methanol/water mixture to give a pale greenish yellow amorphous solid (300 mg) which showed characteristic UV absorption peaks at 252 nm and 347 nm indicated the presence of flavanol skeleton. $^{1}$D NMR (1H-CD3OD) signals from δ 3.38 ppm to δ 5.6 ppm, in duplicates, and 13C-CD3OD signals from δ 70 ppm to δ 110 ppm, showed the presence of two hexose units. The presence of up field $^{1}$H NMR signals at 0.96 ppm and δ 1.284 ppm (J=5.6-6 Hz), and two up field $^{13}$C NMR signals around δ 15 ppm indicated the presence of two rhamnosyl methyl groups. Two anomeric H signals at δ 5.41 ppm and δ 5.57 ppm (coupling constants J =1.6 Hz), and two anomeric C signals at δ 102 ppm further confirmed the presence of two alpha rhamnosyl residues. The $^{1}$H NMR signals at δ 7.80 (2H, d, J =8.7 Hz) and δ 6.95 ppm (2H, d, J =8.5 Hz) precisely matched with the 1H chemical shift values of B ring protons of flavanol structure (H-2′, H-6′ and H-3′, H-5′, respectively). Two meta-coupled doublets (J =2.1 Hz) at δ 6.46 and 6.72 ppm were attributed to the C-6 and C-8 protons of A ring protons of flavanol structure. 2D-NOESY and HSQC (CD3OD) spectral data indicated that the two alpha rhamnosyl residues were attached to the 3$^{rd}$ and 7$^{th}$ positions of the flavanol skeleton. These spectral data proved the structure of the isolated compound to be the kaempferol-3,7-O-alpha-L-dirhamnoside with the molecular formula $C_{27}H_{30}O_{14}$; Molecular Mass 578.16 (Experimental m/z 577.28 [M-H]). Isolated Kaempferol-3,7-O-alpha-L-dirhamnoside showed significant alpha glucosidase inhibitory activity and alpha amylase activity with IC50 values of 84.7 ± 1.7 μM and 5.9±0.37 μM respectively (n=3). For Acarbose positive control $IC_{50}$ values were 74.0 ±2.0 μM and 3.1±0.08 μM respectively (n=3). Chemical structure of Kaempferol-3,7-O-alpha-L-dirhamnoside from Olax zeylanica and its antioxidant activity has been previously reported. Further the same compound has been identified in Bauhinia forficate which is a widely used antidiabetic herbal remedy in Brazil and from two Legume species, *Vicia faba* and *Lotus edulis*. The findings of this study provide some scientific evidence for the ethnomedicinal use of *Olax zeylanica* as a functional food against diabetes mellitus.

**Keywords:** *Olax zeylanica*, Hypoglycemic activity, Kaempferol rhamnoside

*Abstract No: TI 7*

## Biosynthesis, Characterization, Photocatalytic and Fluorescence quenching activity of Zinc Oxide nanoparticles

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Green synthesis of nanoparticles *via* biological entities has gained significant interest as an emerging technology due to the toxicity of nanoparticles (NPs) associated with conventional chemical synthesis processes. The present study focuses on the green synthesis of zinc oxide NPs using extracts of stems and leaves of *Sauropus androgynus* and *Oxalis corniculata* plants, which are used as biological capping and stabilizing agents from zinc acetate dihydrate (metal precursor). Semi-conducting zinc oxide NPs have gained great interest in the field of medicine, micro-electronics, and in water remediation. Zinc oxide NPs were synthesized by varying reaction conditions such as volume of plant extract (1 mL, 2 mL and 5 mL) and metal precursor concentration (0.01 mol $dm^{-3}$ – 0.02 mol $dm^{-3}$) at a pH of 12. The synthesized NPs were collected by centrifuging and dried at a temperature of 60 °C for 14 hours. The formation of zinc oxide NPs in the reaction mixture was determined by Ultraviolet-Visible Spectroscopy and was characterized by Scanning Electron Microscopy, and Fourier Transform Infrared spectroscopy. The SEM images reported that the average size of zinc oxide NPs synthesized at optimum conditions was in the range of 79-89 nm with spherical, hexagonal and rod-shaped. Further the photocatalytic degradation and fluorescence quenching ability of zinc oxide NPs were studied. Photocatalytic degradation activity of zinc oxide NPs was determined by the degradation of 5 ppm solution of Methylene Blue dye under the illumination of

sunlight for 3.30 hours. By triplicating the experimental readings, it was determined, NPs synthesized using *Oxalis corniculata* stem extract at a concentration of 5 mg/mL exhibited the highest percentage degradation of 60% where mean absorbance of methylene blue was reduced from 1.430 to 0.5720. Synthesized zinc oxide NPs quenched the fluorescence of Rhodamine B dye at 591 nm with increasing concentration. Intensity of Rhodamine B dye of concentration $5 \times 10^{-4}$ mol/dm$^{-3}$ (4160 a.u), decreased with increasing NPs concentration from 50 µg/mL to 1000 µg/mL. The highest fluorescence quenching of 71% was shown by Zinc oxide NPs synthesized with extracts of Sauropus androgyus leaves where intensity of Rhodamine B dye was reduced from 4160 a.u. to 1194 a.u. Hence synthesis of zinc oxide nanoparticles using biological entities is a novel and potential alternative to chemically synthesized nanoparticles.

**Keywords:** ZnO NPs, fluorescence resonance energy transfer, photocatalytic, Green synthesis

*Abstract No: TI 8*

## Morphological and photocatalytic properties of zinc oxide nanoparticles synthesized from agricultural wastes of *Nephelium lappaceum* L. and *Garcinia mangostan* L.

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A facile, innovative and ecofriendly approach of biofabrication of zinc oxide nanoparticles (ZnO–NPs) using agricultural wastes (seed and peel) of N*ephelium lappaceum* L. and *Garcinia mangostana* L. have been demonstrated in this study. Characterizations of ZnO–NPs were carried out using Ultraviolet-Visible (UV–vis) spectrophotometry, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Dispersive spectroscopy (EDX), and Fourier Transform Infrared spectroscopy (FTIR). The formation of ZnO-NPs was preliminary confirmed by the UV–vis spectroscopy, by the appearance of peaks between 362–368 nm. The SEM and TEM images show flower and rod-like arrangements of nanocrystals. As per the TEM images, all the synthesized ZnO-NPs showed the particle size ranging from 29-334 nm. FTIR spectral analysis demonstrated peaks at 3269–3500 cm$^{-1}$, 2308–2361 cm$^{-1}$, 2103–2110 cm$^{-1}$ and 1630–1640 cm$^{-1}$, 586–632 cm$^{-1}$ for the plant extracts, whereas an additional peak appeared within the range of 458–499 cm$^{-1}$ in synthesized ZnO–NPs. The degradation efficiency of ZnO–NPs was measured by the study of photo degradation of Methylene Blue and the results of ZnO–NPs synthesized via seed extract of *N. lappaceum* demonstrated the highest activity among all the synthesized NPs with a half-life of 78 min with 97% degradation efficiency at 150 min time frame.

**Keywords:** ZnO-NPs, biofabrication, degradation