1st International Congress on Analytical Chemistry, Electrochemistry and Separation Techniques

October 15th-16th, 2022

BIOSORPTION OF ALUMINUM BY MICROOARGANISMS ISOLATED FROM SOIL

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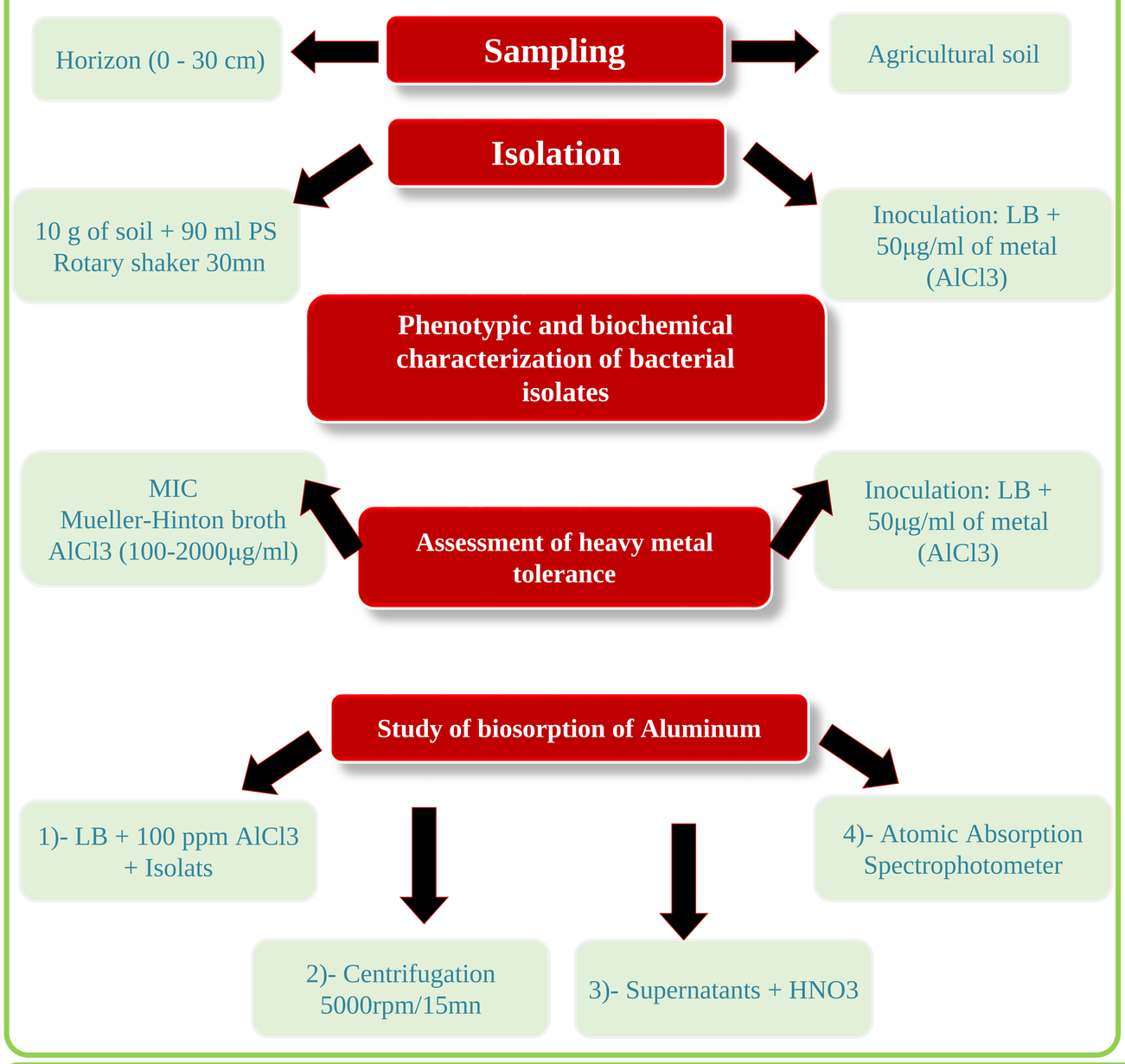
Introduction

Heavy metal pollution of soil is a serious problem in terms of human health and environmental protection. As a result of their persistent and toxic properties, heavy metals need to be removed from contaminated environments using an efficient technology [1-2] .

