



Characterization of a new anaerobic Desulfovibrio strain isolate from Ægir Vent field

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1. Background

The discovery of hydrothermal vents in the deep sea increased our understanding of the range of life on earth. Deep sea sediment habitat contains million of novel species or strains. Deep sea sediment habitats include a lack of light, high pressure, limiting supply of nutritional sources and temperature fluctuations from low to high scale. The genera *Desulfovibrio* is enriched and isolated from hydrothermal water, chimneys and sediments collected at deep-sea vents. They have a curved rod shape, fast motility and grow in absence of oxygen.

Aim:

- Describe the behavior of an anaerobic bacterial strain with focus on temperature and salinity.
- Identify the taxonomy and phylogeny

3. Results

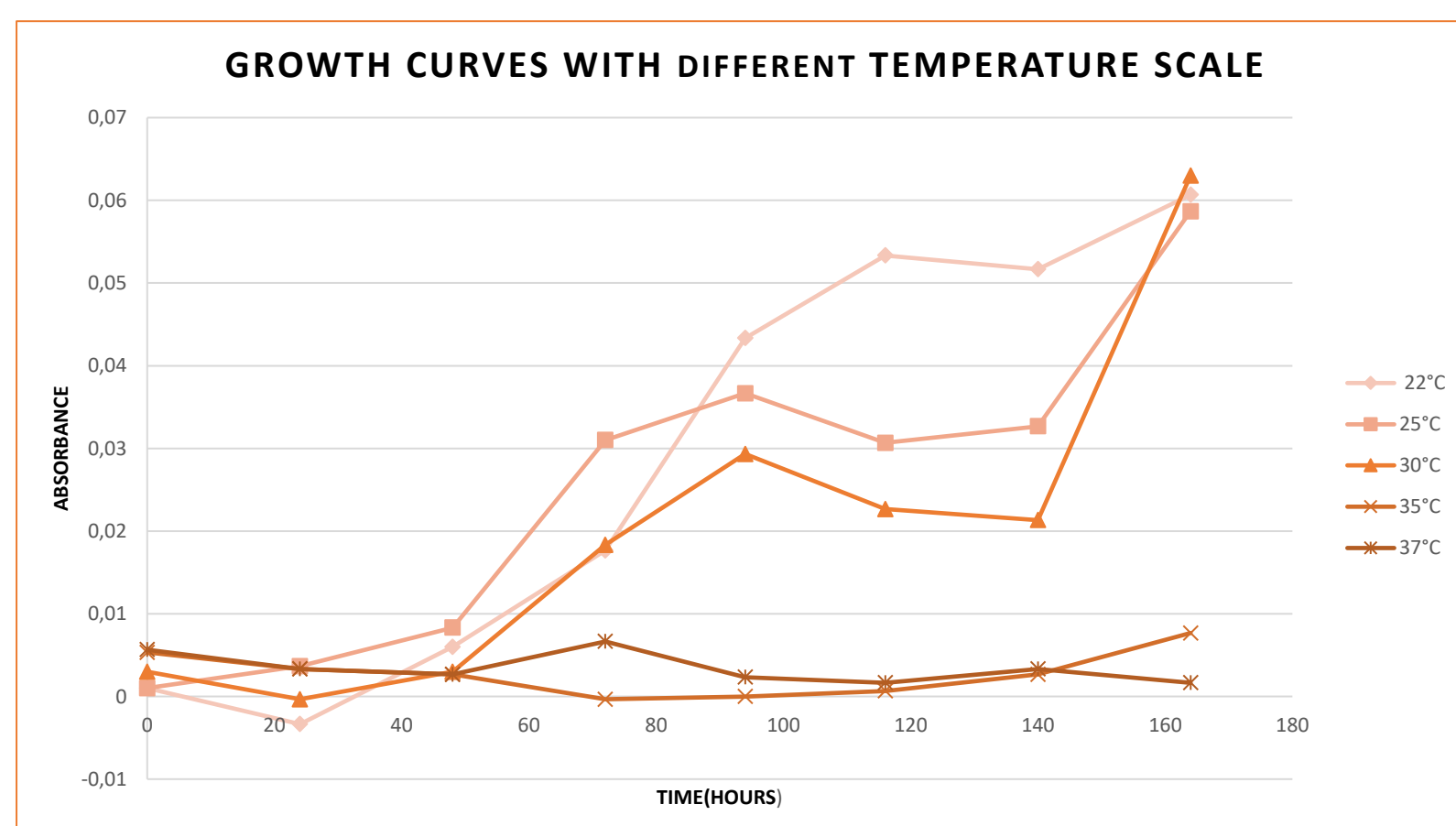


Figure 1: Growth curves of the anerobic strain 432Ro4YPC1 obtained under different temperature scales.

