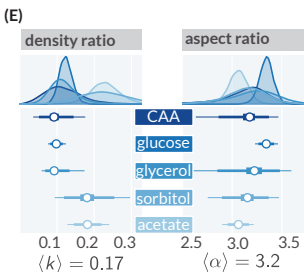
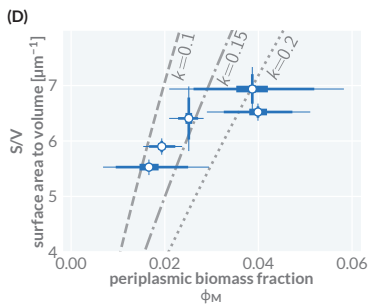
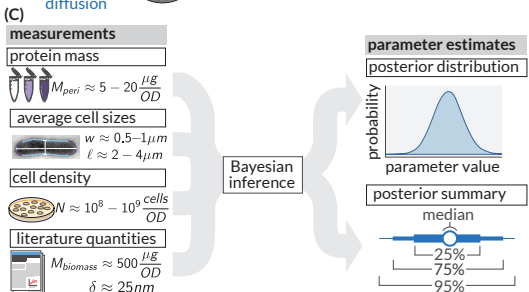


(B) density-dependent scaling of surface area to volume

$$\frac{S}{V} \sim \frac{\text{periplasmic biomass fraction}}{\text{biomass density ratio}} \frac{1}{\delta} = \frac{\phi_M}{k\delta}$$



(F) crowder model for cell-width control

$$w \sim \frac{12\alpha\delta k}{3\alpha - 1} \frac{1}{\phi_M}$$

relative crowding coefficient