This study aims to isolate and identify naturally occurring bacteria capable of reducing and detoxifying heavy metals (Aluminum (III)) from soil

Materials and methods



Results

Table 1: Results of morphological and biochemical characteristics of isolates

	Bacterial Isolates	S1	S2	S3	S4
Morphological characteristics	Colony color	White	White	White	Yellowish
	Gram Nature	-	+	+	+
	Cell shape	Bacilli	Bacilli	Bacilli	Cocci
Biochemical test results	Oxidase	+	-	-	+
	Catalase	+	+	+	+
	ONPG	-	-	-	-
	ADH	+	-	+	-
	LDC	-	-	-	-
	ODC	-	-	-	-
	CIT	+	-	-	-
	H2S	-	-	-	-
	IND	-	-	-	-
	GLU	-	+	-	+
	SAC	-	-	+	+
	LAC	-	-	+	+

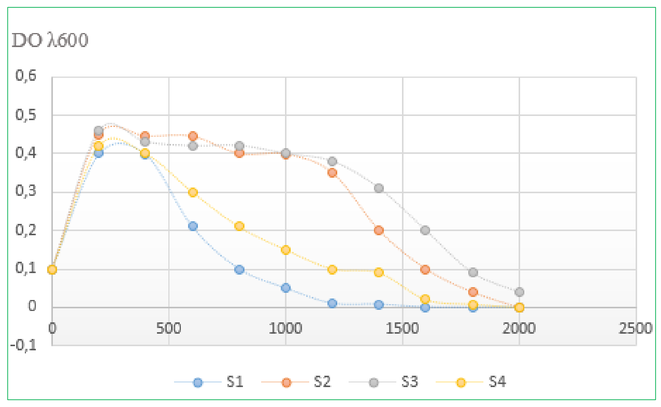


Figure 1: Optical density (k = 600 nm) was measured at UV Spectrophotometer

Table 2: Determination of the MIC of AlCl3

Bacterial Isolates	MIC (µg/ml)
S1	1000<MIC<1200
S2	1800<MIC<2000
S3	1800<MIC<2000
S4	1600<MIC<1800

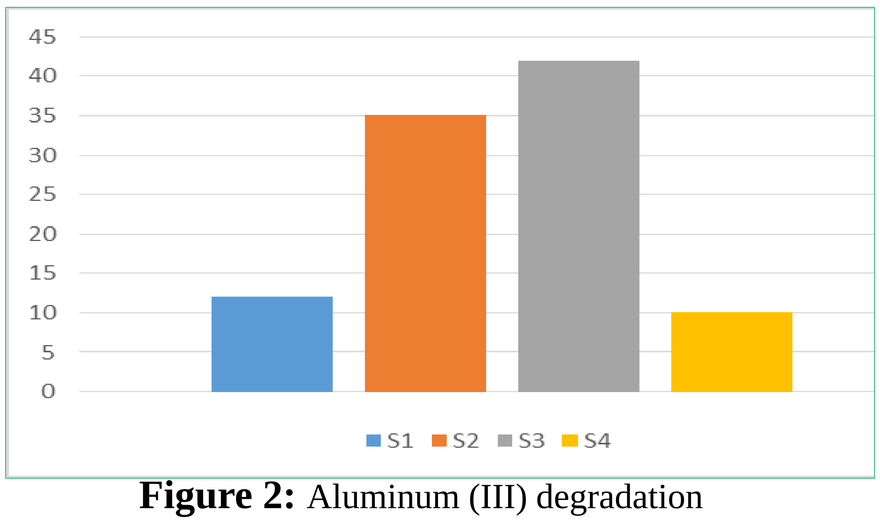


Figure 2: Aluminum (III) degradation capacity (%) by each bacterial isolates.

The relative effects of bacterial growth in the presence of heavy metals at different concentrations have been studied. Bacterial growth has been observed to depend on concentration, as it has shown decreasing optical density with increasing heavy metal concentration.

The isolates measured by Atomic Absorption Spectrophometer; S2 and S3 showed considerable degradation of Al which were 35% and 42%, respectively.

On the other hand S1and S4, show low degradation capacity of Al which were12 % and 10% , respectively.

Heavy metals cause various deleterious effects such as lengthening of the lag phase, inhibition of enzyme activities, alteration of DNA structure, modification of composition and structure of microbial populations [4, 5] Therefore, some microorganisms developed mechanisms to adapt to heavy metals that enable efficient detoxification and transformation of toxic to nontoxic forms [3]

Conclusion

Remediation of environmental media using biological methods is actually a fast-developing research field. Potential metal-resistant microbes can be used to remove contaminants from various contaminated sites. Microbes are an important part of the planet's living material and play a major role in maintaining the ecosystems.

References

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