

INTISARI

KLASIFIKASI KEMURNIAN DAGING SAPI BERBASIS *ELECTRONIC NOSE* DENGAN METODE *PRINCIPAL COMPONENT ANALYSIS*

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Daging merupakan bahan makanan yang dikonsumsi secara luas, sehingga dibutuhkan standar kualitas tertentu agar dapat aman dikonsumsi dan tidak merugikan konsumen. Standar tersebut diantaranya adalah kesegaran dan kemurnian. Dalam praktek jual beli daging ditemukan adanya kasus pencampuran daging sapi dengan daging babi sehingga dapat merugikan konsumen. Untuk mengetahui kemurnian daging sapi tersebut dibutuhkan pengujian dengan menggunakan tes aroma berbasis *electronic nose*.

Sampel daging sapi campuran dibuat dengan variasi kandungan daging babi sebesar 20%, 40%, 60%, dan 80% dari total massa sampel, dengan massa sampel adalah 20 gram. Pengambilan data selama 10 hari dilakukan dengan proses *sensing* dan *flushing* masing-masing selama 180 detik dengan pengulangan sebanyak 6 kali per hari. Pengolahan data dilakukan dalam beberapa tahap yang meliputi prapemrosesan sinyal dengan manipulasi *baseline*, ekstraksi ciri dengan menghitung luas kurva sinyal menggunakan pendekatan integral aturan trapesium, dan analisis multivariat menggunakan *Principal Component Analysis* (PCA).

Hasil persentase variansi kumulatif dua komponen utama pada pengujian klasifikasi antara daging sapi dengan daging babi adalah sebesar 99,9%, sedangkan pada pengujian klasifikasi antara daging sapi murni dengan daging sapi campuran adalah sebesar 99,6%. Dengan demikian, *electronic nose* dapat membedakan antara daging sapi murni dengan daging sapi campuran.

Kata kunci: *Electronic nose*, sensor gas metal oksida, klasifikasi, kemurnian daging, *Principal Component Analysis*, ripitabilitas *electronic nose*.

ABSTRACT

CLASSIFICATION OF BEEF PURITY BASED ON ELECTRONIC NOSE COMBINED WITH PRINCIPAL COMPONENT ANALYSIS

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Meat is a widely consumed food, therefore it is required certain quality standards of meat to be safe to be consumed and does not harm the consumers. Several of those standards including meat freshness and meat purity. Recently it has been found some cases of pork adulteration in beef which consequently could harm the consumers. In order to examine the purity of beef, it required an examination test method based on meat odor characteristics by using *electronic nose*.

Adulterated beef samples were prepared with pork content within samples varied by 20%, 40%, 60%, and 80% of total sample mass, where the sample mass is 20 grams. The 10 days data collecting consists of sensing and flushing cycles, which is 180 seconds for each sensing and flushing cycles, with 6 times process repeating over 1 day. Data processing was carried out in several stages which are including signal preprocessing based on baseline manipulation, feature extraction by calculating the area of the response signal curve by using trapezoidal rule of integral approximation, and multivariate analysis using (Principal Component Analysis) PCA.

Cumulative percentage of variance of two principal components of beef and pork classification yields at 99.9% of total variance, and classification between pure beef and adulterated beef resulting in 99.6% of total variance. Therefore, it can be concluded that electronic nose can classify between pure beef and adulterated beef.

Keywords: Electronic nose, metal-oxide gas sensor, classification, meat purity, Principal Component Analysis, electronic nose repeatability.