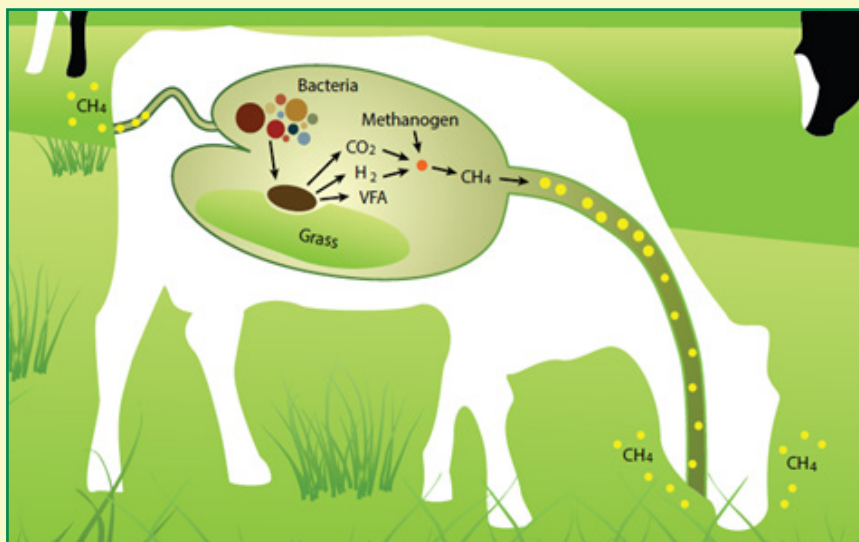


# Methane Production: How can we reduce it?



- Ruminant livestock convert plant matter into high quality sources of dairy and meat protein for human consumption via the microbial ecosystem that exists in the rumen called the rumen microbiome.
- The rumen microbiome consists of bacteria, fungi, protozoa and archaea which convert grass into an energy source for ruminants.
- **BUT**.....they also produce methane ( $\text{CH}_4$ ) as a by-product of fermentation.
- $\text{CH}_4$  is produced by a group of microbes called methanogens (archaea).  $\text{CH}_4$  is released into the atmosphere from the rumen via the animal's breath or during the storage of manure and slurry.



- $\text{CH}_4$  is the second most important greenhouse gas (GHG) in terms of global warming. It is 28 times more potent to the environment than carbon dioxide ( $\text{CO}_2$ ).
- Agriculture accounts for 34% of Irish GHGs emissions, with  $\text{CH}_4$  responsible for nearly 60% of agri emissions.
- In line with EU legislation, Ireland will need to decrease national GHGs emissions by 30% by the end of 2030. Reducing  $\text{CH}_4$  will be key to meeting our targets!

## How will we reduce it?

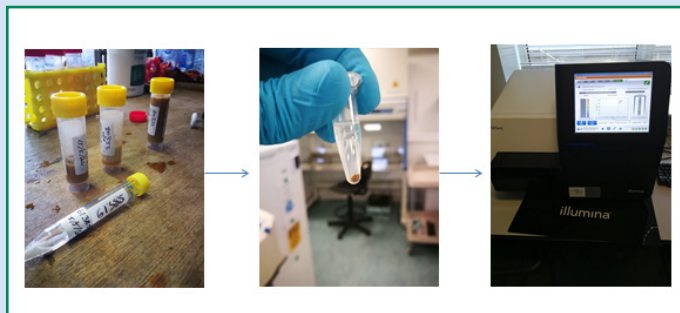
1. Breeding initiatives – collaboration with the Irish Cattle Breeding Federation (ICBF)
2. Additives for animal feed and slurry/manure
3. Mixed species swards – addition of clover

# METH-ABATE - Development of novel farm ready technologies to reduce methane emissions from pasture based Irish agricultural systems

Funded by the Department of Agriculture, Food and the Marine (DAFM)



Measuring CH<sub>4</sub> with the GreenFeed system



Examining the rumen microbiome by DNA sequencing analysis

- Will investigate feed additives to mitigate methane emissions while monitoring their effects on animal productivity.
  - **3-NOP, seaweeds, oils, halides**
- Encapsulation for **slow release** options at pasture
- **Nutritional and toxicological** composition of meat and milk - to confirm **consumer safety - no residues**
- **Farm level cost effectiveness** investigated through the **National Farm Survey**.



## Reducing methane emissions enhances profitability

- Methane production from ruminants is energetically wasteful
  - 2-12% loss in dietary energy

ICBF Tully data - negative correlation developing between methane yield and both the replacement and terminal indexes

Animals that have lower methane yield have a higher ranking on the replacement and terminal index.