From Waste to Fertilizer

How Can Radiation Technology Be Environmentally Friendly and Help Industry and Farming?

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Nuclear Technology for the Sustainable Development Goals

India

Young India

- 330 millions in 1947
- 1220 millions in 2014
- 1/6 of the world's population
- About half of the population lives in cities
- More than 50% less than 25 years, average age by 2020 – 29 years

Generation of Sewage and Sludge

- One of the biggest challenges of the high density population is the huge amount of waste water generated directly by self-consumption and indirectly by industries meeting their needs.

- 38254 MLD of sewage is produced in cities and towns and 7 million tons per year solid infectious sludge
- 133,000 MLD and 24 million tons sludge by 2050

COMPOSITION OF DRY SEWAGE SLUDGE

Rich Source of organic carbon(20%-40%) and 3 times more than city compost organic fertilizers

Macro & Micro Nutrients

N, P, K, Zn, Fe, Cu

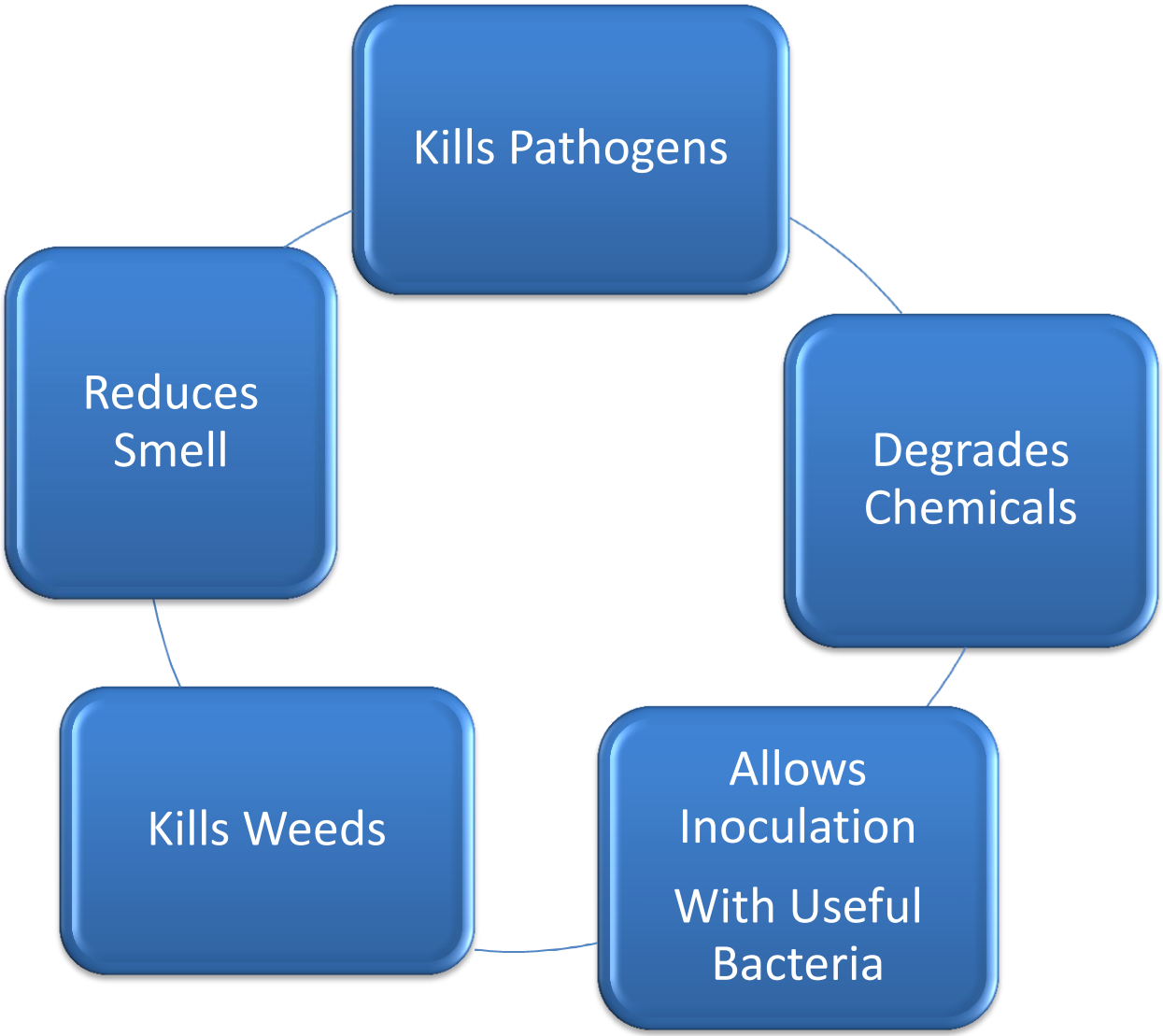
Pathogens, Virus, Bacteria, Weeds,

Chemical Contaminants

Heavy Toxic Metals

Lead, Arsenic, Cadmium, Chromium etc.

