UV range obtained for PO adulterated SO samples were compared with that of pure SO and PO. Pure SO and PO recorded maximum absorbance, 4.2030±0.08 and 3.3530±0.04 at 305.6±0.00 nm and 290.2±0.00 nm respectively. The maximum absorbance for 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90% PO adulterated samples were 4.1870±0.10, 4.1360±0.08, 4.0940±0.12, 4.0260±0.06, 4.0090±0.05, 3.8830±0.10, 3.8010±0.05, 3.7550±0.06, 3.6890±0.09, and 3.5730±0.08 respectively. A significant variation in both maximum absorbance and corresponding wavelength was observed starting from 40% adulteration. The detection can be simply done for 40 – 90% adulteration levels by this method. Secondly, the absorbance measured for the colour complex formed by the reaction between SO and ethanolic furfural solution to represent the SO level. The absorbance recorded for pure SO at 520 nm was 0.7376±0.0201 and 0.6466±0.0550, 0.5576±0.0404, 0.3956±0.0136, 0.3386±0.0116 and 0.2056±0.0185 for 10%, 20%, 30%, 40%, and 50% PO adulterations respectively. Absorbances exhibited a strong correlation with the SO percentage up to 50% adulteration tested in the laboratory. The simple chromogenic test was developed using 0.5M KMnO4 and 0.25M $K_2Cr_2O_7$ solutions separately using 5% - 95% PO adulterated SO samples as a second approach. The colour change in both chromogenic tests indicated promising results and this method could be used to detect a minimum 5% peanut oil adulteration level as there is a visible change in colour compared to the colour given for pure oils.

Key Words:
Sesame oil, Adulteration, Chromogenic reaction, Rapid test, UV Spectrophotometry

Abstract No: 2023_21

Inhibition of Corrosion of Mild Steel by Polyaniline – Cinnamon Oil Composite Layers

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Mild steel is used in many industrial applications. However, its tendency toward corrosion has limited its applications. Consequently, inhibition of corrosion of mild steel, especially through environmentally friendly and cost-effective means has become a necessity. Composite coating of polished mild steel samples coated with polyaniline via electrochemical polymerization with the aid of cyclic voltammetry followed by a layer of cinnamon oil deposited by dipping for 21 hours has shown tremendous corrosion inhibition properties. More importantly, the composite layer results in much increased corrosion inhibition efficiency as compared to cinnamon oil and polyaniline coating alone, demonstrating the synergistic effect. The percentage corrosion inhibition efficiency of mild steel in 0.10 M HCl with polyaniline coating, with cinnamon oil coating and with polyaniline-cinnamon oil composite was quantitatively determined by mass loss measurements and found to be 20.9%, 34.8% and 45.9% respectively. Based on the results, polyaniline-cinnamon oil composite was found to be the effective inhibitor compared to polyaniline and cinnamon oil alone. Further, these results were supported by Tafel plots and Electrochemical Impedance Spectra. The percentage corrosion inhibition efficiencies of the composite layer is shown within the concentration range of aqueous HCl solutions between 0.1 M and 1.0 M, and within the solution temperature range between 303 K and 318 K. Percentage corrosion inhibition efficiency of the polyaniline-cinnamon oil composite layer in 0.1 M, 0.3 M, 0.5 M and 1.0 M HCl found to be 45.9%, 47.97%, 50.63% and 52.27% respectively. Percentage corrosion inhibition efficiencies of the polyaniline-cinnamon oil composite layer at 303 K, 308 K, 313 K and 318 K found to be 48.26%, 42.33%, 38.45% and 34.32% respectively. The results showed that polyaniline-cinnamon oil composite works effectively in 1.0 M HCl at 303 K. Scanning electron microscopy (SEM) was used to investigate the surface morphology of mild steel specimens without any coating and with polyaniline-cinnamon oil composite layer coating after immersion in 0.5 M HCl for 2 hours.

It is thus concluded that the polyaniline-cinnamon oil composite material act as a strong corrosion inhibitor of mild steel in aqueous HCl medium.

Keywords:
Mild steel, Polyaniline-cinnamon oil composite, Corrosion inhibition, Tafel plot, Electrochemical Impedance Spectroscopy (EIS), Scanning Electron Microscopy (SEM)

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Production of biodiesel using waste cooking oil and loose copra oil

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This study focuses on producing biodiesel from waste cooking oil (WCO) and loose copra oil (LCO). The aim is to reduce energy consumption by using low-cost raw materials and energy-saving methods. With the global energy crisis, it is essential to find a sustainable alternative fuel source that is economical, easily transportable and environmentally friendly. Biodiesel has become a popular alternative to fossil fuels, but its production has drawbacks, including high energy consumption, longer production times, and high raw material costs. This study aims to address these drawbacks by using low-cost raw materials and energy-saving methods. Isopropanol (10% w/w) was used as a co-solvent to reduce energy consumption during the transesterification process and NaOH (1 wt%) was used as the catalyst. The quality of the biodiesel produced was determined by examining the fatty acid profile and specific fuel properties. The study found that both WCO and LCO can be used to produce biodiesel. Under the best conditions (oil: CH_3OH- 1:6 molar ratio, reaction temperature- 60 °C, stirring rate- 750 rpm, reaction time- 90 minutes), the maximum biodiesel yields obtained for WCO and LCO were 88.50% w/w and 90.60% w/w, respectively under addition of 10% w/w isopropanol. The specific fuel properties such as density, kinematic viscosity, and flash point of both WCO and LCO were comparable to ASTM limits, indicating their potential as alternative fuels. This study provides a potential solution to the energy crisis by producing biodiesel from low-cost raw materials and energy-saving methods, which has the potential to be a more sustainable and environmentally friendly alternative to fossil fuels.

Keywords:
Energy crisis, Biodiesel, Trans-esterification, Waste cooking oil, Catalyst

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A Computational Approach to Determine the Potential Inhibition of the Gomesin Peptide as an AKT1 Inhibitor in Breast Cancer

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Animal trials and *in vitro* drug screening can improve drug discovery. However, such pre-clinical screenings are often costly and time-consuming. Due to this, a more effective technique is developed using *in silico* method for the same. Drug repositioning using multi-omics data represents a more effective approach over traditional drug development for new cancer-fighting therapies. In this study peptide-based drugs are identified as an excellent candidate due to their properties, such as different amino acid charges, various sizes, polarity, and non-polarity characteristics, producing a composition against microbes and tumor cells. The peptides with anticancer activity, known as anticancer peptides (ACP), are biocompatible and provide a higher degree of specificity and selectivity between cancer and cancer-free cells. Gomesin is a natural antimicrobial peptide (AMP)