

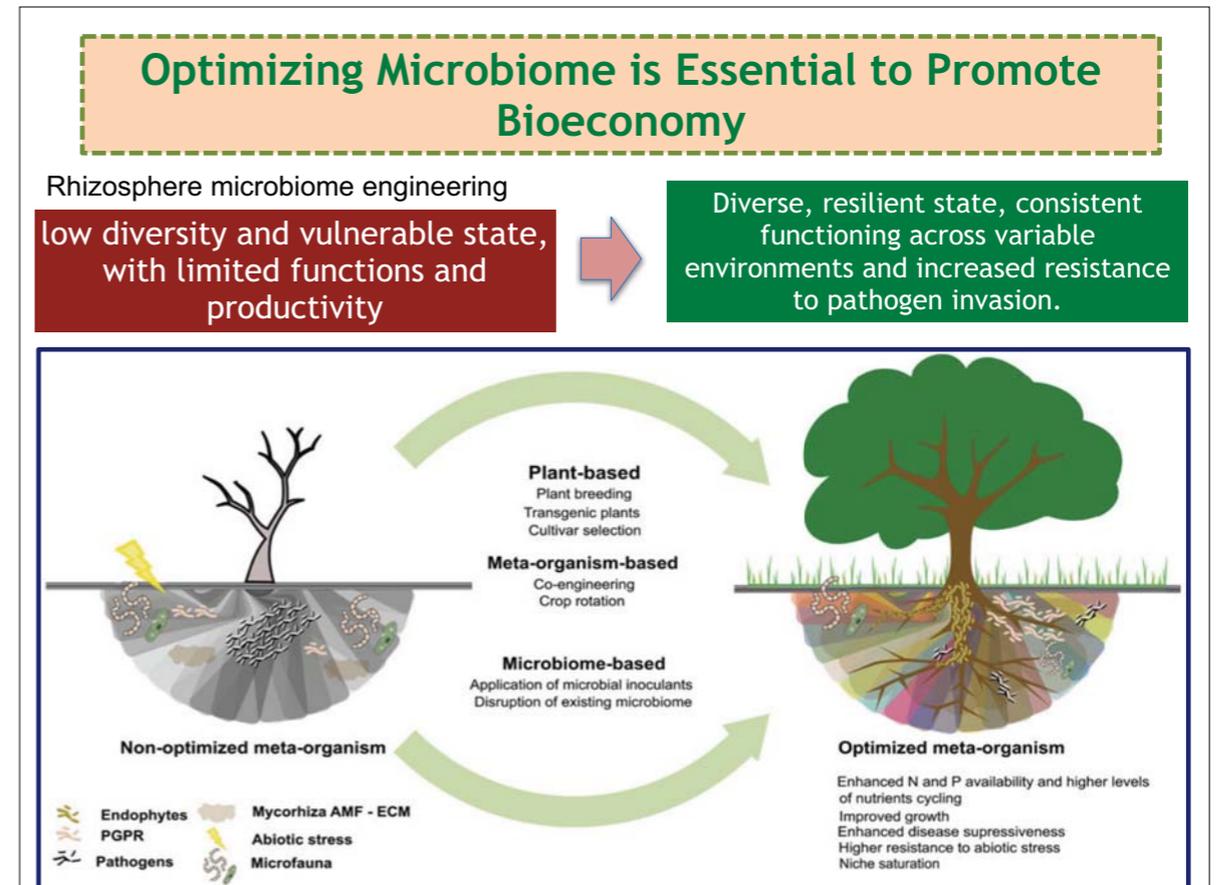
ASEAN perspective on microbial bioprospecting: The Prospects and Challenges of Microbial Communities

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Indonesia

ASEAN Forests

- ★ Tropical forests are very important to the health of our planet
- ★ Covering only about 7% of the Earth's land surface, but they host nearly two-thirds of the world's floral and faunal diversity.
- ★ Southeast Asia is home to nearly 15% of the world's tropical forests.
- ★ The region is also among the world's major deforestation which could lead to the depletion of almost half of Southeast Asia's biodiversity by 2100.
- ★ Significant threat to **ASEAN microbial diversity**, including possible emergence of novel **pathogenic microbes or viruses**.

