

FLUSHING OUT HYDROCARBONS FROM SOIL-GRAVEL MEDIUM (2004)



RESEARCH COOPERATORS

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TRIAL OBJECTIVE(S)

To determine the effect of humic substances (Black Earth Dry Soluble 80) to flush out hydrocarbons trapped in soil-gravel medium.

CERTIFICATIONS

Black Earth Humic products are:

- » Listed by OMRI
- » Registered with CFIA
- » Certified for use for NOP
- » Certified by the CDFA



EXPERIMENT – FIELD PROJECT

Location:	South Central Alberta
Contamination:	1940s
Geology:	Glaciofluvial deposits
Texture:	Sandy loam (3.0 m deep) Clay till (1.5 m deep)
Gravels - In Till (cm diameter):	5 to 8
Water Table (m deep):	2.2 to 2.9
Hydraulic Conductivity (m/s):	4×10^3
Hydraulic Gradient (m/m):	0.01
Porosity:	0.25
Flow Rate (L/s):	0.1 to 0.4
Experimental Area (m ²):	20 x 35
Wells:	2.5 to 4.0 m deep
Injection:	Black Earth Dry Soluble 80
Duration:	August to September, 2004

TREATMENT & ANALYSES

Humic substances perform similarly to surfactant, making hydrocarbons more soluble in water. When applied to trapped hydrocarbons in soil-gravel medium, humic substances would flush out the contaminant into the groundwater. This contaminant can be treated somewhere else, which is not in the scope of this project.

Background groundwater samples were taken three (3) days before the injection. Black Earth Soluble 80 solution was injected into three (3) wells perpendicular to the direction of groundwater flow. Groundwater samples after injection were collected six (6) days later from the three (3) injection wells as well as from one monitoring well 28 m downstream. The samples were analyzed for different parameters, including potassium (K), iron (Fe), and total extractable hydrocarbons (TEH).

RESULTS


Black Earth Soluble 80 increased potassium (K) levels in all three (3) injection wells indicating that this product (containing 15% K) flowed well in the medium. Iron (Fe) levels were lowered indicating that humic substances precipitated iron as expected. Most importantly, this product increased hydrocarbon (TEH) levels in both injection and monitoring wells, indicating that humic substances performed similarly to surfactant flushing out trapped hydrocarbons in the soil-gravel medium.

Note: Black Earth Dry Soluble 80 contains negligible amount of iron and hydrocarbons.

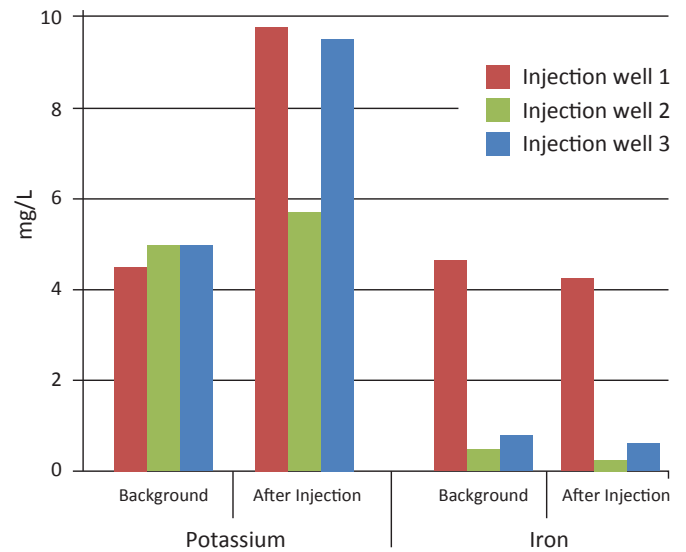
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Potassium (K) & Iron (Fe) In Groundwater



Total Extractable Hydrocarbons (TEH) In Groundwater

