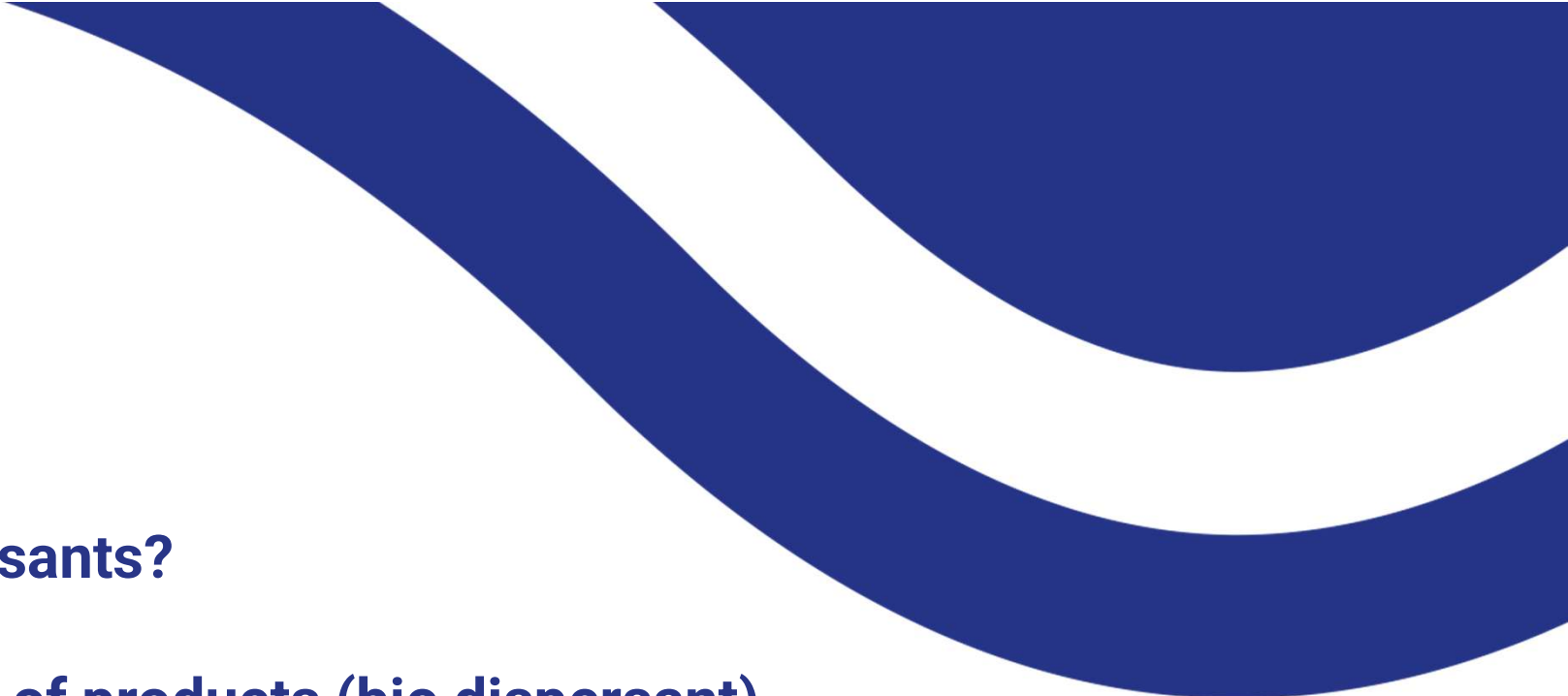


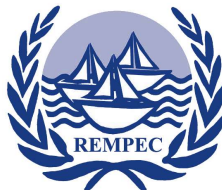


What are dispersants?

New generation of products (bio dispersant)



**Mediterranean
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REMPEC Regional Webinar
November, 17th 2025
Tristan.gobert@cedre.fr



- I – What are dispersants ?
- II – How do dispersants work ?
- III – Bio-dispersants: A Green Revolution in oil spill response

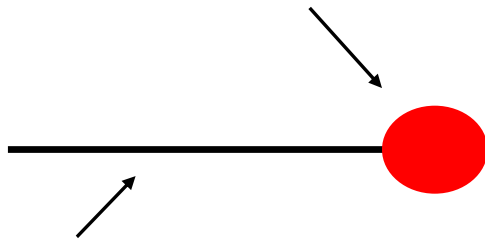
I – What are dispersants?

