MARINETECH

(Bio)plastics sea: how can marine bacteria save the day?

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MARINE LITTER

80%

come from land

80%

is plastic

40-50%

single-used

Rúben Silva • Dec. 2019

> 9 MILLIONS

TONS OF PLASTIC ENTER THE OCEAN EVERY YEAR!

(equivalent to 16 full plastic bags, by beach square meter in the planet)

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PLASTIC

Produced from the 50's
Lightweight, durable, flexible material...
Use of oil in its production

THE PROBLEM IT'S NOT THE PLASTIC ITSELF BUT THE WAY WE ARE USING IT!

BIOPLASTICS

PLASTICS PRODUCED FROM RENEWABLE SOURCES OF BIOMASS

CORN STARCH

POTATO STARCH

SUGARCANE

Is it possible to produce more sustainable bioplastics, from low value materials?

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Chitin

based bioplastics

Most abundant natural product in the marine environments

Degradaded by **CHITINASES**

IN MARINE ENVIRONMENTS IT IS MAINLY DUE TO

BACTERIA

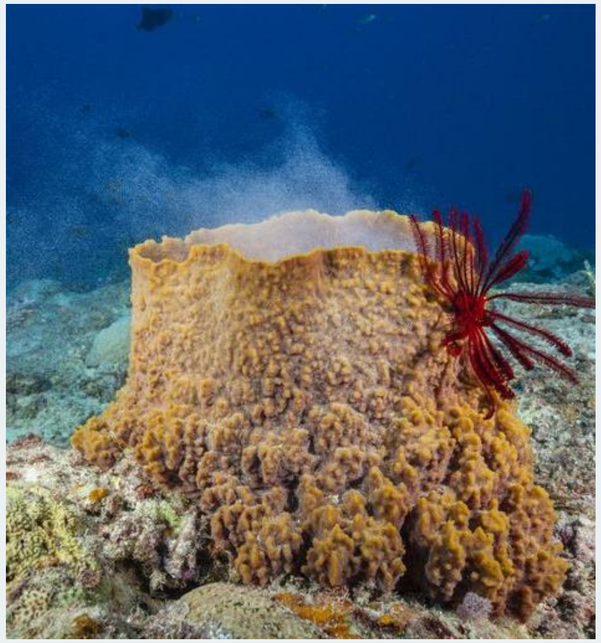
> **IF YOU DON'T LIKE BACTERIA, YOU LIVE IN THE WRONG PLANET!**
>
> **STEWART BRAND**

THEY ARE EVERYWHERE!!

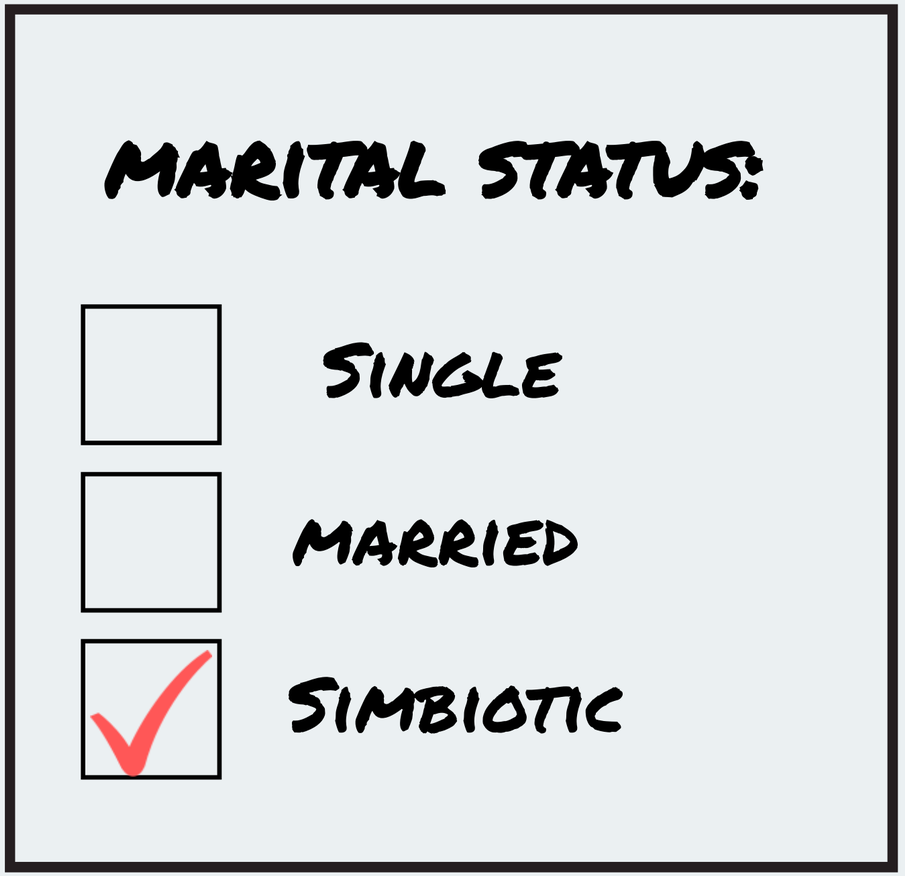
Even in our body, contributing to its proper functioning

