

# Optimasi deteksi gen mitochondrial large dan small subunit rRNA untuk mengidentifikasi *Pneumocystis jirovecii* pada pasien terkait tuberkulosis paru = Optimization of mitochondrial large and small subunit rRNA genes detection to identify *Pneumocystis jirovecii* in pulmonary tuberculosis-related patients

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## Abstrak

Identifikasi *Pneumocystis jirovecii* pada pasien dengan koinfeksi tuberkulosis (TB) paru masih menjadi tantangan karena gambaran klinis maupun radiologis keduanya yang mirip dan *P. jirovecii* tidak dapat dikultur. Identifikasi *P. jirovecii* di Indonesia masih berdasarkan pemeriksaan mikroskopik yang seringkali kurang sensitif. Oleh karena itu, dikembangkan teknik real time PCR yang lebih sensitif dan spesifik dengan gen target mitochondrial large subunit (mtLSU) dan mitochondrial small subunit (mtSSU) rRNA. Penelitian ini bertujuan untuk mengoptimasi deteksi gen mitochondrial large dan small subunit rRNA dalam mengidentifikasi *P. jirovecii* pada pasien terkait TB paru. Penelitian ini menggunakan 26 sampel sputum pasien terkait TB paru. Optimasi teknik real time PCR berupa optimasi konsentrasi primer, probe, suhu penempelan, volume cetakan DNA dan uji reaksi silang dilakukan untuk mendapatkan kondisi yang optimal dalam amplifikasi gen mtLSU dan mtSSU rRNA. Hasil penelitian menunjukkan hasil optimasi deteksi kedua gen tersebut dapat mengidentifikasi *P. jirovecii* 1 dari 26 sampel (3,84%). Uji real time PCR yang telah di optimasi dalam penelitian ini dapat mendeteksi *P. jirovecii* pada sampel klinis pasien terkait TB paru.

.....Identification of *Pneumocystis jirovecii* in patients with co-infected pulmonary tuberculosis (TB) is still a challenge because the clinical and radiological features of both are similar and *P. jirovecii* cannot be cultured. Identification of *P. jirovecii* in Indonesia is still based on microscopic examination which is often less sensitive. Therefore, a more sensitive and specific real time PCR technique was developed with mitochondrial large subunit (mtLSU) and mitochondrial small subunit (mtSSU) rRNA target genes. This study aimed to optimize the detection of mitochondrial large and small subunit rRNA genes to identify *P. jirovecii* in pulmonary TB-related patients. A total of 26 sputum samples of pulmonary TB-related patients were collected. Real time PCR technique optimization including the optimization of primer and probe concentrations, annealing temperature, DNA template volume and cross-reaction testing, was carried out to obtain optimal conditions for mtLSU and mtSSU rRNA gene amplification. The results showed that the optimization of detection for both genes could identify *P. jirovecii* in 1 out of 26 samples (3.84%). The optimized real time PCR test in this study can detect *P. jirovecii* in clinical samples of pulmonary TB-related patients.