## *MASTERing our futures……..microbiomes for food and health*

Micro-organisms are found in every ecological niche explored and their existence facilitates ours! We can discover the make-up and function of many microbial communities (microbiomes) through the use of DNA sequencing technologies. Scientists within our project, MASTER (Microbiome Applications for Sustainable food systems through Technologies and EnteRprise; www.master-h2020.eu), are using high throughput sequencing technologies to map microbiomes across a range of food and non-food environments. MASTER got underway earlier this year, bringing together 30 partners from 14 European countries. The project will improve the quantity, quality and safety of food, by developing microbiome products, foods/feeds, services and processes. Knowledge generated within MASTER will improve plant, soil, animal and human health and reduce the demand for traditional insecticides, fertilizers and antibiotics.


MASTER at a glance

## *The journey so far*

MASTER is studying microbiomes in a range of environments, with sampling due to start shortly at food production facilities across Europe. We take a global microbiome analysis approach; from sampling and DNA extraction to sequencing, data analysis and interpretation. Standard operating



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818368

procedures (SOPs) are required for the entire process. Those relating to sample collection and DNA extraction have already been finalised by the MASTER partners. Over 100 food production companies have agreed to make their facilities available to our team. These companies produce cheese, fresh and smoked fish, fresh and cured meat, fermented sausage and ready to eat vegetables.

During its first year the MASTER project has studied the impact on growth performance and gut microbiome of feeding sustainable protein sources and probiotic bacteria to commercially important fish species. MASTER researchers have also selected the best candidate strains to provide microbiome-based solutions to improve production, enhance quality and control disease of typical fodder crops like fodder maize and grasses. Estimates of methane output, measurements of feed efficiency and carcass quality and yield, have been collected for a large number of beef cattle.

## *The next steps on MASTER*

This is the start of an exciting four year journey with MASTER, building to a busy year in 2020, which will see further trials in the marine, aquaculture, soil, crop and animal research arms of the project and continued sampling, DNA extraction and bioinformatic analysis from food production facilities throughout Europe. Some of the research planned for the next year includes:

- field trials to assess strains and strain combinations for bio-fertilisation and bio-control; to promote crop growth and prevent disease or damage to crops
- detailed microbiome mapping of fish farms; to enable early detection and prevention of fish pathogens in aquaculture systems
- gathering and analysing data relating to methane output, feed efficiency and carcass quality and yield for a greater number of ruminants, with a view to developing a predictive tool for methane emissions
- analysis and interpretation of data from the food production companies; with the data being used to map microbiomes related to food processing, spoilage and contamination
- harmonisation and coordination of the microbiome data generated across MASTER, focussing on the technologies used, computational pipelines and long-term resources

During the broader MASTER project we will harness this microbiome knowledge to enhance the health, sustainability and resilience of fish, plants, soil, animals and humans, improve professional skills and competencies, and support the creation of jobs in the food sector and bio-economy.

Please follow our research on www.master-h2020.eu and @MASTER_IA_H2020

**Website:** www.master-h2020.eu
**Twitter:** @MASTER_IA_H2020
**Co-ordinator:** Prof Paul Cotter; paul.cotter@teagasc.ie



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818368

The MASTER project meeting in Naples, September 2019



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818368