



Application to Release a new organism without controls

The 'organism' is a strict anaerobic microorganism known as *Clostridium magnum* that is able to metabolize gaseous substrates including hydrogen (H₂), carbon monoxide (CO) and carbon dioxide (CO₂)

LanzaTech plans to use *Clostridium magnum* to convert carbon-based gases to acetic acid.

LanzaTech can use *Clostridium magnum* in a laboratory setting, up to a defined scale (10 litre bioreactor), in compliance with the HSNO Act

In order to determine the commercial viability of using *Clostridium magnum*, LanzaTech needs to cultivate the microorganism at a scale greater than 10L, outside the laboratory.

LanzaTech is seeking EPA approval to use *Clostridium magnum* outside the laboratory environment. Such use constitutes a 'release'

- **Dr Sean Simpson (LanzaTech)**

- LanzaTech's expertise and capability
- Gas fermentation economic and environmental value proposition
- Opportunities and benefits relating to use of gas fermentation microorganisms including *Clostridium magnum*

- **Dr Michael Koepke (LanzaTech)**

- LanzaTech's in-house microbiology capability
- Focusing on *Clostridium magnum*

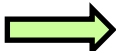
- **Professor Ian Maddox (Massey University)**

- Biodiversity and the global carbon cycle
- Biodiversity in New Zealand
- Member of the LanzaTech Science Advisory Board.
- Scaling *Clostridium acetobutylicum*
 - A case study and lessons learned from scaling a related anaerobic microbe

LanzaTech is seeking EPA approval to use *Clostridium magnum* outside the laboratory environment.

The potential environmental and financial benefit from the scaling of a process utilising *Clostridium magnum* is **substantial**

The environmental risk of using *Clostridium magnum* outside the laboratory environment is **minimal**.

Clostridium magnum passes the five minimum standards for release as stated in the HSNO act. 

LanzaTech has exemplary capability and expertise in gas fermentation and the handling of gas consuming microorganisms

Anaerobic acetogens, such as *Clostridium magnum* have been an integral part of the global carbon cycle for millions of years

The inherent properties of *Clostridium magnum* prevent proliferation:

- Anaerobe
- Limited growth conditions
- Product inhibition (self regulating)
- Does not dominate a complex culture