quantities are available without densification or transport, these materials will undoubtedly be used first as energy values and waste disposal costs are recognized, and the necessary technology for utilization can be harnessed. It is a rare occasion, however, when on-site energy needs and the supply of cellulosic biomass are in perfect balance. The surplus or deficiency then presents some of the same problems associated with large quantities of crop and forest residues that are now underutilized or materials that might be produced under biomass farming.

In addition to the need for the energy in these crops and forest residues, they present a disposal problem. Every year 5 to 6 million tons of crop and forest residues are open-field-burned. The concern about aesthetics, effects on visibility, odors, and possible health effects on sensitive citizens makes it imperative that pollutants generated by agricultural burning be minimized wherever technologically and economically