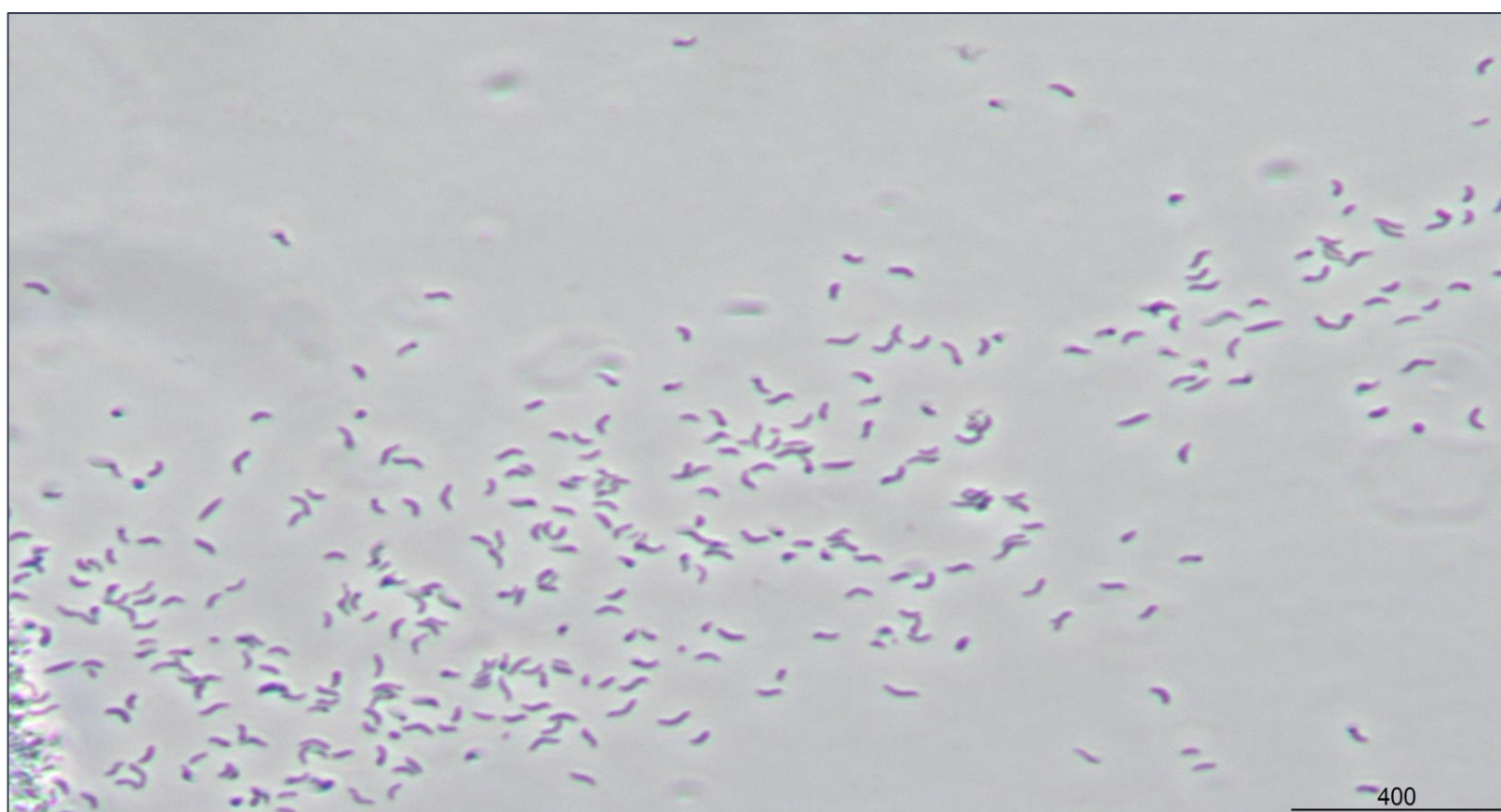
