

**Determination of total phenol, condensed tannin and flavanoid contents and antioxidant activity of Uncaria gambir extracts**

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Uncaria gambir, a well known Southeast Asia plant have been previously used as an alternative medicine for treatment such as diarrheal, sore throat and spongy gums. Due to its useful properties, in this study we have analysed the total phenol, condensed tannin, flavonoid content and antioxidant activity of Uncaria gambir in three different solvent extracts. Characterization and quantification analysis using Fourier Transform Infrared (FTIR) spectroscopy and reverse phase-high performance liquid chromatography (RP-HPLC) has confirmed that the major chemical constituents of Uncaria gambir are mainly catechins. It was revealed that the ethyl acetate gambir extract gives the highest catechin content and antioxidant activity compared with other solvent extracts.

Keywords: Uncaria gambir, antioxidant activity, condensed tannin, flavonoid

**The effect of Tinospora crispa extracts as a natural mild steel corrosion inhibitor in 1 M HCl solution**

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The potential of Tinospora crispa extracts as a corrosion inhibitor of mild steel in 1 M HCl was determined using weight loss, potentiodynamic polarization and electrochemical impedance spectroscopy methods (EIS). Maximum inhibition was attained at the concentration of 800 and 1000 ppm for TCDW (T. crispa water extract) and TCAW (T. crispa acetone–water extract). The inhibition efficiencies of T. crispa extracts obtained from the impedance and polarization measurements were in good agreement where the maximum inhibition is around 70–80%. Potentiodynamic polarization measurement studies revealed that T. crispa extracts behave predominantly as an anodic inhibitor. The adsorption of T. crispa extracts was found to follow Langmuir's adsorption model.

Keywords: Tinospora crispa; Mild steel; Polarization; EIS; Acid inhibition

**On the Solution of Fractional Order Nonlinear Boundary Value Problems By Using Differential Transformation Method**

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In this research, we study about fractional order for nonlinear of fifth-order boundary value problems and produce a theorem for higher order of fractional of nth-order boundary value problems. The aim of this study was to evaluate and validate the theorem and provide several numerical examples to test the performance of our theorem. We also make comparison between exact solutions and differential transformation method(DTM) by calculating the error between them. It is shown that DTM has very small error and suitable in several numerical solutions since it is effective and provide high accuracy.

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Keywords: Differential transformation method, Taylor series, fractional order of nonlinear boundary value problems

**On the Solutions of Nonlinear Higher-Order Boundary Value Problems by Using Differential Transformation Method and Adomian Decomposition Method**

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We study higher-order boundary value problems HOBVP

for higher-order nonlinear differential equation. We make comparison among differential transformation method DTM

, Adomian decomposition method ADM

, and exact solutions. We provide several examples in order to compare our results. We extend and prove a theorem for nonlinear differential equations by using the DTM. The numerical examples show that the DTM is a good method compared to the ADM since it is effective, uses less time in computation, easy to implement and achieve high accuracy. In addition, DTM has many advantages compared to ADM since the calculation of Adomian polynomial is tedious. From the numerical results, DTM is suitable to apply for nonlinear problems.