



PRP OIL ABSORBENCY DEMO

PRP® is an all-natural product manufactured through a patented process that takes pure bee's wax and soybeans and produces these ingredients into a fine powder similar in consistency to baking powder. **PRP®** is a very unique adsorbent that will remediate hydrocarbons and itself.

The science behind the technology in the PRP product was originally discovered in the NASA space program, working with industry scientists whilst performing orbital experiments in microencapsulation and Microspheres in the Space shuttle program, where the commercialization of the discovery was patented.

During the patented manufacturing process, the fine powder created is made up of billions of tiny beads or buoyant capsules (50 microns in size), where each bead has a relatively firm exoskeleton and a pocket of air trapped inside, called a **Microsphere**:

A Microsphere is a Nanotechnology science, where Nano-spheres were created with pockets of air trapped inside a cell structure, creating buoyant capsule.

PRP® has a natural affinity for hydrocarbons, making it *Oleophilic* and will immediately on contact, adsorb and trap the hydrocarbon molecules into the microsphere, where it will never leach out.

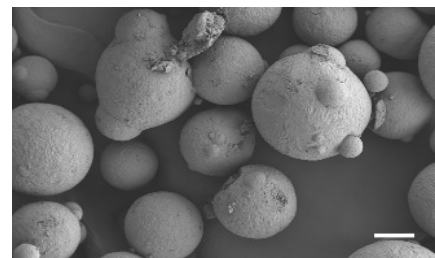
PRP® is also hydro-phobic (meaning it repels water and can't be mixed into water) since the specific gravity of the product is less than water, thus the product will always remain afloat, even when there is extreme wind shear on open waters.

PRP® is a blend of natural ingredients that contain naturally high levels of Phosphates, Nitrogen and Potassium, essential nutrients for the controlled growth of the microbial populations, as the product provides a food source for the oil degrading microbes.

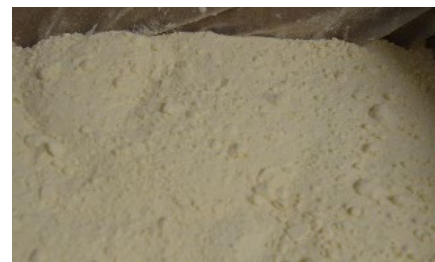
Once the hydrocarbons are adsorbed into the Microsphere, the physical and chemical properties have permanently been altered, thus the hydrocarbons are no longer sticky and they are now readily available in a more simplified state, making the carbons chains available to be used as an energy source.

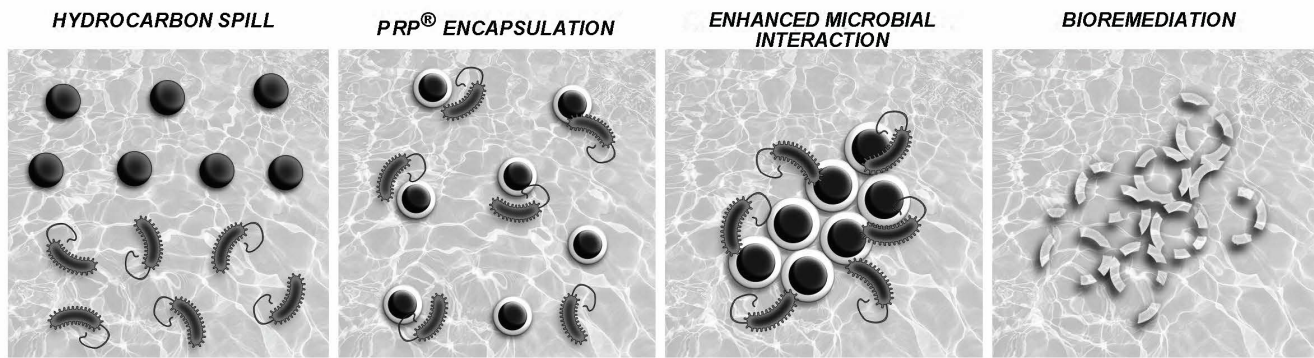
PRP® and Hydrocarbon Matrix is no longer sticky, it will never cause secondary contamination if escaping the contained area. greatly reducing the interaction and impact on wildlife and eco-sensitive areas. In the event that the oily matrix escapes containment, it will naturally and safely bioremediate.

