

**Sensor Berbasis *Imprinting Zeolite* untuk Deteksi Sensitif dan Selectif Asam Urat dalam serum**

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Pengembangan sensor sensitif dan selektif asam urat melalui pelapisan elektroda GC dengan *imprinting zeolit* (IZ) telah dilakukan. Pada penelitian ini digunakan zeolit sintesis yang digunakan sebagai material untuk membuat sensor yang sensitif terhadap asam urat. Zeolit (Z) disintesis dengan mencampurkan TEOS, TBOT, TPAOH, dan air kemudian dilakukan proses hidrotermal. Setelah zeolit terbentuk, zeolit dicetak dengan analit asam urat (*non imprinting zeolite*/NIZ). Asam urat kemudian diekstraksi dengan air panas sehingga menghasilkan zeolit yang tercetak oleh molekul asam urat (IZ). Analisis asam urat secara voltametri lucutan menggunakan sensor GC-IZ dilakukan pada potensial -0,6 V selama 150 detik dengan penambahan  $\text{KNO}_3$  0,02 M sebagai elektrolit pendukung. Sinyal arus tertinggi hingga terendah berturut-turut diperoleh dari analisis asam urat menggunakan sensor GC-NIZ, GC, GC-IZ, dan GC-Z. Validitas metode yang diperoleh meliputi linieritas sebesar 0,9834 (konsentrasi 0,95-4,76 ppb); presisi 1,89-7,65%; sensitivitas  $2,0 \mu\text{A/nM/cm}^2$ ; batas deteksi 0,996 ppb ( $5,9 \times 10^{-9}$  M), dan akurasi sebesar 94,75%. Selektivitas sensor yang dikembangkan ini cukup tinggi. Keberadaan asam askorbat, kreatin dan kreatinin relatif tidak mengganggu analisis asam urat. Sensor GC-IZ memiliki waktu hidup sama dengan elektroda GC.

**Kata kunci :** *sensor, asam urat, voltametri lucutan, zeolit, glassy carbon*

## ***Imprinting Zeolite-based Sensor for Sensitive and Selective Detection of Uric Acid in Serum***

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### **ABSTRACT**

Development of the selective and sensitive sensor through the GC electrode coating with imprinting zeolite (IZ) was carried out. Zeolite was synthesized by mixing TEOS, TBOT, TPAOH, and water through hydrothermal process. Zeolite (Z) was molded by uric acid to produce NIZ. Uric acid was extracted with warm water to produce IZ. The deposition of IZ is -0.6 V during 150 seconds with addition of supporting electrolyte  $\text{KNO}_3$  0,2 M. Uric acid analysis with stripping voltammetry using glassy carbon-imprinted zeolite (GC-IZ) was done at -0.6 V during 150 s with addition of  $\text{KNO}_3$  0.02M as supporting electrolyte. The highest current until lowest current from analysis of uric acid obtained are analysis using GC-NIZ, GC, GC-IZ, and GC-Z sensor, respectively. The method validity obtained are linearity 0.9834 (concentration 0.95-4.76 ppb), precision 1.89-7.65%, sensitivity  $2.0 \mu\text{A/nM/cm}^2$ , limit of detection 0.996 ppb ( $5.9 \times 10^{-9} \text{ M}$ ), and accuracy 94.75%. The development sensor showed a high selectivity. Presence of ascorbic acid, creatine and creatinine with an equal concentration with uric acid did not interfere on the uric acid analysis using the developed sensor. The developed GC-IZ sensor has a lifetime as long as the GC electrode.

**Key words :** *sensor, uric acid, stripping voltammetry, zeolite, glassy carbon*