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*8th
meeting on
medicinal
biotechnology*

BOOK OF
ABSTRACTS

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BOOK OF ABSTRACTS OF THE 8TH MEETING ON MEDICINAL BIOTECHNOLOGY

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Green zero-valent iron in soil remediation and impact on *Raphanus sativus* L. germination, seedling growth and antioxidant system response

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Nano zero-valent iron (nZVI) is the most widely used nanoparticle for remediation in Europe and the USA. Despite this, its impacts on plant growth and soil microbiome are not fully understood [1]. To ensure the sustainable and safe use of this technology, the impacts and mechanisms must be fully elucidated. Here, the phytotoxicity of nZVI synthesized from agrifood wastes (spent coffee grounds and *Cistus ladanifer* L. post-distillation wastes) on radish (*Raphanus sativus* L.) cv. Pharaoh obtained from WerbAna Sp. z o.o. (Warsaw, Poland)) germination and seedling growth was assessed in Petri dishes at concentrations ranging from 5 to 400 mg/L. Next, nZVI (500 mg/kg) were applied for the remediation of soils contaminated with venlafaxine and glyphosate (2 mg/kg). Afterwards,

radish germination and seedling growth on the contaminated and remediated soils was assessed, along with biometric plant growth parameters, chlorophyll content, reactive oxygen species (ROS) and antioxidant system response. The nZVI did not show significant impacts on germination and plant growth, but the levels of ROS (superoxide radical and hydrogen peroxide) and the activity of some antioxidant enzymes (superoxide dismutase and ascorbate peroxidase) was slightly higher, indicating oxidative stress caused by nZVI exposure. Concerning contaminants, glyphosate caused a decrease in chlorophyll content, compared to the control plants. This study helps in understanding the potential impact of nZVI on plant growth after remediation strategies are employed.

KEYWORDS: *nzvi*, oxidative stress, reactive oxygen species

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