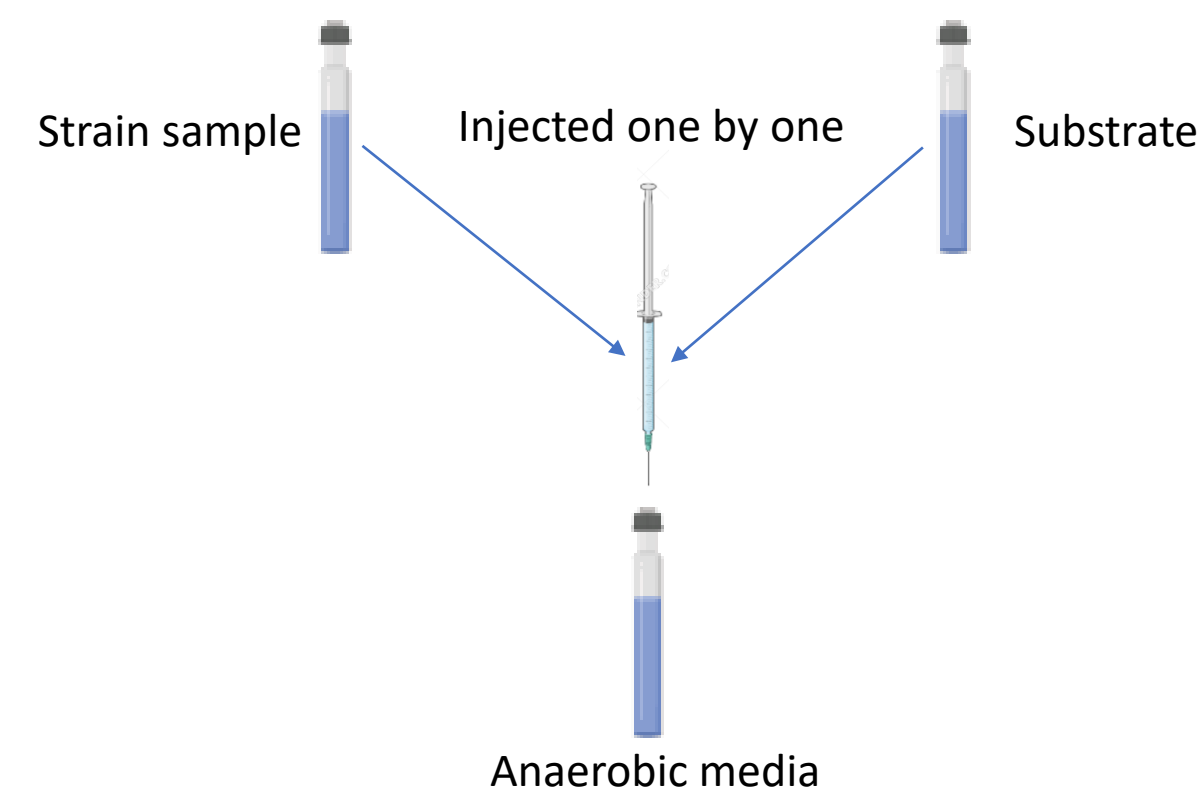


