



# Temperature and perchlorate effects on the metabolic activity of *Deinococcus radiodurans*

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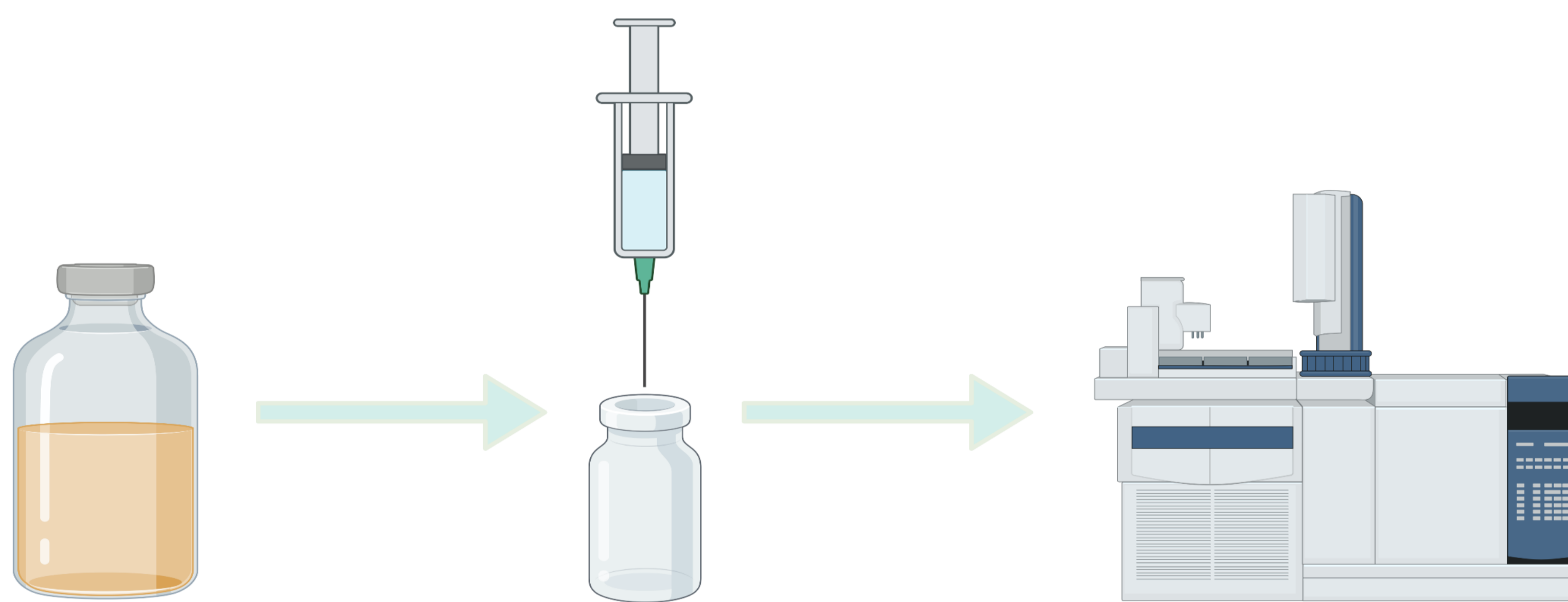
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## Can *Deinococcus radiodurans* remain metabolically active in Mars simulating conditions?

- Martian surface contains many adversities, including low temperatures, perchlorate salts and radiation (UV and cosmic).
- *Deinococcus radiodurans* can survive under extreme radiation amounts – model extremophile microorganism.

