This is a useful study exploring the kinetics of urea hydrolysis by a group of bacteria and its link to microbial-induced calcite precipitation. Three strains of bacteria are tested (*S. pasteurii*, *B. sphaericus 21776* and *B. sphaericus 2178*), grown at 30C while also varying redox conditions to compare rates of urea hydrolysis between aerobic and anaerobic conditions. Further comparison involves using different terminal electron acceptors in the case of anaerobic experiments, presumably because metabolic pathways based on these TEAs are also known to drive up pH.

The main finding is that only two (*S. pasteurii* and *B. sphaericus 21776*) of the three bacterial strains tested hydrolyse urea and lead to calcite precipitation, and that rates were higher for *B. sphaericus 21776* than *S. pasteurii*, although the differences are not tested statistically. In addition, urea hydrolysis rates are higher when calcium is absent, and biomass (and protein) data is given to show that calcite precipitation arrests the growth of the bacteria through cell entombment, which reduces diffusion of urea to cells. Paradoxically, cell growth is also compromised under anaerobic conditions but this does not appear to affect urea hydrolysis rates.

The study is of wide interest to readers of Biogeosciences and deserves to be published following some minor modifications.

1. There is apparent confusion about the meaning of rate being zero order with respect to biomass being interpreted as X=0, which invalidates both equations 9 and 10. I believe what they mean is that X is constant so the non-normalised rate = k_{obs}[Urea], and $k_{urea} = k_{obs}/[X]$. In this context, the calculation of k_{obs} is simply a step towards the calculation of the real k_{urea} and so is not in itself a separate method. Consider this in the same way that observed mineral dissolution rates from solution data are normalised to surface area. The consequence of this is that the comparison with other studies should only be on the biomass-normalised rate constants.
2. In the context of Equation 10, a simpler analysis would have been simply to linearise the function by plotting ln [Urea] against time. I am concerned that other orders were not tested but perhaps it would be useful to provide fitting constraints information (residual sum of squares, r-squared values) for the non-linear fitting presented. Significantly, urea hydrolysis is an enzymatic reaction but this analysis is purely abiotic, while the real rate is likely cell-surface controlled, requiring enzymatic analysis approaches (e.g. Michaelis-Menten).
3. Figure 1 is slightly misleading as it implies urea concentration was measured when it was derived from $NH4^+$ measurements. I wonder if $NH4^+$ data should also be given. Importantly, there is need for an explanation of the drop in Ca concentration in Figure 1C given the limited urea hydrolysis for this bacteria.
4. In line 15, page 8, I am always concerned when control data is “not shown” or presented. It is the only data that gives us confidence that the experimental observations relate to our manipulations rather than chance.
5. In Figure 5, neither of the radial sections show the bright spots which I assume represent the calcium in the cells (arrowed). It would be helpful to clarify why their appearance is orientation-dependent.