**Geography on:
Flavor; Curcuminoids
> Microbiome**



Intimate Interactions with Microbes



Not just leafy salad: 10-100 million bacteria/g



alapan untuk daya tahan tubuh via <https://medan.tribunnews.com>

MEDICATION & HEALTHCARE / NUTRITIONS & WELLNESS / THAILAND

Finger Root can 100% Stop and Inhibit COVID -19

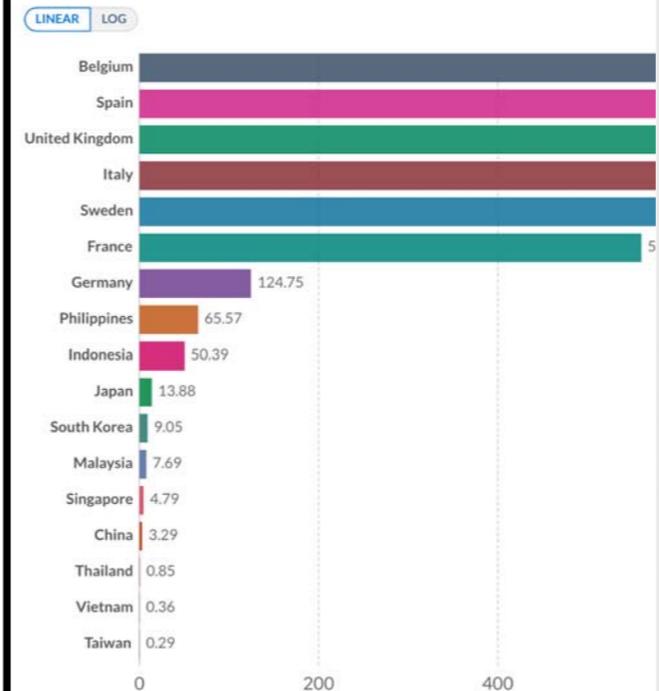
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Food Beyond Nutrition

Cumulative confirmed COVID-19 deaths per million

Limited testing and challenges in the attribution of the cause of death means that the number shown is likely to be lower than the true number of deaths from COVID-19.



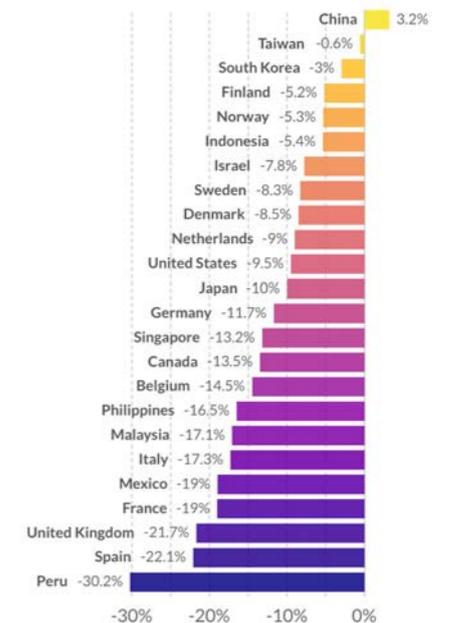
Source: European CDC - Situation Update Worldwide - Last updated 5 November, 10:06 (London time)

Jan 11, 2020

Economic decline in the second quarter of 2020

The percentage decline of GDP relative to the same quarter in 2019. It is adjusted for inflation.

+ Add country



Source: Eurostat, OECD and individual national statistics agencies
Note: Data for China is not shown given the earlier timing of its economic downturn. The country saw positive growth of 3.2% in Q2 preceded by a fall of 6.8% in Q1