<1% PATOGENIC

Among all the known species, 99% are not patogenic to humans



BACTERIA ISOLATED FROM CORALS AND MARINE SPONGES



MARINE SPONGES AND CORALS

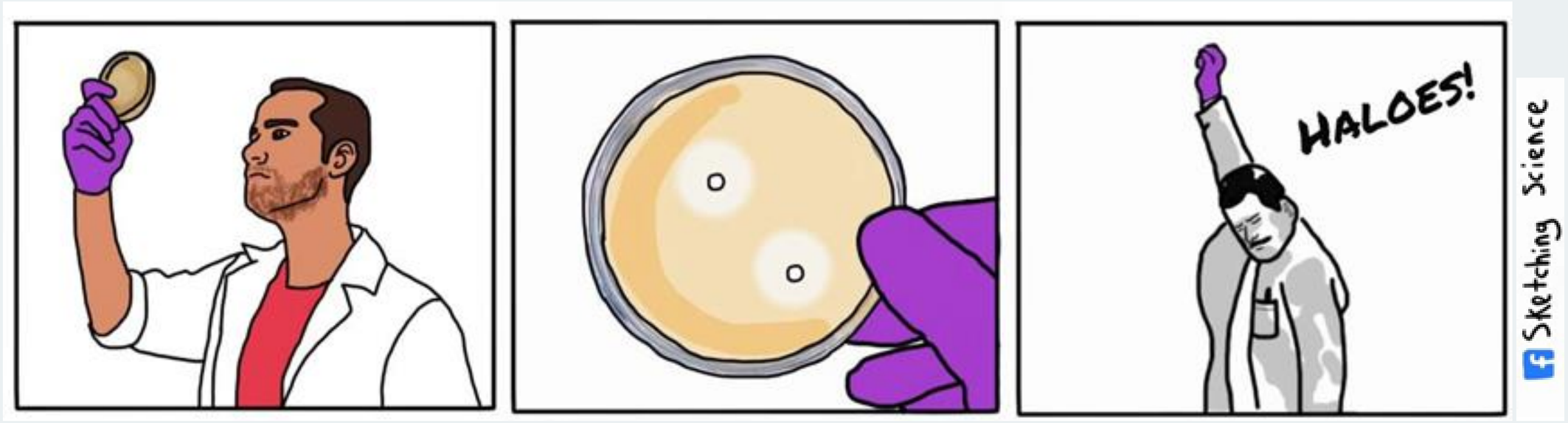
Provide shelter and food availability

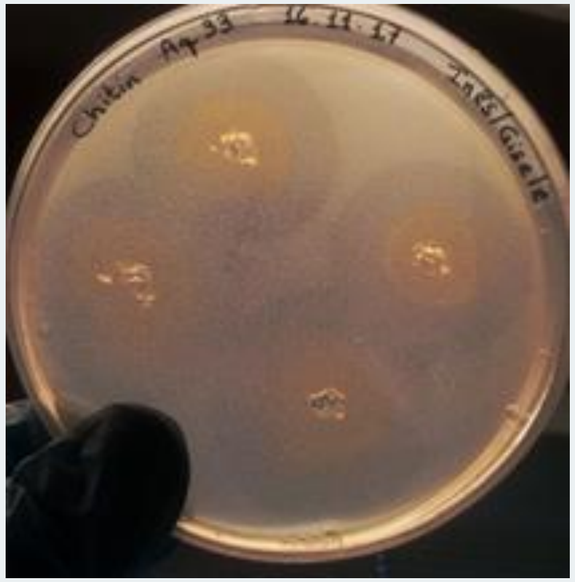
BACTERIA

Produce chemical compounds that help the host in defense mechanisms, degradation of other compounds, etc

ARE THE MARINE SPONGES AND CORAL-ASSOTIATED BACTERIA ABLE TO DEGRADE CHITIN?

IN-VITRO ASSAYS





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SHOWED POSITIVE RESULTS IN (AT LEAST) ONE OF FIVE DIFFERENT DEGRADATION ASSAYS

