



# ANALYSIS OF MICROSATELLITE DNA ON X-CHROMOSOME LOCUS DXS6809 IN THAI MALES

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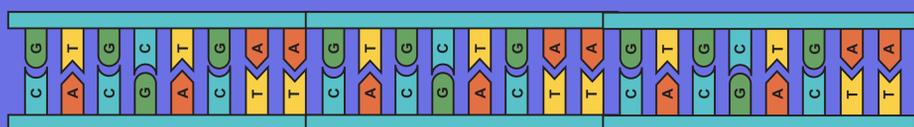
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## ABSTRACT

This study aims to analyse of the microsatellite on the X-chromosome locus DXS6809 in Thai males for forensic science application. To identify genetic traits including a specific locus on the X-chromosome by using the polymerase chain reaction technique (PCR). In this case, partially region on locus DXS6809 were investigated in 50 Thai males aged between 20 and 60 years old. Buccal cells were collected and genomic DNAs were extracted using the NucleoSpin® Tissue kit. The result shows that genomic DNAs contain high purity and the size were around 20 Kb. Then, PCR products were amplified from locus DXS6809 and it was revealed 300 Kb in length. The DXS6809 PCR products were purified using the PrimeWay PCR/Gel purification kit. DXS6809 PCR products were sequenced by Big Dye terminator method and were analyzed by BioEdit program version 7.7. The results revealed that the DXS6809 locus in Thai males population. Contained polymorphic region of three tetranucleotide repeat motifs, which were CTAT, ATCT and TACT. The pattern of (CTAT)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(TATC)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(ATCT)<sub>n</sub> repetition were found 18 patterns. The most highest allelic frequency is (CTAT)<sub>9</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>5</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>11</sub>, (CTAT)<sub>9</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>5</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>13</sub> and (CTAT)<sub>9</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>5</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>14</sub> (0.12). Power of discrimination (PD) of DXS6809 is 0.9234. According to the results, X-chromosome DXS6809 is one of a potential locus to apply in forensic science work.

## INTRODUCTION

Microsatellites, also referred to as Short Tandem Repeats (STRs), are repetitive DNA sequences found in various regions of the genome. These sequences display high variability among individuals and are frequently utilized in genetic studies for purposes such as genetic mapping, identification of genetic disorders, and exploration of population genetics. One notable microsatellite locus, DXS6809 on the X-chromosome, has emerged as a significant marker in both forensic and genetic research. The population genetic data of microsatellite marker DXS6809 obtained from a sample of the German population DXS6809 is a polymorphic sequence of highly polymorphic X-linked tetranucleotides of 77 PCR products, covering 12 alleles, characterized by DXS6809 as a marker with a complex repeating sequence structure, whose repeating pattern is PF20-N37-(CTAT)<sub>7</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>3</sub>-N<sub>10</sub>-(ATCT)<sub>11</sub>-N<sub>31</sub>-PR20.



## RESULTS AND DISCUSSION

According to 1.2% agarose gel, it was found that the extracted DNA samples have a size about 20 Kb when compared with VC Lambda/EcoR I Hind III marker (Figure 1). DNA bands showed the low yield for some samples due to the buccal cells were varies in each volunteer and buccal swab samples were not extracted immediately after buccal swab collection.

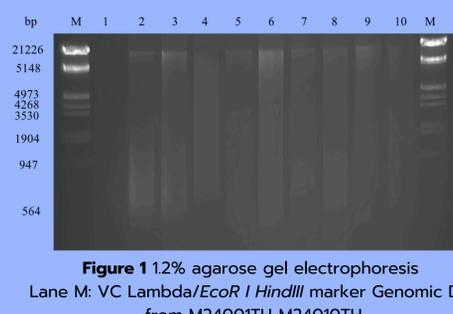


Figure 1 1.2% agarose gel electrophoresis  
Lane M: VC Lambda/EcoR I Hind III marker Genomic DNA from M24001TH-M24010TH

Most samples showed intact genomic DNA, however some samples were degraded during the process. The concentration of genomic DNA samples are range from 13.56 to 98.62 ng/μL. Some genomic DNA samples were contaminated with RNA A<sub>280</sub>/A<sub>260</sub> > 2.0 are range from 1.88 to 2.87.

PCR products of all samples are separated properly with the size about 300 – 350 bp. The optimal annealing temperature is 60.6 degree Celsius and denaturation temperature is 92.0 degree Celsius.