Figure 2: Growth of the strain 432Ro4YPC1 on 2.5% of NaCl concentration.

2. Methods

Experimental design



➤ Temperature

- 22 °C
- 25 °C
- 30 °C
- 35 °C
- 40 °C

Collected measurements for growth by light absorbance every 24h.

➤ Salinity

Media with NaCl gradient.

NaCl concentration, 0-4%, examined under microscope.

➤ Sequence analysis

The DNA was extracted

The 16S rRNA gene was amplified by PCR.

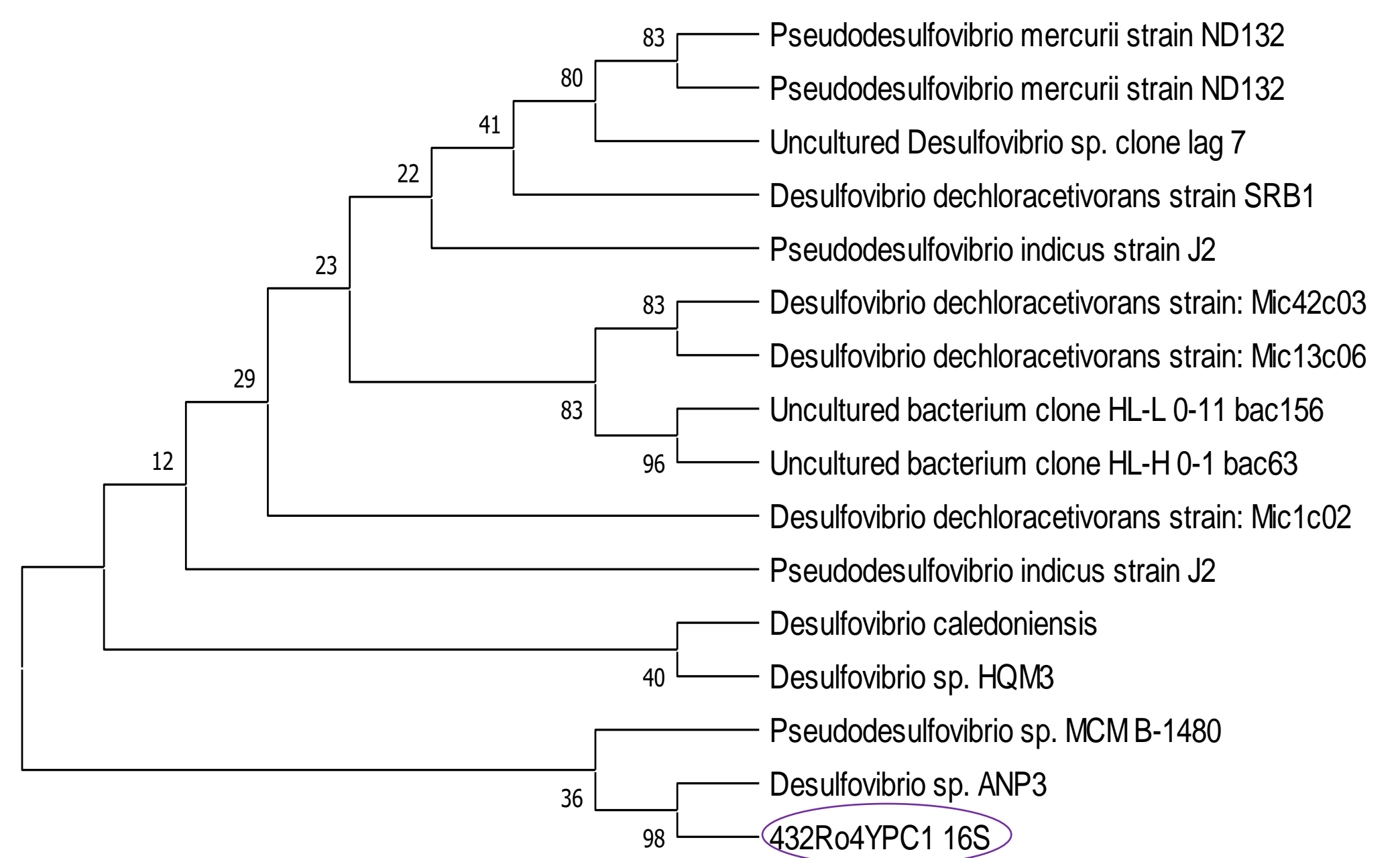


Figure 3: Maximum-likelihood phylogenetic tree based on 16S RNA sequences of strain 432Ro4YPC1 and representative microbes. Numbers at internal nodes are the percentage of samples on the right of nodes.

4. Conclusion

Room temperature or 22°C, 25°C and 30 °C successfully sustained the growth of the strain and also indicated two phase growth while 35°C and 37°C showed no growth. This shows that the strain has a relatively narrow temperature range. The NaCl gradient also showed good growth on all concentrations (0-4%) and should be expanded. The phylogenetic tree shows the similarities of our strain with NCBI Blast results. Our strain has 98% similarities with strain *Deulfovibrio* sp.ANP3. We had only one strain, so thats why it has highest likelihood with only one *Desulfovibrio* strain. All experiments are done with the same strain.

References

- Nunoura, T., Hirai, M., Imachi, H., Miyazaki, M., Makita, H., Hirayama, H., Furushima, Y., Yamamoto, H., & Takai, K. (2010). *Kosmotoga arenicorallina* sp. nov., a thermophilic and obligately anaerobic heterotroph isolated from a shallow hydrothermal system occurring within a coral reef, southern part of the Yaeyama Archipelago, Japan, reclassification of *Thermococcus shengliensis* as *Kosmotoga shengliensis* comb. nov., and emended description of the genus *Kosmotoga*. *Archives of microbiology*, 192, 811-819.
- Sun, B., Cole, J. R., Sanford, R. A., & Tiedje, J. M. (2000). Isolation and characterization of *Desulfovibrio dechloracetivorans* sp. nov., a marine dechlorinating bacterium growing by coupling the oxidation of acetate to the reductive dechlorination of 2-chlorophenol. *Applied and environmental microbiology*, 66(6), 2408-2413.