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INSTRUMENTASI KONVENSIONAL DAN PORTABEL**
GHILMA WIKAYAHNA MILAWONSO, Suherman, S.Si., M.Sc., Ph.D. ; Prof. Drs. Mudasir, M. Eng., Ph.D.
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INTISARI

Pada penelitian ini telah dilakukan studi perbandingan dengan instrumen konvensional dan portabel untuk analisis Cr(VI) pada limbah cair Laboratorium Kimia di UGM. Penelitian ini diawali dengan validasi metode instrumen analisis yaitu spektrofotometer UV-Visibel, portabel PiCOEXPLORER dan *Inductively Coupled Plasma Atomic Emission Spectrometer* (ICP-AES).

Validasi dilakukan dengan menentukan nilai presisi, linearitas, sensitivitas, limit deteksi dan limit kuantifikasi. Uji analisis sampel buatan juga dilakukan dalam penelitian ini sebelum sampel limbah cair laboratorium dianalisis. Uji sampel buatan ini bertujuan untuk menjadi kontrol hasil analisis tiap instrumen.

Hasil penelitian menunjukkan bahwa hasil validasi metode yang dilakukan dapat menjadi acuan dimana nilai presisi, linearitas, sensitivitas, limit deteksi serta limit kuantifikasi telah sesuai. Berdasarkan uji-t dan uji-F (ANOVA) hasil analisis sampel buatan dan sampel limbah cair Laboratorium Kimia di UGM diperoleh hasil bahwa pengukuran konsentrasi Cr(VI) dengan spektrofotometer UV-Visibel dan PiCOEXPLORER, ICP-AES dan PiCOEXPLORER, serta UV-Visibel dan ICP-AES tidak terdapat perbedaan yang signifikan ($t_{hitung}<t_{tabel)}$. Uji ANOVA menunjukkan bahwa nilai F_{hitung} lebih kecil daripada F_{tabel} sehingga hasil analisis Cr(VI) dalam sampel buatan dan sampel limbah cair yang diukur dengan spektrofotometer UV-Visibel, PiCOEXPLORER dan ICP-AES tidak berbeda secara signifikan ($F_{hitung}<F_{tabel)}$. Dari data yang diperoleh dapat disimpulkan bahwa hasil pengukuran sampel menggunakan instrumentasi portabel cukup bagus dan memberikan hasil yang sama dengan instrumentasi konvensional.

Kata kunci: ICP-AES, PiCOEXPLORER, spektrofotometer UV-Visibel, uji-t, uji-F, validasi

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COMPARATIVE STUDY OF ANALYTICAL RESULTS OF Cr(VI) IN WASTE WATER OF CHEMISTRY LABORATORY AT UGM BY USING CONVENTIONAL AND PORTABLE INSTRUMENTATIONS

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ABSTRACT

In this research, a comparative study of analytical result of Cr(VI) in waste water of chemistry laboratory at UGM by using conventional and portable instrumentations has been done. This research started with validation, t-test and F-test of instrumental analytical method consisting of UV-Visible spectrophotometer, portable PiCOEXPLORER and Inductively Coupled Plasma Atomic Emission Spectrometer (ICP-AES).

Method validation was conducted by determination of precision value, linearity, sensitivity, limit of detection and limit of quantification. An analysis of artificial sample test was also performed in this study before the analysis of laboratory waste water samples were done. The test of this artificial sample aimed to got the control result of the analysis of each instrument.

The results showed that the validation methods could be used as a reference indicated by good results of precision, linearity, sensitivity, limit of detection and limit of quantification of each instruments. Based on t-test and F-test (ANOVA) of the analytical data of artificial sample and waste water sample of Chemistry Laboratory of UGM, it was obtained that the measurement of Cr (VI) concentration with comparison methods of UV-Visible and PiCOEXPLORER, ICP-AES and PiCOEXPLORER, and UV-Visible and ICP-AES gave no significant difference ($t_{count} < t_{table}$). The ANOVA results showed that the F_{count} value was less than F_{table} suggesting that the results of Cr (VI) analysis in the artificial and in waste water sample measured by the UV-Visible, PiCOEXPLORER, and ICP-AES instruments were not significantly difference ($F_{count} < F_{table}$) so it was concluded that the data from portable instrumentations was good and gave the same quality as conventional instrumentations.

Keyword: F-test, ICP-AES, PiCOEXPLORER, spectrophotometer UV-Visible, t-test, validation.