



筑波大学
University of Tsukuba

Biological Treatment of Tannery Wastewater by Using Salt Tolerant Bacteria

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Outline



Introduction to tannery waste water



Waste water problem in Mongolia



Materials and methods



Results and discussion

Introduction to tannery waste water



BOD

Biochemical Oxygen Demand

COD

Chemical Oxygen Demand

TDS

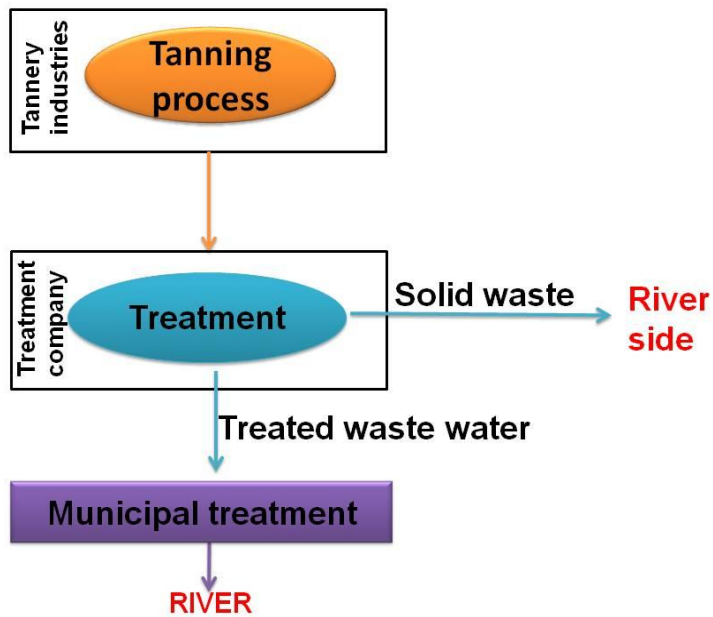
Total Dissolved Solids

SS

Suspended Solids

**Chromium and
sulphides
pH 5-10**

Waste water problem in Mongolia



All of tannery industries are located near the Tuul River, which mainly contributes to the pollution status of the river. In Mongolia, all of the tanneries don't have their own treatment plant. The Khargia Company is the only one private company to treat wastewater from tanneries.



