

As in the journal club paper, glucose is the only carbon source.

- Media Used
 - Enology
 - 220 g/L glucose
 - 200 mg/L nitrogen
 - Anaerobic growth factors
 - Brewery
 - 80 g/L glucose
 - 400 mg/L nitrogen
 - No anaerobic growth factors
 - Bakery
 - 80 g/L glucose
 - 400 mg/L nitrogen
 - 150 g/L sorbitol
 - No anaerobic growth factor
- Fermentation Kinetics
 - V = CO₂ production rate (g liter⁻¹ h⁻¹)
 - h = Lag-phase time
 - Time between inoculation and beginning of CO₂ release
 - **AF time** → fermentation has ended when CO₂ production rate (V) dropped below 0.05 g liter⁻¹ h⁻¹
 - $V_{\max}$ = Maximal CO₂ production rate (g liter⁻¹ h⁻¹)
 - **CO₂tot** = Total amount of CO₂ released at the end of fermentation (g liter⁻¹)
- Population Dynamics
 - $$N_t = \frac{KN_0e^{rt}}{K + N_0(e^{rt} - 1)}$$
 - K = carrying capacity (cells/mL)
 - r = intrinsic growth rate (cell division/hr)
 - N_t = population size at time t
 - N_0 = initial population size
- CO₂ Specific Flux
 - J = CO₂ production rate per cell (g h⁻¹ cell⁻¹)
 - $J_{\max}$ = maximum CO₂ production rate per cell
- Relationships
 - $V_{\max}$ is correlated with K
 - As $V_{\max}$ increases, K increases
 - No correlation between $V_{\max}$ and $J_{\max}$
 - K is correlated with acetic acid, trehalose, and relative nitrogen consumption
 - As K increases, for example, nitrogen consumption increases
 - K is correlated to biomass
 - No correlation between biomass and cell size
 - Correlation between the mean cell size and $J_{\max}$

- As cell size increase, $J_{\max}$ increases
- K is negatively correlated with cell size
 - As cell size increases, K decreases
- Cell size and growth recovery and cell size and trehalose are positively correlated
 - As cell size increases, growth recovery and trehalose increase
- K is the main component of Vmax variation
- The major factors controlling fermentative ability were population parameters (K, $V_{\max}$)
- As ammonia (mg/L) increases, K (cells/mL) increases, thus $V_{\max}$ increases → ultimately, CO_2tot (g liter⁻¹ h⁻¹) will increase