PRP® Powder Microcapsules (100x)



PRP® Powder





PRP® is completely non-toxic, non-hazardous, 100% biodegradable, non-flammable.

PRP® is effective in water bodies with varying salinities, creating a perfect microenvironment in which the oil degrading microbes can perform.

PRP® obtains moisture from the water and at the same time gains oxygen from the ambient air.

PRP® can be used in variety of ways to control and degrade hydrocarbons as a first, second or tertiary response tool in open water, backwater, wetlands, near shore scenarios and anywhere where water encounters hydrocarbons.

PRP® can be allowed to degrade oil spills In Situ or the matrix can be recovered mechanically and then recycled or relocated to a land treatment facility (Bio cell or Bio Piles).

PRP® has been scientifically evaluated since 1993 via accredited third-party test facilities such as the National Environmental Technology Applications Corporation (NETAC) and many other independent laboratories.

PRP® has been tested for toxicity against other leading remediation chemical agents:

Agent/Pollutant	Marine Test Specimen	LC50 (ppm)*
COREXIT 7664	Mysidopsis Bahia	751
COREXIT 7664	Menidia Beryllina	899
COREXIT 9527	Mysidopsis Bahia	27
COREXIT 9527	Menidia Beryllina	45
PRP	Mysidopsis Bahia	68,000
PRP	Menidia Beryllina	354,000
#2 Fuel Oil	Mysidopsis Bahia	3.3
#2 Fuel Oil	Menidia Beryllina	3.7

*Higher LC50 indicates more living microorganisms

PRP® can limit the negative effects of secondary environmental damage often caused from first responders entering eco-sensitive areas and since the product is inert it will pose health risks to responders or OSR teams.

PRP® The floating wax matrix will disappear over time, into CO₂, H₂O and Nitrates as dictated by microbial flora where the product has been deployed.

Regulatory Concurrence

PRP[®] was originally listed in the mid-1990s into the 2000's on U.S. EPA's National Contingency Plan Sub Part J as an oil spill response bioremediation agent. The EPA later re-classified **PRP**[®] as a sorbent due to its unique ability to first adsorb and hold oils in a surface water release.

In addition to the EPA acceptance, the U.S. Coast Guard's ARTES program, reviewed the technically data and accepted **PRP**[®] as a sorbent for use in ecologically sensitive areas.

PRP[®] has been approved by the Department of Petroleum Resources (**DPR**) and National Oil Spill Detection and Response Agency (**NOSDRA**) for deployment on the navigation waters of Nigeria.

Application Control

PRP[®] addresses specifically the issue of application control, where traditional products tend to disperse rapidly into the water column from uncontrolled applications, causing oxygen depletion, resulting in algae blooms.

PRP[®] does not cause oxygen depletion in the water column nor create an environment toxic to indigenous populations.

PRP[®] has no negative impact to shorelines influenced by tidal fluctuations and storm waters, which can flush the microbes and soluble nutrients from the soil and introduce them into the water column.

PRP[®] is both hydrophobic and is oleophilic and is the only product that will contain and remediate hydrocarbons in a microenvironment on the water's surface.

Specification and Safety Information

PRP[®] is a natural non-combustible, non-reactive, granular powder, is completely non-toxic, non-hazardous, 100% biodegradable, supplied as a loose powder containing millions of tiny particles (Beads). Exposure to the fine powder, which can be dust like, may be irritating to eyes, nose, throat and lungs at very high exposure levels. Responders or Applicators should wear suitable F1 type dust masks and eye goggles.

Applications of PRP are nearly infinite and it can be spread in many ways:

- By hand - sprinkling like rock salt;
- Mechanically using a Hydroseeder - applied in a combination water/ product slurry, where the water is used as the delivery system up to 30m from the Hydroseeder;
- From the air helicopter or vessels;

The addition / combination of additional microbes can speed up the biodegradation process.