Significantly

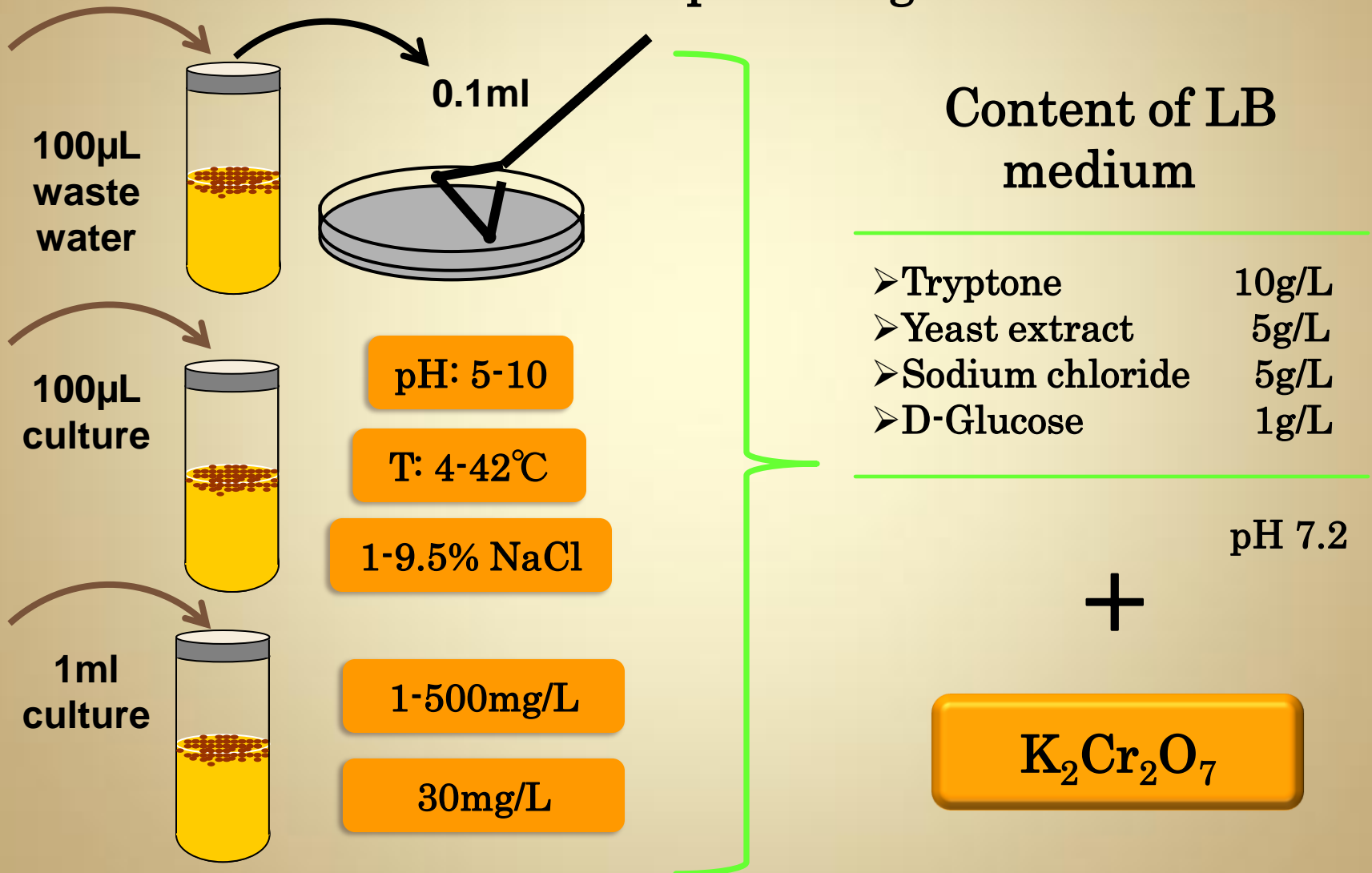
Treatment is necessary due to the wide range of toxic chemicals in untreated tannery and their effects on the environment.

My propose

- Isolation indigenous bacterial strain having detoxification activity
- Lab scale degradation hexavalent chromium into its trivalent form.

Materials and methods

❑ Isolation of bacteria and optimum growth condition



Materials and methods

❑ Phylogenetic analysis of bacteria and identification

16S rRNA sequence data

```
>HT1
ATTGAACGCTGGCGGCAGGCCTAACACATGCAAGTCGAGCGG
CAGCAGCTCTTCGGGAGGCTGGCGAGCGGCGGACGGGTGAG
TAACGCATGGGAACTTCCCAGTAGTGGGGGATAGCCCGGGGA
AACCCGGATTAATACCGCATAACGCCCTGAGGGGGAAAGCGGG
CTCCGGCTCGCGCTATTGGATGGGCCCATGTCGGATTAGTTA
GTTGGTGGGGTAATGGCCTACCAAGGCGACGATCCGTAGCTG
GTCTGAGAGGATGATCAGCCACACCGGGACTGAGACACGGCC
CGGACTCCTACGGGAGGCAGCAGTGGGGAATATTGGACAATG
GGGGCAACCTGATCCAGCCATGCCGCGTGTGTGAAGAAGGC
CTTAGGGTTGTAAAGCACTTTCAGCAGGGAGGAAAAGCTGAT
CGTTAATACCGGTCAGTGTGACGTTACCTGCAGAAGAAGCA
CCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATTACTGGGCGTAAAGGGCGCGTAGGC
GGTTTGGTAAGCGAGTTGTGAAAGCCCCGGGCTCAACCTGGG
AATGGCAATTCGAACTGCCAAGCTAGAATGCAGCAG.....
```

