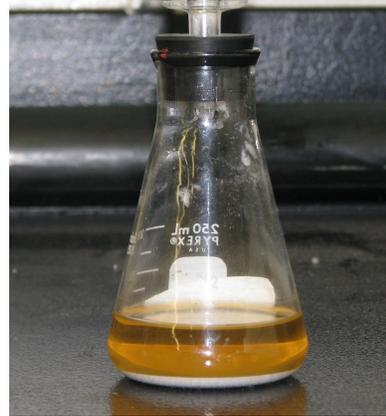


# Nanoscale Enzyme Assemblies for Breakdown of Cellulosic Biomass

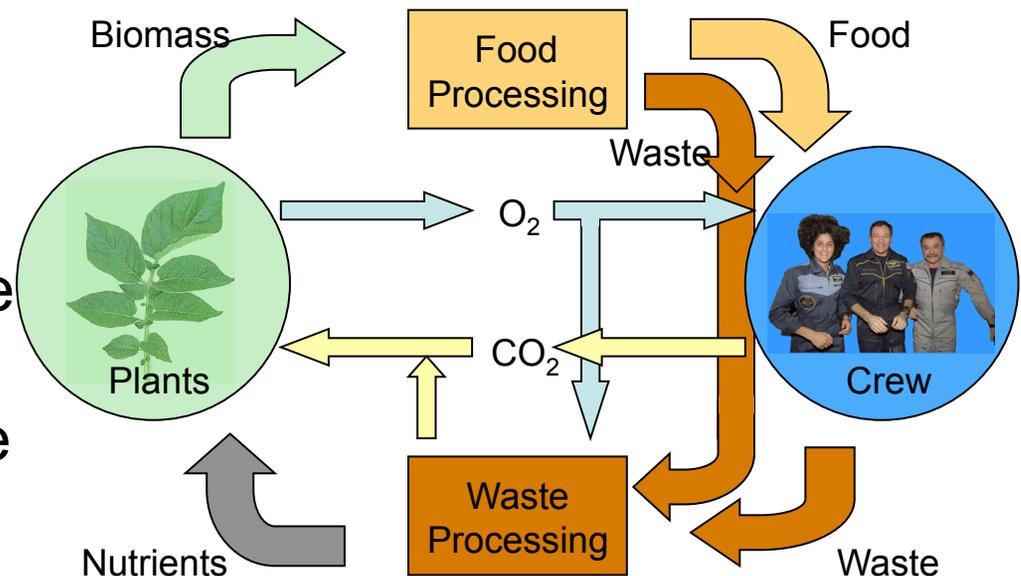
Chad Paavola  
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Bioengineering Branch

# Cellulosic biomass applications



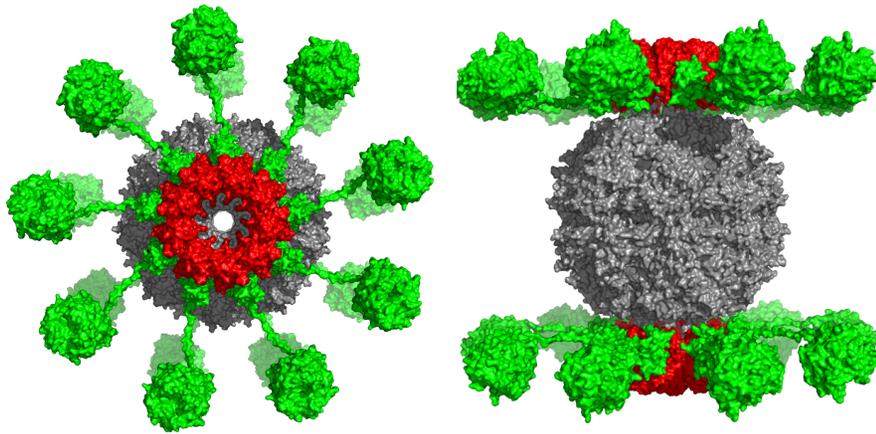
Terrestrial: conversion of cellulosic feedstocks such as non-edible plant matter to biofuels and chemicals.

Space flight: conversion of crop waste and paper waste to high-protein food supplements for sustainable space exploration.



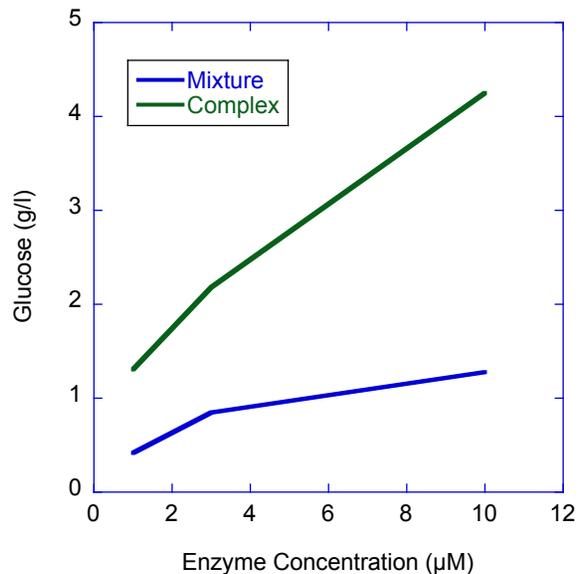
New technology is needed to make these applications practical.

# A biomimetic enzyme complex

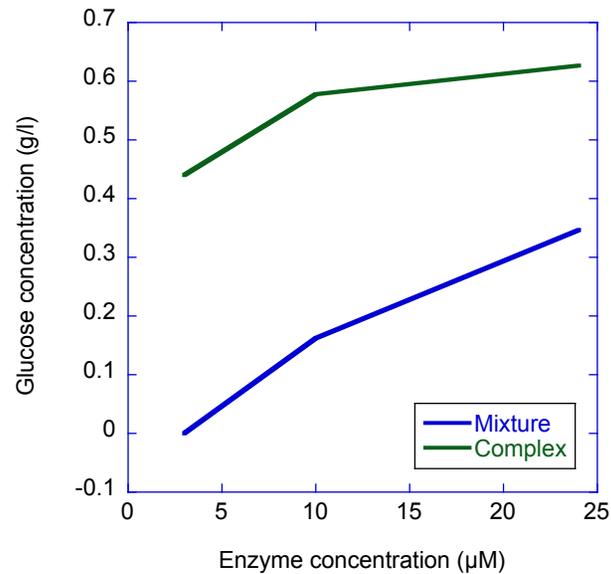


An engineered multi-enzyme complex is more effective at releasing fermentable glucose from cellulosic biomass than the same enzymes without the complex.

## Pure cellulose



## Municipal green waste



Sugars released by this process can be used to produce food or fuels and other chemicals by fermentation.