- ❑ Dispersants are liquid mixtures of surfactants and solvents

Surfactant: reduces surface tension and breaks up the oil slick

Solvent: penetration of the dispersant into the oil slick

Polar part = affinity for water

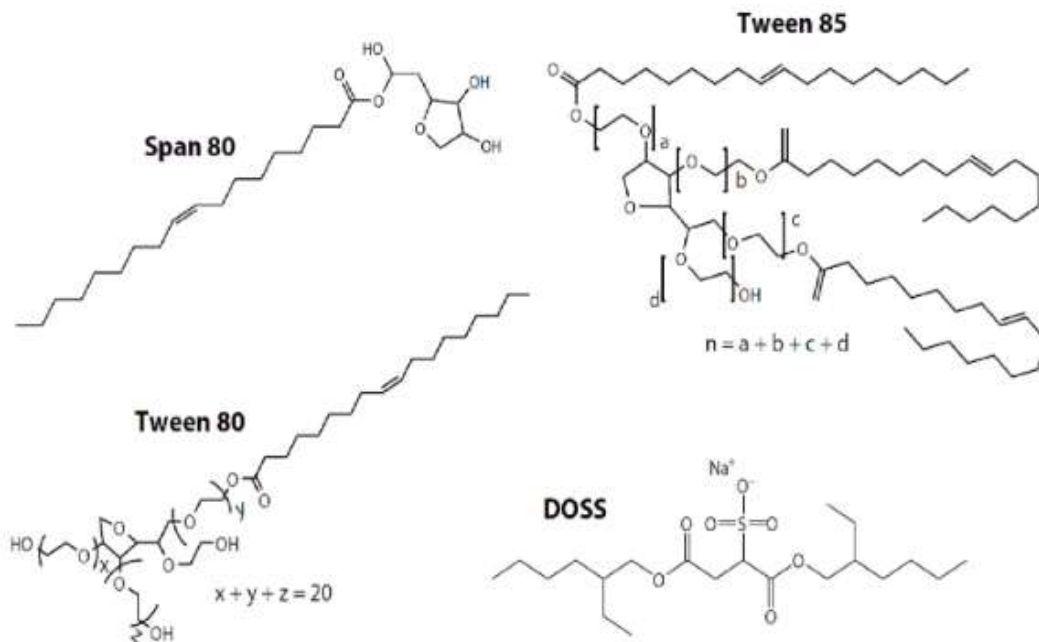


Apolar part = affinity for oil

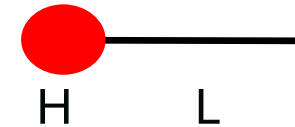


I – What are dispersants?

➤ Conventional Surfactants :



(John et al. 2016)



HLB = Hydrophilic / Lipophilic Balance

HLB	Behaviour
0-6	Water in Oil Emulsion
6-14	Typical Dispersant Zone
14-20	Oil in Water Emulsion

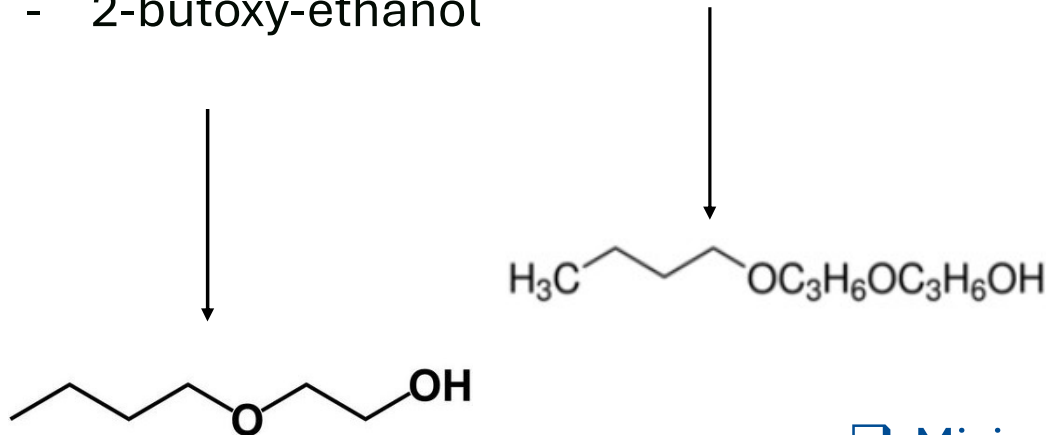
❑ Mixing several surfactants to obtain the active agent

I – What are dispersants?

➤ Solvents :

Alcohols

- Dipropylene glycol butyl ether
- 2-butoxy-ethanol



(Place et al. 2016)

Petroleum distillates

Example of SDS (dispersant)

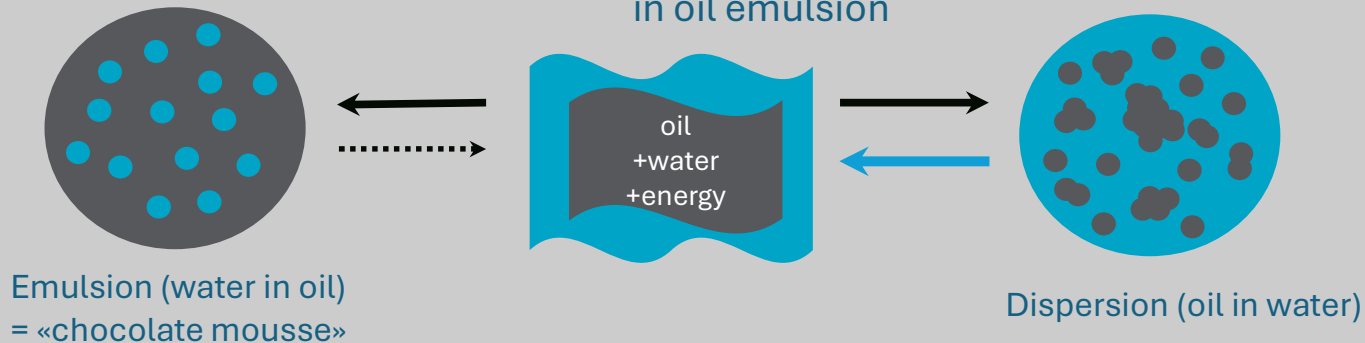
3.2. Mixture

Chemical Name	EC-No
Hydrocarbons, C11-C14, n-alkanes, isoalkanes, cyclics, <2% aromatics	926-141-6

