

# Literature Review: RECENT DEVELOPMENTS OF BIOREMEDIATION APPLICATIONS TO OCEAN OIL SPILLS

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## Background

Ocean oil spills are a growing issue worldwide— for both human and environmental health.

In high levels, oil spills can cover a wide area in the ocean, capable of

- Marine life suffocation (EPA, 1999)
- Human reproductivity issues (Gay et al., 2010)



(ENTRIX Inc., 2015)

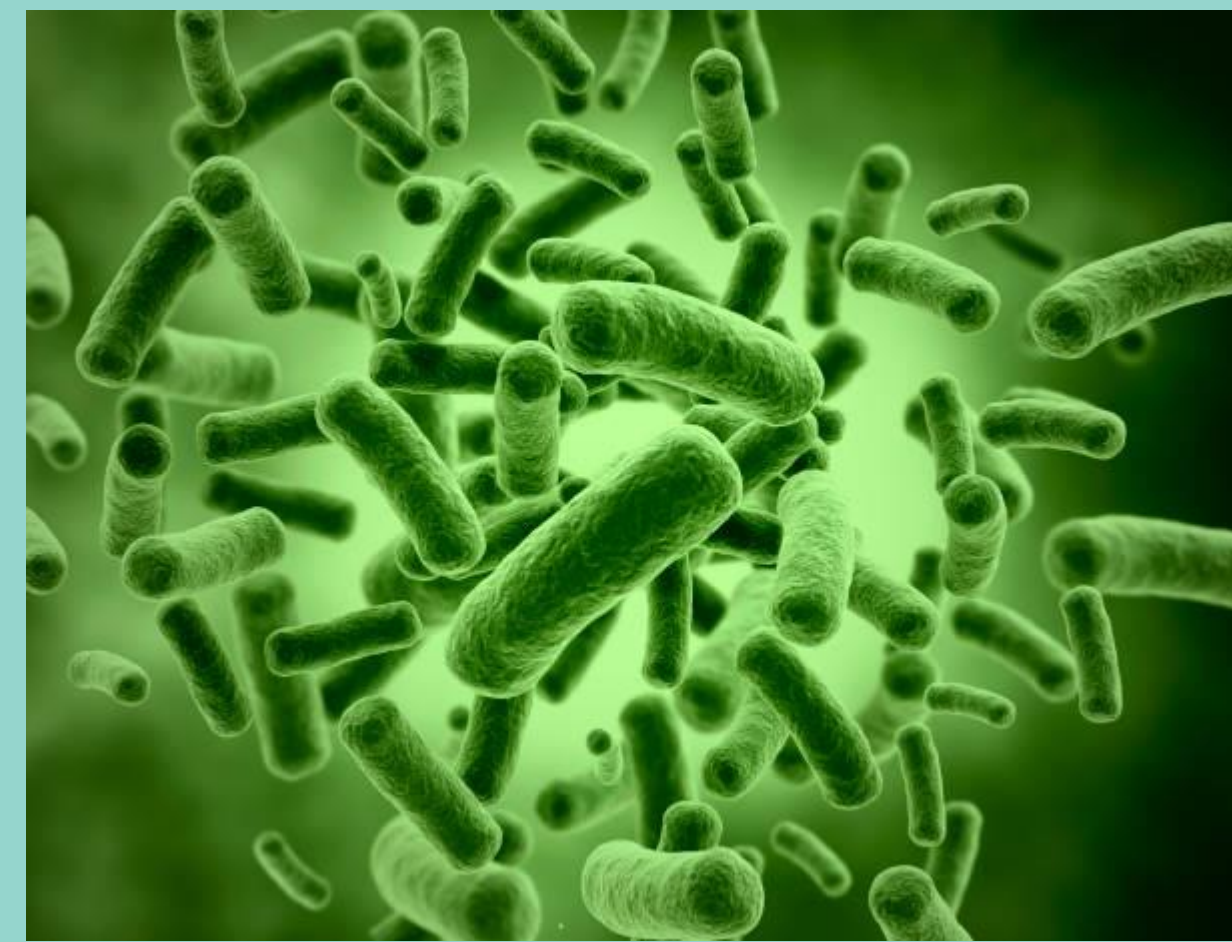
## Introduction

Bioremediation uses bacteria/microbes that are able to break down oil into nontoxic substances (Al-Sayegh et al., 2016).

This systematic literature review will discuss:

- The development of oil-degrading bacteria
- Potential applications in environmental restoration of ocean oil spills.

By reviewing recent developments in microbial remediation, specifically oil-degrading bacteria, bioremediation may be a potential method in ocean oil spill management.