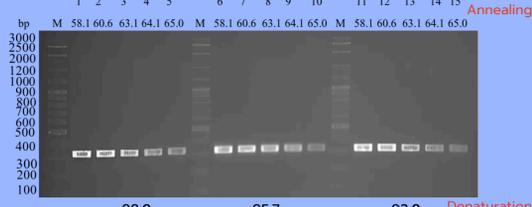


Figure 2 1.5% agarose gel electrophoresis of DXS6809 PCR product Lane M: VC 100 bp DNA ladder and Lane 1-15 : DXS6809 PCR products

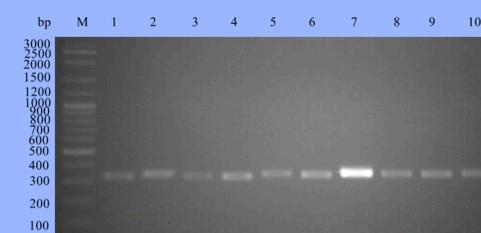


Figure 3 1.5% agarose gel electrophoresis of DXS6809 PCR product Lane M: VC 100 bp DNA ladder and Lane 1-10 : DXS6809 PCR product

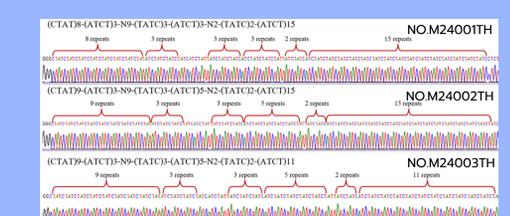


Figure 4 Nucleotides sequences of DXS6809 PCR products are repeated with (CTAT)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(TATC)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(ATCT)<sub>n</sub>

Then, the PCR products of DXS6809 locus were purified from solution by follow protocol of the PrimeWay PCR/Gel purification kit (Figure 3). The pattern of (CTAT)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(TATC)<sub>n</sub>-(ATCT)<sub>n</sub>-Nn-(ATCT)<sub>n</sub> repetition were found 18 patterns (Figure 4) namely (CTAT)<sub>8</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>3</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>15</sub>, (CTAT)<sub>9</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>5</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>15</sub>, (CTAT)<sub>9</sub>-(ATCT)<sub>3</sub>-N<sub>9</sub>-(TATC)<sub>3</sub>-(ATCT)<sub>5</sub>-N<sub>2</sub>-(TATC)<sub>2</sub>-(ATCT)<sub>11</sub>.

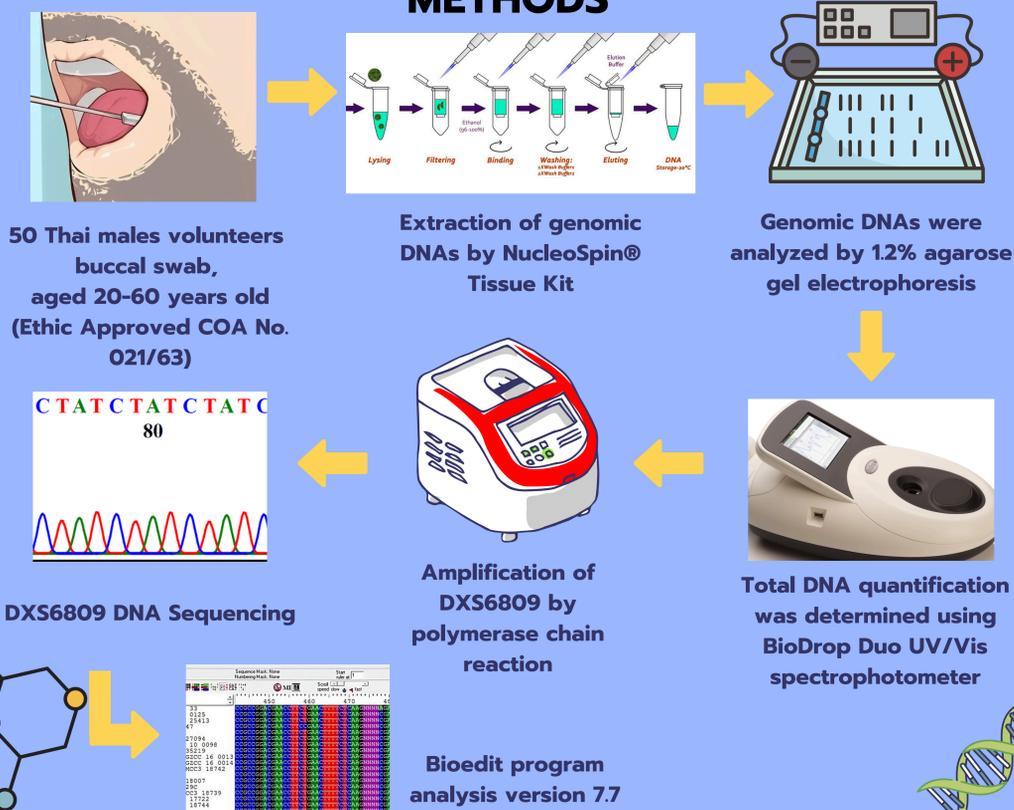
## CONCLUSIONS

The statistical data obtained from this study can indicate that DXS6809 locus is highly power of discrimination in Thai population. Size of STRs is approximately 294 to 318 bp. Power of discrimination (PD) was 0.9234 and polymorphism information content (PIC) is 0.7966.

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## METHODS



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