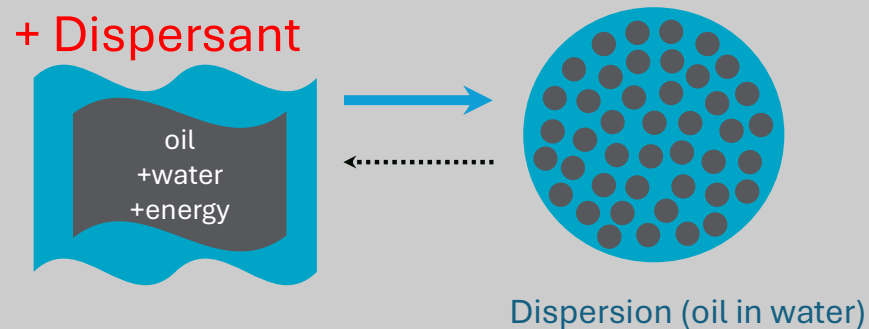
❑ Mixing several solvents to obtain the solvent

II – How do dispersants work?

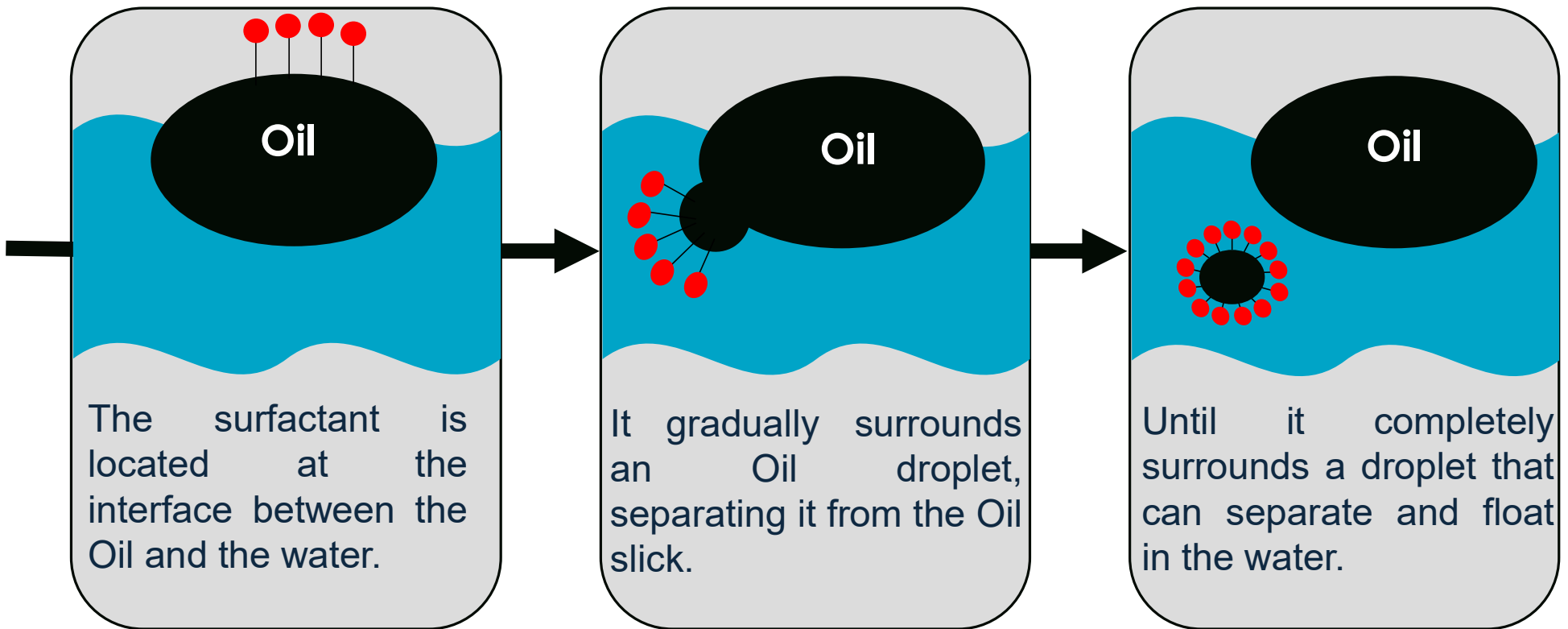
1- In the absence of dispersants, oil floating on the surface will either disperse naturally or form a water in oil emulsion



2- By adding dispersant, fine oil droplets will form in the water, disperse and mitigate emulsification



