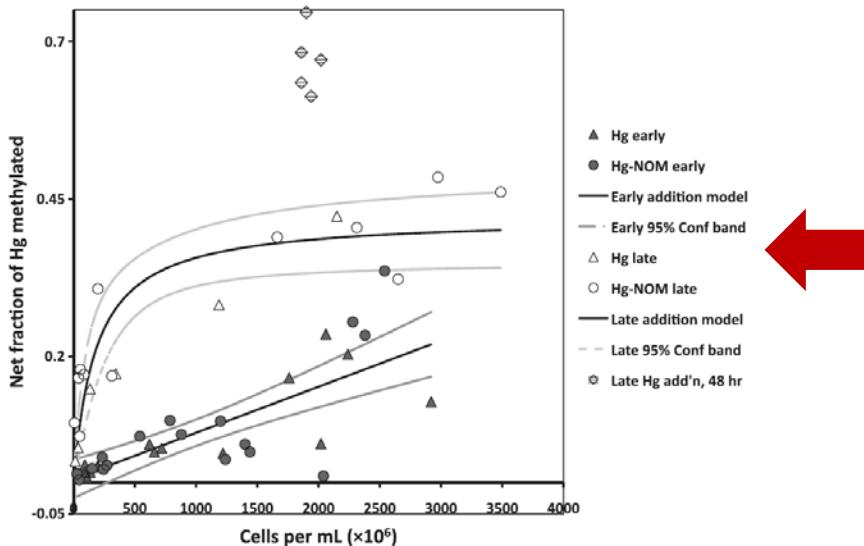
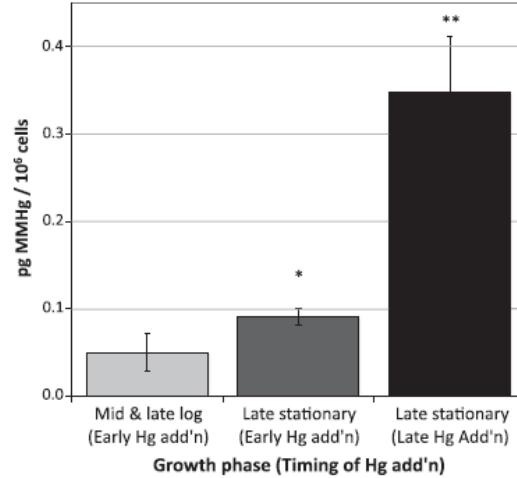


Bacterial Growth Phase Influences Methylmercury Production by the Sulfate-Reducing Bacterium *Desulfovibrio desulfuricans* ND132

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DOE/Office of Science/Biological & Environmental Research

- For the first time, we explicitly test the effect of bacterial growth phase on monomethyl mercury (MMHg) production by *D. desulfuricans* ND132.
- At late stationary phase ND132 cells produce significantly more net MMHg than cells at mid- or late-log phase



- Relationship between MMHg produced and cell number depended on when Hg was added to growing cell cultures
- Unfractionated Suwanee River natural organic matter had no effect on MMHg production
- These results highlight the potential importance of considering growth phase in future studies of environmentally relevant controls on bacterial MMHg production in natural systems.

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The effect of bacterial growth phase is an aspect of mercury (Hg) methylation that previous studies have not investigated in detail. Here we consider the effect of growth phase (mid-log, late-log and late stationary phase) on Hg methylation by the known methylator *Desulfovibrio desulfuricans* ND132. We tested the addition of Hg alone (chloride-complex), Hg with Suwannee River natural organic matter (SRNOM) (unequilibrated), and Hg equilibrated with SRNOM on monomethylmercury (MMHg) production by ND132 over a growth curve in pyruvate–fumarate media. This NOM did not affect MMHg production even under very low Hg:SRNOM ratios, where Hg binding is predicted to be dominated by high energy sites. Adding Hg or Hg–NOM to growing cultures 24 h before sampling (late addition) resulted in approximately 2 times greater net fraction of Hg methylated than for comparably aged cultures exposed to Hg from the initial culture inoculation (early addition). Mid and late-log phase cultures produced similar amounts of MMHg, but late stationary phase cultures (both under early and late Hg addition conditions) produced up to approximately 3 times more MMHg, indicating the potential importance of growth phase in studies of MMHg production.

Biswas, A., S.C. Brooks, C.L. Miller, J.J. Mosher, X.L. Yin and M.M. Drake. 2011. Bacterial growth phase influences methylmercury production by the sulfate-reducing bacterium *Desulfovibrio desulfuricans* ND132. Sci. Tot. Environ. 409:3943-3948 (doi:10.1016/j.scitotenv.2011.06.037).