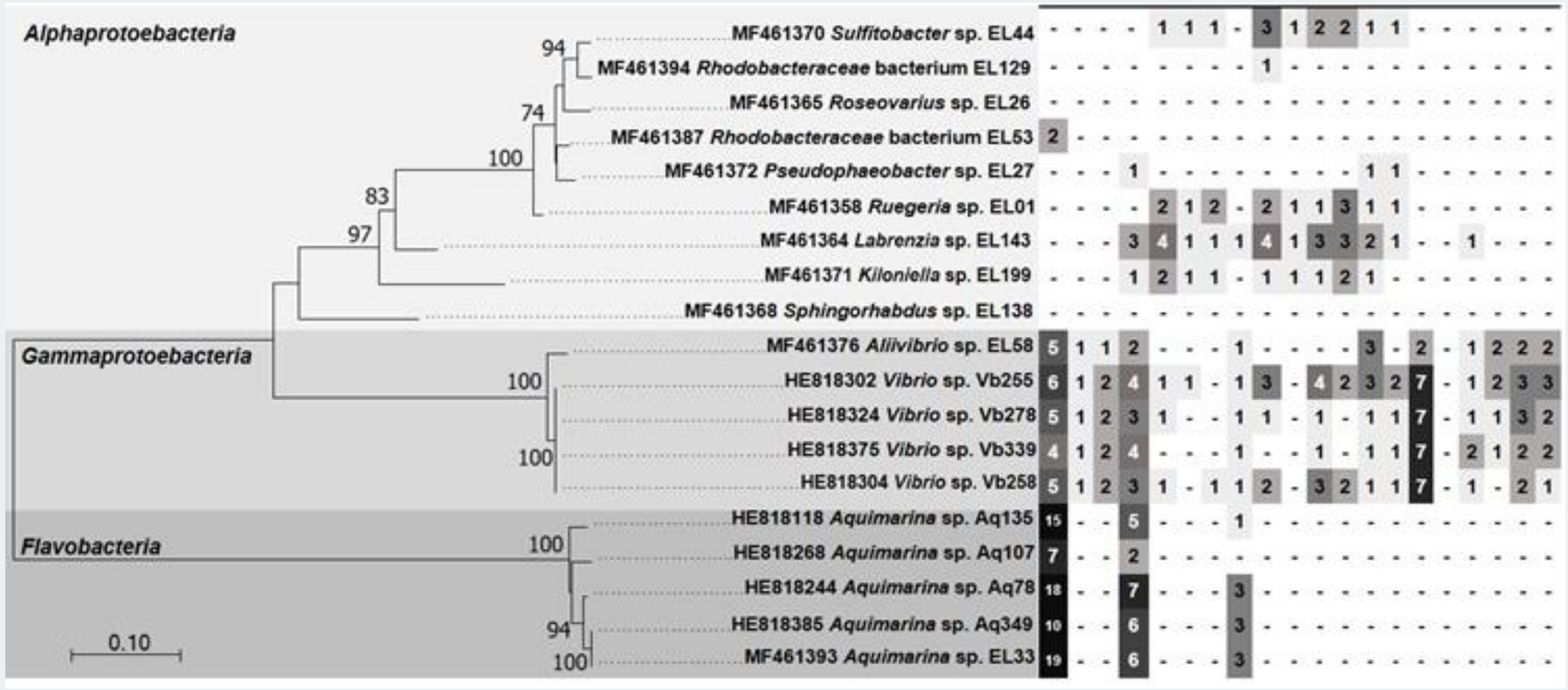
VIBRIO E *AQUIMARINA*

SHOWED HIGHER DEGRADATION HABILITY

ARE THEY SHOWING THEIR FULL POTENTIAL?

GENOMIC ASSAYS

GENOMIC RESULTS SUPPORT THE *IN VITRO* RESULTS



Take-home messages

CHITIN DEGRADATION

Most of tested bacteria showed hability to degrade chitin *in vitro*

VIBRIO E *AQUIMARINA*

I*Vibrio* e *Aquimarina* isolates presented higher degradation efficiency then isolates from other genera

SOURCE FOR NEW CHITINASES

Both sponges and coral - associated bacteria showed to be a promissing source for new chitinases

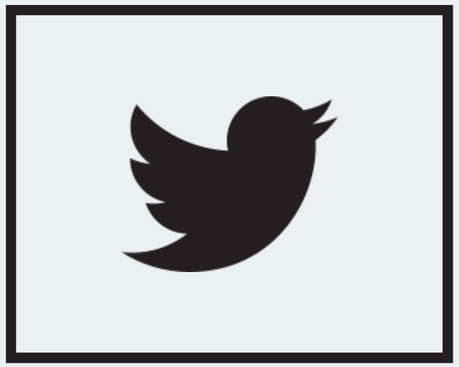
BIOPLASTIC DEGRADATION

According to the results, these bacteria have the potential to be part of chitin based bioplastics degradation processes

BUT MOST OF ALL...

We only have one ocean!
The way to preserve it is to REDUCE!

Follow Us



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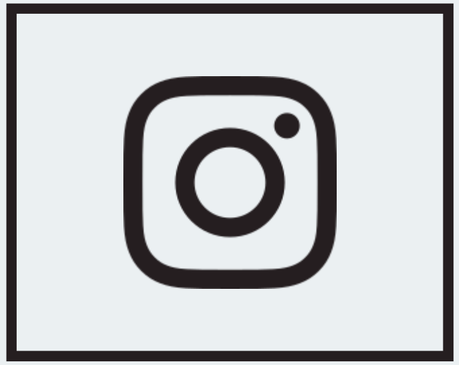

INSTAGRAM

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QUESTIONS?

THANK YOU

for your attention!