HEATING/COOLING SYSTEM WATER TREATMENT (H/CS)

BIOREMEDIATION PROCESS

Unique Biodegradation Stimulation:
H/CS showcases an unmatched capability to stimulate biodegradation. Research and testing reveal its function mimics that of a synthetic enzyme catalyst, bypassing common biological enzyme constraints tied to temperature and pH. Moreover, H/CS remains undiminished during the process and has been recognized by the Canadian Government for its environmental safety.

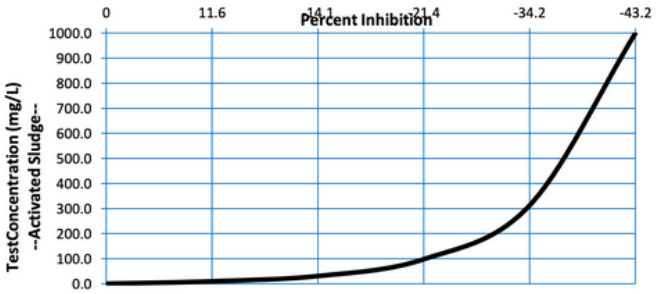
Key Advantages of H/CS:

- Facilitates in situ bioremediation in contaminated and geothermal waters.
- Harnesses Phosphorus and Nitrates from geothermal waters, turning them into energy sources to bolster bacterial aerobic respiration.
- Efficiently biodegrades Sulphates and other organic compounds.
- Successfully dissolves and suspends elements like calcium, magnesium, and iron at the molecular level.
- Accelerates aerobic biodegradation of slime, mitigating foul odors.

Degradation Pathway:
H/CS aids in transforming organic compounds, including hydrocarbons, into carboxylic acids. These acids subsequently biodegrade into innocuous outputs: carbon dioxide, water, and a minute amount of benign protein biomass.

ACTIVATED SLUDGE RESPIRATION INHIBITION TEST (OECD 209)
Absolutely Non-Toxic to wastewater treatment plant bacteria

Negative inhibition values represent stimulation (3h $EC50^2$)
that is to say: **BIODEGRADATION OF THE ACTIVATED SLUDGE**



BIODEGRADABILITY

Acute Aquatic
(US Fish and Wildlife, 1984)
Ecotoxicity Classification

Rainbow Trout OECD 203
LC50 = 148.3 mg/L
"Practically Non-Toxic"

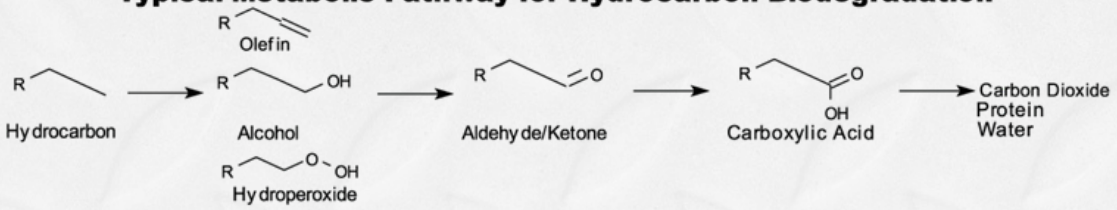
Daphnia Toxicity OECD 202
EC50 = 36.8 mg/L
48 hr immobility

Selenastrum Toxicity OECD 201
EC50 = 31.5 mg/L
72 hr Cell number

Bacterial & Fungal Biodegradation Mechanism:
The enzymatic activities of bacterial and fungal cells are vital in degrading hydrocarbons and other organic compounds. These organisms leverage oxygenases for the oxidation of various substrates, such as hydrocarbons and mineral compounds.

Metabolic Pathways for Organic Compound Biodegradation:
The foundational steps in biodegrading organic compounds and hydrocarbons are initiated by bacterial and fungal actions, which oxidize the substrate using oxygenases. Oxygen, present as dissolved air in liquids, is crucial for this. H/CS amplifies the fusion of oxygen with the substrate, expediting the degradation of various organic compounds into carboxylic acids. These acids are then further broken down via the ß-oxidation process, resulting in environmentally harmless end products that can be naturally integrated into the food chain.

Typical Metabolic Pathway for Hydrocarbon Biodegradation



Annotations:

- Biological enzymes, while functioning as catalysts, are bound by specific temperature and pH levels. When involved in redox reactions, these are termed oxygenases.
- Oxygenases are specialized enzymes that introduce oxygen from O2 into recipient molecules, essentially oxidizing the substrate.
- ß-oxidation plays a central role in metabolizing fatty acids from lipids, breaking them down for energy in aerobic respiration.
- Fungi and bacteria have varied intermediate formations. Bacteria, being the primary hydrocarbon decomposers, lead to detoxification, while the breakdown by fungi might result in potential carcinogens.