

ELSEVIER

Radiation Physics and Chemistry

The international Radiative Physics, Radiation Chemistry and Radiation Processing Journal

Editors

M. J. COOPER
D. OLIVIERO
I. FERNANDEZ-RODRIGUEZ
J. L. HAYES
J. L. KILPATRICK
D. L. LEE
D. T. L. JOSEPH
E. LEARNEY
J. LEON
B. J. LLOYD
J. T. MANDON
M. MATHIEU
J. PATA
D. J. RAYSON
J. E. ROSS
F. SHARPE
A. J. THOMAS
T. T. TATARA
A. TALLERIE
A. D. TILLOTSON

Editors-in-Chief

Radiation Physics: P. M. Beqistrom, Jr.
Radiation Chemistry: L. Wondolowski
Radiation Processing: A. Miller

Consulting Editor

J. H. Habel

INTERNATIONAL RADIATION PHYSICS SOCIETY

Radiation Physics and Chemistry is a journal recognized by the International Radiation Physics Society

<http://www.elsevier.com/locate/radphvschem>

PII: S0969-806X(16)30318-8
 DOI: <http://dx.doi.org/10.1016/j.radphyschem.2016.11.001>
 Reference: RPC7313

To appear in: *Radiation Physics and Chemistry*

Received date: 4 September 2016

Revised date: 21 October 2016

Accepted date: 2 November 2016

Cite this article as: Deborah Zani, Daniele Dondi, Susana Araujo, Andre Mondoni and Alma Balestrazzi, Impact of γ -rays on seed germination/short-term storage in four native alpine species: correlation with free radical and antioxidant profiles, *Radiation Physics and Chemistry*
<http://dx.doi.org/10.1016/j.radphyschem.2016.11.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Impact of γ -rays on seed germination/short-term storage in four native alpine species:
correlation with free radical and antioxidant profiles

Deborah Zani¹, Daniele Dondi², Susana Araujo^{1,3}, Andrea Mondoni⁴, Alma Balestrazzi^{1*}

¹Department of Biology and Biotechnology 'L. Spallanzani', via Ferrata 9 - 27100 Pavia, Italy

²Department of Chemistry, viale Taramelli 12 - 27100 Pavia, Italy

³Instituto De Tecnologia Química e Biológica António Xavier (ITQB-UN)L, Avenida da Republica, Estação Agronómica Nacional 2780-157-Oeiras, Portugal

⁴Department of Earth and Environmental Sciences, via S. Epifanio 14 - 27100 Pavia, Italy

*Correspondence to: A. Balestrazzi. Department of Biology and Biotechnology 'L. Spallanzani', via Ferrata 1, 27100 Pavia, Italy. Tel.: +390382985435; fax: +390382528496. alma.balestrazzi@unipv.it

Abstract

In this study, the impact of gamma (γ) radiation on seeds was investigated in four native alpine species, *Campanula barbata* L., *Cirsium spinosissimum* (L.) Scop., *Plantago alpina* L., and *Silene vulgaris* (Moench) Garcke. Seeds were γ -irradiated with 100 and 200 Gy total doses delivered at a dose rate of 2.7 Gy min⁻¹. Irradiated and non-irradiated seeds were used immediately, and subsequently 7 and 14 days after drying (15% Relative Humidity, 15°C) to assess their response to standard seed bank processing. Germination rates, seedling length and weight, antioxidant activity and phenolics content were measured, while free radical accumulation profiles were acquired by electron paramagnetic resonance (EPR). Germination was only hampered in irradiated *C. barbata* seeds. *C. barbata* and *C. spinosissimum* seedlings obtained from irradiated seeds suffered a decrease in length and weight, while growth was not affected in *P. alpina* and *S. vulgaris*, when compared to non-irradiated control. Although profiles of seed antioxidant activity were not influenced immediately after γ -irradiation, subsequent drying under seed bank standards induced changes in seed antioxidant activity, depending on the species. According to EPR data, *C. barbata* and *C. spinosissimum* seeds revealed high free radical levels in non-irradiated samples, which were further enhanced by γ -irradiation. An opposite behaviour was observed in *P. alpina* and *S. vulgaris*. The four alpine species showed different profiles of γ -ray sensitivity. The reported data encourage future research to test inter-specific variability in the plant response to γ -rays based on a multidisciplinary approach which integrates

Download English Version:

<https://daneshyari.com/en/article/5499199>

Download Persian Version:

<https://daneshyari.com/article/5499199>

[Daneshyari.com](https://daneshyari.com)