OIL CLEANUP PRODUCT DEMONSTRATION

BENCH TEST

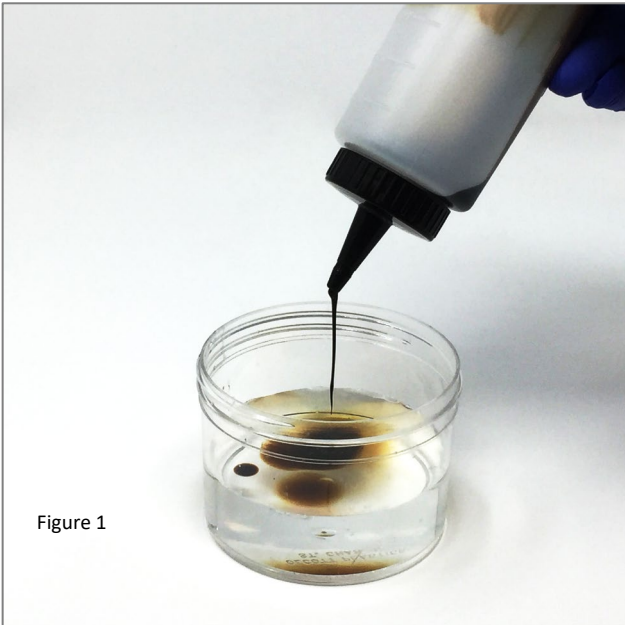


FIGURE 1) Sample Preparation: Add oil contaminated water to a container. In this demonstration contaminated water was prepared by adding crude oil to clean water.

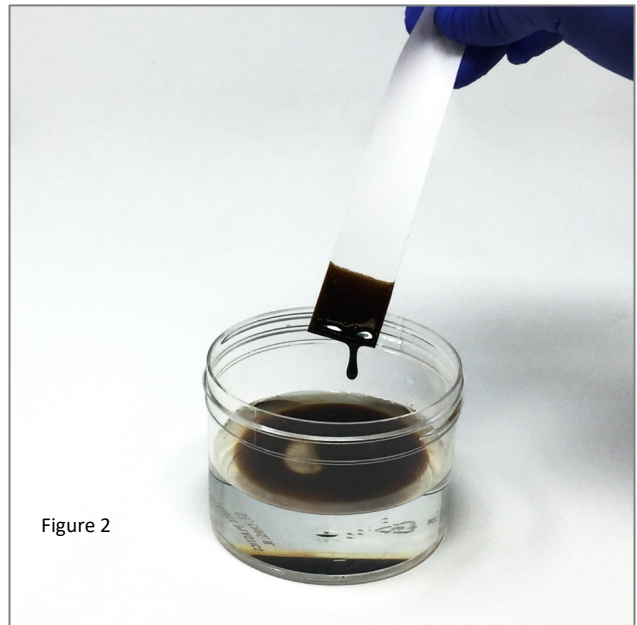


FIGURE 2) Oil Contamination Test: Insert a strip of adsorbent paper into the oil contaminated water. Remove the strip to show that the oil contamination has adsorbed into the strip.

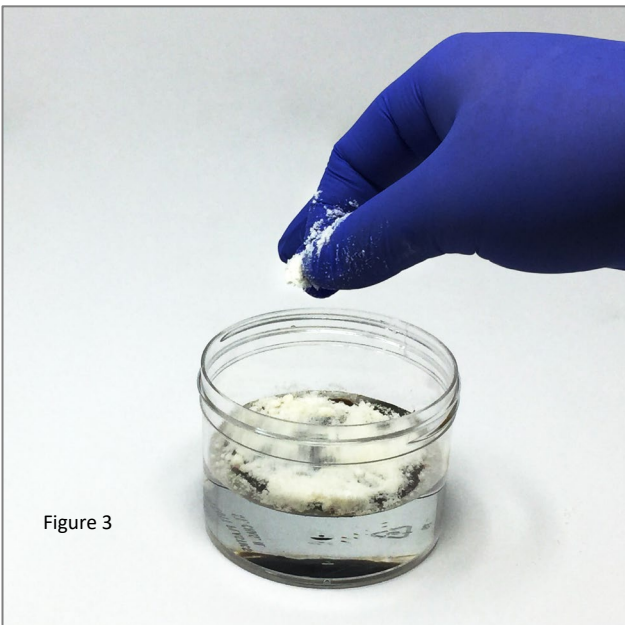


FIGURE 3) REMSORB Encapsulation and Absorption Stage: Apply REMSORB to the contaminated water sample. Stirring/Agitation may be required to ensure sufficient contact with oil particles. Add enough REMSORB to fully adsorb and encapsulate the quantity of oil present.

