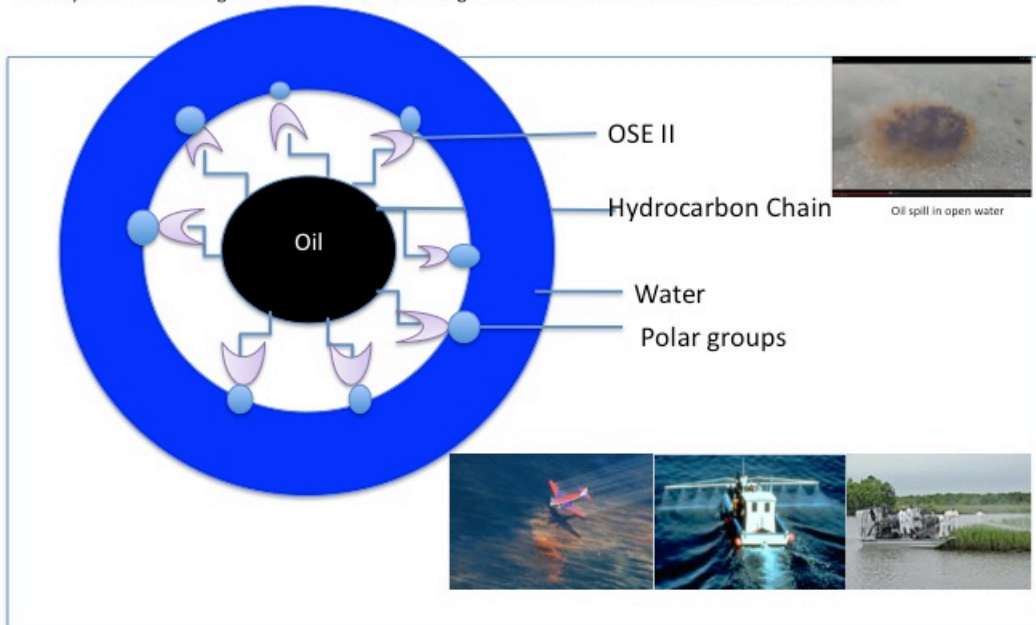


Oil Spill Eater II-Mechanism of Action

These illustrations represent a simplified overview of how OSE II breaks down oil and converts it to CO₂ and water

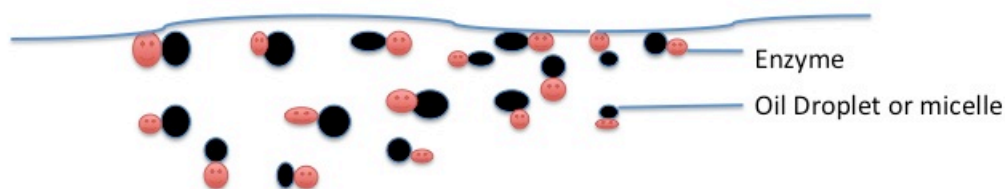
OSE II BIOSURFACTANTS—THEIR MECHANISM OF ACTION

When OSE II is applied to an oil spill on open water, the molecular structure begins to breakdown immediately and in a short time, *visually* disappear. This is caused through the action of bio surfactants that connect with the oil molecules and breakdown the covalent and ionic bonds creating small micelles (oil droplets). This process rapidly reduces the toxicity of the oil making it more bioavailable to indigenous bacteria that utilize the oil as a food source.



OSE II FORMS PROTEIN BINDING SITES THAT STAY IN CONTACT WITH AN OPEN WATER SPILL

Simultaneous with the biosurfactant action breaking down the oil into a more manageable form, enzymes form protein binding sites that attract the bacteria to induce or *trick* them into utilizing the detoxified oil as a food. The food-source droplets are called micelles—liken these to being self contained separated units where bacteria can safely live. OSE II also changes the density of the oil to cause it to float, and reduces the adhesion properties so the oil will no longer adhere to shorelines, vegetation or man made structures.



Oil Before application of OSE II



Oil starting to break up immediately when OSE II is applied



Oil breaking down to very small droplets or micelles after a short time once OSE II is applied

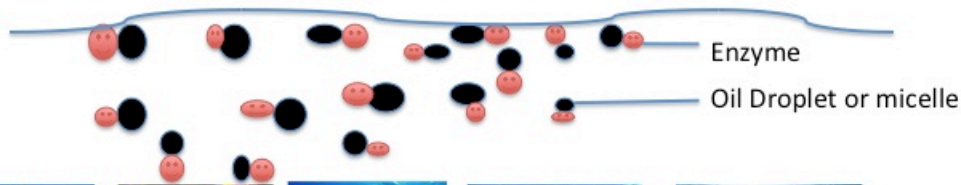


Oil droplets are virtually invisible in a short time after applying OSE II enzyme are now attached as well, the oils impact to the environment has been greatly reduced at this point

ADD Time notations across all images

OSE II CONTAINS MORE THAN 150 TYPES OF ENZYMES THAT ACT IN TANDEM WITH BIOSURFACTANTS AND NUTRIENTS

Once OSE II has come into contact with oil molecules, the enzymes form protein binding sites enabling the already present bacteria to utilize the oil as a food source. OSE II enzymes and biosurfactants create a detoxified medium of smaller separated droplets called micelles, where indigenous bacteria can safely attach themselves and digest to CO₂ and water. OSE II also changes the density of the oil making it float and reduces the adhesion properties so the oil will no longer adhere to shorelines, vegetation or man made structures.



