

ABSTRAK

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AKURASI METODE PRESIPITASI FOSFOTUNGSTAT TERHADAP
METODE DIRECT ENZIMATIK DALAM PENENTUAN KADAR
HDL-C PADA PASIEN HIPERLIPIDEMIA

xvii+66 Halaman+8 Tabel+11 Lampiran

Akurasi merupakan aspek penting dalam penjaminan mutu laboratorium klinik karena menunjukkan kedekatan hasil pemeriksaan terhadap nilai sebenarnya. Pemeriksaan *High Density Lipoprotein Cholesterol* (HDL-C) memerlukan hasil yang akurat karena digunakan dalam penilaian risiko penyakit kardiovaskular. Metode direct enzimatis digunakan sebagai metode acuan karena mampu mengukur HDL-C secara selektif tanpa pemisahan manual, sedangkan metode presipitasi fosfotungstat merupakan metode yang masih banyak digunakan di laboratorium pratama karena tidak memerlukan sistem pemeriksaan otomatis khusus. Metode ini bekerja dengan mengendapkan lipoprotein non-HDL menggunakan asam fosfotungstat dan ion magnesium sehingga HDL-C yang tersisa dalam supernatan dapat diukur.

Penelitian ini bertujuan mengetahui akurasi metode presipitasi fosfotungstat terhadap metode direct enzimatis dalam penentuan kadar HDL-C pada pasien hiperlipidemia. Penelitian ini merupakan studi komparatif metode dengan pendekatan *cross-sectional* yang dilakukan di Laboratorium Klinik Farmalab, Bangkalan pada periode Desember 2025-April 2026. Sebanyak 40 sampel serum pasien hiperlipidemia dengan kadar trigliserida >200 mg/dL dipilih menggunakan teknik *purposive sampling* dan diperiksa menggunakan kedua metode. Analisis data meliputi perhitungan bias dan *recovery*, uji normalitas Shapiro-Wilk, serta uji Wilcoxon *signed-rank test* dengan taraf signifikansi $\alpha = 0,05$.

Hasil penelitian menunjukkan rerata kadar HDL-C metode direct enzimatis sebesar 34,90 mg/dL dan metode presipitasi fosfotungstat sebesar 35,05 mg/dL dengan nilai bias rata-rata 0,97% dan *recovery* rata-rata 100,97%. Uji Wilcoxon menunjukkan tidak terdapat perbedaan bermakna antara kedua metode ($p = 0,78$). Metode presipitasi fosfotungstat menunjukkan akurasi yang cukup baik dibandingkan metode direct enzimatis sehingga dapat digunakan dalam pemeriksaan HDL-C di laboratorium dengan tetap memperhatikan pelaksanaan pemeriksaan yang tepat dan terkendali.

Kata kunci : Akurasi, HDL-C, hiperlipidemia, presipitasi fosfotungstat, direct enzimatis.

Daftar Bacaan : 12 Buku dan 41 Jurnal (2016-2026)

ABSTRACT

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ACCURACY OF THE PHOSPHOTUNGSTATE PRECIPITATION METHOD COMPARED TO THE DIRECT ENZYMATIC METHOD IN DETERMINING HDL-C LEVELS IN HYPERLIPIDEMIC PATIENTS
xvii + 66 Pages + 8 Tables + 11 Appendices

Accuracy is a crucial aspect of clinical laboratory quality assurance, as it indicates how close a test result is to the true value. High-Density Lipoprotein Cholesterol (HDL-C) testing requires accurate results because it is used in assessing the risk of cardiovascular disease. The direct enzymatic method serves as the reference method because it can measure HDL-C selectively without manual separation. Meanwhile, the phosphotungstate precipitation method is still widely used in primary laboratories as it does not require specialized automated testing systems. This method works by precipitating non-HDL lipoproteins using phosphotungstic acid and magnesium ions, allowing HDL-C remaining in the supernatant to be measured. This study aimed to determine the accuracy of the phosphotungstate precipitation method compared to the direct enzymatic method for measuring HDL-C levels in hyperlipidemic patients.

This was a comparative method study with a cross-sectional approach conducted at the Farmalab Clinical Laboratory, Bangkalan, from December 2025 to April 2026. A total of 40 serum samples from hyperlipidemic patients with triglyceride levels >200 mg/dL were selected using purposive sampling and examined using both methods. Data analysis included bias and recovery calculations, the Shapiro–Wilk normality test, and the Wilcoxon signed-rank test with a significance level of $\alpha = 0.05$.

The results showed that the mean HDL-C level was 34.90 mg/dL by the direct enzymatic method and 35.05 mg/dL by the phosphotungstate precipitation method, with an average bias of 0.97% and an average recovery of 100.97%. The Wilcoxon test indicated no significant difference between the two methods ($p = 0.78$). The phosphotungstate precipitation method demonstrated reasonably good accuracy compared to the direct enzymatic method; therefore, it can be used for HDL-C testing in laboratories, provided that proper and controlled testing procedures are followed.

Keywords : Accuracy, HDL-C, hyperlipidemia, phosphotungstic acid precipitation, direct enzymatic.

References : 12 books and 41 journal (2016-2025)