MOLECULAR MEDIATION®

'Shamantra' Overview

Molecular Mediation ("MM") has developed **a range of revolutionary products which have never before existed for problems which have never before been solved.**

Pollution – e.g., Oil Spills, Heavy Metal Contamination

The first set of MM ***Shamantra*** products provides a complete solution for the capture and removal of air, ground, and water pollution, as well as contamination caused by industry. The most common forms include polychlorinated biphenyls (PCBs), heavy metals, radionuclides, hydrocarbon oils, and *'greenhouse'* gasses emitted when carbon and hydrocarbon materials are burnt or combusted.

CO_2 Capture & Sequestration

'Anthropogenic Climate Change' is the subject of virtually daily news coverage in which CO_2 emissions are blamed. Billions of dollars have been spent and billions more will be raised to find a viable and cost effective solution capable of capturing and storing ('sequestering') carbon dioxide. The MM product ***Shamantra Green*** will efficiently sequester carbon dioxide which is then safe for transport. It can then be regenerated for use in emerging fuel process technology or placed in landfill where it can degrade naturally but not be released back into the atmosphere.

MM products are marketed under the generic name ***Shamantra***. Shamantra is produced as a powder that may be used as media in air filtration systems to absorb gas emissions, and it can also be applied directly onto oil and toxic spills on land or water. It performs by sorption (absorption, adsorption) and ion exchange. The sorbed contaminant will be converted into benign or beneficial organic compounds by natural biodegradation.

Shamantra is both hydrophobic (i.e. *tending to repel and not absorb water*) and oleophilic (i.e. *having a strong affinity for oils rather than water*), exhibiting extraordinary propensity to sorb and convert hydrocarbon gasses, oils, and other contaminants, at a sorption ratio of up to 30:1. (The sorbed contaminants agglomerate and are broken down by natural biodegradation.)

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Once sorbed into ***Shamantra***, greenhouse gases cannot leach out and after a short time will be converted into high quality fertiliser. Hydrocarbon oils will be converted into sugars, fatty acids and amino acids (plant food). Oil-spill areas can be remediated within weeks instead of many decades. PCB, heavy metal, and radionuclide contamination can be safely converted into benign organic compounds, some of which become bioavailable to plants and vegetation.

Shamantra makes it possible to dispense with the use of expensive and dangerous chemical agents and other hazardous methods used to treat, cover, or disperse contamination on land and water. It has the ability to bioremediate or biodegrade most of the pollution and contamination which exists in the world today.

Depleted Land Restoration

By varying the processing parameters of the technology, and the organic raw material, a new product has been created that yields extraordinary amounts of humic substances. Humic substances are the primary active components of the products engineered by *Molecular Mediation* for the agriculture and health industries, and are branded as ***"Humanic"***.

MM products are 100% organic, that is, completely natural, non-chemical, non-toxic, and non-harmful. They are unique because they are produced by a patented technology and they are revolutionary because they deliver exceptional results never before possible on such a large scale.

How is it created?

Molecular Mediation produces ***Shamantra*** by subjecting organic lignite and organic catalysts to a unique process. The manufacturing process is a recently-developed, patented technology which processes material by a technique known as *"Aeroacoustics"* (Acoustic shock), which combines air pressure, vacuum, aerodynamics, and sound waves to cause the effect which alters the original molecular structure of material.

The molecular alteration that occurs during the process is a purely mechanical function, that is, there is no use of chemicals, toxic materials, or any dangerous catalysts or modification agents. The process removes moisture from the voids in the substrate and the remaining organic compounds are exposed to a high oxygen and hydrogen atmosphere. The new material has an enormous propensity to attract and sorb contaminants.

The cost to process material by this method is quite economical, although it should be noted that there is no other technique or technology presently known that can achieve such outcomes, or increase the value of base materials so significantly.

Applications

What the creation of ***Shamantra*** means in practical terms is that all the poisonous/toxic gas emissions from power stations, the broader energy industry, and other sources of pollution, can be captured and converted into benign or beneficial matter and put safely back into the ground as high-quality fertilizer or as bio-available plant nutrients. For the very first time **"Ground to Ground Recycling"** will be a reality.