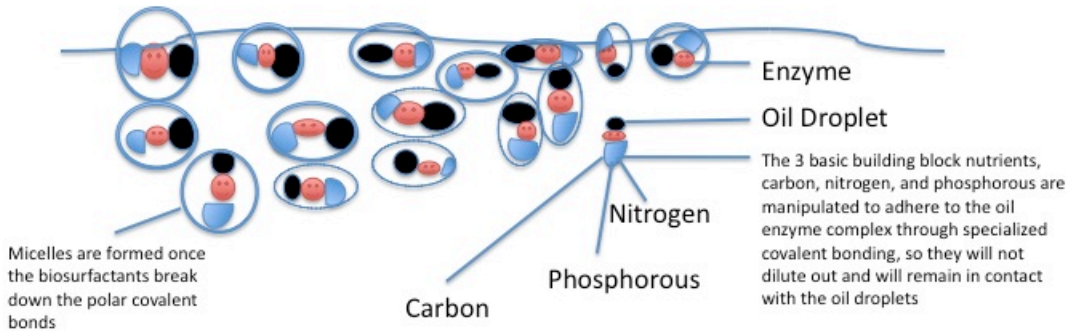
60 percent of marine species live in the water column, while 40 % of the species are bottom dwellers, OSE II protects all of these species



OSE II breaks down the molecular structure of the hydrocarbons so they also lose adhesion properties ensuring it will not stick to sandy or rocky shorelines or vegetation. As can be seen above, the oil lifts and remains on the surface until the oil is digested to CO₂ and water

ENZYME-NUTRIENT OIL DROPLET PACKETS FORMED

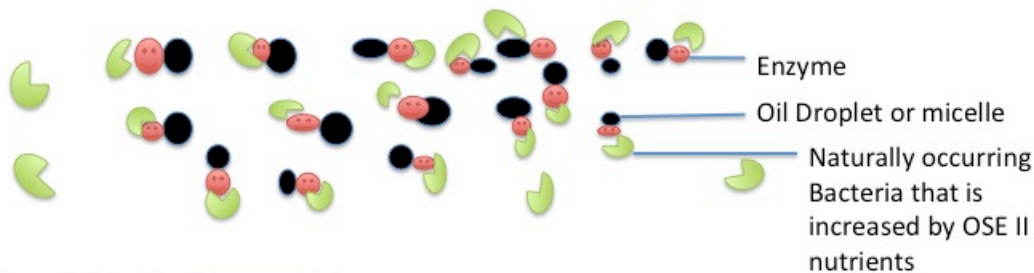
The Biosurfactants breakdown the polar compounds in oil/hydrocarbons and thus change the polarity, disengaging the covalent and ionic bonds enabling oil and water to mix. While this is occurring the enzymes and micro-nutrients bond to the micelles forming an enzyme nutrient complex package. The affinity that certain enzymes have for various chain hydrocarbons make it possible for these small packets of micro-nutrients, (containing the three basic building blocks for growing bacteria; carbon, nitrogen, and phosphorous) to bond or adhere to the micelles through specialized covalent and ionic bonds until they are digested to CO₂ and water by bacteria.



OSE II breaks down the molecular structure of the hydrocarbons so they also lose adhesion properties ensuring it will not stick to sandy or rocky shorelines or vegetation. As can be seen above, the oil lifts and remains on the surface while the broken down hydrocarbons with enzymes as well as packets of micro nutrients attached, start growing local bacteria, which you can see occurring on the oil in the above images. Once the large population of bacteria run out of OSE II nutrients they will start digesting the oil.

NATURAL BACTERIA LIVING IN THE SPILL ENVIRONMENT DIGEST THE OIL TO 100% NON DETECT

OSE II contains nutrients that attract indigenous bacteria that rapidly colonize/grow in numbers greatly speeding up spill remediation. OSE II does not contain any foreign bacteria or non indigenous organisms. The bacteria, natural to the spill environment, rapidly consume detoxified oil with the help of OSE II nutrients and enzymes until all is converted to CO₂ and water, permanently removing the oil from the environment.



You can see the bacteria spreading out over the detoxified floating oil and once the oil/food source is depleted, the bacteria clumped up to gain access to the oil remnants until all the oil had been converted to CO₂ and water, at which point the enhanced bacteria dies off to background or pre spill levels