



EFFECTIVENESS OF SODIUM FLUORIDE AND ACIDIFYING BLOOD SAMPLES IN THE IN VITRO PRESERVATION OF BLOOD GLUCOSE AND DIABETIC DIAGNOSIS

Inoka Uluwaduge, KobikaThillainathan, Janani Jeyachandran, S.S.P. Gamage

Medical Laboratory Sciences Degree Program, Department of Allied Health Sciences, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda

kosthima@gmail.com

This study was carried out to validate the use of sodium fluoride in the *in vitro* preservation of blood glucose and diagnosis of diabetes and to decide on a simple and more reliable alternative in the place of NaF to preserve blood glucose concentration more effectively.

A total number of 103 volunteer individuals including 20 diabetes patients (to ensure obtaining higher values) participated in this study. Fasting or random blood samples (3 ml) were obtained from each participant and aliquot into three different containers; the plain tube, NaF containing bottles and citric acid containing bottles. Blood in plain tubes were processed immediately and the values obtained from the tubes were taken as the baseline glucose concentration. Blood samples preserved with NaF (1mg NaF /3mg K₂C₂O₄ /1mL blood) and citric acid (5mg citric acid /2mg EDTA-2Na /1mL blood) were analysed for glucose (Glucose oxidase enzymatic kit, BiaSys) after 1 hour and 2 hours of collection and the values obtained were compared against control value from plain tube.

The mean baseline blood glucose concentration obtained was 106.5 mg/dL. A significant reduction in the mean glucose concentration was seen [8.9 mg/dL or 8.8% at 1 hour and 12.2 mg/dL or 11.9% at 2 hour; $p < 0.05$] when blood was drawn into tubes containing NaF /K₂C₂O₄. In contrast, the reduction in the mean glucose concentration was comparatively less [2.3 mg/dL or 2.2% at 1 hour and 4.4 mg/dL or 4.1% at 2 hour] when blood was drawn into tubes containing citric acid / EDTA-2Na. The test sensitivity of citric acid treated samples was higher than the NaF treated samples. Especially among the cases having glucose concentration within IFG range (based on baseline glucose findings), the test sensitivity of citric acid treated samples (61.5% at 1 hour and 30.8% at 2 hour) was superior in comparison to the NaF treated samples (7.7% at 1 hour and 0.0% at 2 hour).

Based on findings, the citric acid containing tubes are superior to the NaF containing tubes in the preservation of blood glucose. Treating blood samples with citric acid (acidifying blood samples) minimizes the risk of misdiagnosis of diabetes and prediabetes. Therefore, citric acid would be a simple and more reliable alternative for NaF in the *in vitro* preservation of blood glucose.

Keywords: *sodium fluoride, acidifying samples, blood glucose, diabetic diagnosis, in vitro preservation*