| Table1: Biochemical Reactions | | | | |
|---|---|---|---|---|
| **Number** | **Reaction name** | **Reaction** | **Kinetic law** | **Flux ($v$)** |
| 1 | Degradation of AHL by AiiA | AiiA + AHL → AiiA | Michaelis - Menten | $v_1 = \frac{k_{1cat}[AiiA][AHL]}{K_{1M} + AHL}$ |
| 2 | Complex formation and dissociation between AHL and LuxR | AHL + LuxR ↔ AHL:LuxR | Mass Action | $v_2 = k_2[AHL][LuxR] - k_{-2}[AHL{:}LuxR]$ |
| 2.1 | Dimer formation and dissociation between AHL:LuxR complexes | 2 AHL:LuxR ↔ (AHL:LuxR):(AHL:LuxR) | Mass Action | $v_{2.1} = k_{2.1}[AHL][LuxR]^2 - k_{-2.1}[(AHL{:}LuxR){:}(AHL{:}LuxR)]$ |
| 3.1 | CI synthesis induced by AHL and LuxR complexes dimer | $\rho_{cI}$ + (AHL:LuxR):(AHL:LuxR) → $\rho_{cI}$ + (AHL:LuxR):(AHL:LuxR) + CI | Mass Action | $v_{3.1} = k_{3on}[\rho_{cI}][(AHL{:}LuxR){:}(AHL{:}LuxR)]$ |
| 3.2 | Constitutive CI synthesis | $\rho_{cI}$ → $\rho_{cI}$ + CI | Mass Action | $v_{3.2} = k_{3off}[\rho_{cI}]$ |
| 4 | Natural degradation of CI | CI → Ø | Mass Action | $v_4 = k_4[CI]$ |
| 4.1 | Dimer formation and dissociation between CI molecules | 2 CI ↔ CI:CI | Mass Action | $v_{4.1} = k_{4.1}[CI]^2 - k_{-4.1}[CI{:}CI]$ |
| 6 | RcnA production | ρ → ρ + RcnA | Hill kinetics | $v_6 = \frac{k_6[\rho]}{1 + \frac{[CI:CI]}{k_{5.1}} + \frac{[CI:CI]}{k_{5.2}} + \frac{[CI:CI]^2}{k_5}}$ |
| 7 | Nickel efflux by RcnA | RcnA + $Ni_{int}$ → RcnA + $Ni_{ext}$ | Mass Action | $v_7 = k_7[RcnA][Ni_{int}]$ |
| 8 | Natural degradation of RcnA | RcnA → Ø | Mass Action | $v_8 = k_8[RcnA]$ |
| 9 | Nickel import by unknown channel | Unk + $Ni_{ext}$ → Unk + $Ni_{int}$ | Mass Action | $v_9 = k_9[Unk][Ni_{ext}]$ |