Simulation and Flexibility Analysis of Milk Production Process

In this work, process simulation method is used to simulate pasteurised market milk production line. A commercial process simulation tool - Pro/II from Simulation Science Inc. is used in the simulation work. In the simulation, a new model is used to calculate the thermal property of milk. In this work, a simulator is obtained for the milk production line. Using the simulator, different milk processing situation can be quantitatively simulated investigated, such as different products production, capacity changes, fat content changes in raw milk, energy cost at different operation conditions etc. As the pasteurised market milk production line involves typical milk processing steps, such as pasteurisation, centrifugal separation, standardisation, the simulator can be modified to simulate similar milk processing lines. In many cases, the rapidly changed market requires a flexible milk production line. Such flexible dairy production line can adjust its production pace in manufacturing different products without replacing existing equipment in the production line. In this work, the dairy process simulator is applied to study the flexibility of milk production line. In the same production line, various processing conditions are investigated through the simulator. A flexible operation range or ‘operation window’ is obtained from the simulation for the milk production line. The study gives both the operation feasibility and detailed operation cost.

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