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**DEVELOPMENT OF AN EFFECTIVE REDUCED PHENOLPHTHALEIN
REAGENT FOR OCCULT BLOOD DETECTION ON GLUCOSE METERS
AND HEMATOLOGY ANALYZERS**

SUNANTHINEE KHONGNUN

A Thesis Submitted to the Graduate School of Naresuan University

in Partial Fulfillment of the Requirements

for the Master Science Degree in Biomedical Sciences

October 2010

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This thesis entitled “Development of an Effective Reduced Phenolphthalein Reagent for Occult Blood Detection on Glucose Meters and Hematology Analyzers” submitted by Sunanthinee Khongnun in partial fulfillment of the requirements for the Master of Science Degree in Biomedical Sciences is hereby approved.

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ABSTRACT

Objective: The purposes of this study were to develop the new reduced phenolphthalein reagent with high efficiency for blood detection, to produce reduced phenolphthalein test kits for detection of blood contamination on medical devices, and to survey the contamination of blood on glucose meters and hematology analyzers.

Methods: The conditions for reduced phenolphthalein reagent preparation were optimized. Sensitivity, specificity, precision, and stability in developing reduced phenolphthalein reagent were investigated using fresh blood and dried blood samples. Using the new reagent, the blood detection results were compared against the original method and a commercial test kit. The new reduced phenolphthalein testing was used for occult blood contamination on glucose meters and hematology analyzers in 15 hospitals and 74 primary care units in Phichit and Uttaradit Provinces.

Results: The new reagent had good results for precision, stability, sensitivity and specificity. Blood contamination was exhibited in 54.62 percent of glucose meters (59/108), 56.76 percent of the primary care units, (42/74), 50 percent of the hospitals (17/34), and 53 percent of the hematology analyzers (8/15). Overall, the users were satisfied with the new reduced phenolphthalein test kits.

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Conclusions: The new reduced phenolphthalein reagent was efficient for the detection of blood contamination. The new reduced phenolphthalein test kits could be used conveniently for occult blood contamination detection on medical devices. Blood contamination frequencies were still found on glucose meters and hematology analyzers; therefore medical personnel should avoid this biohazard.

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ABBREVIATION

CBC	=	Complete Blood Count
DNA	=	Deoxyribonucleic acid
ESBL	=	Extended-spectrum beta-lactamase
g	=	Gram
HBV	=	Hepatitis virus B
HIV	=	Human Immunodeficiency Virus
Hb	=	Hemoglobin
Hct	=	Hematocrit
ICU	=	Intensive care unit
KM	=	Kastale Meyer
ml	=	Milliliter
mg/dl	=	Milligram / deciliter
NaCl	=	Sodium chloride
PCR	=	Polymerase chain reaction
POCT	=	Point of care testing
PCU	=	Primary care units
μ l	=	Micro liter
pH	=	Power of hydrogen ion concentration
+Ve	=	Positive
-Ve	=	Negative