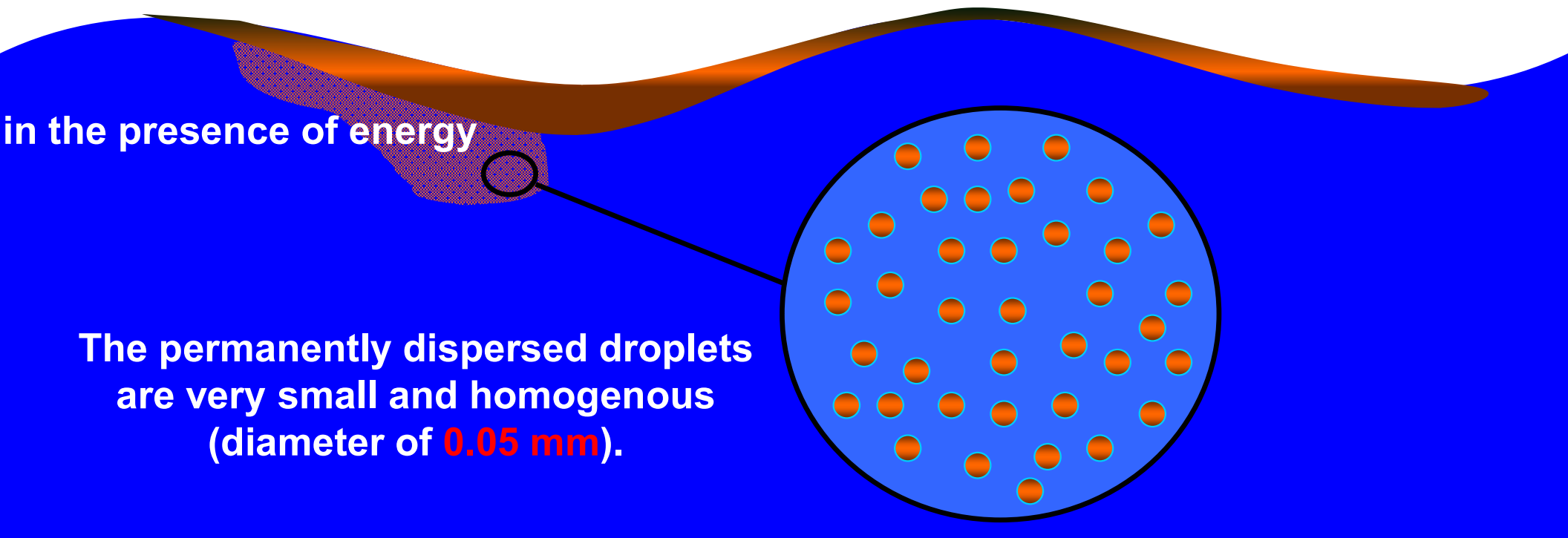
II – How do dispersants work?



- ❑ Performance in penetrating oil depends on the nature of the apolar part.
- ❑ Performance in stabilizing the droplet in water depends on the nature of the polar part.

II – How do dispersants work?

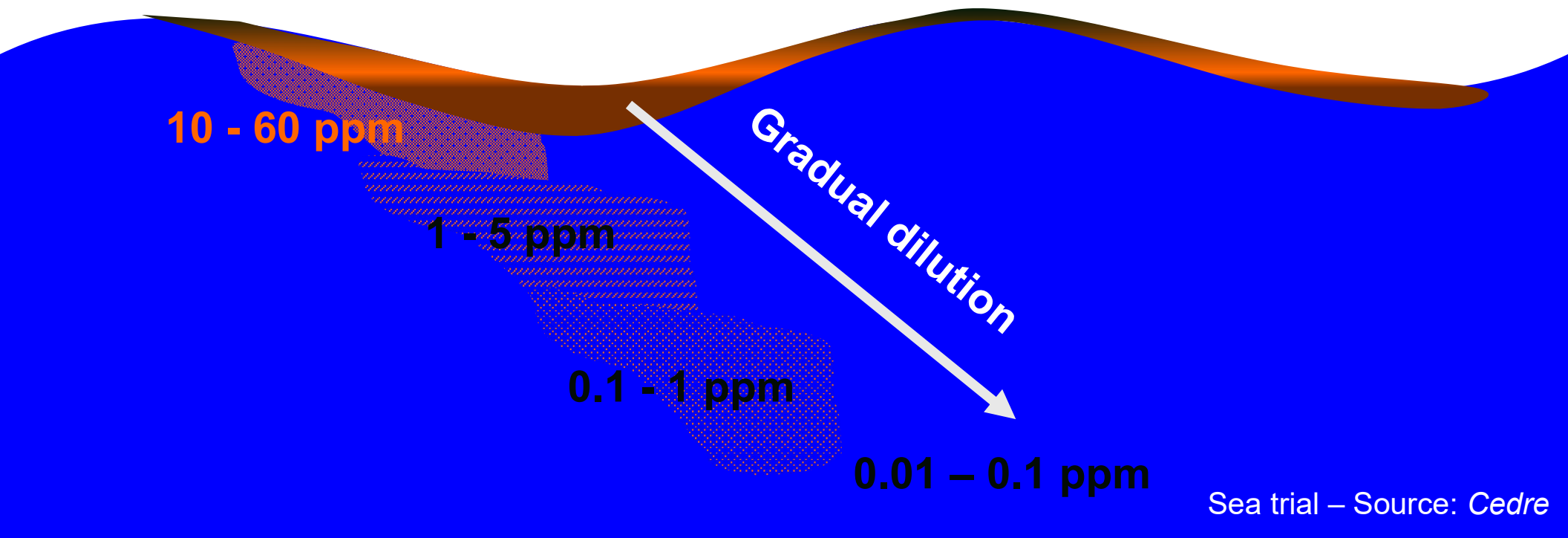
- ❑ The dispersant promotes the formation of droplets of uniform size that will disperse in all directions



II – How do dispersants work?



