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Dedication

For my lovely mother

To my brothers, sister, friends and
colleagues

For their encouragement and support

And every one helped me.

'''

Acknowledgement

Thanks must first be given to Allah, for giving me health, strength, and power to achieve this work and to make my dream real.

I thank my mother for asking Allah to keep care and success.

I'm very glad to thank my supervisor Dr. Alnazier for his endless guidance, my thanks to my colleagues for their encouragement.

My thanks extended to my brother En. Issam Branko for his continuous advices and supporting and all the staff in laboratory Administration in Khartoum State for their helpful, collaboration and endless help during my research especially
Dr. Maged.

Abstract

Many critical patient-care decisions are based on results supplied by the clinical laboratory produced by means of the clinical laboratory instruments like flame photometer which is used to determine the proportion of sodium and potassium for patient's sample, so the effective quality control programs are essential to ensure more accurate results.

This study was conducted on a number (10) flame photometers in the period from October 2011 until May 2012 to calibrate the instrumentations in the laboratories of Khartoum State in order to evaluate the efficiency and to calibrate flame photometers, and the study was performed after a questionnaire to laboratories technicians according to the specifications (ISO 15189: 2007 E), to assess the surveyed instruments. The subjected instruments are calibrated by using standards tools and materials which are specified for calibration by the manufacturers.

Data were collected before and after calibration procedures and the results of the analysis showed positively variation in the instruments adjustment after calibration, which influenced positively in improving the instruments readings, but statistically there were not significant different which may be due to the sample size. For example, average of the sample sucking rates per minute became 5.86 ml which are located in the standard normal range of sucking rate (4-6) ml per minute as specified by the manufacturer.

As well as the after-calibration readings of flame photometer instruments are compared with ISEs readings to determine the accuracy and precision, the analysis showed that the ISEs readings are more accurate and more precise.

الملخص

العديد من القرارات الطبية الهامة تُبنى على نتائج الفحوصات المعملية والتي تنتج من خلال أجهزة المختبرات مثل أجهزة القياس بواسطة اللهب الذي يستخدم في تحديد نسب مادتي الصوديوم والبوتاسيوم في عينات المرضى ولهذا فإن برامج ضبط الجودة الفعالة تعتبر أساسية لضمان نتائج أكثر دقة.

هذه الدراسة أجريت على عشرة من أجهزة القياس بواسطة اللهب في الفترة من أكتوبر 2011 وحتى مايو 2012م في إدارة المعامل لولاية الخرطوم وذلك لمعايرة تلك الأجهزة وتقدير كفاءتها. تمت الدراسة بعد إجراء استبيان لتقديري المعامل بناءً على مواصفات الآيزو (ISO 15189: 2007 E) لتقييم الأجهزة المعينة، وتمت معايرة الأجهزة في الدراسة بواسطة أدوات قياس ومواد معايرة خاصة للمعايرة من قبل الشركات المصنعة.

تم تجميع القراءات قبل وبعد عملية المعايرة، وأظهرت نتائج التحاليل تغيرات إيجابية في ضبط الأجهزة بعد المعايرة والتي أثرت إيجاباً في تحسين قراءات الأجهزة، ولكن نتائج الاختبارات الإحصائية لم تظهر أي تغيير مهم وقد يكون ذلك ناتج بسبب صغر حجم العينة المأخوذة. وعلى سبيل المثال: متوسط معدل سحب العينة في الدقيقة أصبح 5.86 مل وهو يقع في المدى الطبيعي (4-6) مل في الدقيقة والمحدد من قبل الشركة المصنعة.

إضافة لذلك فإن قراءات أجهزة القياس بواسطة اللهب بعد المعايرة تمت مقارنتها مع قراءات أجهزة قياس الأيونات بواسطة الأقطاب لتحديد صحة ودقة قراءات تلك الأجهزة، وأظهرت التحاليل أن أجهزة قياس الأيونات بواسطة الأقطاب أكثر صحة وأكثر دقة من أجهزة القياس بواسطة اللهب.