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Official Recognition

The intellectual property, know-how, trade secrets and trademarks relating to the business are very robust and will withstand any scrutiny. ***Shamantra*** has been extensively tested and certified by regulatory authorities, including the US Environmental Protection Agency (USEPA). (See - http://www2.epa.gov/emergency-response/shamantra-green). Independent testing by certified laboratories has confirmed the efficacy of ***Shamantra***, and that it is far superior to any product currently available. The manufacturing technology is proven, and production capacity can be increased by millions of tonnes per year within six months of equipment order.

Worldwide Applications

The products have applications in numerous industries including Agriculture, Power, Oil & Gas, Military, Pollution Control, and Health. It is likely that demand will exceed supply for the foreseeable future.

An equally massive worldwide market exists for economical products that can replenish depleted soils and farmland and add back minerals and nutritional substances which have been depleted by decades of negligent farming methods and contamination from the overuse of fertilisers and pesticides.

Humanic has the ability to replenish depleted soils, farmland, and arid areas to such an extent that produce from these areas will be returned to the original quality and nutritional value they had in earlier centuries. ***It is a panacea for the Agriculture industry.***

Example of Crude Oil Sorption

Shamantra added to oil and water - became homogenous with oil.

Spherical-shaped balls sank to the bottom of the vessel.

There was virtually no oil visible on the surface, it had been absorbed and encapsulated by Shamantra, and the agglomerated particles then sank to the bottom of the vessel.

Samples of the agglomerated Shamantra/oil were examined physically. They were firmly bonded but crumbled when broken, and they did not leach oil when under pressure.

Potential Uses of Molecular Mediation Products

The ***Shamantra*** range of products are bioremediation agents, bio-stimulants, and sorbents consisting of natural, chemical, catalytic, enzyme, and microbial formulations for commercial, industrial, and household applications. Applications and uses are summarized below:

- ✓ Adsorbent for use in air treatment and purification;
- ✓ Adsorber filter unit containing particulates for removing soluble or insoluble organic compounds, and heavy metals from water;
- ✓ Adsorbent for use in respirators and military respirator masks to purify air;
- ✓ Adsorbent for use in the removal of *mercury dioxin*, *furans*, and other VOC compounds from flue-stack gas streams;
- ✓ Adsorbent for use in the removal of *Carbon Monoxide*, *Nitric Oxide*, *Nitrogen Dioxide*, *Sulphur Dioxide*, *Sulphur Trioxide*, and *Carbon Dioxide* from flue-gas streams;
- ✓ Adsorbent for use in removing *hydrogen sulphide* and *organic sulphur* compounds from flue-gas streams;
- ✓ Adsorber filter unit containing particulates for removing soluble or insoluble organic compounds, and heavy metals from water;
- ✓ Removal of mercury from gaseous streams or environments in natural gas processing, metal refining, electronics manufacturing, battery production, light bulb production, and caustic production;
- ✓ Spill control, bioremediation and restoration of organic or hydrocarbon-based materials including chemical, oil, or solvent liquid spills;
- ✓ Municipal and industrial water treatment;
- ✓ *Chloramine* removal in the home water filter and industrial water treatment sectors;
- ✓ *Phosphine*, *hydrogen sulphide*, *arsine*, or *sulphur dioxide* abatement in the cigarette market;
- ✓ *Ozone* removal in the copier/laser printer market;
- ✓ Gold, platinum, and other precious metal adsorption processes;
- ✓ Industrial processes to remove odour-causing components, such as, *hydrogen sulphide* and *methyl mercaptan*;
- ✓ Adsorber filter unit containing particulates for removing soluble or insoluble organic compounds from water.
- ✓ Stain removal;
- ✓ Odour elimination;
- ✓ Products may be in the form of powders, granules, chips, socks, pads, rolls, booms, spill kits, filters, slurries, dispersions, and micro emulsions.
- ✓ ***Shamantra*** does everything that *activated carbon* does, and much more, at a lower cost; however there is no need for further treatment or impounding that is required for *saturated activated carbon*;
- ✓ ***Humanic*** provides soil replenishment by liberated humic substances which contain maximum nutritional input for plants and vegetation;
- ✓ ***Humanic*** contains all the nutritional elements that nature has to offer to meet the future needs of intensive greenhouse farming.
- ✓ ***Humanic*** is the perfect liquid fertiliser.

A Few Critical Applications

- Land remediation
- Oil spills
- Spill and storage problems
- Emissions filtration and remediation
- Water filtration/purification
- Agriculture