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We are all using biomass chemical conversions right now and we have recently done a biomass mechanical conversion. Every time you cut your food to eat it and every time you chew it before swallowing you are doing a mechanical conversion. You reduced to size to get it into the reactor (your mouth). Then you chewed it so that it could be broken down easier in your stomach, so technically you had to perform 2 mechanical conversions. Likewise, two chemical conversions also occurred – as soon you began chewing the biomass you began adding enzymes (a fancy protein chemical) to the biomass to begin the breakdown process. Then after you swallowed the biomass it was conveyed down your throat and into a special reactor where it began the second chemical conversion by being broken down in a 98 degF, hydrochloric acid bath also known as your stomach. The biomass is broken down enough by these mechanical and chemical conversions that it can be used as a source of nutrition for living organisms like us – thank goodness its designed so well. It turns out that many of the chemical processes you can use to break biomass into its pieces can also be used to break those pieces into sugars and chemicals. Acid breakdown is a good example One of the reasons acid hydrolysis with hydrochloric and sulfuric acid is compelling is that the same chemical can be used to both break the biomass into its parts and also to break the cellulose fiber into sugars. The conditions of both reactions are different and it is necessary to separate the solid fibers, but the fact that both processes can use the same reactive chemical is ideal because it means less overall steps which often improves economics. You take the cellulose fibers that were produced from one acid bath and you soak them in a second acid bath until they turn into sugar. Then you recycle all the acid and the process continues to produce sugar and lignin from biomass.

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