Wednesday, February 1, 2023 10:16 AM

63 species

$FC_i^{(\alpha)} < 1$

$\sim 300\ R_i$

abundancy

$D = \frac{1}{15{,}000}$

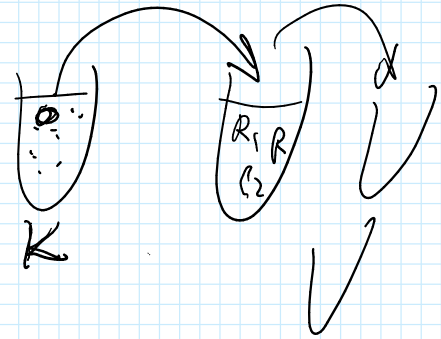
passage

$\left[1 - FC_i^{(\alpha)}\right] R_i$

$C_i^{(\alpha)}$

$B^{(\alpha)}(\text{end}, K)$

$R_i$




Diauxic shifts

$$B^{(\alpha)}(\text{end}) - \cancel{B^{(\alpha)}(\text{start})} = \sum_i R_i C_i^{(\alpha)}$$

$$B^{(\alpha)}(\text{alone}) = \sum_i R_i C_i^{(\alpha)}$$

$\beta_i^{(\alpha)} \le 1$

$$B^{(\alpha)}(\text{comm}) = \sum_i R_i C_i^{(\alpha)} \cdot \beta_i^{(\alpha)}$$

$$\beta_i^{(\alpha)} = \frac{C_i^{(\alpha)} B^{(\alpha)}(\text{comm})}{\sum_\beta C_i^{(\beta)} B^{(\beta)}(\text{comm})}$$

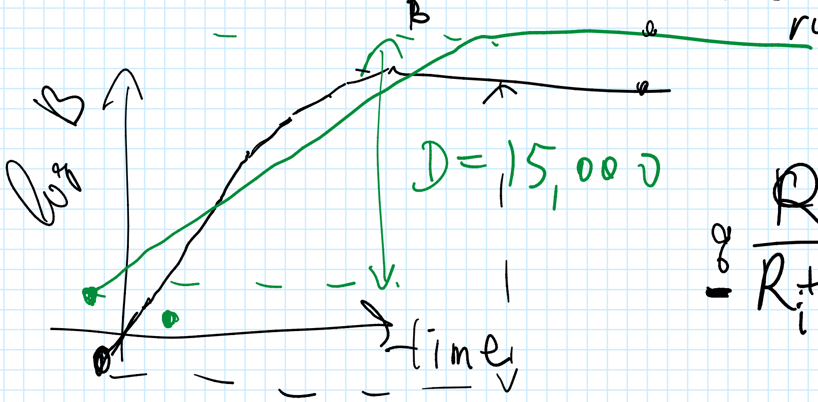
$$B^{(\alpha)}(\text{comm}) = \sum R_i \cancel{C_i^{(\alpha)}} \frac{C_i^{(\alpha)} B^{(\alpha)}(\text{comm})}{\sum_\beta C_i^{(\beta)} B^{(\beta)}(\text{comm})}$$

Steady state condition

$$\beta_i^{(\alpha)} = \frac{C_i^{(\alpha)} B^{(\alpha)}}{\sum_\beta C_i^{(\beta)} B^{(\beta)}}$$

condition $\quad \sum_{\beta} C_i^{(\cdot)} B^{(\cdot)}$

$$1 = \sum \tilde{R}_i \frac{C_i^{(\alpha)}}{\sum_{\beta} C_i^{(\beta)} B^{(\beta)}}$$ (at time resource $i$ runs out)




$$\frac{R_i}{R_i + K_i}$$

300 $\quad 63 \times 6 \times 3$

$$1 = \sum R_i \frac{C_i^{(\alpha)}}{\sum_{\beta} C_i^{(\beta)} B^{(\beta)}} \quad \forall \alpha \text{ surviving species}$$

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$K_{in}^{(\alpha)} \qquad B^{(\alpha)}$ (passage)

$$K_{in}^{(\alpha)} = \sum_i \Theta\left[C_i^{(\alpha)} > th\right] \qquad 0$$

$$K_{in\ \text{weighted}}^{(\alpha)} = \sum C_i^{(\alpha)}\, \Theta\left[C_i^{(\alpha)} - th\right]$$

$$K^{(\alpha)}_{\text{in weight}+\beta} =$$

$$= \sum_i \underset{\approx}{R_i} \frac{C_i^{(\alpha)} B^{(\alpha)}}{\boxed{\sum_\beta C_i^{(\beta)} B^{(\beta)}}}$$