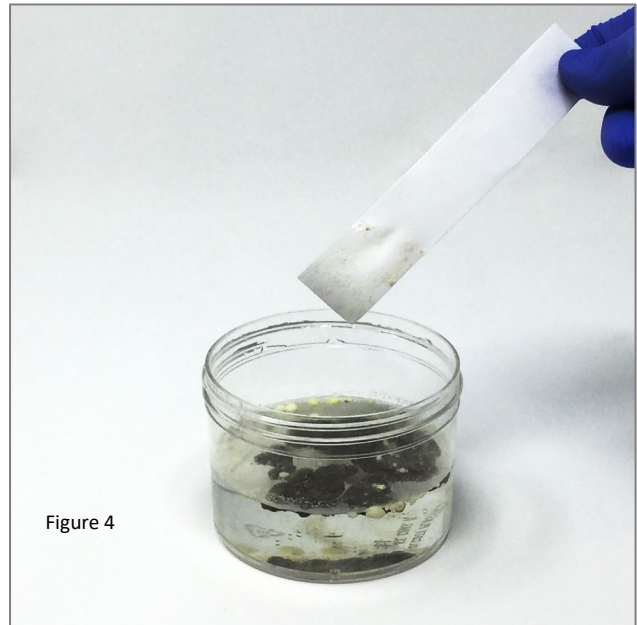


FIGURE 4) Oil Encapsulation Test: After REMSORB has had time to fully adsorb and encapsulate the oil, much of the original white color from the REMSORB should be gone. Insert a new strip of adsorbent paper into the REMSORB treated water sample. Remove the strip to demonstrate that oil has not adsorbed into the strip once treated with REMSORB.

OIL CLEANUP PRODUCT DEMONSTRATION (CONT)

