



Fermentation in a Bag

Follow-up discussion: explaining results
and comparing plant sugar sources

Why did we see differences in fermentation between plant sugar sources?

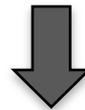
Ethanol from Sugar Cane (Glucose)

Sugar Cane



Harvest & Pressing

Cane Juice

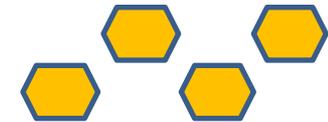


Fermentation with yeast

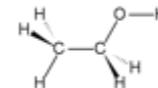
Fermented Cane Juice



Glucose sugar
($C_6H_{12}O_6$)



Ethanol (C_2H_5OH)



Ethanol from Corn Grain (Starch)



Corn grain



Heat and enzymes

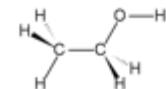
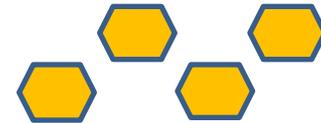
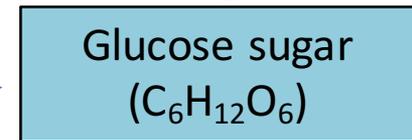
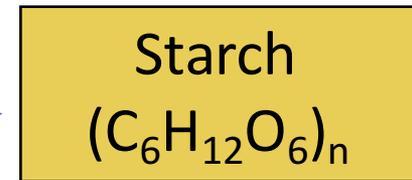


Corn mash

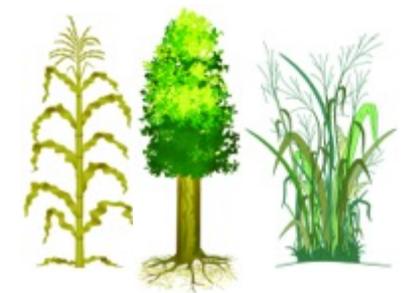
Fermentation with yeast



Fermented corn mash



Ethanol from Corn stalks, Grasses, Wood (Cellulose)



Biomass (corn stalks, trees, grass)



Ground up grass

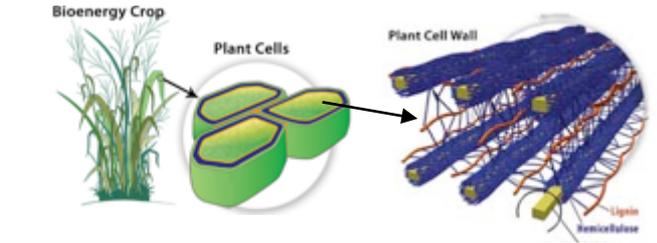
Plant cell walls (cellulose, lignin, hemicellulose)



Heat & pressure



Pretreated grass



Cellulose (C₆H₁₂O₆)_n

Enzymes



Liquefied grass



Glucose sugar (C₆H₁₂O₆)



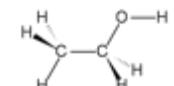
Fermentation with yeast



Fermented grass



Ethanol (C₂H₅OH)