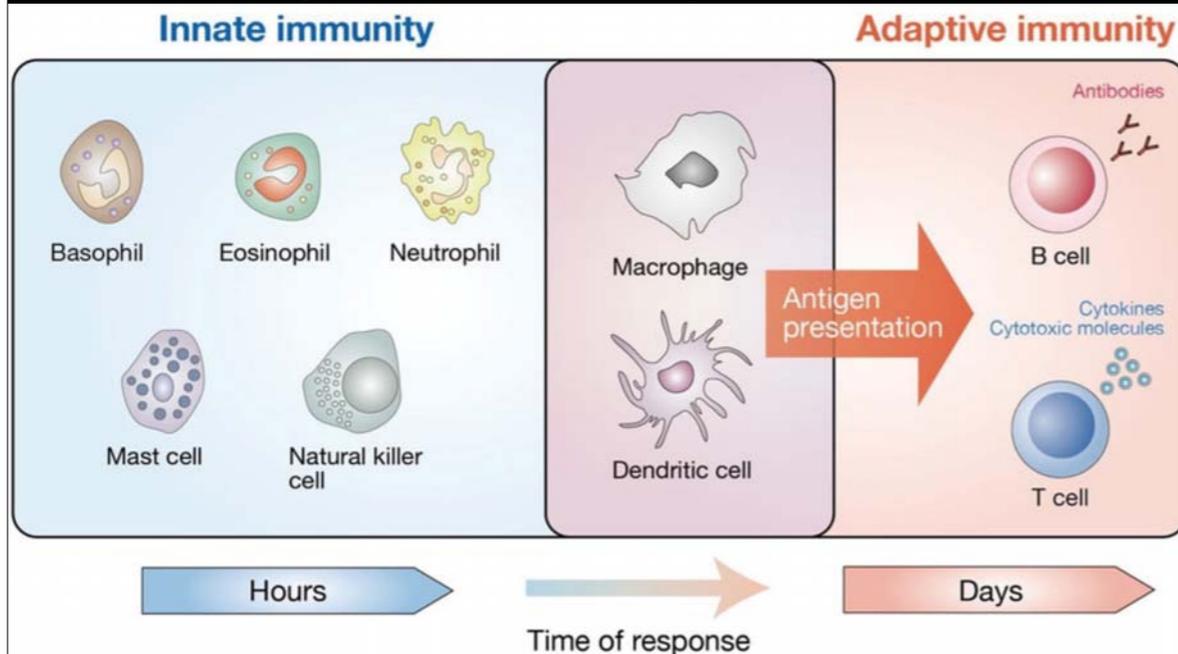
Natural Protection Against Covid-19: Fundamental for Bioeconomy



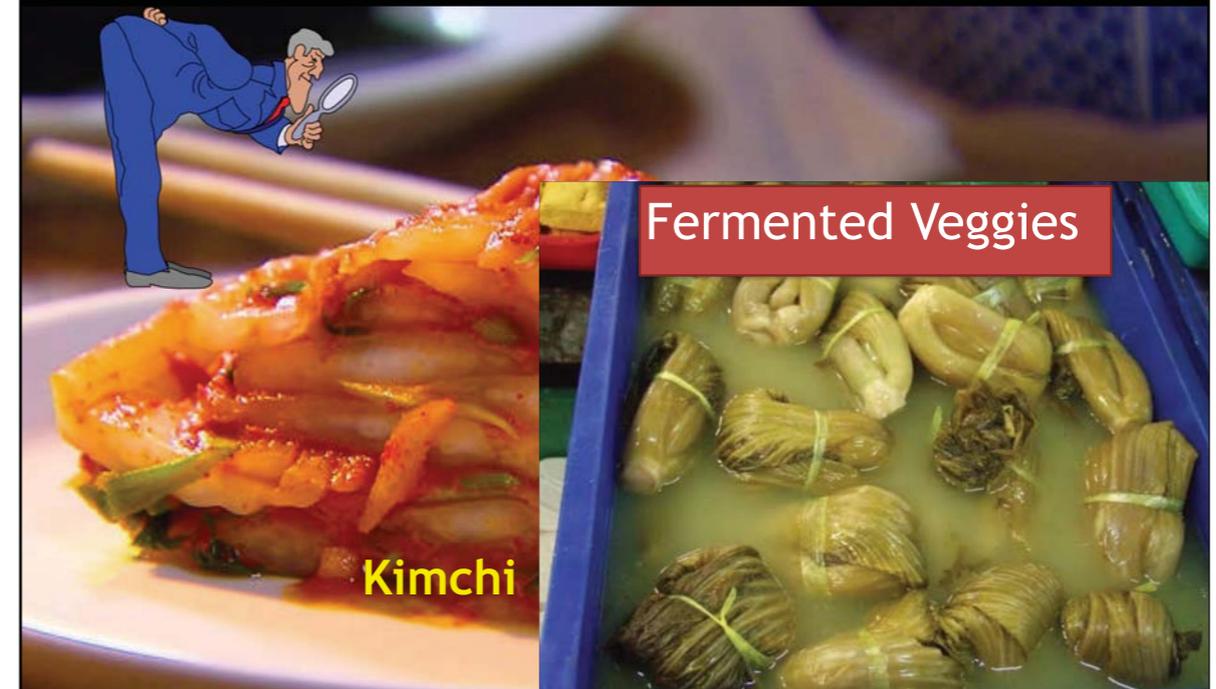
Microbiome studies:
90% of human cells are microbial
> Our **Health & Happiness**



