On-chip Hematocrit Correction for Whole Blood Glucose Amperometric Sensing Strip Using a Post-Measurement Potential Step

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The accuracy of a point-of-care whole blood glucose sensor can be considerably influenced by hematocrit; therefore, an on-chip Hct correction protocol was developed and incorporated to meet the clinical demands. An impulse of DC 0.3 V was first applied for detecting blood glucose amperometrically, followed by an additional 3.2 V DC impulse for Hct estimation. Without Hct correction, the results of blood glucose tests were negatively correlated with Hct levels, and the glucose values were overestimated by 38.8% and underestimated by 43.8% when the Hct levels were 9% and 70%, respectively. On the other hand, all the mean biases of blood glucose tests with 5 designed Hct levels (9%, 25%, 43%, 55% and 70%) were less than $\pm 10\%$ by utilizing the proposed Hct correction method. The method was insensitive to several representative interfering chemicals.

Keywords: Hematocrit compensation, post-measurement potential step, blood glucose sensor, strip

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