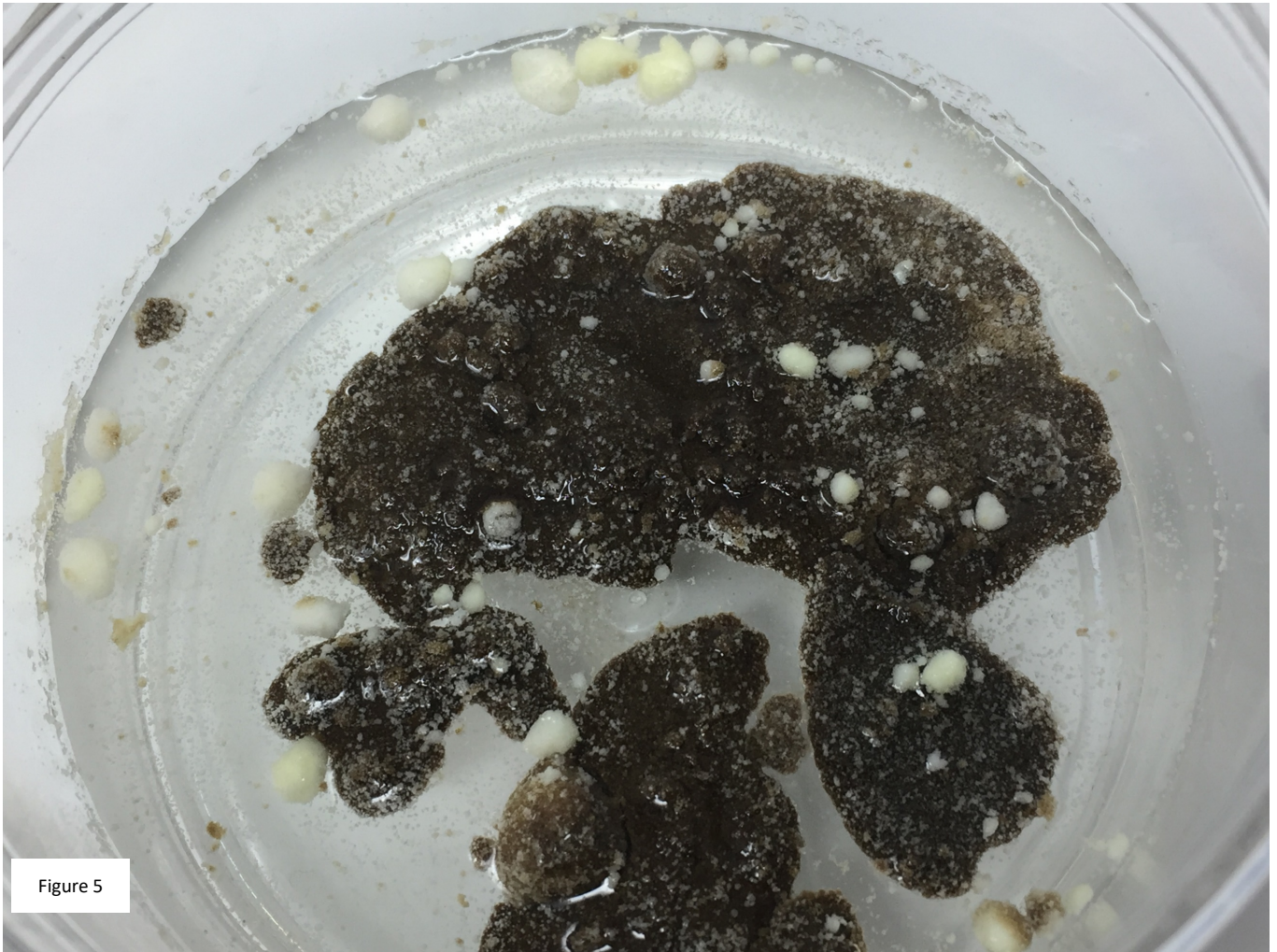


FIGURE 5) PRP CLOSEUP: Pictured above is a close-up photo of the oil cleanup test after full encapsulation by PRP. This photo was taken after having let the product in Figures 1-4 sit for approx. 24 hours. Note that the oil spill is no longer round such as in Figure 2, nor is it causing a visible brown oil slick on the water's surface such as in Figure 1. PRP has entirely adsorbed and encapsulated the oil turning it into a buoyant, semi-solid mass that is now isolated from its surrounding environment and can be effectively bioremediated.

SITE LOCATION:

BODO CITY PHASE 2 PROJECT

FIELD TEST:

FIELD TEST DEMONSTRATION USING PRP

DAY 1.

1. The field test to be undertaken at the change from the High tide to the Low tide
2. Deploy 2 x River Boom, both booms are connected to each other and anchored to the shoreline, in such a way as to create a containment cell. The center point of the 2 joined booms to be anchored in the water, to prevent movement from receding tide
3. Once the tide starts to recede i.e. the mud bank is becoming exposed, start injecting water into the mud with a lance > 1,2m long, so that any trapped oil will be released to the surface.
4. Once released brown or black oil is visible, sprinkle by hand **PRP**[®] onto the floating oil, making sure the powder is evenly spread. Some powder can be sprinkled in front of the adsorbent boom in advance of any anticipated released oil
5. Continuing inserting the lance until no further oil is been released and continue the process until the low water mark goes beyond the river boom

During the flushing and application process, the virgin product must first be filtered using a conventional rice strainer to break up any solids from airfreight – ensure the product is homogenized as a uniform powder. The powder in its virgin state, is a yellowish colour

Once the product comes into contact with the released oil, it will change colour as it adsorbs the oil into the Microsphere, this is a visual indicator that the absorption process has occurred.

The remaining virgin powder, still inside the containment area, can be agitated with a rake, to spread the virgin powder to where released oil exists.

Once the oil has been adsorbed, it will not leach out, even if the matrix escapes the containment area it will no longer be sticky or have the ability to contaminate clean areas within the creek

The oil can be recovered manually or with skimmer depending on the volume, which is made easy since the oil cannot sink, or skimmers can be used to recover oil product matrix if the flushing technique is attempted in the reverse, i.e. from the low tide change to high tide change.

The Boom can be left in place overnight and the area can be inspected the next day, indicators that remediation is taking place may include the matrix showing signs of becoming “moldy – like bread mold”. Due to site conditions, quality of the water and surrounds remediation results will be visibly noticeable in 24 hours.

Day 2.

The SCAT to inspect the surface of the mud bank and dig a hole “remove mud plug” and evaluate the condition on the mud inside the hole