Exposure to beneficial microbes: To keep our immune system on alerts



Exposure to microbes in Food: Training to alert our immune system



Fermented noodle: Kanomjeen



Fish sauce fermentation: Vietnam & Thailand

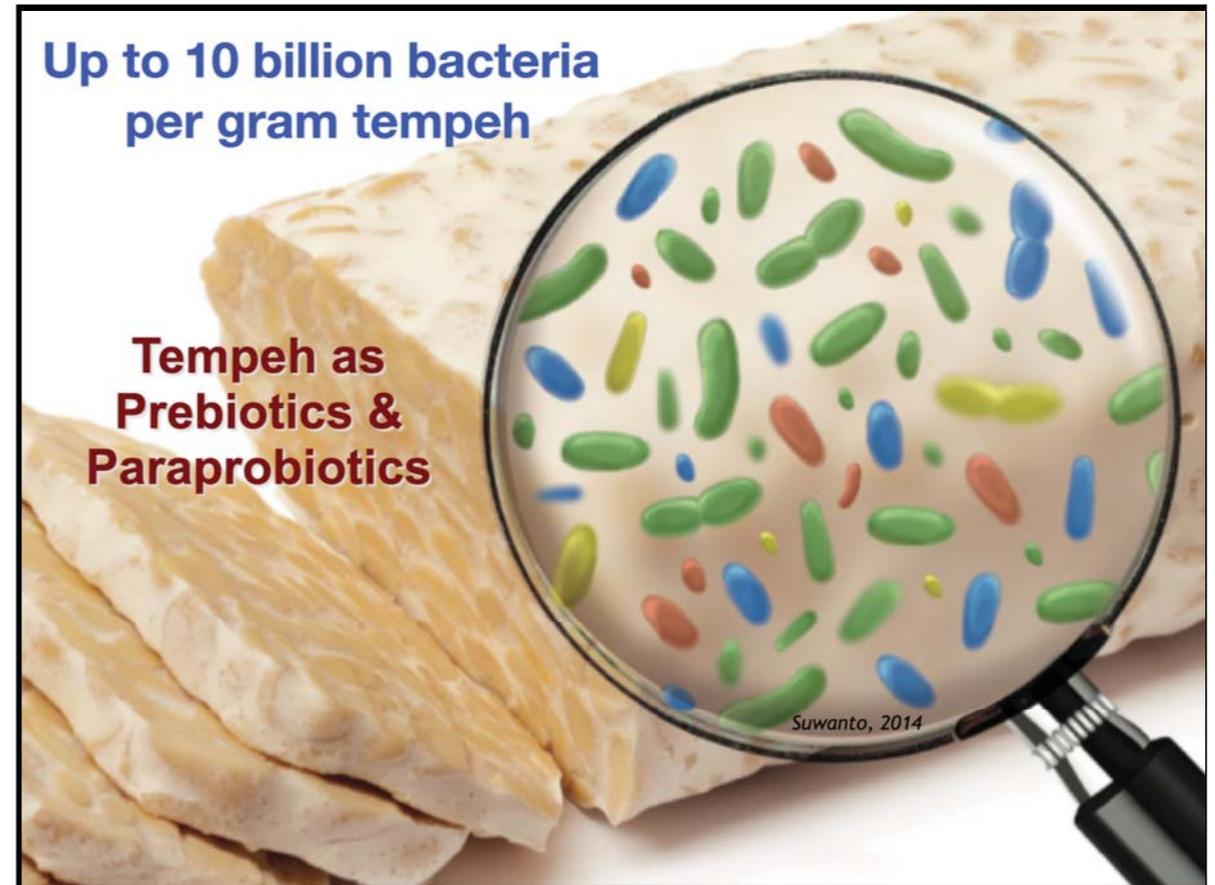


**Kombucha:
Fermented Tea**



**Up to 10 billion bacteria
per gram tempeh**

