



Numerical error analysis of mass transfer measurements in batch dialyzer

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ABSTRACT

The overall dialysis coefficient, which is the basic transport characteristic of a dialysis process, can easily be determined from experimental data obtained in a two-compartment dialysis cell. Here, the volume changes and the concentrations of component in both the compartments are recorded as functions of time. Generally, all these input quantities can be loaded with an experimental error. The paper deals with the transformation of concentration and liquid volume errors into the final results under the conditions of constant liquid volumes in both the compartments of the dialyzer. Using the generated precise experimental data, small random errors have been introduced into them and the effect of these errors upon the overall dialysis coefficient has been evaluated. The error analysis has proved that the unfavourable effect of the input quantities is dependent upon intensity of mass transfer. Moreover, in some cases the effect of the input quantities can be eliminated to some extent using reconciled experimental data.

Keywords: Batch dialysis; Mass transfer; Overall dialysis coefficient; Error analysis; Data reconciliation

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