

## INTISARI

### **ANALISIS METODE KEMOMETRIK DENGAN ALGORITMA GENETIK PADA LIDAH ELEKTRONIK: STUDI KASUS DETEKSI RESIDU ANTIBIOTIK *VIRGINIAMYCIN* PADA DAGING AYAM**

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Residu antibiotik pada daging ayam sangat berbahaya bagi kesehatan manusia jika dikonsumsi dalam jangka panjang. Pada penelitian ini, lidah elektronik berbasis larik sensor berbahan *lipid* dikembangkan dan digunakan untuk mendeteksi daging ayam apakah mengandung residu antibiotik virginiamycin. Sebanyak 9 jenis sensor rasa dibuat dengan mengkombinasikan material polimer dan *lipid* yang selanjutnya ditempelkan pada ujung larik elektroda. Sampel daging diperoleh dari FKH UGM. Untuk pengujian dengan lidah elektronik, daging dipotong-potong dan direndam dalam air distilasi mendidih dan didinginkan hingga suhu ruangan. Respon larik sensor rasa berupa tegangan antara elektroda kerja terhadap elektroda referensi selanjutnya dirata-rata dan dianalisis dengan beberapa model kemometrik berbasis *machine learning* yang selanjutnya dioptimasi dengan algoritma genetik (AG). Hasil optimasi didapatkan dengan model *random forest* (RF) dengan akurasi 92,8%, presisi sebesar 80%, sensitivitas 85,7% dan spesifisitas 83%. Sebagai kesimpulan, lidah elektronik yang ditandem dengan RF-AG dapat dikembangkan lebih lanjut sebagai alat deteksi residu antibiotik dalam daging secara umum.

**Kata Kunci:** residu antibiotik, lidah elektronik, kemometrik, algoritma genetik.

## **ABSTRACT**

### ***Chemometric Method Analysis Employing Genetic Algorithms in Electronic Tongue: A Case Study Detection of Virginiamycin Antibiotic Residue in Chicken Meat***

*Antibiotic residue in chicken is a threat for human health when consumed for a long term. In this study, an electronic tongue consisting a taste sensor array of polymer/lipid was developed and used to detect whether or not the chicken meat contained residues of the virginiamycin antibiotic. A total of 9 types of taste sensor were made by combining polymer and lipid materials which were then attached to the end of the electrode array. Chicken meat samples were obtained from Faculty of Veterinary Medicine UGM. For testing with an electronic tongue, the meat was cut into pieces followed by immersing in boiling distilled water and left to room temperature. The response of the taste sensor array in the form of the voltage between the working electrodes and the reference electrode was then averaged and analyzed with several machine learning-based chemometric models which were then optimized with a genetic algorithm (GA). The optimization results were obtained by using a random forest (RF) model with an accuracy of 92.8%, a precision of 80%, a sensitivity of 85.7%, and a specificity of 83% . In conclusion, the electronic tongue coupled with RF-GA can be further developed as a tool for detecting antibiotic residues in meat as general.*

**Key words:** *antibiotic residue, electronic tongue, chemometrics, genetic algorithm*