ISTANBUL AYDIN UNIVERSITY
FACULTY OF PHARMACY

E-NEWSLETTER

1 NOVEMBER - 30 NOVEMBER 2025

ISTANBUL AYDIN UNIVERSITY
FACULTY OF PHARMACY

DEPARTMENTS

Department of Pharmaceutical Technology

- Pharmaceutical Technology

Department of Professional Pharmaceutical Sciences

- Pharmacology
- Pharmaceutical Chemistry
- Pharmacognosy
- Pharmaceutical Toxicology

Department of Basic Pharmaceutical Sciences

- Analytical Chemistry
- Biochemistry
- Pharmaceutical Microbiology

The 2025 Turkish Pharmacists' Association Service Award has been granted to our faculty member from the Department of Pharmacology, Prof. Dr. Yusuf ÖZTÜRK. Öztürk has been deemed worthy of this award for his research and educational activities, his contributions to the development of research and education infrastructure, as well as his administrative duties and community service throughout his 45-year academic career.

Asst. Prof. Dr. Gizem Sena ELAGÖZ, a faculty member of the Department of Pharmaceutical Toxicology, attended the *12th International Congress of the Turkish Society of Toxicology* held on 6–9 November 2025 and delivered an oral presentation entitled "***Biomarker-Based Assessment of Mycotoxin Exposure in Children***".

FACULTY OF PHARMACY

November

Asst. Prof. Dr. Tuğçe TÜCCAR, faculty member of the Department of Pharmaceutical Microbiology, has co-authored an article entitled "***Fungal composition in deteriorated historical manuscripts: a comparative study of sampling and media factors using molecular and cultural approaches***" which has been published in *Journal of Cultural Heritage*, internationally recognized journal.

Journal of Cultural Heritage 76 (2025) 307–316

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Journal of Cultural Heritage

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Original article

Fungal composition in deteriorated historical manuscripts: A comparative study of sampling and media factors using molecular and cultural approaches

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Historical manuscripts
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Cellulolytic fungi
Amylolytic fungi
Gelatinolytic fungi

ABSTRACT

Cultural heritage objects reflect the social memory of humanity, making their protection essential. Fungal colonization is widely acknowledged as a principal agent of deterioration in historical manuscripts (HMs). However, standardized sampling and analysis protocols that integrate both culture-based and culture-independent approaches to accurately reflect in situ fungal diversity, along with the identification of the most suitable culture media, have not yet been comprehensively established. This persistent knowledge gap not only highlights the limited understanding of fungal-induced biodegradation in historical manuscripts but also critically hampers the development of targeted, evidence-based preventive measures for priceless collections that already exhibit fungal staining and cellulose degradation. This study aimed to (i) characterize the total fungal community in deteriorated HMs found in the Süleymaniye Manuscript Library using both culture-independent and culture-dependent approaches, (ii) assess the effect of different sampling methods and media selection on the identification of fungal biota, and (iii) screen for extracellular enzymes associated with HMs deterioration. In essence, this research moves beyond descriptive fungal inventories to deliver a methodological blueprint for future assessments, enabling the development of more accurate, microbiologically informed conservation strategies for invaluable historical manuscript collections by highlighting the critical impact of sampling and media choices on biodiversity data. To achieve the objectives, 10 deteriorated HMs were sampled by swab (S) and membrane filter methods. Fungal community was analyzed by denaturant gradient gel electrophoresis (DGGE). The fungal load in HMs was determined using both dichloran glycerol 18 (DG18) and malt extract agar media, and fungi were isolated. All isolates were screened for producing cellulase, amylase, and gelatinase, and also identified by molecular methods. In both DGGE and culture-dependent analyses of HMs, *Aspergillus* was the predominant genus, with *A. halophilicus* most frequently detected by DGGE and *A. versicolor* predominantly identified through culture-dependent methods. The S method proved more effective in recovering fungal communities. Moreover, combining different media enhanced the detection of fungal diversity. However, fungal counts in HMs were more clearly determined on DG18. The K20 isolate closely related to *Aspergillus* sp. demonstrated notable enzymatic activity, exhibiting the highest enzymatic index values for both cellulase and gelatinase. Concurrently, another isolate (K19), identified as closely related to *A. versicolor*, displayed the highest amylase activity among those tested. These findings collectively suggest that the genus *Aspergillus* may play a significant role in the biodeterioration and/or the acceleration of biodeterioration in HMs.

1. Introduction and research aims

Cultural heritage includes historical manuscripts (HMs), and books that have been preserved from the past and passed on to future generations. HMs provide a favorable nutrient source for cellulolytic, amylolytic, and gelotinolytic fungi, due to both the raw cellulose fibers used in paper production and additional components

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Prof. Dr. Hadi BAYKAL, faculty member of the Department of Analytical Chemistry, has co-authored an article entitled "**Synthesis and tracking of novel Mn and Se co-doped iron oxide nanoparticles: a promising nanofertilizer for plant growth and nutrient enrichment without genotoxic impact**" which has been published in *Journal of the Saudi Society of Agricultural Sciences*, internationally recognized journal.