Radiation Technology Makes Sludge Safer and Useful



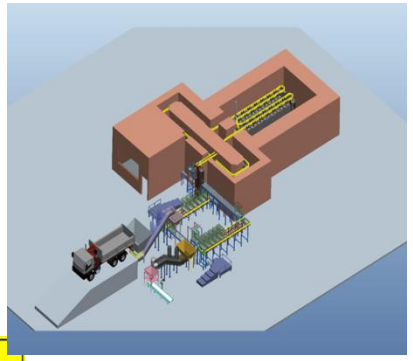
Radiation Technology For Municipal Sewage Sludge Hygienisation

1st facility of 100 tons/day capacity under construction.

To be operational by October - December 2017.

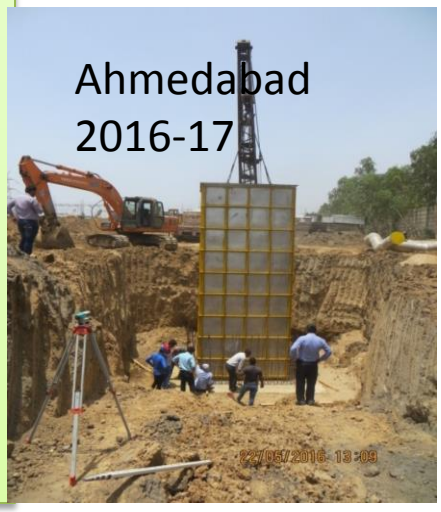
- Total cost of the project USD 5 Million
- Converts waste sludge to Manure
- Protects health and environment
- Provides organic Carbon to soil
- Saves subsidy on Urea

Dried sludge crushed and packed in tote boxes



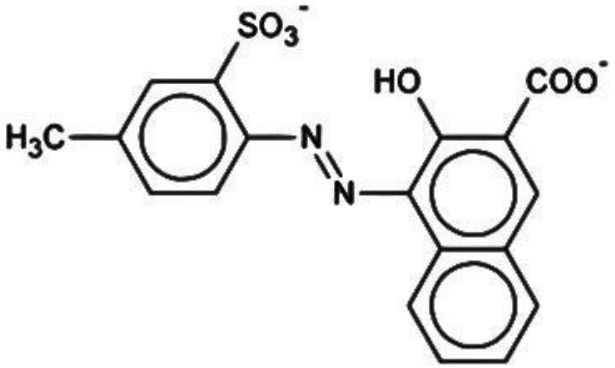
^{60}Co radiation dose of 10 kGY

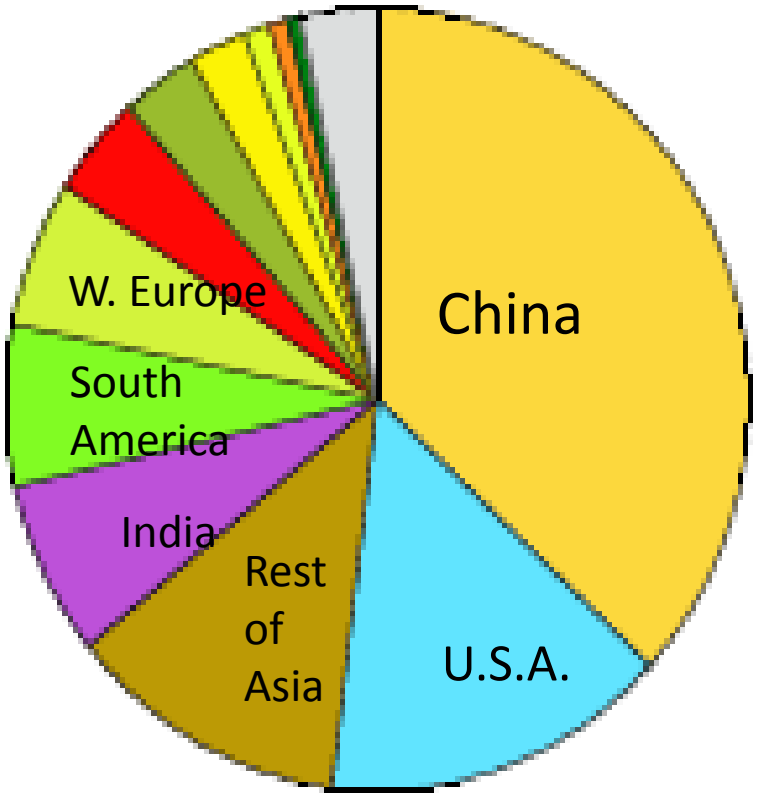
Treated sludge to farmers (manure)

