O14-2

Nephroprotective roles of potent medicinal plants against acetaminophen (N-acetyl-P-aminophenol) induced kidney damage in mice

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Paracetamol (acetaminophen) is anti-inflammatory drug used as analgesics worldwide whose overdose could be damaging to kidneys in human and animals. Medicinal plants offer potential to protect kidneys against nephrotoxicity.

This study was conducted to evaluate Geranium wallichianum, Thymus serpyllum, Elaeagnus parvifolia and Viola canescens plants against paracetamol induced nephrotoxicity in albino mice. Mice were divided into six groups with three mice in each group. Group I was given no paracetamol and was termed as normal control. Group II was paracetamol control (PC). Group III was treated with PC and methanolic leaves extract of Geranium plant. Group IV was treated with PC and methanolic leaves extract of Elaeagnus plant. Group V was treated with PC and methanolic leaves extract of Thymus plant. Group VI was treated with PC and methanolic leaves extract of Viola plant. On fifteenth day, mice were sacrificed to draw their blood and kidneys for further examination. Biochemical results showed significant increase of Urea, Creatinine and Uric acid levels in the blood serum of mice of group II ($P < 0.001$). On the other hand, these levels were significantly reduced in groups III–VI. Histopathological examination of the renal sections from mice treated with only PC showed significant damages to the renal tubules and renal corpuscles, whereas renal sections from mice treated with PC and plants leaves extracts exhibited normal physiology. Therefore, it is concluded that crude methanolic extracts of all four treated plants have nephroprotective role against Paracetamol induced nephrotoxicity which could be due to their antioxidant properties.

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O14-4

Acidogenic fermentation of spent coffee grounds

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Spent coffee grounds (SCG), the waste that results from the brewing process, are produced in high amounts and contain many diverse organic compounds, including carbohydrates, fatty acids, and phenolics. SCG can be valorized in numerous ways, including the production of polyhydroxyalkanoates (PHA) by pure cultures. This process requires operation under extremely controlled conditions and sterility, which contributes to the increase in production costs. Mixed microbial cultures (MMC) can produce PHA using wastes or industrial by-products as substrates, allowing for their valorization. The use of wastes, together with the lower requirements of sterility and process control, could signify a decrease in PHA production costs. PHA production costs are considered one of the main drawbacks that prevent the increase of world market share of these polymers. The ability to store PHA provides microorganisms a competitive advantage for survival under transient conditions typical of wastewater treatment systems. In this way, MMC can continuously adapt to the operational conditions increasing the number of PHA-storing organisms with minimum requirements of sterility.

The objective of this work was the conversion of carbon compounds present in SCG to short chain organic acids (SCOA) since SCOA are the preferred substrates by MMC to produce PHA. Direct fermentation of SCG was carried out in a continuous stirred tank reactor (CSTR) where the operational conditions that enriched the microbial population in acidogenic organisms were evaluated. Several organic loading rates and hydraulic retention times were tested in order to achieve the highest amount of SCOA with the best composition for PHA production. The produced SCOA will be utilized for the selection of a PHA-storing MMC and in accumulation assays.

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O14-5

Pretreatment of coffee silverskin with ultrasound and mild alkaline solutions for enhancement of sugar yield

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The increasing global energy requirement is shifting the scientific attention from fossil to bio-based resources to produce energy and chemicals. Lignocellulose is the most abundant natural and renewable resource on Earth. A considerable amount of such material is generated as waste through agricultural practices mainly from various agro-industries. Agriculture food processing wastes (AFWs) are potential feedstock for biorefinery processes being economic and eco-friendly. Coffee silverskin (CSS) is an AFWs produced during the coffee beans roasting process. These vegetable residues are recalcitrant to enzymatic and microbial attacks, limiting their use for biorefinery applications. Pretreatment delignification methods are required to facilitate the enzymatic hydrolysis of AFWs aimed at the recovery of monomeric fermentable sugars from these residues. The aim of this study was to develop a pretreatment process by using ultrasound and mild alkaline solutions for the effective separation of lignin and cellulose to improve the sugar yield from CSS. The effects of sonication time, biomass loading, sodium hydroxide concentration and residence time in autoclave, were studied using Response Surface Methodology (RSM). A maximum reducing sugar yield of 0.6 $g_{sugar}/g_{total\ sugar\ in\ pretreated\ biomass}$ was obtained with 5 min sonication, 11% w/v biomass loading, 5% w/v NaOH and 75 min autoclave. Analysis of liquid after pretreatment revealed that fermentation inhibitors like furfural, HMF, ferulic and p-coumaric acid were absent or present in non-toxic concentrations for various *Clostridium* sp. Moreover, a phenolic content of 25.3 $mg_{GAE}/g_{raw\ CSS}$ was found. Changes of biomass structural properties after pretreatment were highlighted by SEM and XRD analysis.

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