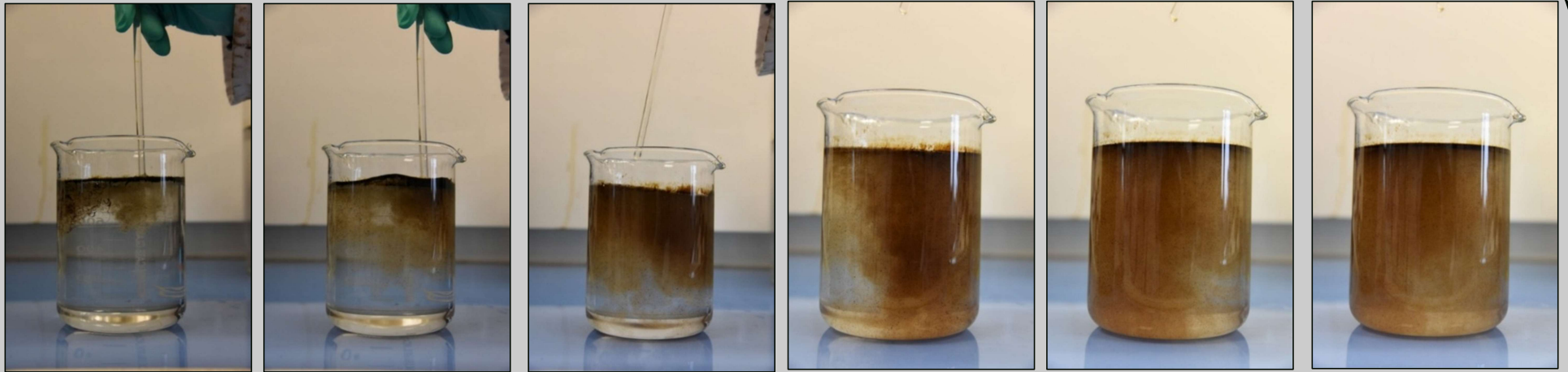
- Depending on the current velocity, this can be a rapid process.



Sea trial – Source: Cedre

II – How do dispersants work?

Example of effective dispersion

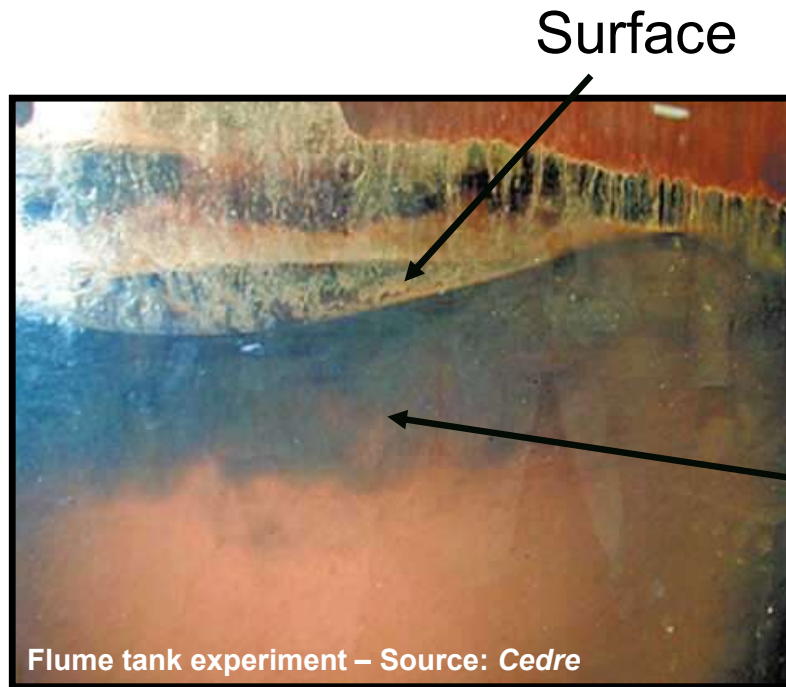


With the appropriate energy

homogeneous cloud

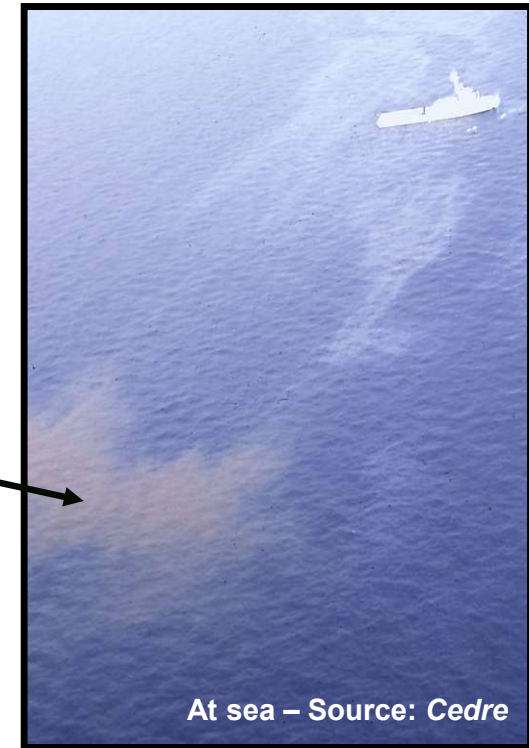
II – How do dispersants work?

