Reduction of Chromium(VI) by *Cellulomonas sp.* and *Propionibacterium sp.* in anaerobic soil microcosms

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Introduction

Chromium is considered as one of the priority pollutants in the USA and elsewhere (Hedgecott, 1994). A number of biological treatment methods which use microorganisms for the chromium(VI) removal have been investigated and developed to remediate chromium contaminated soil. While the chromium(VI) reduction in aerobic soil microcosms has been extensively studied, there is little information in anaerobic soil community (Turick and Apel, 1997; Kourtev *et al*., 2006).

In this study, we used *Cellulomonas sp.* and *Propionibacterium sp.* to study the effect of various initial concentrations of Cr(VI) on chromium reduction rate in anaerobic soil microcosms and to examine the effect of various oxygen concentrations on Cr(VI) reduction rate.

Results and Discussion

The reduction rates of Cr(VI) decreased with an increase of Cr(VI) concentrations. When the second dose of Cr(VI) added after the onset of Cr(VI) reduction, the reduction rate of Cr(VI) decreased, indicating that the developing Cr-resistant communities had a relatively low tolerance threshold.

The oxygen was added from 2 % to 20 %, with 2 % interval, in anaerobic enrichment culture mediums. The reduction rates of Cr(VI) by *Cellulomonas sp.* decreased with an increase of oxygen concentrations. When the 20 % of oxygen added, which is the oxygen concentraion in the atmosphere, the Cr(VI) did not reduce. The addition of oxygen can inhibit the reduction of Cr(VI). However, the concentrations of Cr(VI) was reduced by *Propionibacterium sp.* with the additions of oxygen continously. Therefore, the reduction of Cr(VI) by *Propionibacterium sp.* was not affected by the presence of oxygen.

References

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Structural controls on changing differentiation pathways at an arc volcano

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Intra-crustal recycling has been identified as a key component in the generation of andesites at Mt. Ruapehu, New Zealand. The crustal column beneath Ruapehu is composed of two main lithologies; a 5-10 km thick lower crustal meta-igneous granulite overlain by a 15-25 km thick Permian – mid Cretaceous meta-sedimentary sequence. Previous modelling of crustal contamination using Ruapehu lavas has indicated a role for meta-sedimentary material. However, on the basis of new trace element and Sr, Nd, Hf and O isotope data for lavas and crustal xenoliths we have identified a distinct change in the assimilants between the oldest formation (Te Herenga) and the younger formations (Post Te Herenga). Te Herenga lavas are a product of lower crustal differentiation involving assimilation of meta-igneous granulite. Post Te Herenga lavas display evidence for interaction with the same meta-igneous granulite followed by interaction with meta-sedimentary crust. This change in assimilant coincides with increased rates of extension at the southern tip of the TVZ. We propose that the change in melt-crust interaction from Te Herenga to Post Te Herenga lavas is a response to adjustments in differentiation depth. Fault movement dating suggests major geochemical changes in lavas can be broadly correlated with increased rates of extension within the Ruapehu crustal column.