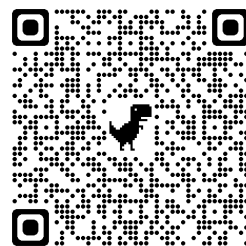


# CURRENT RESEARCH TOPICS IN PHARMACY:

## *Traditional Medicine Talks*

May 26<sup>th</sup>, 2023



### FIRST SESSION 11.00 AM-12.45 PM

Moderator:  
Mehmet  
GÜMÜŞTAŞ

Welcome  
Assoc.Prof. Betül OKUYAN

Bioorganic MgO nanoparticles attenuate oxidative stress and upregulate gene expression to attenuate doxorubicin-induced cardiotoxicity  
Prof. Atiar Rahman

Phytopharmaceuticals as a protagonist approach for upsurging bioactivity of traditional medicines  
Assist.Prof. Monika Dwivedi

Evaluation of *Withania somnifera* (Ashwagandha) in post-traumatic stress disorder induced neurobehavioral and biochemical markers : An experimental study  
Dr. Sana Rehman

### SECOND SESSION 13:00-14.45 PM

Moderator:  
Ceyda EKENTOK  
ATICI

HPTLC: A tool for herbal drug discovery  
Prof. Abhishek Gupta

Persian Traditional Medicine  
Assist. Prof. Laleh Khodaie

Folk medicinal plants of Turkey :  
An overview  
Assoc. Prof. Gizem Emre

Interactions of traditional and modern medicine in respiratory disorders : An Indian perspective  
Prof. Arunabha Ray

### THIRD SESSION 15.00-16.15 PM

Moderator:  
Esra TATAR

Traditional use of medicinal plants in Albania, past and present  
Prof. Vilma Papajani

Voltametric analysis of the antioxidative potential of medicinal plants traditionally used in North Macedonia  
Assoc. Prof. Viktorija Maksimova

Biological activities of *Scolymus hispanicus* L.  
Assist.Prof. Pervin Rayaman

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# BIOORGANIC MgO NANOPARTICLES ATTENUATE OXIDATIVE STRESS and UPREGULATE GENE EXPRESSION TO ATTENUATE DOXORUBICIN-INDUCED CARDIOTOXICITY

**Md. Atiar RAHMAN<sup>1,2,\*</sup>, Fatema Yasmin NISA<sup>1</sup>, Khalid Juhani RAFI<sup>1</sup>,  
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Plant materials used in association with metal oxide nanoparticles are a viable alternative to chemical approaches. We studied the cardioprotective effects of the biosynthesized magnesium oxide nanoparticles (MgO-NPs) from the hydroalcoholic extracts of *Tamarindus indica* fruit pulp, seed, and pericarp. The synthesized nanoparticles were characterized with ultraviolet-visible spectroscopy (UV-Vis), X-ray diffraction (XRD), scanning electron microscopy (SEM) with energy-dispersive X-ray diffraction (EDX), and Fourier-transform infrared spectroscopy (FTIR). Total phenolic contents (TPC) and total flavonoid contents (TFC) were measured to detect the presence of phenol and flavonoid-like components in the MgO-NPs. The biogenic MgO-NPs (Pulp-MgONP, Seed-MgONP, and Pericarp-MgONP) were evaluated for their antioxidant potential using 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2-azinobis-(3-ethylbenzothiazoline-6-sulfonate) (ABTS•+), and Nitric oxide (NO) scavenging assays, as well as the Ferric ion reducing antioxidant power (FRAP) assay. Additionally, Wistar albino rats were undertaken to measure the cardioprotective impact of biogenic MgO-NPs against Doxorubicin-induced cardiotoxicity. BHK-21 and Vero cell lines were incorporated for toxicity tests. Gene expression of cardiac tissue was studied to evaluate the effect of MgO-NPs in upregulations of cardiac genes. The UV-VIS spectroscopy of the biogenic MgO-NPs verified the synthesis of MgO-NPs, all of which had a wide absorption peak at 300 nm. According to XRD examination, the biogenic MgO-NPs were 13.78, 13.38, and 13.48 nm, respectively in crystal size. In SEM analysis, the biosynthesized MgO-NPs displayed agglomeration, and EDX validated the elemental composition of these biogenic MgO-NPs. Besides, their FTIR spectra revealed distinct bands for phytochemical functional groups as well as MgO. The biogenic MgO-NPs revealed a considerable amount of TPC and TFC values while the biogenic MgO-NPs demonstrated a significant free radical scavenging activity as measured by inhibition of DPPH, ABTS•+, and NO compared to different standards; also, they exhibited higher FRAP values. Pretreatment with Seed-MgONP and PericarpMgONP resulted in a significant reduction of cardiac biomarkers i.e., cardiac Troponin-I (cTnI), creatine kinase (CK-MB), and aspartate aminotransferase (AST); whereas Pulp-MgONP led to a moderate decrease in these biomarkers. Seed-MgONP and Pericarp-MgONP were more successful in reducing lipid levels than Pulp-MgONP. Nanoparticles were assayed in BHK-21 and Vero cell lines both of which showed no toxicity for the nanoparticles. According to the findings of the mRNA expression study,

Seed-MgONP effectively downregulated the expression of apoptotic genes: p53 and caspase-3. Pulp-MgONP, Seed-MgONP, and Pericarp-MgONP, on the other hand, all restored normal SOD gene expression levels. The histopathological observations were mostly focused on the disruption of cardiac fibers and myofibrillar disintegration, which are consistent with the biochemical findings. Therefore, our research suggests that MgO-NPs derived from the fruit pulp, seed, and pericarp of *Tamarindus indica* can serve as powerful antioxidants and their administration may be effective in protecting the heart from DOX-induced cardiotoxicity.

**Keywords:** MgO-nanoparticles; *Tamarindus indica*, p53, and caspase-3 gene expression; Troponin-I; cardiac toxicity.