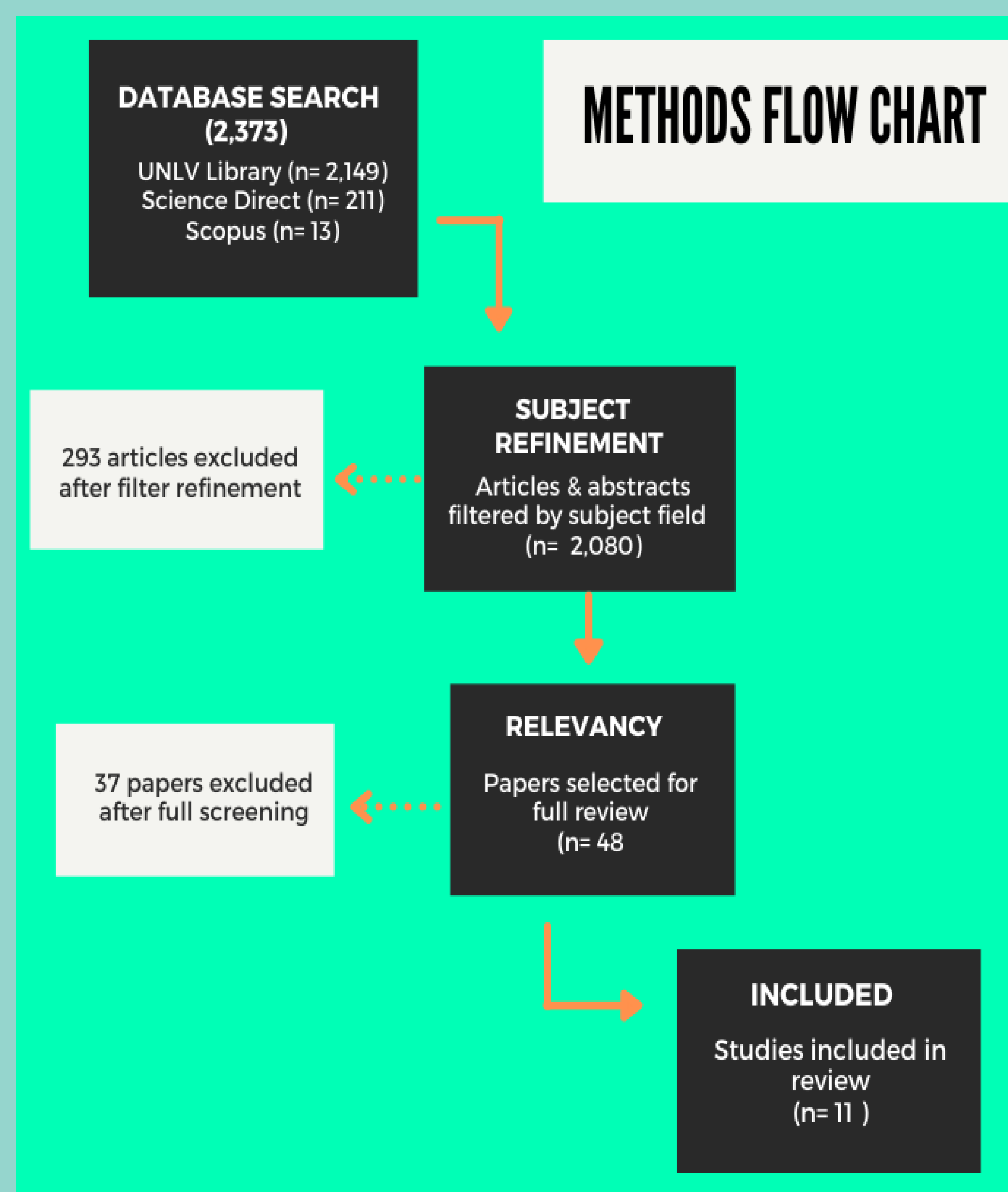


Bacteria (JESPER KLAUSEN / SCIENCE PHOTO LIBRARY)

## Methodology

A systematic review was done to answer the research question.

1. Which marine bacteria degrade oil?
2. What supplements enhance bioremediation?



## Further Considerations

Many strides have been made in bioremediation applications

A few topics that may need further consideration, include:

- Can bacteria be engineered to have oil-degrading capabilities?
- How can oil-degradation be maximized, without increasing CO<sub>2</sub> emissions?

