

ABSTRAK

SISTEM DETEKSI KANDUNGAN DAGING BABI PADA BAKSO SAPI MENGUNAKAN *ELECTRONIC NOSE (E-NOSE)* BERBASIS JARINGAN SYARAF TIRUAN DENGAN METODE BACKPROPAGATION

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Telah dilakukan penelitian mengenai sistem deteksi kandungan daging babi pada bakso sapi menggunakan *electronic nose (e-nose)* berbasis jaringan syaraf tiruan dengan metode *backpropagation*. Penelitian ini bertujuan mendeteksi kandungan daging babi pada bakso sapi menggunakan e-nose berbasis JST dengan metode *backpropagation*, membuat program JST untuk mengenali beberapa macam sampel bakso menggunakan *e-nose* dan menganalisis pola yang terbentuk menggunakan *Principal Component Analysis (PCA)*. Penelitian ini menggunakan sampel bakso sapi, bakso babi dan bakso campuran. Sistem *e-nose* yang dikembangkan menggunakan empat sensor gas, yaitu MQ-2, MQ-7, MQ-9, dan MQ-135, untuk menangkap respons aroma bakso. Tahap penelitian meliputi pengambilan data, pelatihan JST, pengujian JST dan analisis JST. Sistem *e-nose* menggunakan JST dengan metode *backpropagation* mampu mendeteksi bakso sapi, bakso babi, dan bakso campuran. Arsitektur JST dengan jumlah *neuron hidden layer* 9 merupakan JST dengan akurasi terbaik yang dihasilkan dari proses pelatihan. Model ini menghasilkan nilai presisi sebesar 73,13%, sensitivitas sebesar 74,85%, dan akurasi sebesar 90,40%.

Kata Kunci : *Elektronic Nose, Jaringan Syaraf Tiruan, Backpropagation, Aroma Bakso, Principal Component Analysis.*

ABSTRACT

PORK CONTENT DETECTION SYSTEM IN BEEF MEATBALLS USING AN ELECTRONIC NOSE (E-NOSE) BASED ON AN ARTIFICIAL NEURAL NETWORK WITH THE BACKPROPAGATION METHOD

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A study has been conducted on a pork meat detection system in beef meatballs using an electronic nose (e-nose) based on an artificial neural network (ANN) with the backpropagation method. This research aims to detect the presence of pork in beef meatballs using an ANN-based e-nose with the backpropagation method, to develop an ANN program for recognizing various types of meatball samples using an e-nose, and to analyze the patterns formed using Principal Component Analysis (PCA). This study used samples of beef meatballs, pork meatballs, and mixed meatballs. The developed e-nose system employed four gas sensors, namely MQ-2, MQ-7, MQ-9, and MQ-135, to capture the aroma responses of meatballs. The research stages included data acquisition, ANN training, ANN testing, and ANN analysis. The e-nose system using an ANN with the backpropagation method was able to detect beef meatballs, pork meatballs, and mixed meatballs. The ANN architecture with nine hidden layer neurons produced the best performance obtained from the training process. This model achieved a precision of 73.13%, sensitivity of 74.85%, and accuracy of 90.40%

Keywords: Electronic Nose, Artificial Neural Network, Backpropagation, Meatball Aroma, Principal Component Analysis.