**Tempeh as
Prebiotics &
Paraprobiotics**



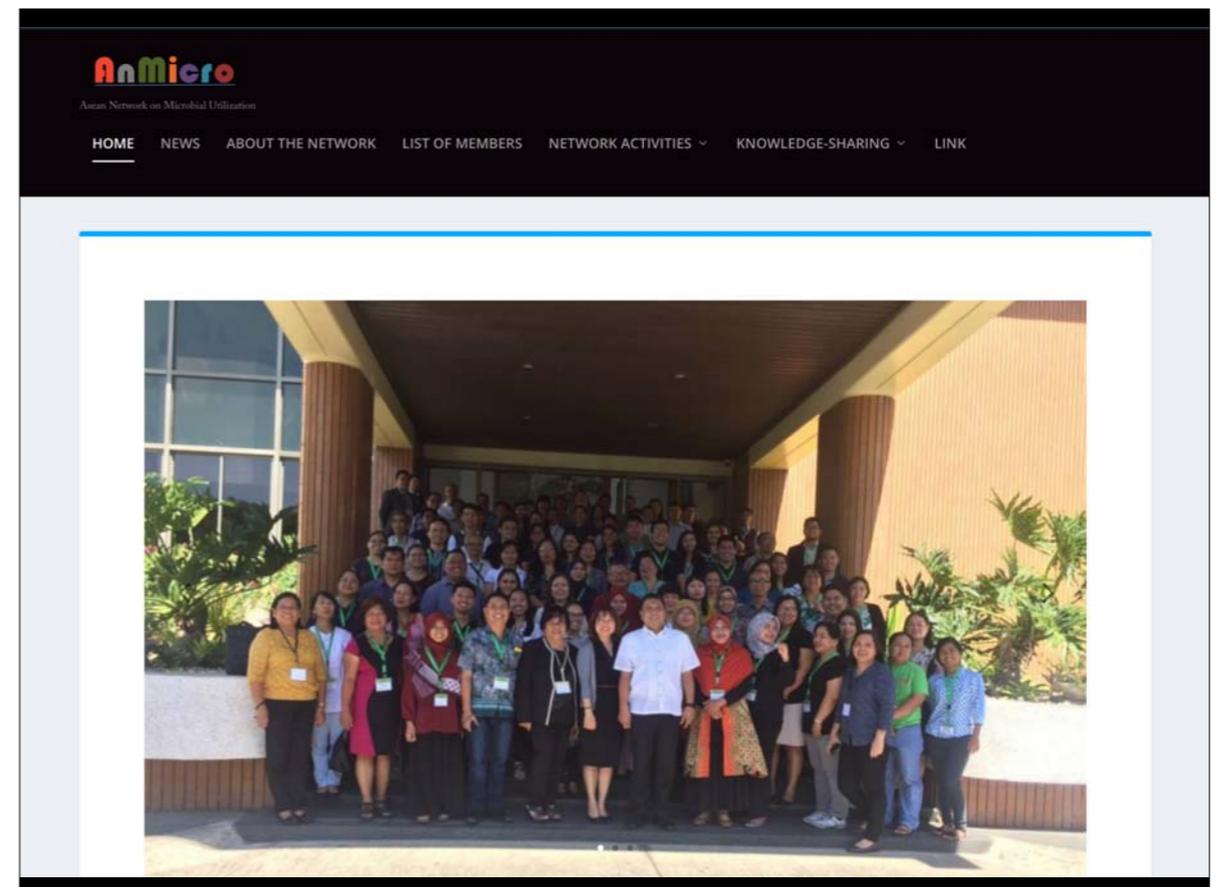
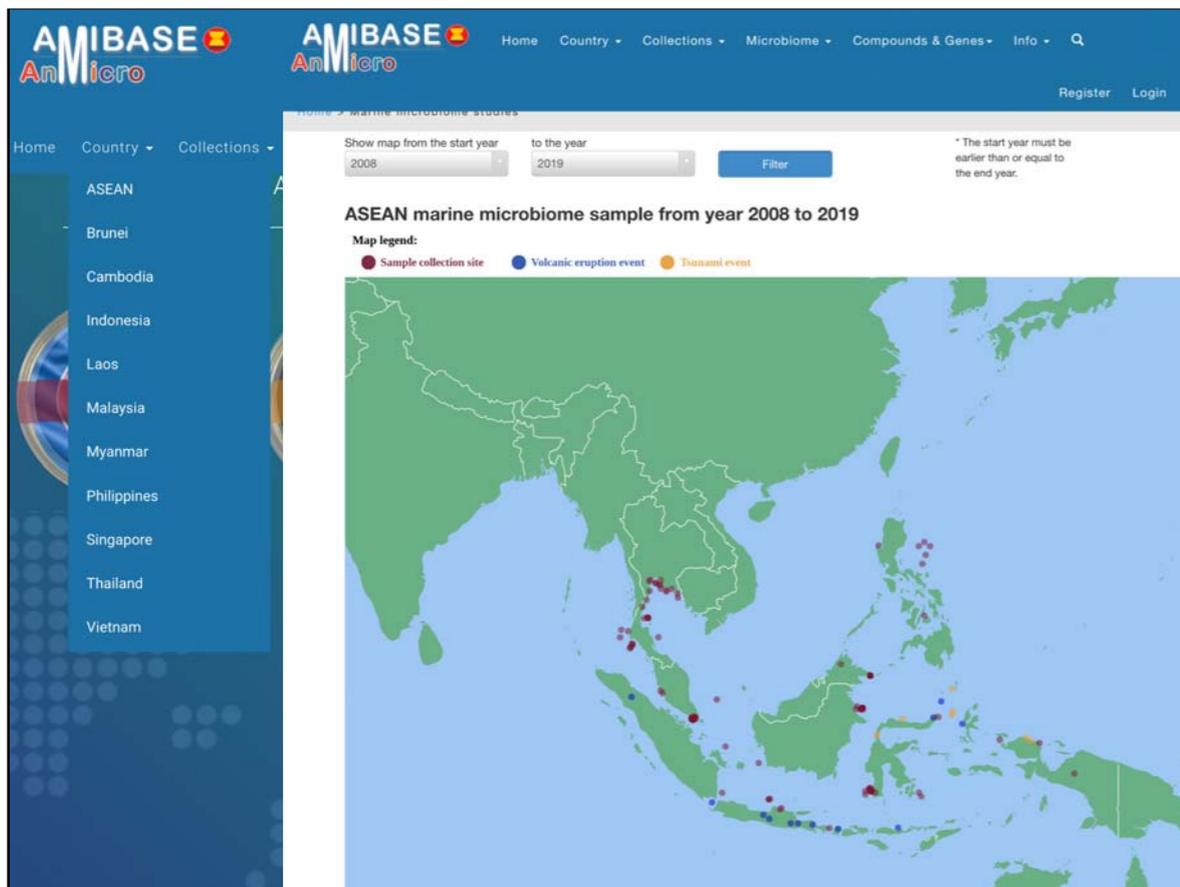
Suwanto, 2014

