

The logo for MicrobeBio, featuring the brand name in a green, sans-serif font with a registered trademark symbol, is displayed on a white, downward-pointing banner that is superimposed over the right side of the image.

MicrobeBio®

**MICROBEBIO GREEN
HAZMAT OR 9.0™
ADVANCED
BIOLOGICAL OIL
SORBENT & ACTIVE
REMEDICATION
TECHNOLOGY**



**ABSORB
TODAY.
BIOREMEDIATE
TOMORROW.
RESTORE FOR
GENERATIONS.**



MicrobeBio® Green Hazmat OR 9.0™ represents the next generation of oil spill response and environmental remediation.

Unlike conventional absorbents that simply collect oil for disposal, Green Hazmat OR 9.0™ is a living biological remediation platform that immediately captures petroleum hydrocarbons while simultaneously initiating their natural destruction through advanced microbial biodegradation.

Engineered from highly efficient, low-cost, sustainable carrier materials and infused with MicrobeBio's proprietary hydrocarbon-degrading microbial technology, Green Hazmat OR 9.0™ transforms contaminated soil and water into recovering ecosystems.

The result is faster cleanup, lower remediation costs, reduced waste disposal, improved environmental compliance, and long-term restoration of land and water resources.

Whether responding to pipeline failures, produced-water contamination, refinery operations, storage tank leaks, drilling sites, marine spills, or legacy oil fields such as Lake Maracaibo, Green Hazmat OR 9.0™ converts passive containment into active environmental recovery.



MORE THAN AN OIL SORBENT

- Green Hazmat OR 9.0™ is a complete biological remediation system designed for some of the world's most challenging petroleum-contaminated environments.
- Unlike traditional sorbents that become hazardous waste after absorbing oil, Green Hazmat OR 9.0™ continues working long after application by supporting continuous microbial degradation of hydrocarbons directly within the contaminated site.
- Every particle functions as a miniature biological treatment reactor.

The background image shows an industrial facility with several large, white, cylindrical storage tanks. The tanks are arranged in a row, with some showing signs of rust and wear. In the foreground, there is a muddy, dark brown area with some puddles of water, suggesting a site of environmental remediation or a spill. The sky is clear and blue.

TECHNOLOGY PLATFORM ADVANCED HIGH-SURFACE-AREA CARRIER

A proprietary porous matrix manufactured from sustainable, environmentally responsible materials provides exceptional oil adsorption while creating an ideal habitat for beneficial microorganisms.



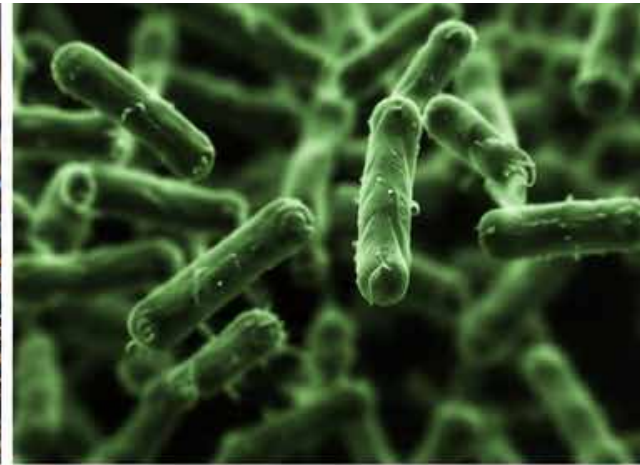
PROPRIETARY MICROBIAL CONSORTIUM

Each formulation is inoculated with carefully selected non-pathogenic hydrocarbon-degrading microorganisms specifically adapted for heavy crude oil and petroleum-contaminated environments.

Typical microbial groups include:

- Rhodococcus spp.
- Environmental Pseudomonas isolates
- Bacillus spp.
- Additional proprietary hydrocarbon-degrading microorganisms optimized for site-specific conditions.

These microorganisms attack multiple petroleum fractions simultaneously, accelerating degradation far beyond natural attenuation.



BIOLOGICAL ACTIVATION SYSTEM

Green Hazmat OR 9.0™ contains proprietary biological stimulants including:

- Humic substances
- Marine plant extracts
- Natural growth promoters
- Balanced macro- and micronutrients

These components stimulate microbial metabolism, maximize enzyme production, improve soil aggregation, and accelerate ecosystem recovery.



MULTIPLE APPLICATION FORMATS

Designed for virtually every petroleum remediation scenario:

- Granules
- Pellets
- Fine powder
- Floating booms
- Filled containment socks
- Water treatment formulations
- Custom industrial blends



HOW GREEN HAZMAT OR 9.0™ WORKS

A FIVE-STAGE BIOLOGICAL REMEDIATION PROCESS



STAGE 1 — IMMEDIATE OIL CAPTURE

The highly porous carrier rapidly absorbs free hydrocarbons, typically retaining 5–10 times its own weight in oil. Immediate containment minimizes contaminant migration while reducing environmental damage.