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RESEARCH ARTICLE

Synthesis and tracking of novel Mn and Se co-doped iron oxide nanoparticles: a promising nanofertilizer for plant growth and nutrient enrichment without genotoxic impact

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Abstract
Novel nanoformulations are promising agents to enhance plant growth and nutritional value. On the other hand, their inclusion in agricultural systems and environmental effects should be monitored carefully. This study synthesizes a novel nanofertilizer containing plant essential and beneficial elements, namely manganese (Mn) and selenium (Se) co-doped iron (Fe) oxide nanocomposites ($MnSeFe_2O_4$ NCs) and clarifies its growth-promoting property, cytotoxicity, and genotoxicity on a common crop, barley (*Hordeum vulgare* L.). To characterize the NCs, analytical procedures including XRD, EDX, TEM, SEM, and XPS were employed. Following this, barley sprouts were grown for three weeks in an aquacultural setup, containing varied NC doses: 0 (control), 50 to 400 mg L^{-1}. The study then assessed germination rates, various growth parameters, photosynthetic efficiency, and macro- and micro-element quantities. Microscopy techniques (i.e., confocal and scanning electron) and RAPD-PCR techniques were utilized to assess cellular, morphological, and genotoxic effects. Results demonstrated that $MnSeFe_2O_4$ NCs, crystal size of 36.3 nm, were taken up by the plant roots and translocated to the leaves, leading to a significant increase in Mn, Se, and Fe contents. The abundances of Ca, Mg, K, P, Zn, Ni, and Co were also remarkably improved over the control. Improvement in physiological and photosynthetic indices, such as germination rate (~25%), tissue growth (26–50%), chlorophyll, and carotenoid pigments (~50–75%), ETR, Fv/Fm, and Y(II) (10–27%) was evident upon NCs' inclusion. Importantly, the applied concentrations of the $MnSeFe_2O_4$ NCs did not cause genotoxicity or significant cellular and morphological changes in the barley plants, suggesting their safe application at the tested doses. These findings indicate that the $MnSeFe_2O_4$ NCs are effective at enhancing plant growth and nutrient uptake, making them promising agents for use in nutrient-deficient agricultural systems and plant breeding programs.

Keywords Nanofertilizer · Manganese · Selenium · Iron · Growth · Barley

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Prof. Dr. Hadi BAYKAL, faculty member of the Department of Analytical Chemistry, has co-authored an article entitled "**Efficient visible-light-active ZnO/Cs0. 33WO3/g-C3N4 double Z-type heterojunction photocatalyst for rhodamine b photodegradation**" which has been published in *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, internationally recognized journal.

Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 341 (2025) 126380

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Efficient visible-light-active $ZnO/Cs_{0.33}WO_3/g\text{-}C_3N_4$ double Z-type heterojunction photocatalyst for rhodamine B photodegradation

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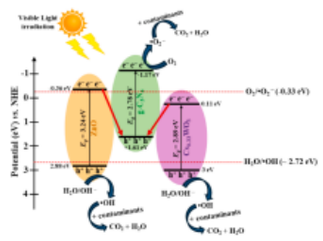
HIGHLIGHTS

- A novel $ZnO/Cs_{0.33}WO_3/g\text{-}C_3N_4$ nanocomposite was synthesized for photocatalytic dye degradation.
- The proposed double Z-type heterojunction charge transfer mechanism enhanced the photocatalytic performance.
- The kinetic rate constant is 31 times faster than $Cs_{0.33}WO_3$ and 3.5 times faster than ZnO.
- The nanocomposite demonstrated high efficiency and rapid visible-light photodegradation of RhB dye.
- The ternary nanocomposite photocatalyst showed excellent stability and reusability.

GRAPHICAL ABSTRACT



ARTICLE INFO

Keywords:
$ZnO/Cs_{0.33}WO_3/g\text{-}C_3N_4$
Nanocomposite
Photodegradation of organic dyes
Direct Z-scheme heterojunction

ABSTRACT

Developing highly efficient photocatalyst systems for the removal of cancer-causing organic dye substances from polluted water and wastewater is now in high demand because of the growing problem of contaminated water. An affordable technique was employed to create a ternary $ZnO/Cs_{0.33}WO_3/g\text{-}C_3N_4$ heterojunction nanocomposite with highly efficient and rapid photodegradation capabilities for degrading rhodamine B (RhB) dye. Using visible-light irradiation, the photocatalytic tests revealed that the proposed $ZnO/Cs_{0.33}WO_3/g\text{-}C_3N_4$ heterojunction nanocomposite is efficiently able to degrade more than 91 % of RhB dye within 15 min, 97.5 % within 20 min, and 99.9 % within 30 min, which is significantly efficient compared to sole ZnO and $Cs_{0.33}WO_3$.

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FACULTY OF PHARMACY

November

The Alumni Reunion organized within the scope of the Wisdom Program carried out by the Anatolian Education and Culture Foundation (AKEV) was held under the coordination of Istanbul Aydın University Faculty of Pharmacy on November 27, 2025, at 11:00 in T Block Purple Hall. The event focused on the theme of "Nutrition and Health," and participants were provided with up-to-date scientific information.

Within the program, Prof. Dr. Fikriye Uras delivered a comprehensive presentation on the importance of vitamin K in health; Asst. Prof. Dr. Tuğçe Tüccar presented "The Key to a Healthy Life: Gut Microbiota," discussing the effects of the gut microbiota on human health; and Asst. Prof. Dr. Gizem Sena Elagöz, in her presentation titled "Food Safety: Invisible Risks on Our Plate," highlighted unseen dangers related to food safety and protective approaches.