Example of effective dispersion



Dispersant application in Cedre's flume tank
Distribution of dispersed oil in the water column

Dispersed oil



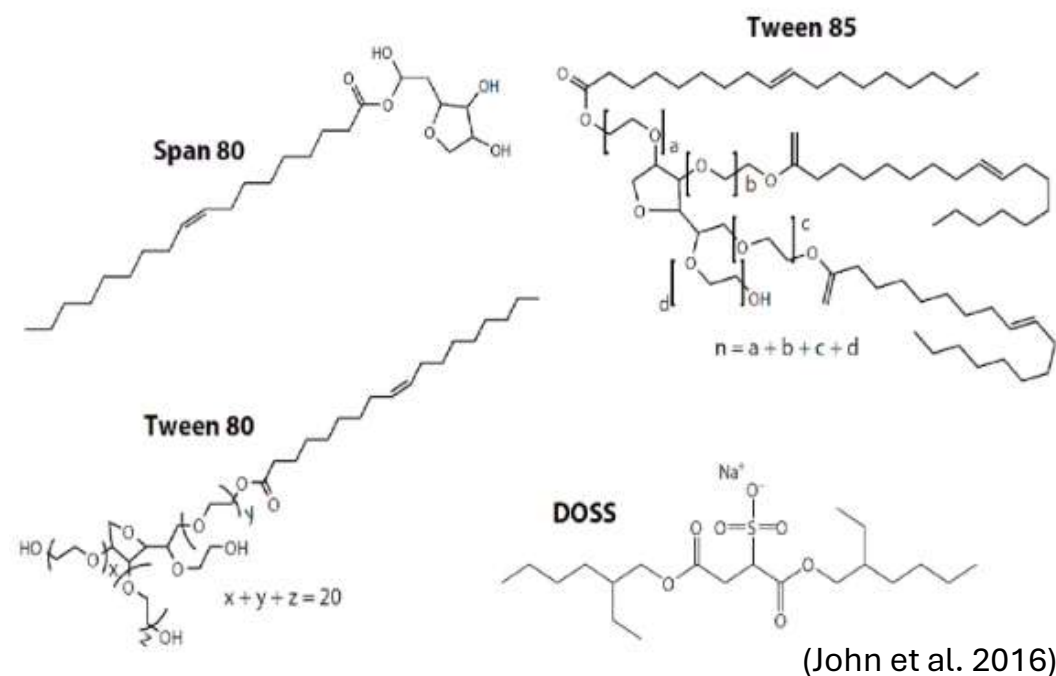
Aerial view:
Dispersed oil appears as an orange plume