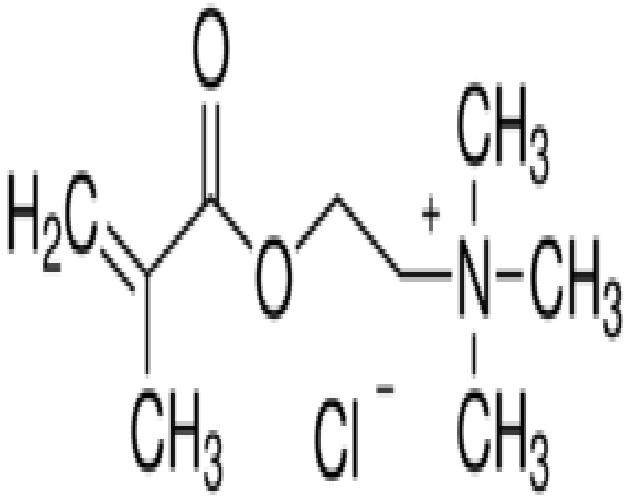


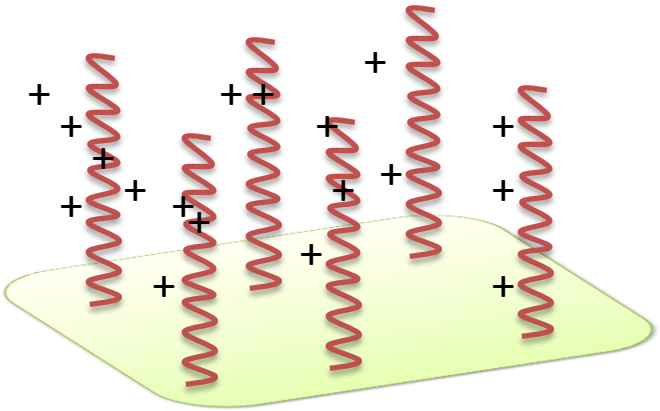
Textile Dye Effluent Treatment

- 10,000 dyes and pigments in use
- 7 x 10^5 tons produced globally (India 6%)
- 200,000 tons lost to environment
- About 200 litres of water consumed for colouring one kg of textile
- Unorganized small scale industries are the most polluting and find it difficult to afford technological solutions
- These industries cater to low income population





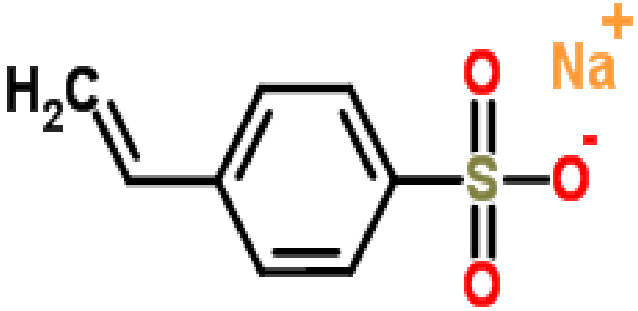


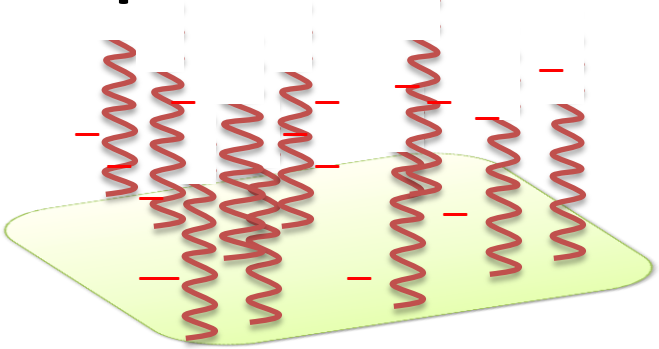


+tive charged Grafted Polymer

Radiation Grafting by Gamma Radiation

Hydrophobic and Hydrophilic interactions





-tive charged Grafted Polymer

Textile Dye Effluent Treatment

- 20,000 litres of effluent containing 200 mg/litre dyes can be treated using one kg adsorbent in ten cycles
- Reusable
- Useful for small scale industries (20000-25000 litre/day effluent)
- Machine cost approx. USD 3000

When Radiation Technology Helps Common Man

ATOMS SMILE

Thank you!

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