

INTISARI

STUDI SENSOR RASA ASIN BERBASIS MEMBRAN LIPID PADA ELEKTRODA GRAFIT PVC TERMODIFIKASI *POLYPYRROLE -CARBON BLACK* (PPy-CB) MENGGUNAKAN METODE IMPEDIMETRIK

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Sensor rasa asin telah berhasil dibuat menggunakan elektroda grafit PVC (*polyvinyl chloride*) yang kemudian dimodifikasi dengan *polypyrrole-carbon black* (PPy-CB). dan Hasil fabrikasi elektroda dikarakterisasi menggunakan *scanning electron microscopy* (SEM), *cyclic voltametry* (CV), dan *electrochemical impedance spectroscopy* (EIS). Karakterisasi elektroda menunjukkan penambahan material PPy-CB meningkatkan sifat kapasitif, menurunkan resistansi, dan memperbesar luas permukaan elektroda grafit PVC. Pengukuran selektivitas sensor pada sampel rasa dasar menggunakan metode impedimetrik menunjukkan penambahan membran lipid berupa *tetradodecyl ammonium bromide* (TDAB) dan *1-hexadecanol* pada permukaan elektroda grafit PVC yang dimodifikasi PPy-CB menghasilkan kecenderungan selektivitas terhadap rasa asin yang baik. Sensor yang dibuat juga menunjukkan perilaku linier terhadap NaCl dengan sensitivitas sebesar $-4,36 \text{ k}\Omega/\text{dekade}$ dengan $R^2 = 0,99$ pada rentang penginderaan 0,1 hingga 30 mM. Selain itu, respon sensor terhadap komponen rasa asin berupa NaCl, KCl, MgCl_2 , dan CaCl_2 menunjukkan elektroda tersebut mampu membedakan rasa asin berdasarkan kesamaan tingkat keasinan yang dihasilkan. Hal ini menunjukkan sensor rasa asin berbasis membran lipid yang dibuat dengan elektroda grafit PVC yang dimodifikasi PPy-CB yang dikombinasikan dengan metode pengukuran impedimetrik memiliki selektivitas, sensitivitas, dan mampu membedakan komponen rasa asin dengan baik.

Kata kunci: sensor rasa, membran lipid, elektroda grafit PVC, impedimetrik, *polypyrrole-carbon black*

ABSTRACT

STUDY OF SALTY TASTE SENSOR BASED ON LIPID MEMBRANE ON PVC GRAPHITE ELECTRODE MODIFIED WITH POLYPYRROLE CARBON BLACK (PPy-CB) USING IMPEDIMETRIC METHOD

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A salty sensor has been successfully fabricated using graphite PVC (polyvinyl chloride) electrodes, which were modified with polypyrrole-carbon black (PPy-CB) material. The electrode fabrication results were characterized using scanning electron microscopy (SEM), cyclic voltammetry (CV), and electrochemical impedance spectroscopy (EIS). The electrode characterization showed that the addition of PPy-CB material improved the capacitive properties, decrease resistivity, and enlarged the surface area of the graphite PVC electrode. The sensor selectivity was measured on basic taste samples using impedance methods. The results showed that the addition of a lipid membrane consisting of tetradodecyl ammonium bromide (TDAB) and 1-hexadecanol on the electrode surface resulted in good salty taste selectivity on the graphite PVC electrodes modified with PPy-CB. The fabricated sensor exhibited linear behavior towards NaCl with a sensitivity of $-4.36 \text{ k}\Omega/\text{decade}$ and $R^2 = 0.99$ in the sensing range of 0.1 to 30 mM. In addition, the sensor response to salty taste components, including NaCl, KCl, MgCl_2 , and CaCl_2 , showed that the electrode was able to differentiate salty taste based on the level of saltiness produced. This indicates that the lipid membrane-based salty taste sensor fabricated using graphite PVC electrodes modified with PPy-CB and combined with impedance measurement methods has good selectivity, sensitivity, and is able to distinguish salty taste components well.

Kata kunci: Taste sensor, lipid membrane, graphite PVC electrode, impedimetric, polypyrrole-carbon black