BLAST search

<http://www.ddbj.nig.ac.jp>

<http://www.ncbi.nlm.nih.gov>

<http://www.eztaxon.org>

Constructing phylogenetic tree & identification of bacterial strains using software

- Clustal W1.83 XP
- NJPlot.exe

Isolation of bacteria and optimum growth condition

Characteristic

Strain numbers

HT1

HT2

HT3

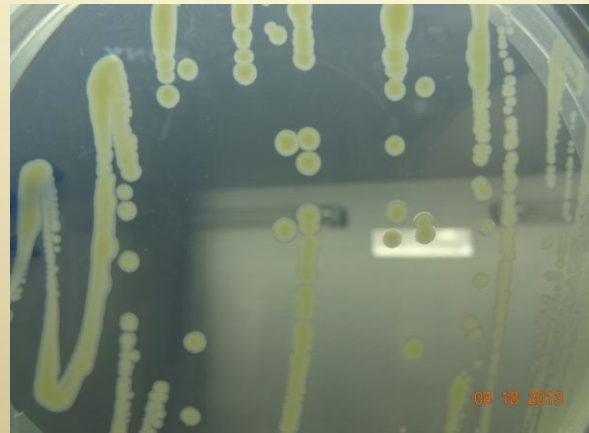
HT4

Morphological characteristic

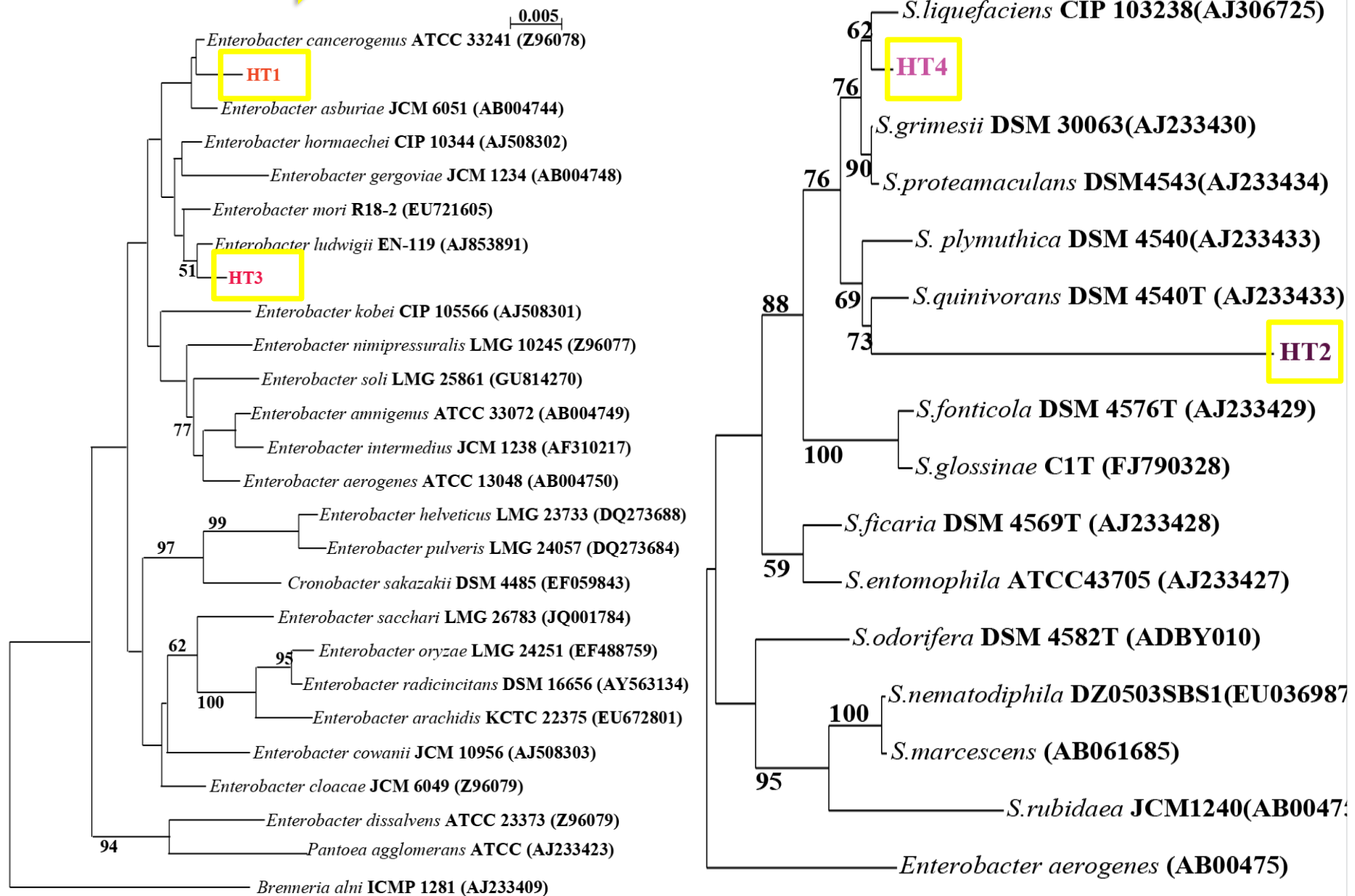
Colony morphology	Circular	Circular	Circular	Circular
Colony size	3mm	2mm	3mm	3mm
Colony elevation	Even	Even	Even	Even

