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**Increasing Revenue from Lignocellulosic Biomass: Maximizing Feedstock Utilization**

Biomass can compete with petroleum if revenue is generated from all three primary biomass constituents.

**The Science**

Researchers show that the three main components of plant biomass can be converted to high value products in economically favorable yields when using the solvent gamma-valerolactone (GVL) to break apart the biomass.

**The Impact**

This technology can be used to produce fermentable sugars, advanced biofuels, or specialty chemicals, and could enable the concept of an integrated renewable biorefinery that is cost-competitive with petroleum.

**Summary**

The production of renewable chemicals and biofuels must be cost-competitive with petroleum–derived equivalents to be accepted by markets. GLBRC researchers propose a biomass conversion strategy that maximizes the conversion of lignocellulosic biomass (up to 80% of the biomass to useful products) into high value products that can be commercialized, providing the opportunity for successful translation to a viable commercial process. The fractionation method preserves the value of all three primary biomass components: cellulose, which is converted into dissolving pulp for fibers and chemical production; hemicellulose, which is converted into furfural, a building block chemical; and lignin, which is converted into carbon products (carbon foam, fibers or battery anodes). Since these products are all existing targets for pulp mills, they can be directly introduced into current markets, minimizing market risk for the first commercial plant. The overall revenue of the process is about $500 per dry megaton of biomass, which combined with low total cost results in an internal rate of return over 30%, thus making the technology attractive for investment. Once de-risked, the technology can be extended to produce fermentable sugars, advanced biofuels, or other specialty chemicals.

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**Publications**

Alonso, D.M. et al, “Increasing the revenue from lignocellulosic biomass: Maximizing feedstock utilization.” *Science Advances* (2017), DOI: 10.1126/sciadv.1603301

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<http://advances.sciencemag.org/content/3/5/e1603301.full>

**PM Recommendation for SC Web Publication**