

## **Modification of Methaemoglobin Reduction Test/ Brewer's Test for Rapid Diagnosis of G6PD Deficiency for Screening**

**D.M.T.S. Dissanayake<sup>1</sup>, K.B. Jayasekara<sup>2</sup>, F.Shihana<sup>3</sup> and D.M.Dissanayake<sup>2</sup>**

*<sup>1</sup>Department of Medical Laboratory Science, Faculty of Allied Health Sciences, University of Peradeniya*

*<sup>2</sup>Department of Pathology, Faculty of Medicine, University of Peradeniya*

*<sup>3</sup>South Asian Clinical Toxicology Research Collaboration, University of Peradeniya*

Methaemoglobin reduction test (Brewer's test) is the most commonly used technique to screen the G6PD deficiency, which is the most common human enzyme deficiency in the world. The standard test procedure requires a large volume of blood (2 ml) and includes a longer incubation period of three hours at 37<sup>o</sup>C which makes it difficult to use in the field.

The objective of this study was to develop a rapid diagnostic method by changing different parameters of methaemoglobin reduction test procedure, enabling it to be used in the field.

Minimum incubation period, minimum blood volume and minimum reagent volumes needed for the reaction were tested. Dry tubes were prepared with the reagents necessary for the lowest volume of blood. A new enzyme activator was introduced to minimize the incubation time.

The study results showed that minimum incubation time required for the standard test was 135 minutes, minimum blood volume needed was 0.100 ml, minimum NaNO<sub>2</sub> and glucose reagent volume required was 0.01 ml at 0.0864 mol/l. The minimum methylene blue volume was 0.01 ml at 0.2 X 10<sup>5</sup> mol/l. Results revealed that MgCl<sub>2</sub> can be used as an enzyme activator and the incubation time needed for the test reduced up to 105 minutes. Development of strip method failed due to instability of the negative control.

The standard methaemoglobin reduction test can be modified to reduce the incubation time. The development of the strip method needs improvement for the negative control.