

INTISARI

UNJUK KERJA LIDAH ELEKTRONIK UNTUK MENDIFERENSIASI TEH HITAM BERDASARKAN JENISNYA

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Telah dilakukan penelitian mengenai aplikasi lidah elektronik potensiometrik dengan penambahan perangkat *datalogger* yang terhubung dengan *bluetooth system* untuk mengklasifikasikan teh berdasarkan Standar Nasional Indonesia. Penelitian dilakukan dengan menganalisa tiga jenis teh dengan menggunakan perangkat lidah elektronik yang menggabungkan elektroda referensi komersial dan 16 lipid/ membran polimer, yang didapat dari teknik *drop-by-drop*. Hasil analisa dari perangkat lidah elektronik diverifikasi menggunakan metode *principal component analysis* (PCA), *linear discriminant analysis* (LDA), yang terdiri dari set data *training* dan set data *testing*. Data tersebut digunakan untuk pelatihan model dan validasi internal menggunakan *cross validation* K-fold (80% data) dan yang lainnya untuk keperluan validasi eksternal (20% data). Dari pengujian sampel teh hitam menggunakan metode LDA dengan fitur *simulated annealing* (SA), didapatkan nilai akurasi sebesar 96%. Dengan demikian, penggunaan lidah elektronik sebagai deteksi cepat diferensiasi teh hitam memiliki potensi dalam dunia industri.

Kata Kunci : lidah elektronik, membran *lipid*, teh hitam, PCA, LDA, SA.

ABSTRACT

PERFORMANCE OF ELECTRONIC TONGUE FOR BLACK TEA DIFFERENTIATION ACCORDING TO TEH TYPE

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Teh application of potentiometric electronic tongue is combined with datalogger devices that are connected via Bluetooth system. For teh classification of black tea in accordance with Indonesian National Standards. Teh classification is based on how to harvest, process, shape and quality. Teh electronic tongue device combines commercial reference electrodes and 16 lipid / polymer membranes, obtained from teh *drop-by-drop* technique. Potentiometric signal profiles were collected from 16 sensors, through analysis of 3 types of tea with 60 samples. Principal component analysis shows that different tea samples can be grouped according to teh group obtained. To furtehr investigate, and verify this capability, teh Principal component analysis (PCA) method is required. Linear Discriminant Analysis (LDA), which is randomly divided into two datasets. Teh first set is used as training data and teh second set is used as testing data. Linear discriminant analysis together with teh simulation annealing variable selection algorithm is also applied to electrochemical data, which are randomly divided into two datasets, one used for model training and internal validation using teh K-fold iterative cross-validation procedure (with 80% data); and otehrs for external validation purposes (containing teh remaining 20% of teh data). From testing black tea samples using teh LDA method combined with *simulated annealing* (SA), obtained an accuracy value of 96%. Thus, teh use of electronic tongues as a rapid detection of black tea differentiation has potential in teh *black tea* industry.

Keyword : Electronic Tongue, *lipid* membrane , black tea, PCA, LDA, SA.