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<p>GNS Science is the leading Earth Sciences provider in New Zealand. We are the government's principal earth systems and isotope science researcher and advisor, and our purpose is to understand earth systems and technologies and to transform this knowledge into economic, environmental, and social benefits for New Zealand.</p>	<p>Core Skill(s):</p>
<p>The Geomicrobiology Group at GNS science was established in 2004 with the principle aim to investigate the distribution and abundance of microorganisms from New Zealand's extreme environments, as well as the interactions between the organisms and their surroundings.</p>	<ul style="list-style-type: none"> • Enrichment and isolation of novel extremophilic bacteria with current focus on cellulolytic thermophiles
<p>One feature that makes New Zealand unlike any other place on Earth is the presence of a vast array of extreme environments in a small geographical area. The majority of these environments are found in the Taupo Volcanic Zone (TVZ) in which the Geomicrobiology Group is centrally located. The Geomicrobiology Group specializes in the enrichment and isolation of novel microorganisms. The laboratory uses both cultivation-dependent and -independent techniques to investigate microbial communities in NZ geothermal areas.</p>	<p>Biofuel Focus:</p>
<p>Since 2007, Geomicrobiology Group has focused on the isolation of novel cellulolytic and thermophilic bacteria. The use of thermophilic microorganisms, and/or enzymatic preparations derived from thermophiles are strategies to increase the rate of cellulose degradation, and therefore production efficiency. Our novel microbial isolates represent an important step in understanding and improving bioethanol production. Amongst our database of cellulose-degrading bacteria are a number of highly novel bacterial isolates including the first isolate from candidate division OP10 and thermophilic <i>Chloroflexi</i>-like species that effectively breakdown cellulose and hemicellulose compounds to form sugars for fermentation to ethanol.</p>	<ul style="list-style-type: none"> • Bioethanol and value-adding by-products • Focus on second and third generation biofuels
<p>In early 2009, the Geomicrobiology Group received a grant from the Foundation for Research Science and Technology (FRST) to investigate the use of thermophilic bacteria in bioethanol production. The Group also has collaborative projects with Scion Research and also the University of Manitoba as part of the Genomes Canada programme. GNS is a member of the Ministry of Research, Science & Technology (MoRST)-sponsored NZ Renewable Energy Transformation Research Science and Technology (TRST) group, alongside Scion and AgResearch.</p>	<p>Core Product/Activity:</p>
<p>The Geomicrobiology Group has legally binding agreements with landowners of geothermal areas to isolate and develop novel microbes for use in research and commercial processes. This provides ongoing and secure access to geothermal features for on-going refinement for targeted biodiscovery and research, as well as surety that biodiscovery is being conducted in a consented and sustainable process.</p>	<ul style="list-style-type: none"> • Fundamental research into thermophilic bacterial cellulolytics.
	<p>Key Project Activities:</p>
	<ul style="list-style-type: none"> • Targeted enrichment and isolation of novel cellulose and lignin degrading enzymes and/or microorganisms. • Genomics of thermophilic cellulose degradation.
	<p>Leading Edge:</p>
	<p><i>The Geomicrobiology group targets and isolates novel bacterial isolates from NZ's unique geothermal systems. Because of our location and pre-existing legal agreements with landowners for the biodiscovery and application of novel microorganisms, we are able to easily refine enrichments while providing the security of legal agreement to conduct these activities</i></p>
	<p>Investment Base:</p>
	<ul style="list-style-type: none"> • NZ government & internal funding. • Co-funding from a small NZ commercial operation. • Collaborations with international university & government institutes.
	<p>Employees:</p>
	<p></p>
	<p>Production Capacity</p>
	<p>n/a</p>