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ERGOFITO PHYTOREMEDIATION FOR HEAVY METAL CONTAMINATION IN SOIL & WATER

REMEDIATION WITH NATURE

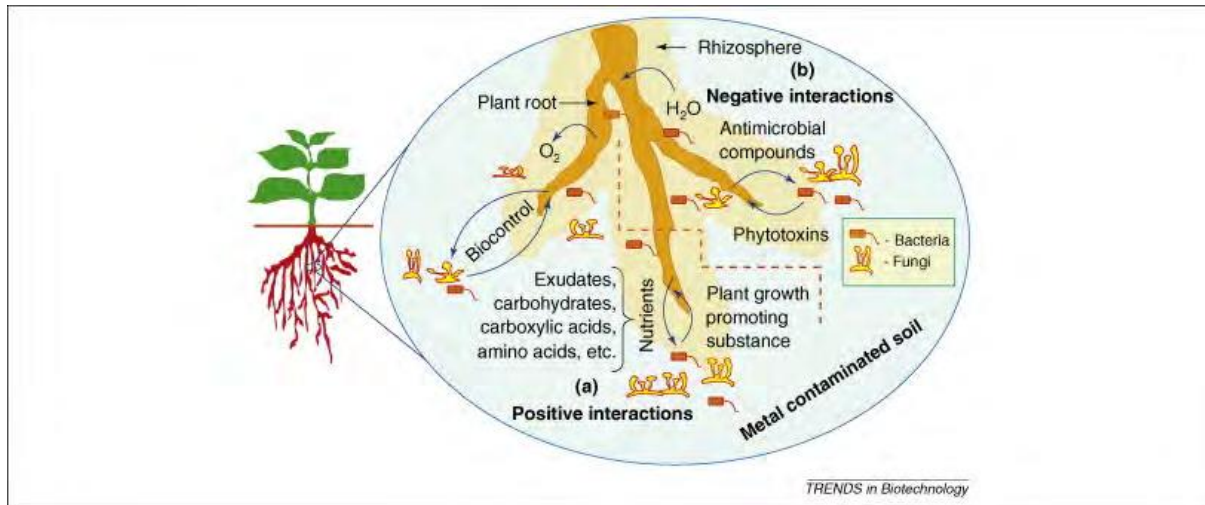


PHYTOREMEDIATION:

Phytoremediation is the direct use of green plants and their associated microorganisms to extract contamination in soils, sludge's, sediments, surface water, or ground water. Because it is a natural process, phytoremediation can be an effective remediation method at a variety of sites and on numerous contaminants. Sites over large clean-up areas and at shallow depths present especially favourable conditions for phytoremediation. Plant species are selected for use based on factors such as ability to extract or degrade the contaminants of concern, adaptation to local climates, high biomass, depth root structure, compatibility with soils, growth rate, ease of planting and maintenance, and ability to take up large quantities of water through the roots.

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PERMISSIBLE HEAVY METAL CONTENT IN SOIL: (PPM)

<u>METAL</u>	<u>MAX CONCENTRATION (PPM)</u>
CADMIUM (Cd)	1,5
CHROMIUM (Cr)	50
COPPER (Cu)	40
IRON (Fe)	21 000
MERCURY (Hg)	0,8
MANGANESE (Mn)	320
NICKEL (Ni)	50
LEAD (Pb)	32
ZINC (Zi)	150
COBALT (Co)	5,2
ARSENIC (As)	13



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ERGOFITO MICROBIOLOGICAL ACTION:

Phytoremediation on its own is not sufficient in cases where the soil suffers from a high level of heavy metals contamination. Often the said contamination is so high in the soil that plant life cannot be sustained. The first step to remediation is to render the soil sufficiently fertile to allow plant growth and activate phytoremediation.

Ergofito beneficially operates in the rhizosphere even under extreme conditions. It begins by releasing fluvial acid increasing soil aeration. It triggers a chelation effect on all the present metals preparing such for plant absorption.

