Increasing the efficiency of biofuel production

1. Problems
2. Solutions at the biomass level
3. Solutions at the processing level

Bioenergy Problems

- Ethanol: burning food and not enough anyway (All U.S. corn→10% ethanol needs)
- Biodiesel: burning food and not enough anyway (All U.S. soybean→8% biodiesel needs)
- Waste in transporting the feedstocks

(More problems)

- Biomethanol: simple technology to produce it but limited use as a liquid fuel?
- Lignocellulosic ethanol has plentiful sources but technology isn't quite there
- Biodiesel: Mostly food crops; uses minor part of the plant

Key issues affecting biofuel Life Cycle Assessment

- 1. N fertilizer
  - 31% of GHG from corn EtOH is from N fert!
- 2. Farming practices (E & chem inputs)
- 3. E use in EtOH facility
- 4. Credits for co-products (animal feed)
- 5. N20 conversion factors of N fertilizer
- 6. Land use changes (clear rain forest vs use abandoned ag field)

Increasing the efficiency of bioenergy production

A. At the feedstock level
B. At the processing level

A. Enhanced efficiency at the feedstock / biomass level

- 1. Increase overall biomass production
- 2. Better source material
- 3. Growth at less cost

B. Enhanced efficiency at the processing level

- Use different yeast or bacteria for fermentation
- Use novel methods
- Combine methods