III – Bio-dispersants: A Green Revolution in oil spill response



➤ Conventional dispersant

Surfactants present



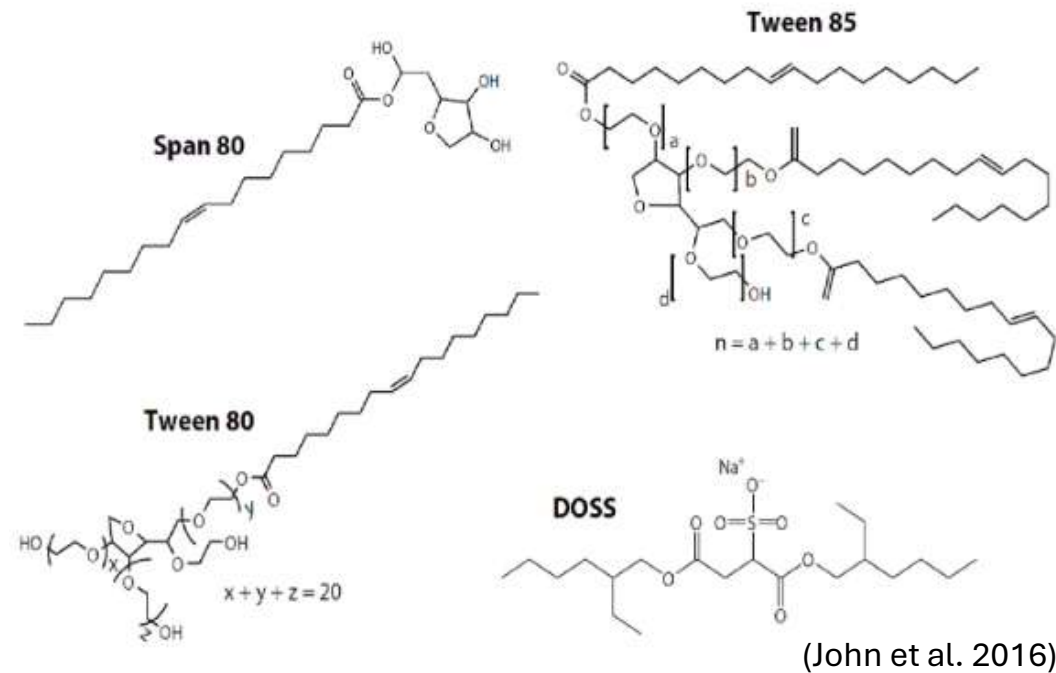
Deepwater Horizon oil spill

- Heavy use of dispersants (7,000 m³)
 - Between 16% and 30% of oil dispersed (source: Cedre)
-
- **Persistent DOSS in the environment**
(measured 300 km from the site after 64 days)
(Kujawinski et al., 2011)
 - **Concerns regarding toxicity and excessive time required for biodegradation of surfactants**

III – Bio-dispersants: A Green Revolution in oil spill response

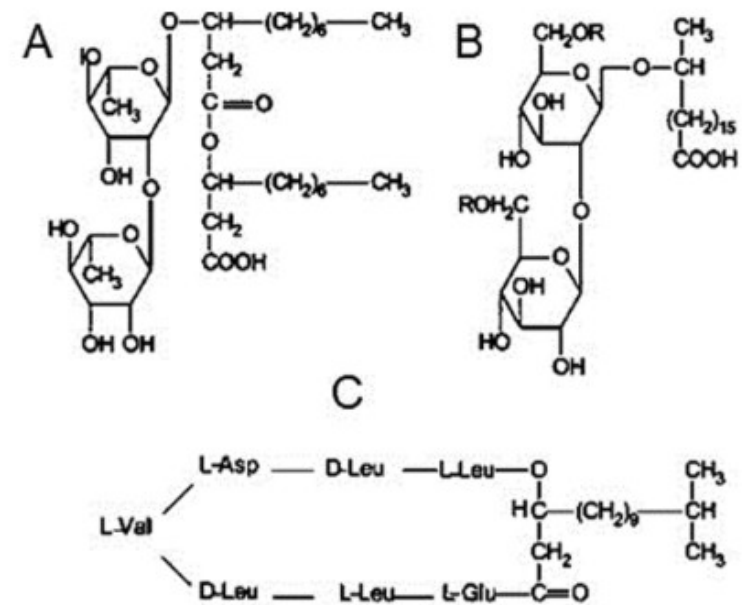
➤ Conventional dispersant

Surfactants :



➤ Bio-dispersants

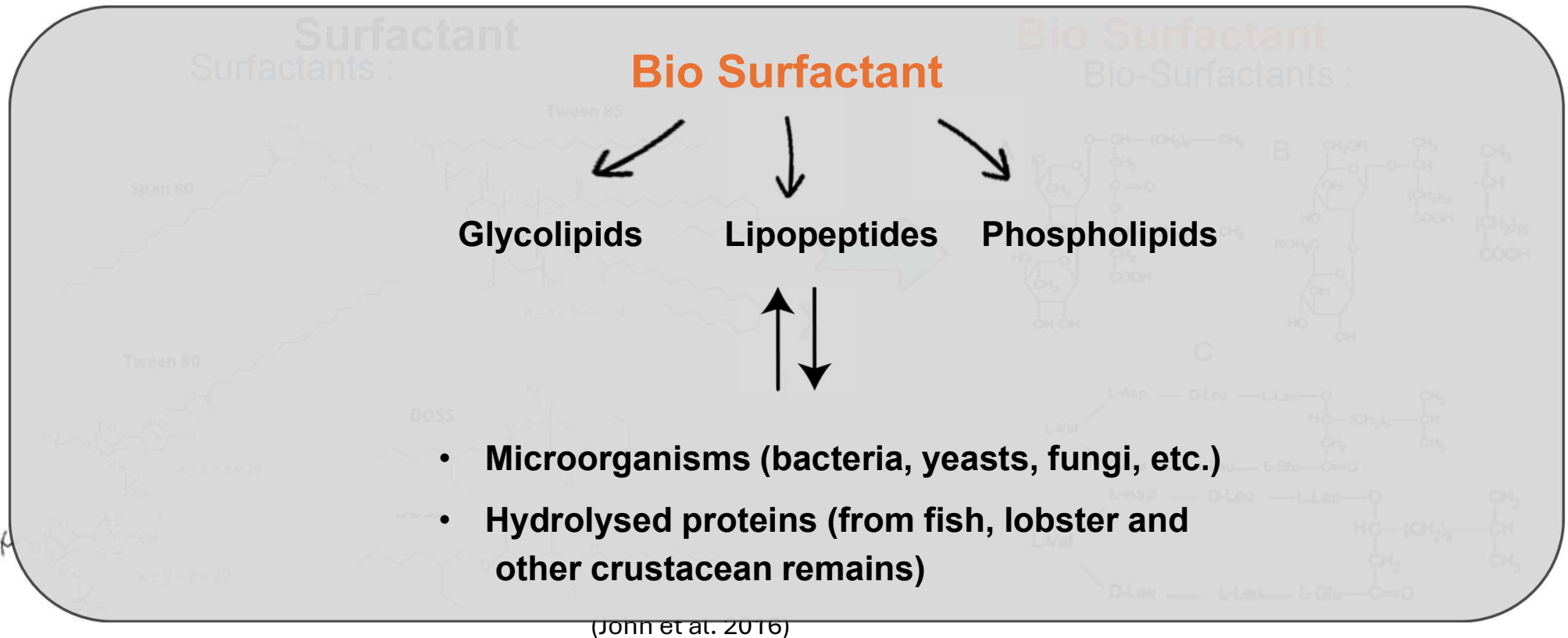
Bio-Surfactants :