Healthy soil manages water like a sponge. Microorganisms excrete well-balanced nutrients, which create spaces (aerating soil) enabling water and oxygen to surround root systems.

IDEAL SOIL STRUCTURE:

45% minerals and other nutrients, 25% air, 25% water and 5% humus. Soil is a living thing and just like all living things it needs to breathe atmospheric oxygen, digest nutrients, and process waste materials.

Macro-organisms and Microorganisms are the lifeblood of your soil. They contain electrolytes, minerals and more. Each cell within macro-organisms and microorganisms has negatively and positively charged components, and these electrical charges must remain in correct balance. The use of chemical, toxic substances on your soil causes these organisms to go dormant. As a result soil lacks oxygen and goes anaerobic compromising nutrient absorbability.

Plants absorb oxygen from carbon dioxide and water vapour through their leaves, stems and roots. Earthworms, beneficial-nematodes, bacteria etc. also need atmospheric oxygen to function. When soil is compacted plant roots are oxygen-deprived and can die. Oxygen deficient soil does not support aerobic life forms.

It becomes anaerobic smelling sour or mouldy. Farm waste processed by anaerobic microorganisms is embalmed and preserved instead of being decomposed. Anaerobic soil becomes a breeding ground for root and plant diseases, as well as various destructive pests.

All nutrients are made assimilable to roots by water molecules. If soil is compacted (tight) water remains on the surface unable to reach the plants' roots. If all the water is not absorbed at application a high percentage of it is lost to evaporation and run-off. Valuable topsoil is also removed with any water run-off.

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ERGOFITO APPLICATION:

The following protocol is formulated for multiple heavy metal contamination emanating from mining or industrial activities. It is a guideline only as final protocols are issued after soil analysis.

FIRST APPLICATION:

The above application is mixed prior spraying with water at a ratio of 1:100. This application will prepare the soil with sufficient beneficial activity to sustain plant life.

WHAT TO APPLY	HOW MUCH	WHEN
ERGOSTARTBIO/METAL	300KG PER HECTARE	IMMEDIATELY

SECOND APPLICATION:

WHAT TO APPLY	HOW MUCH	WHEN
ORGANIC MATTER	10 TONS PER HECTARE	3 WEEKS AFTER APPLICATION 1
ORGANO FERTILIZER	1500 KG PER HECTARE	AS PER ABOVE
PLANTS	1000 PLANTS PER HECTARE	AS PER ABOVE

THIRD APPLICATION:

WHAT TO APPLY	HOW MUCH	WHEN
ERGOFITO METAL I	25 KG PER HECTARE	8 WEEKS AFTER THE ABOVE
ERGOFITO METAL II	10 KG PER HECTARE	AS ABOVE

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FOURTH APPLICATION:

WHAT TO APPLY HOW MUCH		WHEN
ERGOFITO METAL I	25 KG PER HECTARE	8 WEEKS AFTER THE ABOVE
ERGOFITO METAL II	10 KG PER HECTARE	AS ABOVE

FIFTH APPLICATION:

WHAT TO APPLY HOW MUCH		WHEN
ERGOFITO METAL I	25 KG PER HECTARE	8 WEEKS AFTER THE ABOVE
ERGOFITO METAL II	10 KG PER HECTARE	AS ABOVE

CHOICE OF PLANTS:

Plants are selected according to area and conditions. The remediated depth required will also dictate the plant type. Generally the sourced plants are indigenous but that may not be always possible.

When remediation is required for a maximum depth of 1 meter, alfalfa or Indian mustard plant is used. If the depth is over 4 meters, then poplar trees are planted. If the contamination level is very high, then usable timber trees are planted in order to recover value out of the crop.

CONCLUSION:

When faced with large polluted areas and or rivers or ponds, phytoremediation is the only viable solution. In cases where the population has lost their livelihood due to the said contamination, it is advisable to plant decorative or timber producing crops. In all cases no edible crop is advisable as it may be wrongly eaten or sold to unsuspecting people.

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