IMPLEMENTASI *ELECTRONIC NOSE* DENGAN SISTEM PENYAJI SAMPEL TERKENDALI UNTUK IDENTIFIKASI KESEGARAN IKAN KEMBUNG (*Rastrelliger sp.)*

INTISARI

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Electronic nose (*E-nose*) merupakan instrumen yang dibuat dengan menirukan kemampuan hidung manusia untuk mendeteksi dan mengidentifikasi senyawa aroma. *E-nose* pada umumnya terdiri dari sensor *array* yang dapat mengukur aroma berdasarkan pola sinyal spesifik yang dihasilkan setiap sampel. Hasil pengukuran yang disimpan dalam bentuk data MS Excel perlu diolah melalui *pre-treatment* agar dapat dianalisis lebih lanjut dengan metode pengenalan pola. E-nose digunakan untuk mengukur tingkat kesegaran ikan Kembung di Pasar Yogyakarta melalui identifikasi senyawa aroma berdasar standar ikan Kembung segar dan tidak segar. Pengukuran kondisi ikan Kembung segar dilakukan segera setelah ikan di beli dari nelayan, sedangkan ikan kembung tidak segar diukur setelah inkubasi 24 jam pada suhu kamar. Sampel penelitian berupa ikan Kembung yang dijual di Pasar Yogyakarta, yang diambil secara random, baik waktu maupun tempat, Satu kali proses pengujian meliputi tiga tahap, terdiri dari flushing 120 detik, collecting 180 detik, dan purging 180 detik. Pengambilan data dilakukan sebanyak 40 kali ulangan untuk setiap sampel. Data tersebut kemudian dianalisis menggunakan metode *pre-treatment* berupa *absolute data* yang selanjutnya dievaluasi menggunakan analisis metode *Principal Component Analysis* (PCA). Hasil penelitian menunjukkan bahwa tingkat kesegaran ikan Kembung di Pasar Yogyakarta mendekati kualitas ikan segar, sesuai hasil pengujian menggunakan PCA bahwa pola sinyal aroma ikan Kembung dari pasar Yogyakarta lebih menjelasakan bahwa PC1 dengan nilai 87,20% dan PC2 dengan nilai 7,88% dengan total variansi kumulatif dari kedua komponen tersebut sebesar 95,08%. Pengujian formalin menggunakan tes formalin pada ikan kembung dari pasar Yogyakarta menunjukkan kandungan formalin di pasar Yogykarta bebas dari kandungan formalin.

Kata kunci: *electronic nose*, ikan kembung, *principle component analysis*, tingkat kesegaran, formalin

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IMPLEMENTATION OF ELECTRONIC NOSE WITH CONTROLLED MULTI-CHAMBER SAMPLE SYSTEM FOR IDENTIFICATION OF THE FRESHNESS OF MACKEREL (*Rastrelliger sp.)*

ABSTRACT

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Electronic nose (E-nose) is an instrument made by imitating the ability of the human nose to detect and identify aroma compounds. E-nose generally consists of a sensor array that can measure the aroma based on the specific signal pattern generated by each sample. The measurement results that are stored in the form of MS Excel data need to be processed through pre-treatment so that they can be analyzed further using the pattern recognition method. E-nose is used to measure the freshness level of mackerel in Yogyakarta Market through identification of aroma compounds based on fresh and unfresh mackerel standards. The measurement of the condition of fresh mackerel was carried out immediately after the fish was purchased from the fishermen, while the non-fresh mackerel was measured after 24 hours of incubation at room temperature. The research sample in the form of mackerel sold at the Yogyakarta Market, which was taken at random, both time and place. One testing process includes three stages, consisting of 120 seconds of flushing, 180 seconds of collecting, and 180 seconds of purging. Data collection was carried out 40 times for each sample. The data were then analyzed using pre-treatment methods in the form of absolute data which were then evaluated using the Principal Component Analysis (PCA) method. The results showed that the freshness level of mackerel in the Yogyakarta Market was close to the quality of fresh fish, according to the results of testing using PCA that the aroma signal pattern of mackerel from the Yogyakarta market further explained that PC1 with a value of 87.20% and PC2 with a value of 7.88% with a total the cumulative variance of the two components is 95.08%. The formalin test using the formalin test on mackerel from the Yogyakarta market showed that the formalin content in the Yogykarta market was free from formaldehyde content.

Keyword: electronic nose, mackerel, principle component analysis, freshness level, formalin