

# THE EFFECT OF DIFFERENT GIEMSA STAINING CONDITIONS ON THIN BLOOD FILM MALARIA IDENTIFICATION

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**Abstract.** Malaria is a major public health problem in many countries, including Thailand. The gold standard of malaria diagnosis and species identification is microscopic examination but this depends on the skill of the microscopist and the quality of the Giemsa stained blood smear. Different concentrations of Giemsa and staining times may affect dye deposits interfering with malaria identification and resulting in false positive findings since the dye deposit size is similar to that of malaria. The purpose of this study was to determine the ideal Giemsa stain concentration and staining time to identify malaria on a thin blood film with the lowest dye deposits. Positive and negative blood films were prepared and stained with Giemsa with following regimens: 2.5% for 45 min, 2.5% for 60 min; 3% for 30 min, 3% for 40 min; 5% for 20 min, 5% for 30 min; 10% for 10 min, 10% for 20 min, 10% for 30 min; 20% for 5 min, 20% for 10 min, 20% for 20 min, 20% for 30 min; 30% for 5 min and 30% for 10 min. Each slide was reviewed by 3 microscopists in triplicate who were blinded to whether the slide was positive or negative. One slide was made for each regimen giving a total of 270 observations of that 30 slides (15 for negative and 15 for positive) by the 3 microscopists in triplicate. Of these, 4.8% had false positive results and 0% had false negative results. False positive results were: 1 positive result each at 10% for 20 min, 10% for 30 min, 20% for 5 min, and 2 positive results each for 20% for 10 min, 20% for 20 min, 20% for 30 min, 30% for 5 min and 30% for 10 min. Our results show the greater the concentration, the greater the false positive rate. Therefore, the most efficient staining regimen in our study was 3% for 30 min which give a 100% sensitivity and 100% specificity. The concentration and time had the fewest dye deposits and was still able to detect the malaria species.

**Keywords:** malaria, stained blood smear, Giemsa, concentration

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