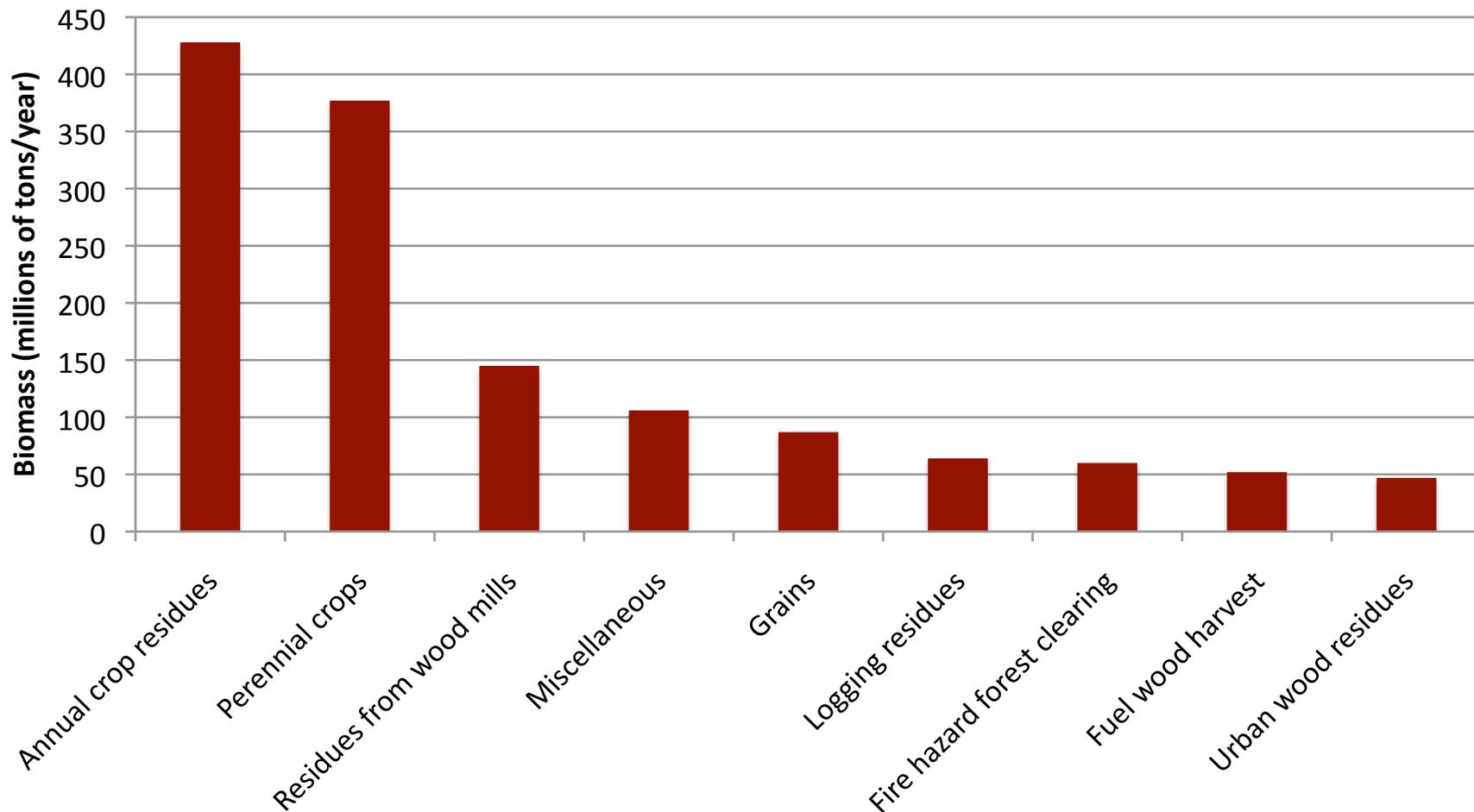


Right now, almost all ethanol biofuel is made from sugar cane and corn grain

1. Why do you think this is?
2. Why are researchers looking for ways to make ethanol from corn stalks, trees, grasses (cellulosic biomass)?

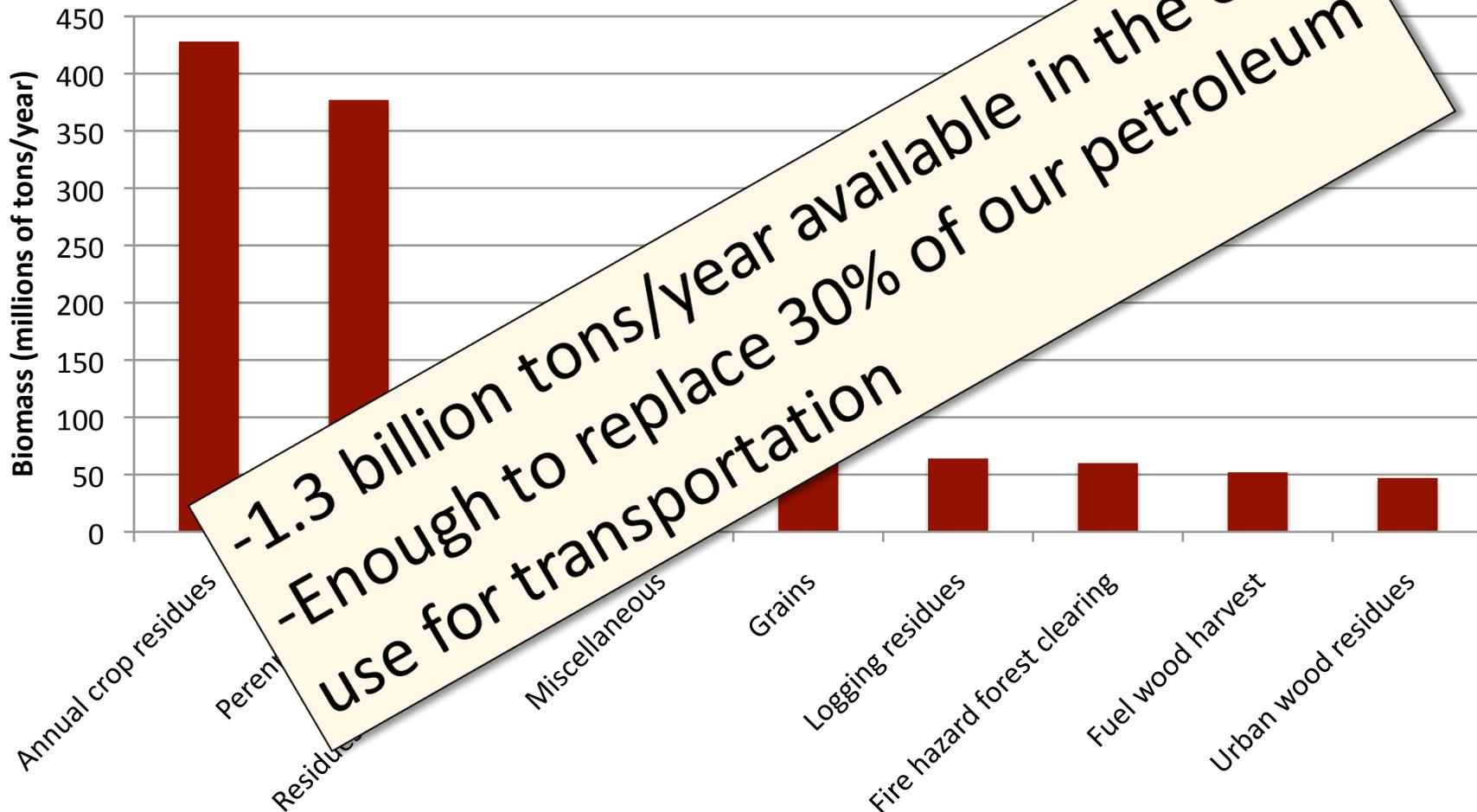
Biomass Feedstocks Available for Billion Ton/Year Harvest in the U.S.

R.D. Perlack, et al, 2005, Biomass as feedstock for a bioenergy and bioproducts industry: The technical feasibility of a billion-ton annual supply (DOE/GO-102005-2135). Oak Ridge, TN: US DOE



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The Mission of GLBRC

To perform the basic research that generates technology to convert cellulosic biomass to sustainable biofuels.

