Detection of tuberculosis (TB) using gold standard method, direct sputum smears microscopy, PCR, qPCR and electrochemical DNA sensor: a mini review

ABSTRACT

Despite the continued effort globally made to control the growing case of Tuberculosis (TB), it continues to be regarded as the second deadliest disease after the HIV. There are various methods developed to diagnose TB, most of which having the criteria of sensitive, selective, cheap and portable to be used in robust applications. Even with the advancement in medication, the important keys including early stage diagnosis is yet to be considered. In diagnosing TB, the only technique remained as the gold standard method is the culturing method, which is the Acid Fast Bacilli (AFB) staining. On the other hand, molecular technique utilising Polymerase Chain Reaction (PCR) assay is preferred as a non-culturing method. Additionally, as molecular techniques become advanced, real-time PCR or quantitative PCR (qPCR) using multiple probes in one shot has raised interest among researchers, because it can skip the process of gel electrophoresis. Recently, researchers have been working on electrochemical DNA sensors which are sensitive, selective, rapid, cheap and can meet with point of care (POC) testing requirements to diagnose TB.

Keyword: Tuberculosis; Acid fast bacilli staining; Electrochemical DNA sensor; Polymerase chain reaction; Quantitative polymerase chain reaction