Thermophilic biomass recycling by novel Chloroflexi to support NASA spaceflights

Lignocellulose is the structurally complex building block of all plants and would be the dominant waste from crop materials during spaceflight missions. NASA recognizes the complex and highly mission dependent nature of both the quality and quantity of lignocellulose wastes. As such, technologies for degradation of diverse lignocellulose waste streams depend on diverse organisms and enzymes regardless of the downstream application (e.g., soil formation, biofuels, specialty chemicals, etc.). To address this need, we propose to explore the ability of the novel bacterium, *Kallotenue papyrolyticum*, and its purified glycoside hydrolase (GH) enzymes to degrade a variety of polysaccharies under the broad hypothesis that this organism could be useful to degrade lignocellulose wastes during spaceflights. Work will (i) determine the functions of *K. papyrolyticum* GH enzymes that are heterologously expressed and purified and (ii) determine the broader polysaccharide substrate ranges and products of *K. papyrolyticum* growth.