

Mycoremediation and the Integrated Biological Approach

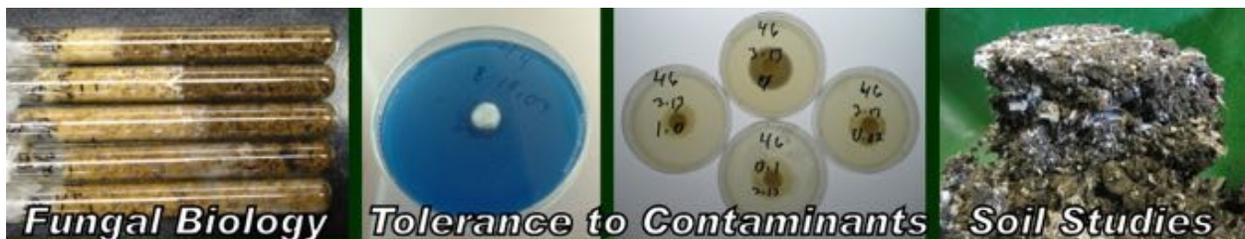
Mycoremediation of Environmental Pollutants

Petroleum based contamination of soil and water are a major threat to the health of our ecosystems and human health. Cleanup costs for these often hard to treat contaminants have imposed an enormous financial burden on society with negative effects on land values. As a standalone treatment for petroleum contamination mycoremediation has achieved ‘non-detects’ in as little as a few months’ time. The fungal metabolization of hydrocarbons creates no toxic waste stream with carbon dioxide and water being the final product of decomposition. Mycoremediation in an integrated bioremediation system represents the state of the art in bioremediation technology. We combine the use of specifically selected fungal treatments with phytoremediation plant / microbe combinations that have been proven successful in field applications to treat a variety of pollutants. This newly developed approach allows an effective solution for a broad range of organic and inorganic pollutants as well as being the least costly.

Fungi are nature’s recyclers. They secrete enzymes into their environment that break down organic compounds. These compounds are chemically broken down into simpler ones which then become available to the growing fungi and other organisms. The degradation of lignin and cellulose are primary sources of energy for most fungi and lignin is a natural analogue of petroleum based hydrocarbons. Fungi can degrade a variety of petroleum hydrocarbons including aromatic (PAHs, dioxins) and chlorinated (PCBs, DDT) compounds. Enzymes responsible for this can likewise deconstruct inorganic compounds and metals which then become available to microbes and plants within our combined bioremediation systems.

Mycelium, where mushroom meets toxin. Mycelium, the rootlike structure that comprises the bulk of these fungal organisms, exist in an interconnected web of microscopic threads called hyphae that penetrate their environment. A gram of healthy soil can contain hundreds of meters of fungal hyphae. Fungal growth is dependent upon nutrients and minerals that the mycelium encounters that are degraded by enzymes secreted by the mycelium and then reabsorbed as their primary food source. It is in and around the mycelial network that the remediation occurs. Our Mycoremediation treatments consist of live fungal mycelium in cellulosic carriers optimized to meet specific project needs.

- Eliminates the need for offsite disposal of soil.
- There are no downstream negative effects from the process. The conversion of toxins transforms them to mostly CO₂ and Water.
- MycoRemediation A “Green” technology. The materials used can be helpful in restoring soil health.
- The decontaminated soils may be reused, or left in place as an in-situ process.
- Minimal monitoring and no mechanical infrastructure.



Each fungal strain is thoroughly tested for the ability to decontaminate a range of toxins and for growth under different conditions.

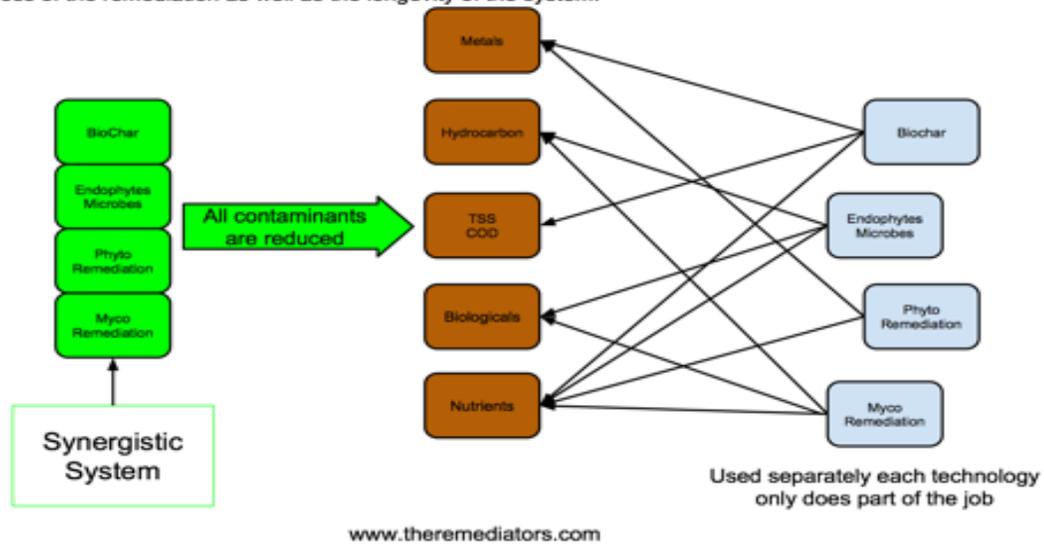
Our process has been used successfully in the United States and Canada in the remediation of petroleum hydrocarbons and was approved by the US Navy’s Facilities Engineering Service Center (NFESC) as an innovative technology suitable for their environmental program.

A Living Partnership: The Integrated Biological Approach.

Soil bacteria grow and travel in the film surrounding the mycelial hyphae more efficiently than in soil or water without hyphae, giving these microbes direct access to their food source. These interactions also support the transfer of genetic material within these populations which supports greater diversity and vitality. These factors translate to more rapid decomposition of toxic compounds that are also made

Integrated Biological Approach

When incorporated into one system each technology supports the success of the remediation as well as the longevity of the system.



accessible for uptake into the roots of plants used in the remediation. The partnership between fungi, soil bacteria, and hyper accumulating plants allows for the successful treatment of many hard to treat toxins as well as increasing the performance of each component of the system. The Integrated Biological Approach is our remediation ‘toolbox’ and constitutes latest state of the art of bioremediation.

For effective and affordable treatment of contaminated soil, sediments and water feel free to contact us for more information.

The Remediators Contact:

Howard Sprouse CEO

The Remediators Incorporated

Email hsprouse@theremediators.com 1-773-609-2427

Website www.theremediators.com