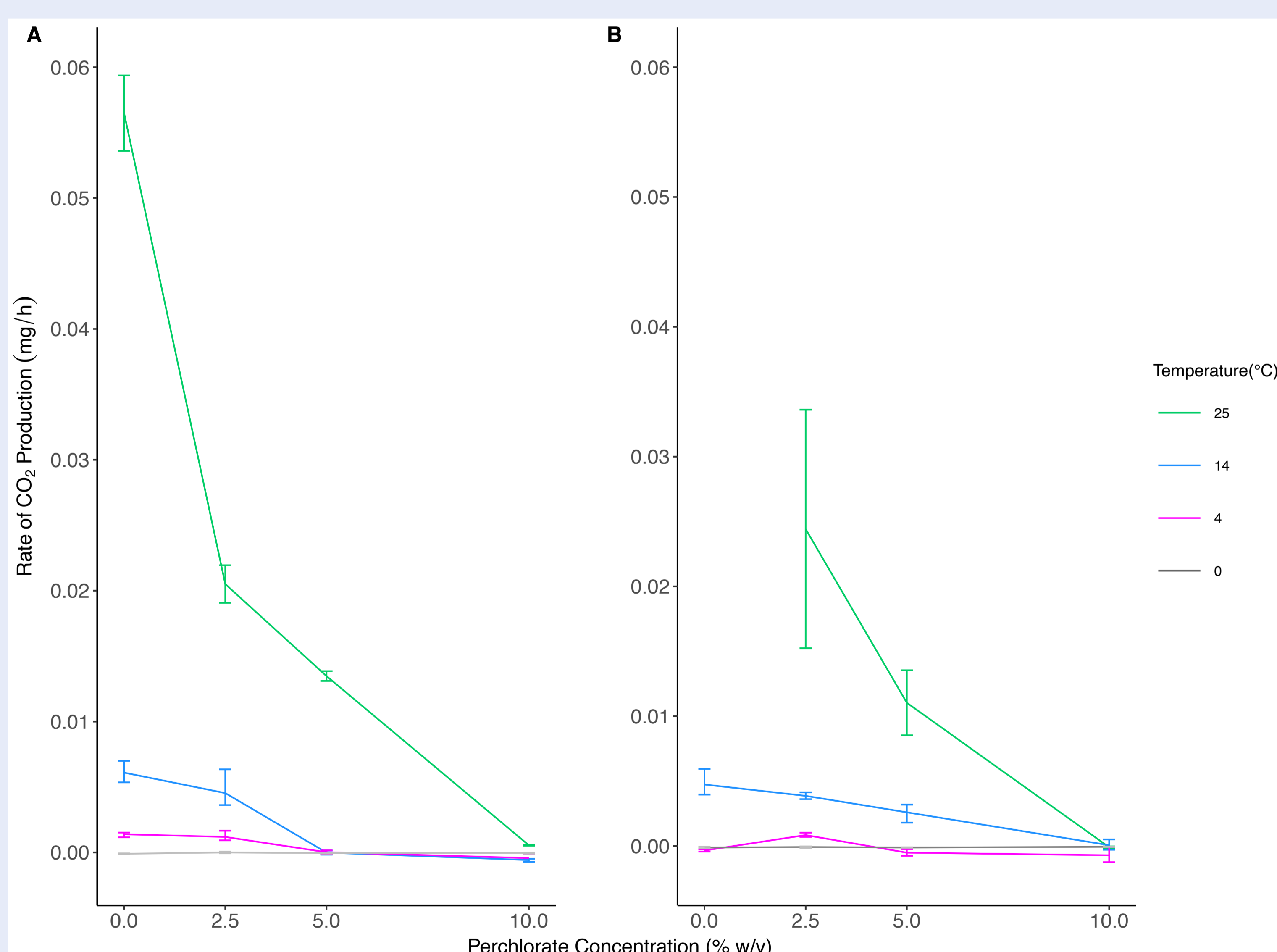
**HYPOTHESIS: Perchlorate salts (Magnesium or Calcium) interact with the temperature response of *Deinococcus radiodurans* metabolic activity.**

## METHODOLOGY



- Incubation of *Deinococcus radiodurans* with perchlorate salts (0, 2.5, 5 and 10% w/v) at different temperatures (0, 4, 14 and 25°C).
- Metabolic activity estimated as CO<sub>2</sub> production.

## RESULTS AND DISCUSSION



- Decreased CO<sub>2</sub> production rates with increasing perchlorate concentrations.
- Increased metabolic activity with increased temperature.
- No interaction between temperature and perchlorates was observed.
- Survival observed at 0°C using CFU counts.

**Figure 1:** CO<sub>2</sub> production rates by *Deinococcus radiodurans* when incubated at different temperatures and a) Mg-perchlorate or b) Ca-perchlorate concentrations. Data are average ± standard error of the mean.

## FUTURE WORK

- Identification and quantification of volatile organic compounds (VOCs) produced by *Deinococcus radiodurans*.
- Introduce VOC results as spectra into atmospheric cloud formation code in order to interpret possible biosignatures at exoplanets.