

Control Analysis of Mixed Populations of *Gluconobacter oxydans* and *Saccharomyces cerevisiae*

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We developed a theoretical framework, derived from Metabolic Control Analysis and corroborated by experiments, for a formal description of the interaction between two microbes, *Saccharomyces cerevisiae* and *Gluconobacter oxydans*. Our analysis treats microbes as super-enzymes converting glucose and oxygen to acetic acid via the intermediate ethanol. Flux through this system is defined as the specific steady-state rate of acetate production. We have measured the kinetic parameters for the overall reactions in pure cultures and used the data to construct a kinetic model, describing the mixed population system. The model was validated experimentally using mixed cultures under non-growing conditions. We are currently doing a control analysis on the steady state behaviour of the system.