

ABSTRACT

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Title of diploma thesis: **Effect of flow rate on the kinetic and the possibility of evaluating different reactions in the SIA system**

The diploma thesis dealt with testing the effect of mixing and flow rate on the kinetic and the possibility of evaluating different reactions in the SIA system with spectrophotometric detection. Absorbance was measured for two kinds of chemical reactions with different reaction speed. For faster running reaction color change of bromothymol blue (BTB) with sodium hydroxide (NaOH) by the change in pH was evaluated by the increase in absorbance of blue form/decrease in absorbance of yellow form of BTB. The effect of flow rate and method of mixing (different sequence aspirations, different mixing ratio of working solution) was tested. The same parameters were also tested for slowly running two-step reaction of nitrites (D) with a diazo-coupling reagent (DKC). Furthermore, stop-flow technique was applied to see the effect of stopping the flow at certain parts of the flow system. The "sandwich" technique was tested too. The obtained results were evaluated using peak heights and peak areas.

In case of slower flow rates the larger volume amounts of working solutions were advantageous. Application was favorable in terms of higher measurement sensitivity, but on the other hand, peaks got wider and the time of analysis was prolonged. Using the equivalent ratio of the working solutions proved to be the most appropriate. For the reaction of nitrites with diazo-coupling reagent the highest values were achieved using the longest period of stopping the flow. Stopping the flow for 60 - 80 s did not bring a significant increase in the signal. Stop the flow in the holding coil and before the detector was reflected by lower values of peak area than stop the flow in the flow cell of the detector. In evaluation using the peak height significant differences using stop the flow in different places were not observed. Use of the sandwich technique where the aspiration of the sample was made between the two zones reagent showed the highest reaction yield.