INTERNATIONAL CONFERENCE ON BIOLOGICAL RESEARCH AND APPLIED SCIENCE (IBRAS)

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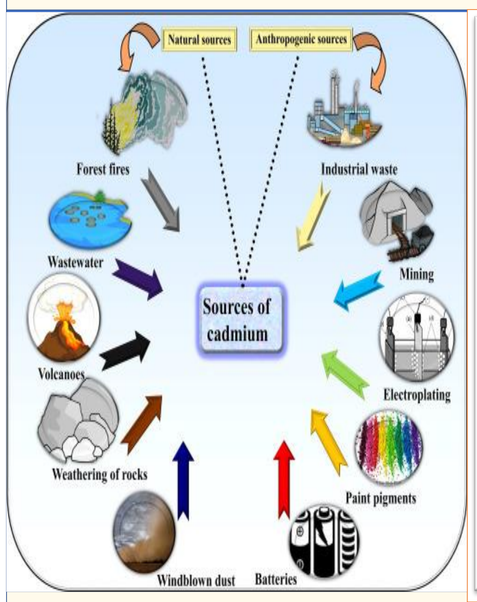
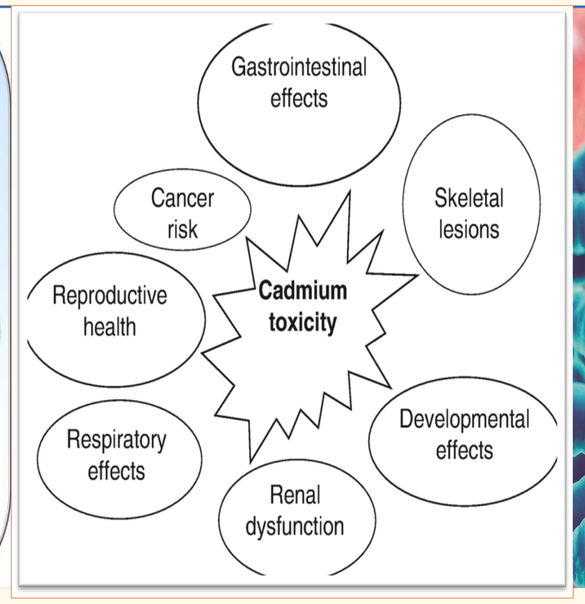
Assessment of cadmium resistant *Lactobacilli* species





Discussion

Contamination of metals in the environment and human diet represents a persistent problem that will continue to be a burden on human health. Through this study we find the bacteria resistant to toxic metal could be as used as an index of pollution. *Lactobacilli* have the property to remove the cadmium from the environment and can use as the treatment for cadmium toxicity in future. However, once metal-resistant bacteria are present, it is not at all apparent that their numbers depend on metal concentration. Other, multiple environmental factors which affect the ability of organisms to take up metals also influence the ability of a metal to select and to maintain a metal-resistant population.

Methods and Materials

Several strains isolated from various food product and were identified as *lactobacillus* species based on morphological and biochemical analysis. The MIC of the cadmium metal ion was determined by adding various concentration of cadmium ranging from 0.1mg/l-1 to 50 mg/l-1 to the MRS broth and measures bacterial growth at 600nm OD. Two strains were selected for further experiments one least resistant to cadmium and other highly resistant to cadmium. Effect of cadmium was investigated based upon morphological, biochemical and protein analysis by SDS PAGE. Numbers of studies have shown that antibiotics and heavy metal resistance gene are encoded together on the plasmid therefore antibiotic resistance profile was carried against azithromycin, vancomycin, streptomycin, trimethoprim, sufamethoxazole, cloxacillin. Identification of species was carried out by 16 s rRNA sequencing.

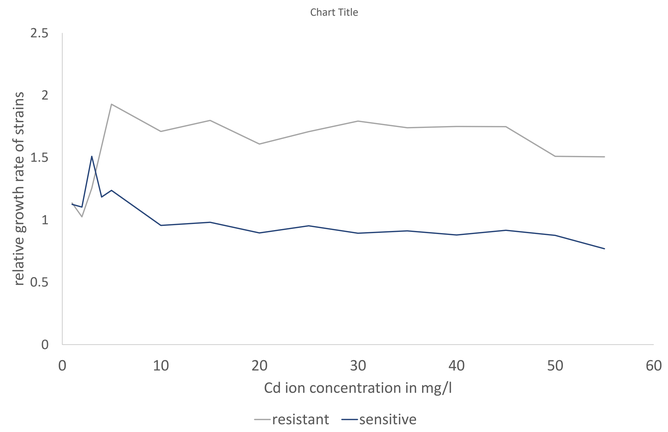
Results

Some strains failed to withstand cadmium stressed environment while other evolve to respond to cadmium stressed environment and is considered as bacteria resistant to heavy metals. Strain with highest MIC value was selected for further experiments. The cadmium tolerance ability of the strain was tested with increasing concentration of cadmium (0.1mg/l- 60mg/l). Increasing concentration of cadmium caused constant decrease in optical density which indicates toxic effect of cadmium on the growth of bacteria. Significant tolerance of our strain is 5 mg/l hence strain can survive in cadmium stressed environment so it is possible to remove cadmium from wastewater containing cadmium.

Conclusions

Since there is no proper method of removing cadmium from waste water is available therefore cadmium bioremediation gets much attention as it is economical safe and eco-friendly. To apply at large scale it require basic knowledge of bioremediation, identification of efficient strain which is capable of removing cadmium in situ studies and pilot studies. Additionally, genetically cadmium resistant strains can be utilized in much advance way. Further studies could be carried out to study removal pathways, identification of enzymes and genes regulates cadmium detoxification pathways.

Strains	OD 600/nm of strains without cadmium	OD 600/nm of strains with cadmium	
LB1	0.543	0.061	Sensitive
LB2	0.244	0.784	Resistant
LB3	0.256	0.002	Sensitive
LB4	0.020	0.018	Sensitive
LB5	0.806	0.091	Sensitive
LB6	0.138	0.056	Sensitive
Lb7	0.135	0.347	Resistant
LB8	0.924	0.023	Sensitive
LB9	0.533	0.029	Sensitive
LB10	0.241	0.431	Resistant



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