# BOOK of ABSTRACTS

# 6th INTERNATIONAL CONFERENCE ON PLANT BIOLOGY

## (25th SPPS Meeting)

**5-7 NOVEMBER 2026**
**NOVI SAD, SERBIA**



Serbian Plant Physiology Society

Institute for Biological Research "Siniša Stanković"
– National Institute of the Republic of Serbia, University of Belgrade

Faculty of Sciences, University of Novi Sad

University of Belgrade, Faculty of Biology

Institute for Multidisciplinary Research
– National Institute of the Republic of Serbia, University of Belgrade

Serbian Biological Society "Stevan Jakovljević" Kragujevac

Maize Research Institute "Zemun Polje"

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**PUBLISHERS**

Serbian Plant Physiology Society, Institute for Biological Research "Siniša Stanković" – National Institute of Republic of Serbia, University of Belgrade

**EDITOR**

Milica Milutinović, Luka Petrović,
Tijana Cvetić Antić

**GRAPHIC DESIGN**

Dejan Matekalo

**PREPRESS**

Marija G. Gray

**YEAR PUBLISHED**

2026

**ISBN**

978-86-912591-8-1

**PRINTED BY**

DigitalArt, Beograd

**PRINT RUN**

30 pcs

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

581(048)

INTERNATIONAL Conference on Plant Biology (6 ; 2026 ; Novi Sad)

Book of Abstracts / 6th International Conference on Plant Biology [and] (25th SPPS Meeting), 5–7 November 2026, Novi Sad ; [organized by] Serbian Plant Physiology Society ... [et al.] ; [editor Milica Milutinović, Luka Petrović, Tijana Cvetić Antić]. - Belgrade : Serbian Plant Physiology Society : Institute for Biological Research "Siniša Stanković" : University, 2026 (Beograd : DigitalArt). - 171 str. : ilustr. ; 24 cm

Tiraž 30. - Registar.

ISBN 978-86-912591-8-1 (SPPS)

1. Друштво за физиологију биљака Србије. Састанак (25 ; 2026 ; Нови Сад)

a) Ботаника -- Апстракти

COBISS.SR-ID 203849993

**Supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia**

# 6th International Conference on Plant Biology
# (25th SPPS Meeting)
# 5–7 November 2026, Novi Sad

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PP3-18

# Dose-Dependent Effects of Green-Synthesized Silver Nanoparticles on Antioxidant Responses of Winter Wheat Under Heat Stress

**Minić, D.**[1], Marković, K.[2], Grujović, M.[2], Kesić, A.[2], Cirić, A.[3], Popović, M.[4], Milanović, Ž.[2], Djukić, N.[1]

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The application of green-synthesized silver nanoparticles (AgNPs) may modify plant responses to abiotic stress, although their effects depend strongly on concentration and environmental conditions. In this study, AgNPs synthesized using *Agrimonia eupatoria* L. extract were investigated for their influence on non-enzymatic antioxidant metabolism and heat-stress responses in winter wheat. Surface-sensitive analysis showed a predominantly metallic Ag core surrounded by a phytochemical-derived organic corona, while phytochemical profiling revealed a diverse polyphenolic composition dominated by epicatechin, chlorogenic acid, myricetin, and rutin. Density functional theory (DFT) calculations using chlorogenate as a representative corona component indicated possible interaction with surface-accessible Ag(I)-like sites and showed that Ag(I) coordination altered the energetics of electron- and proton-transfer steps without substantially improving the overall net hydrogen-transfer process toward ABTS. Three wheat cultivars were exposed to AgNPs under optimal and heat stress conditions. Heat stress reduced phenolic and flavonoid contents, radical-scavenging capacity, and overall antioxidant capacity, with these effects becoming more pronounced as AgNP concentration increased. The applied AgNPs therefore did not protect the non-enzymatic antioxidant system, but instead caused a concentration-dependent disruption of antioxidant homeostasis. The combined experimental and computational results indicate that the redox-active organic corona was insufficient to compensate for the oxidative burden associated with heat stress and relatively high AgNP exposure. Together, these findings link nanoparticle surface chemistry with plant physiological responses and emphasize the concentration-dependent role of green-synthesized nanomaterials in plant stress biology.

KEYWORDS: antioxidant metabolism; dose-dependent effects; heat stress; silver nanoparticles (AgNPs-$H_2O$); *Triticum aestivum* L.

*ACKNOWLEDGEMENT*: This work was supported by the Science, Tecnjological Development and Innovation of the Republic of Serbia under Contracts No. 451-03-33/2026-03/200122 and 451-03-33/2026-03/200378.

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