

INTISARI

Sosis merupakan makanan cepat saji yang memiliki beragam jenis rasa sesuai dengan asal daging yang digunakan. Identitas dari jenis daging sangat dibutuhkan untuk menjamin kehalalan suatu produk makanan. Penelitian bertujuan mengkaji unjuk kerja hidung elektronik (*e-nose*) yang terdiri dari delapan sensor berbasis *metal oxide semiconductor* (MOS) terhadap sampel sosis ayam, sapi, dan babi tanpa ada campuran bumbu serta bahan tambahan pangan. Konfirmasi gugus fungsi tidak adanya bumbu dianalisis menggunakan FTIR, hasilnya ditemukan puncak 1651 cm^{-1} dan 3008 cm^{-1} yang merupakan puncak pembeda. Eksperimen pengukuran menggunakan *e-nose* dilakukan sebanyak 100 kali pengulangan secara acak untuk masing-masing jenis sosis pada suhu ruangan. Hasil respon sinyal *e-nose* diekstraksi menggunakan metode ekstraksi ciri aksimum dan rata-rata. Analisis dilakukan dengan metode pengelompokan dan klasifikasi. Metode pengelompokan menggunakan *principal component analysis* (PCA), sedangkan metode klasifikasi menggunakan *linier discriminant analysis* (LDA), *quadratic discriminant analysis* (QDA), *support vector machine* (SVM), *k Neares Neighbor* (k-NN), *partial least square* (PLS), dan random forest (RF). Seluruh model klasifikasi menghasilkan akurasi, *sensitivity*, dan *specificity* lebih dari 90%. Akurasi terbaik yakni metode LDA menggunakan ekstraksi ciri maksimum masing-masing akurasi internal dan eksternal secara berurutan ialah 98,76% dan 100%. Berdasarkan model klasifikasi LDA terdapat tumpang tindih antara sosis sapi dan ayam. Klasifikasi *e-nose* menggambarkan pola pengelompokan antar sample, sehingga untuk melihat *volatile organic compound* (VOC) menggunakan *gas chromatography mass spectrometry* (GC-MS). Hasilnya terdapat kemiripan komponen senyawa volatil pada sosis ayam dan sapi pada gugus fungsi hidrokarbon dan ester. Sehingga, sosis ayam dan sapi memiliki aroma yang serupa dari sejenis VOC.

Kata Kunci: sosis, halal, hidung elektronik, ekstraksi fitur, kemometrik

ABSTRACT

Sausage is a fast food that has various types of flavors according to the origin of the meat used. The identity of the type of meat is needed to ensure the halal of a food product. This research aims to examine the performance of the electronic nose (e-nose) which consists of eight sensors based on metal oxide semiconductor (MOS) on chicken, beef, and pork sausage samples without any mixture of spices and food additives. The confirmation of functional group absence of spices was analyzed by FTIR, the results found peaks of 1651 cm^{-1} and 3008 cm^{-1} , which were the peaks of differentiation. The e-nose measurement experiment was carried out 100 times randomly for each type of sausage at room temperature. The results of the e-nose signal response were extracted using the maximum and average feature extraction method. The analysis was carried out using the method of grouping and classification. The grouping method was used PCA, while the classification method was used LDA, QDA, SVM, k-NN, PLS, and RF. All model classification was made sensitivity, and specificity more than 90%. The best accuracy is the LDA method using maximum feature extraction. The internal and external accuracy 98.76% and 100% respectively. Based on the LDA classification model, there was an overlap between beef and chicken sausages. The e-nose classification describes the pattern recognition between samples. The VOC was used by GC-MS, the results showed similarities in the components of volatile compounds in chicken and beef sausages on the hydrocarbon and ester functional groups. Thus, chicken and beef sausages have a similar aroma to similar VOC.

Keywords: *sausage, halal, electronic nose, feature extraction chemometric*