III – Bio-dispersants: A Green Revolution in oil spill response

➤ Conventional dispersant

➤ Bio-dispersants



(John et al. 2016)

III – Bio-dispersants: A Green Revolution in oil spill response



➤ From a toxicity point of view

Fish and Wildlife Service (FWS) Acute Toxicity Rating Scale

	LC50 (ppm)
Highly toxic	< 1
Toxic	1-10
Moderately toxic	10-100
Low toxic	100-1000

Conventional dispersants



Bio dispersants

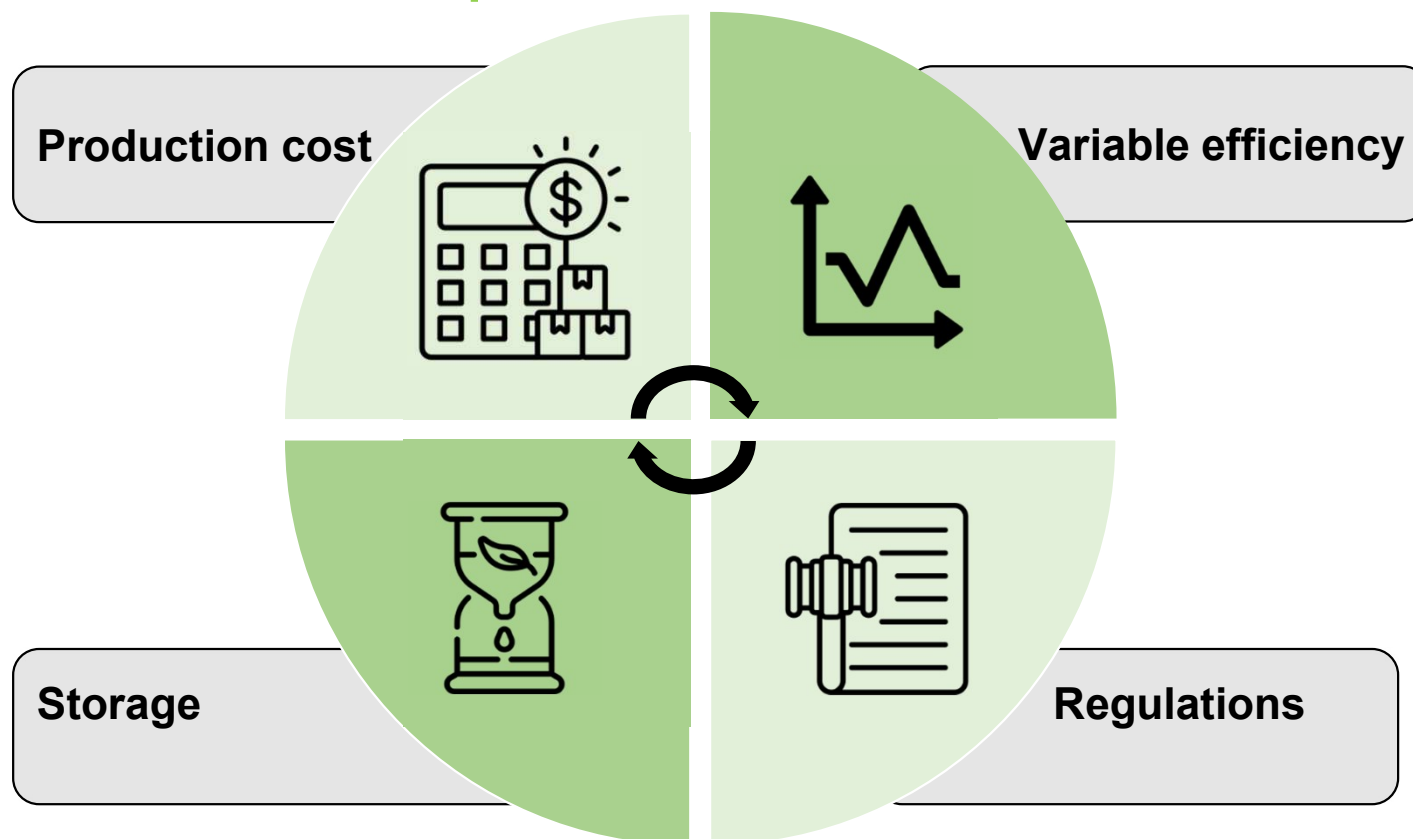


(Giwa et al. 2023)

III – Bio-dispersants: A Green Revolution in oil spill response



➤ Limits on the use of **bio-dispersants**



THANK YOU



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