Physiological characteristic

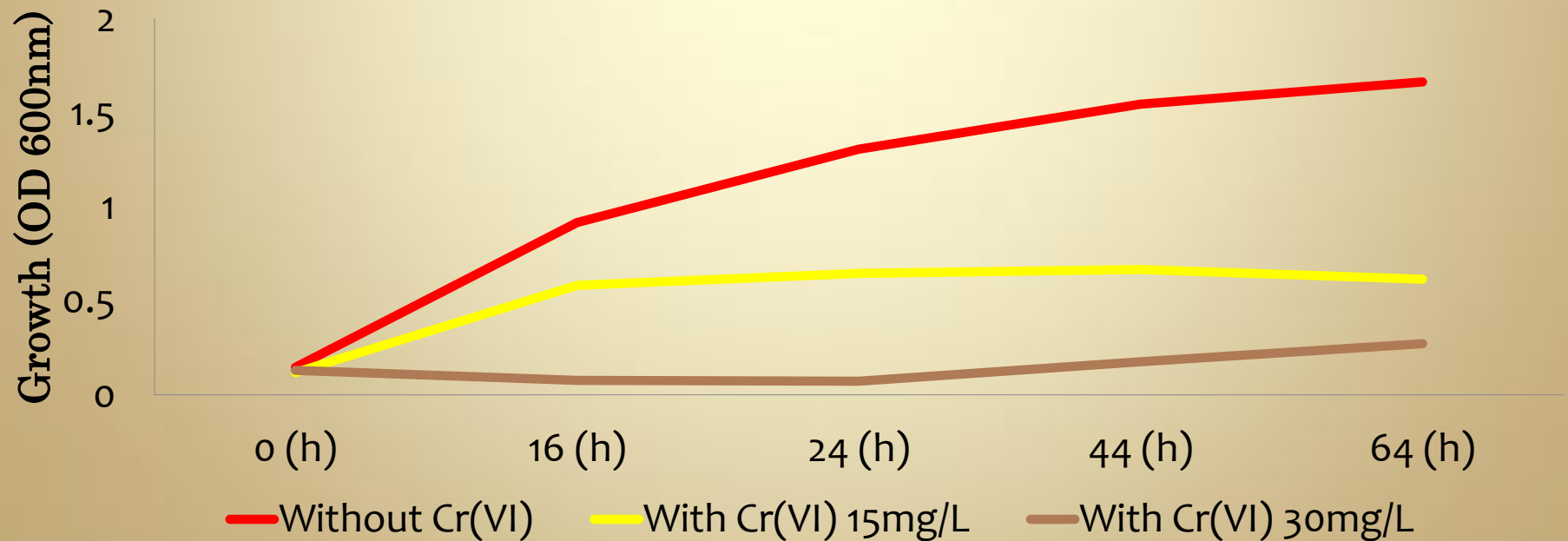
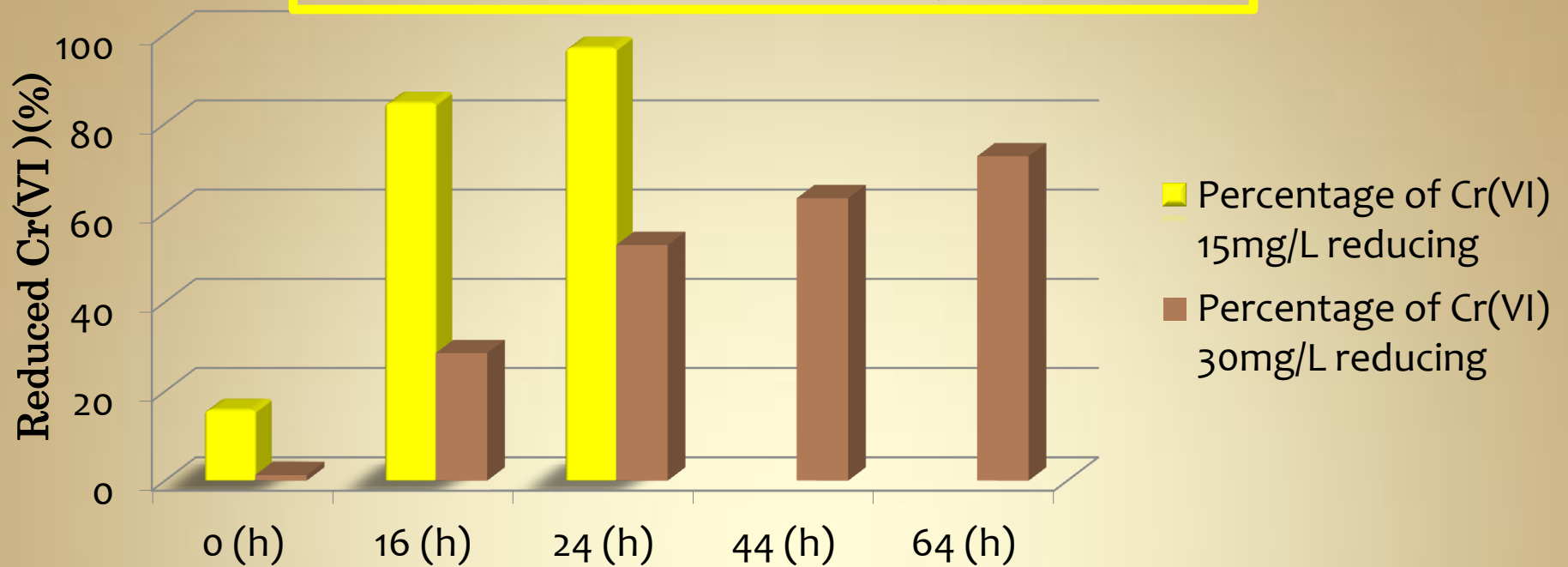
pH range	4-11	4-11	4-9	4-10
NaCl range (% w/v)	5-9.5	5-7	5-9.5	5-9.5
Temperature range (T°)	4-45	15-45	4-45	15-45



Phylogenetic analysis of isolates



Cr (VI) reduction by HT1



Conclusion



Chromium resistant bacteria have been isolated from tannery effluents , Mongolia



All of strains are salt tolerant and two strain belonged to the genus *Enterobacter* and two strains belonged to the genus *Serratia*



The results indicate that indigenous bacterial strains are able to reduce hexavalent chromium and these bacterial strains can be exploited for lab-scale degradation of the tannery waste waters.

Thank you