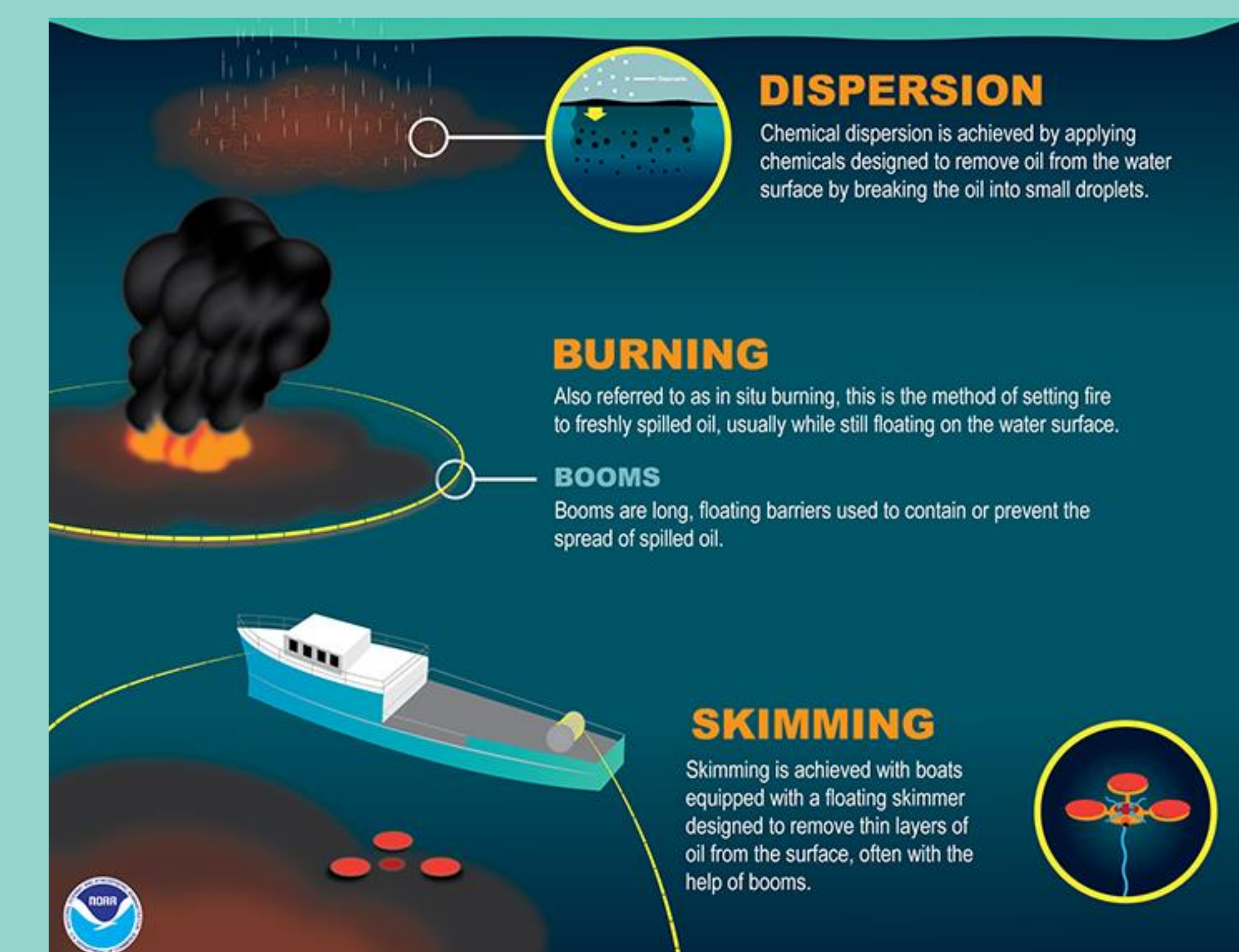
## Conclusion

Suitable bacterial strains for bioremediation of oil spills, include:

- *Alcanivorax* (Yakimov et al., 2007)
- *Marinobacter* (Yakimov et al., 2007)
- *Thalassolituus* (Ron & Rosenberg, 2014)
- *Mycobacterium* (Kim et al., 2015)
- *Oleispira* (Ron & Rosenberg, 2014)
- *Exiguobacterium* (Muangchinda et al., 2020)

Supplements that enhance oil-degradation:

- Uric Acid (Ron & Rosenberg, 2014)
- Algae (Zhang et al., 2018)
- Combining dispersants w/ marine bacteria (Tremblay et al., 2019)
- A ready-to-use bioremediation liquid (Muangchinda et al., 2020)



Responses to Oil Spills (NOAA, 2015)

## References

Further references can be provided through the provided link:

<https://docs.google.com/document/d/1LyLrZr5Q7P>

[8u\\_wBbC9O8HmoSMRf6gkQH/edit?usp=sharing&o](https://docs.google.com/document/d/1LyLrZr5Q7P8u_wBbC9O8HmoSMRf6gkQH/edit?usp=sharing&o)

[uid=106304675138952987445&rtpof=true&sd=truea](https://docs.google.com/document/d/1LyLrZr5Q7P8u_wBbC9O8HmoSMRf6gkQH/edit?usp=sharing&ouid=106304675138952987445&rtpof=true&sd=truea)