STAGE 2 — BIOSURFACTANT PRODUCTION

Activated microorganisms naturally produce powerful biosurfactants that reduce surface tension and emulsify petroleum into microscopic droplets. This dramatically increases hydrocarbon bioavailability and exposes contaminants previously inaccessible to conventional remediation technologies.

STAGE 3 — ADVANCED ENZYMATIC BIODEGRADATION

Once activated, specialized microbial enzymes begin dismantling petroleum molecules.

Aliphatic Hydrocarbons
Monooxygenases and

dehydrogenases oxidize long hydrocarbon chains into fatty acids that enter β -oxidation and central cellular metabolism.

Aromatic Hydrocarbons & PAHs

Specialized dioxygenase enzymes cleave stable aromatic rings, converting persistent petroleum compounds into harmless natural products including:

- Carbon dioxide
- Water
- Beneficial microbial biomass
- Stable soil organic matter

Rather than transferring pollution elsewhere, Green Hazmat OR 9.0™ biologically eliminates it.



STAGE 4 — SUSTAINED BIOLOGICAL ACTIVITY

Unlike chemical treatments that lose effectiveness after application, Green Hazmat OR 9.0™ continues working for weeks and months. Its porous carrier protects beneficial microorganisms from environmental stress while providing a slow-release biological habitat that sustains microbial populations throughout the remediation process. The result is continuous degradation without repeated chemical intervention.

STAGE 5 — ECOLOGICAL RESTORATION

As petroleum concentrations decline, soil biology rapidly recovers. The remaining carrier contributes to:

- Improved soil structure
- Greater porosity
- Enhanced water infiltration
- Increased water-holding capacity
- Improved nutrient cycling
- Higher microbial diversity
- Increased organic matter
- Greater root development

Recovered sites become suitable for phytoremediation, reforestation, pasture establishment, and eventually agricultural production.



SCIENTIFIC ADVANTAGES

Green Hazmat OR 9.0™ has been engineered for superior performance under real-world field conditions.

OPTIMIZED FOR TROPICAL ENVIRONMENTS

Maximum biological activity occurs under warm environmental conditions common throughout Venezuela and other tropical petroleum-producing regions.

BROAD ENVIRONMENTAL COMPATIBILITY

Performs effectively across a wide pH range and varying soil textures with minimal site preparation.

WORKS WITH NATIVE MICROBIOLOGY

Rather than replacing indigenous microorganisms, Green Hazmat OR 9.0™ enhances native biological communities, producing faster, more complete hydrocarbon degradation through microbial synergy.



LONG-TERM BIOLOGICAL PERFORMANCE

Unlike conventional sorbents that become contaminated waste requiring disposal, Green Hazmat OR 9.0™ continues degrading hydrocarbons long after application, significantly reducing secondary waste generation.



PROVEN REMEDICATION POTENTIAL

Depending upon contamination levels, hydrocarbon composition, nutrient availability, oxygen, temperature, and site conditions, Green Hazmat OR 9.0™ is designed to achieve:

- 50–90%+ Total Petroleum Hydrocarbon (TPH) reduction
- Significant reduction of Polycyclic Aromatic Hydrocarbons (PAHs)
- Improved soil biological activity
- Accelerated ecological recovery
- Reduced remediation time and total project costs

WHY CHOOSE MICROBEBIO GREEN HAZMAT OR 9.0™?



IMMEDIATE SPILL RESPONSE

Rapid containment minimizes environmental spread and operational downtime.

ACTIVE BIOLOGICAL CLEANUP

Oil is biologically destroyed rather than simply collected and transported to landfills.

LOWER TOTAL REMEDIATION COSTS

Reduces excavation, transportation, hazardous waste disposal, and long-term site management expenses.

SUSTAINABLE ENVIRONMENTAL RESTORATION

Transforms contaminated sites into healthy ecosystems capable of supporting agriculture, forestry, and future land development.

FLEXIBLE ACROSS MULTIPLE INDUSTRIES

Ideal for:

- Oil & gas production
- Pipelines
- Refineries
- Petrochemical facilities
- Marine terminals
- Ports
- Produced-water ponds
- Industrial spill response
- Shoreline remediation
- Legacy contamination
- Environmental restoration projects



DESIGNED FOR VENEZUELA. ADAPTABLE WORLDWIDE.

From Lake Maracaibo to the Orinoco Belt, Green Hazmat OR 9.0™ provides an environmentally responsible solution for one of the world's largest petroleum remediation challenges.

By integrating immediate containment with advanced microbial biotechnology, MicrobeBio enables governments, energy companies, and environmental agencies to restore contaminated land, recover valuable water resources, reduce environmental liabilities, and prepare former oil production sites for productive agricultural and industrial use.



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THE FUTURE OF OIL SPILL
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