

Technical Sessions : A - 16

Radical scavenging activity of extracts of endolichenic fungi isolated from mangrove plants in Puttalam Lagoon

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Two lichens *Dirinaria picta* and *Crateria dissimilis* collected from mangroves in Puttalam district were used for isolation of endolichenic fungi. The ethyl acetate extracts of endolichenic fungi were investigated for antioxidant activity. The objectives of this study were to isolate and identify endolichenic fungi inhabiting mangroves in Puttalam lagoon, and to isolate extracts with bioactive secondary metabolites of above endolichenic fungi. Endolichenic fungi (EF) were isolated from mangrove lichens in Puttalam lagoon and identified. Identification of the endolichenic fungi was carried out using a molecular biological protocol by genomic DNA extraction, amplification and sequencing techniques. Identified EF were grown on Potato Dextrose Agar (PDA) plates. Five large PDA plates were prepared from each fungal species and incubated at room temperature for two weeks. Secondary metabolites were extracted in to ethyl acetate (300 mL) to obtain the crude extract. Antioxidant activity of each extract was evaluated using DPPH radical scavenging assay. Out of the seven EF tested, *Aspergillus fumigatus* showed the highest

activity (IC₅₀ = 19 µg/mL) in DPPH assay which was higher than that of the control. Butylated hydroxy toluene (BHT) (IC₅₀ = 108±0.072 µg/mL), was the positive control. Methanol was used as the negative control.

IC₅₀ values of *Neurospora calospora*, *Sordariomycetes* sp., *Aspergillus* sp., *Aspergillus fumigatus*, *Daldinia caldariorum*, *Neurospora intermedia* and *Hypoxylon* sp. were 843.3 µg/mL, 643.7 µg/mL, 119.7 µg/mL, 19 µg/mL, 134.5 µg/mL, 764.5 µg/mL and 306.3 µg/mL, respectively.

References

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Technical Sessions : A - 17

The effect of the chelating ligand in TISAB solutions on the potentiometric determination of fluoride in aquatic samples with ion-selective electrode

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Potentiometric determination of fluoride with ion-selective electrode is one of the frequently used methods to quantify fluoride in aqueous samples. The method requires using TISAB (Total Ionic Strength Adjusting Buffer) solution to improve the accuracy because it measures the activity of an analyte rather than its concentration. One of the main disadvantages of this method is high cost of commercial TISAB solutions. In this research project, fluoride concentration in well water samples was determined

using a fluoride ion-selective electrode and several TISAB solutions developed in the laboratory. The main objective of this study was to evaluate the effect of the chelating ligand in TISAB solutions on the accuracy of the measured fluoride concentration. The data generated in this study will be used to develop a cost effective TISAB solution that can produce statistically comparable results to commercial TISAB solutions.

During the study, eight (08) TISAB solutions were developed and seventy five (75) well water samples

were analyzed by using these buffers. All the buffer solutions contained 1.0 M NaCl, 0.1 M sodium acetate pH buffer, adjusted to pH 5.5 and a metal complexing ligand to break metal-fluoride complexes to free fluoride ions to the solution to be determined by the fluoride selective electrode. The ligands used in this study were CDTA, EDTA, HE-EDTA, triethanolamine, citrate, tartrate and phosphate. One buffer was developed without any ligand where acetate was the pH buffer and the metal chelating ligand. In addition to the above buffers, WTW brand TISAB (140100) solution was used as the reference. WTW brand 340i pH/ion meter equipped with a WTW brand fluoride electrode were used for fluoride analysis. All the analyses were carried-out in duplicate. Finally the samples were also analyzed by YSI 9500 photometer for fluoride using the Zirconyl-Cyanine R colorimetric method. In addition to fluoride concentration, pH and conductivity of the samples were also measured.

The measured conductivities of the samples were in the range of 53.3 to 481.0 $\mu\text{S cm}^{-1}$ and the fluoride concentrations were in the range of 0.389 to 1.961 mg dm^{-3} . Sample pH values were in the range of 6.4 to 8.5. The standard deviations of the duplicate fluoride

measurements were less than 5% for all data. According to the results, the highest fluoride concentrations were produced by the WTW (commercial TISAB) buffer and the lowest fluoride concentrations were produced by the buffer without a ligand (acetate only buffer) at all times. Furthermore, WTW and CDTA TISAB solutions produced comparable results for most of the samples. Interestingly, Zirconyl-Cyanine R colorimetric method which is generally accepted as a standard method for total fluoride analysis produced low fluoride concentrations compared to WTW, CDTA, EDTA and HE-EDTA buffers for most of the samples.

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Technical Sessions : A - 18

Synthesis of functionalized graphene oxide as a solid phase catalyst for Ullmann reaction

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The Ullmann coupling is an important and well known nucleophilic aromatic substitution ($\text{S}_{\text{N}}\text{Ar}$) reaction. This reaction is widely used in pharmaceutical and agrochemical industries, where homogeneous ligated Cu(I) compounds are employed as catalysts.¹⁻³

In the present study, a solid graphene based catalyst was developed for the above coupling reaction. The solid catalyst was developed by converting graphite in to graphene oxide, then converting graphene oxide into aminated graphene oxide and chelating with Cu(I). This catalyst was used to catalyze the *N*-arylation of bromobenzene and benzylamine.

Synthesis of *N*-phenylbenzylamine (Figure 01) was carried out using a reaction mixture of, 0.060 g (0.315 mmol) of freshly prepared CuI, 0.104 mL (0.990 mmol) of bromobenzene, 0.109 mL (0.998 mmol) of benzylamine, 0.60 mL (1.5 mmol) of dimethylsulfoxide, 0.137 g of potassium carbonate (1.0

mmol) and 0.060 g of different solid graphene based catalysts (0.060 g were used according to the earlier studies). The reaction mixture with the particular catalyst was then heated at 80 °C for 3 hours. Purification was carried out using column chromatography. The purified product was identified and characterized using NMR spectroscopy [¹H NMR CDCl₃ δ 7.24-7.40 (m, 5H), 7.18 (m, 2H), 6.74 (m, 1H), 6.65 (m, 2H), 4.33 (s, 2H)].

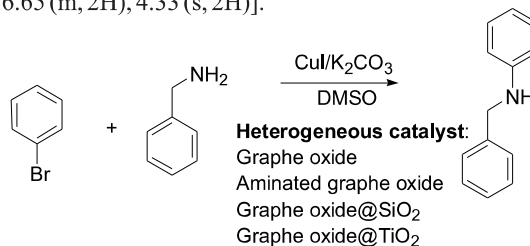


Figure 1: Synthesis of the *N*-phenylbenzylamine using the heterogeneous catalysis in the presence of Cu (I)