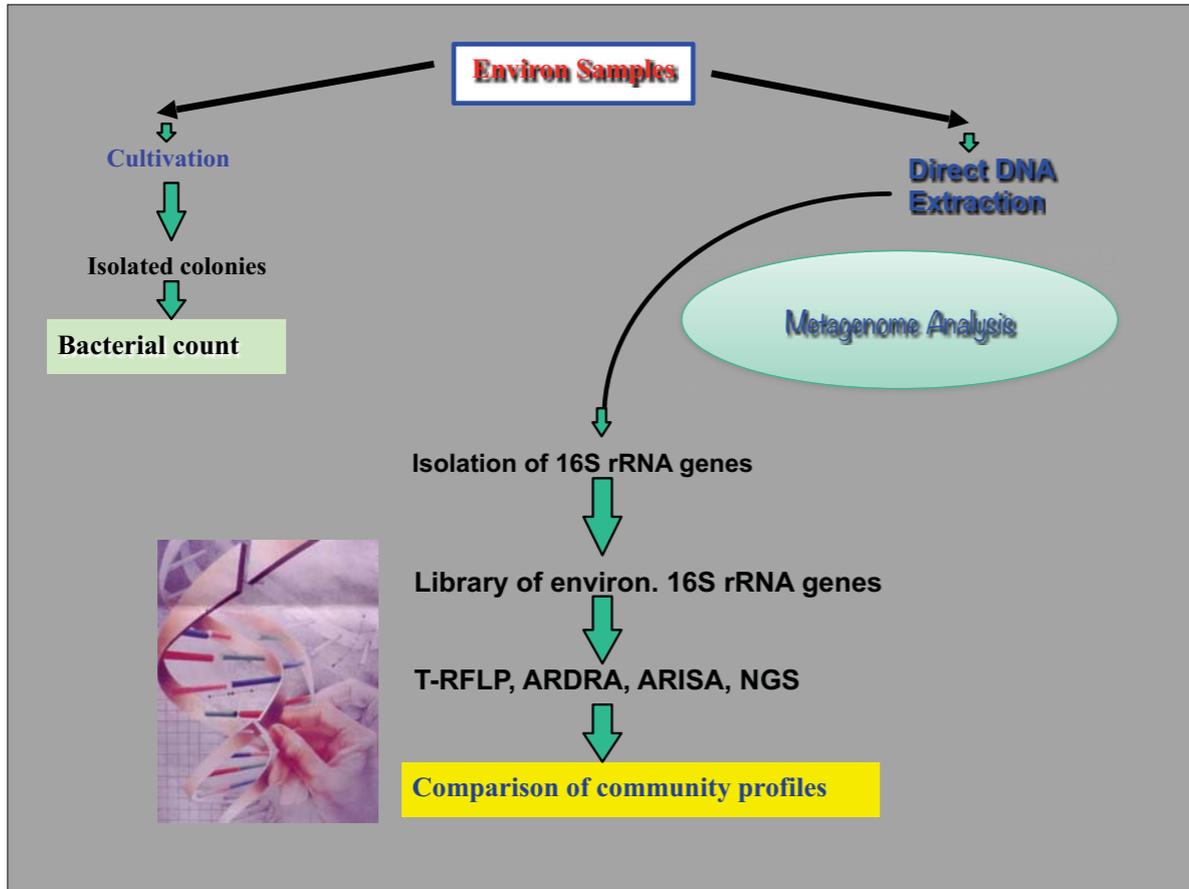
‘The process required for **fermented** foods were present on earth when man appeared on the scene ... When we study these foods, we are in fact studying the most intimate relationships between **man, microbe and foods**’

Prof. Keith H. Steinkraus, Cornell University, 1993

Microbial Bioprospecting

- Sustainable & Environmentally Friendly Ag
- Healthy & wholesome food
- Probiotics, Prebiotics, Bioactive cpds, Enzymes
- The Essentials of Plant Microbiome > Environment
- Techniques: Metagenome, Metatranscriptome, Genome Editing, NGS
- Regulatory aspects & Networking ASEAN





Collaboration in ASEAN Microbiome Analysis



**Let's work together.
Synergistically!**

2007: 30,000,000 - 60,000,000 kb
2009: 100,000,000 - 1,000,000,000 kb

**Whole genome, targeted-sequencing,
transcriptome analysis**

