

Deteksi Cepat *Salmonella typhimurium* pada Daging Sapi Menggunakan  
Teknologi Biosensor *Electronic Nose*

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**Intisari**

Penurunan mutu daging sapi terutama disebabkan oleh mikroorganisme, salah satunya adalah *Salmonella typhimurium*. Dalam mencegah penyebaran *S. typhimurium* diperlukan deteksi terhadap keberadaan cemaran *S. typhimurium* pada daging sapi. Selama ini deteksi *S. typhimurium* dengan metode konvensional. Tujuan dari penelitian ini adalah mendeteksi keberadaan *S. typhimurium* pada daging sapi dengan *e-nose* yang dikembangkan oleh Departemen Fismatel, Universitas Gadjah Mada (UGM). Re-identifikasi *S. typhimurium* menggunakan media selektif *Brilliant Green Agar* (BGA), *Salmonella Shigella Agar* (SSA), *Xylose Lysine Deoxycholate Agar* (XLDA), uji-uji biokimiawi dan pengecatan gram. Sampel sebanyak 50 buah @ 30 gram daging sapi yang dipotong dadu. Sampel dimasukkan ke dalam gelas becker 5 ml dan ditutup. Inokulasikan biak *S. typhimurium* dengan konsentrasi  $1 \times 10^3$  cfu/ml biakan *S. typhimurium* ATCC 14028 sebanyak 1 ml menggunakan spuit 1 ml. Setiap sampel diinkubasi pada suhu kamar, selama 0, 8, 16, 24, 32, 40, dan 48 jam. Perlakuan 0 jam tanpa inokulasi *S. typhimurium*. Analisis data dilakukan dengan metode *Linear Discriminant Analysis* (LDA), *Principal Component Analysis* (PCA). Hasil yang diperoleh membuktikan bahwa *e-nose* yang dikembangkan oleh Departemen Fismatel UGM dapat mendeteksi keberadaan *S. typhimurium* pada daging sapi dengan nilai total variansi PCA 84%, LDA dengan nilai akurasi 99 % setelah inkubasi selama 24 jam serta nilai total variansi PCA 79 %, LDA dengan nilai akurasi 80 % setelah inkubasi selama 48 jam. Penelitian ini menyimpulkan bahwa keberadaan *S. typhimurium* pada daging sapi dapat dideteksi dengan *e-nose*.

**Kata kunci** : Deteksi cepat, *Salmonella typhimurium*, *Electronic Nose*,  
*Volatile Organic Compounds*.

Rapid Detection of *Salmonella typhimurium* in Beef Using  
*Electronic Nose* Biosensor Technology

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**Abstract**

Damage that causes a decrease in beef quality is mainly caused by microorganisms, one of which is *Salmonella typhimurium*. In preventing the spread of *S. typhimurium*, it is necessary to detect the presence of *S. typhimurium* contamination on beef. So far, the detection of *S. typhimurium* by conventional methods. The purpose of this study was to detect the presence of *S. typhimurium* in beef with an *e-nose* developed by the Fismatel Department, Gadjah Mada University (GMU). Re-identification of *S. typhimurium* using selective media Brilliant Green Agar (BGA), *Salmonella Shigella Agar* (SSA), Xylose Lysine Deoxycholate Agar (XLDA), biochemical tests and gram staining. Samples were 50 pieces @ 30 grams of diced beef. The sample was put into a 5 ml becker glass and closed. Inoculate *S. typhimurium* with a concentration of  $1 \times 10^3$  cfu/ml *S. typhimurium* ATCC 14028 culture as much as 1 ml using a 1 ml syringe. Each sample was incubated at room temperature, for 0, 8, 16, 24, 32, 40, and 48 hours. Treatment 0 hours without *S. typhimurium* inoculation. Data analysis was performed using *Linear Discriminant Analysis* (LDA), *Principal Components Analysis* (PCA) methods. The results obtained prove that the *e-nose* developed by the Department of Fismatel, GMU can detect the presence of *S. typhimurium* in beef with a total PCA variance value of 84%, LDA with an accuracy value of 99% after incubation for 24 hours, and a total PCA variance value 79%, LDA with an accuracy value of 80% after incubation for 48 hours. This study concluded that the presence of *S. typhimurium* in beef can be detected by *e-nose*.

**Keywords:** *Rapid detection, Salmonella typhimurium, Electronic Nose, Volatile Organic Compounds.*